THE

Electric Railway Journal.

INDEX TO VOLUME XXXIII.

SCIENTIFIC LIBRARY PATENT OFFICE

January to June, 1909.

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INDEX TO VOLUME XXXIII.

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A

Acceleration of trains:
——Measurement of [Mailloux], *277; Comment, 270
——Plotting speed curves [Farmer], *1131
——Slow vs. fast acceleration, 270
Accident bureau, Philadelphia, 861
Accident claim department:
——Avoiding accidents, Prize essays on, 953
——Co-operation of operating department [Johnson], 98
——Co-operation of operating and legal departments, Discussion, 622
——How to handle accidents [Rippey], 783
——Maintenance department and accident prevention, 1013
——Organization and operation of a claim department [Forbess], 1034
——Philadelphia bulletins [Johnson], 230
——Problem of reducing accident damages [Johnson], 62, 98, 141, 186, 230; Comment, 53, 322; [Carpenter], c339; [Kidd], c382
——Scope of legal and claim departments and their relation to each other [Cooper], 1034
——Shop reports, 377
——"Unreported accident" problem [Johnson], 187

Accident claims:
——Australia [Badger], c475
——Baltimore swindler, 309, 351, 568
——Cleveland, Cost of injuries and damages, 415
——Damage suits [Lawyer], 942
——Fakir in the Southwest [Classen], c111; 443
——New Castle, Pa., swindler, 443
——New York City swindler, 349
Accident releases, 1012
Accident reports posted at car house, Kansas City, 105; Comment, 90

Accidents:
——Avoidance of, on new lines, 761
——Campaign against, Chicago, 1046
——Casualties to electric railway property, Losses from, 898
——Indiana, 1002, 1143
——New York City, 261, 800
——Peculiar, 433 [Gunn], *956
——Pedestrians and their rights, 899
——Reduction of, by use of controller regulators, 550
——South Bend, Ind., 1179
——Trespassing on railway tracks, Indiana, 713, 800
——Wisconsin, 285
Accountants' Association Committee meeting, 247; Comment, 219

Accounting:
——Changing old accounts to the new [Broad], 779
——Conference with Interstate Commission on standard classification, 829
——Depreciation (See Depreciation)
——Diagram of system, Mexico City, 817
——Discount on bonds [Duffy], 556
——Interstate system, Application of, to street and interurban railways [Weeks], 785; Discussion, 832, 1162
——Milwaukee methods, 421
——New York Public Service Commission:
Report, 136
Standard classification, 67
——Ontario, 879
——Park restaurants, Philadelphia, 369
——Rate-making for public utilities [Erickson], 775
——Repair shop (See Repair shop records)
——Shop bookkeeping, 1067
——Stock ledger and time sheet, Novel, *560
——Third Avenue R. R., New York, Record system, 546
——Wisconsin system of accounts, 773, 1076 [Allison], 777
Accounting Conference (See Central Electric)
Accounting department, Organization of [Wright], 1040; Comment, 1009
Ackerman, J. N., 164

Advertising:
——Boston, concerning improved service, 116
——Chicago, Newspaper, 237
——Engineering department methods, 672
——Illinois Traction System, Newspaper, *406
——London station announcements, 149
——Minneapolis history, 82, 102, 149, 205, 254, 291, 480
——Newspapers for historical and other matter, 90
——Newspaper in Detroit, 1142
——(See also Publicity)
Air brakes (See Brakes, Air)
Alarm device on rear dasher (Nichols), *433
Albany, N. Y.:
——Mortgage bond sale of United Traction Co., 799
——Number of passengers in car limited, 854
——Report of United Traction Co., 1059
——Vestibuled cars, 891
Albany & Hudson R. R., Bond issue, 484
Allentown, Pa., Bond issue of Lehigh Valley Transit Co., 663
Alternating-current testing set for repair shops, *101
American Blower Co. and Sirocco Engineering Co. consolidate, 156
American Institute of Electrical Engineers:
——Pittsburgh meeting, 915
——Twenty-fifth anniversary, *514
American Railway Engineering & Maintenance of Way Association:
——Annual convention, 550
——Convention announcement, 338
——Exhibit at Chicago, 518
——Wood preservation report, 506
American Railway Master Mechanics' Association Convention, 1149, 1168
American Society of Hungarian Engineers and Architects, Organization, 286
American Street & Interurban Railway Association:
——Committee meetings, 151, 247, 1167; Comment, 219
——Denver for convention, 558, 791, 807, 830, 873, 911
——Denver convention date, 1067, 1092
——Education committee:
Data sheet, 847
Meeting, 508
Work of, 809
——Employees, Selection and training, Data sheet, 1054
——Future of [Shaw], 56; Comment, 55
——Letter from President Shaw, 794
——Members, New, 113, 206, 255
——Pamphlets on Association work, 648
——Proceedings, 1908, of allied associations, 291
——Topics for discussion at 1909 convention, 290
——Value of the association [Ely], 461; Comment, 451
——Welfare of employees committee, 994
American Street & Interurban Railway Accountants' Association (See Accountants' Association)
American Street & Interurban Railway Claim Agents' Association (See Claim Agents' Association)
American Street & Interurban Railway Engineering Association:
——Committees, 508
——Committee, Joint, on accounts, 652
——Committee on power distribution, Meeting, 948
——Committee on power generation, Meeting, 1075
——Data sheets, 958, 1171
——Letter from President Winsor, 794
American Street & Interurban Railway Manufacturers' Association:
——Banquet, 248
——Executive committee meeting, 913
American Street & Interurban Railway Transportation & Traffic Association:
——Committees, 294
——Committee on training employees, meeting, 665
——Rules for city railways, 1088
——Rules for interurban railways, Criticism requested, 648
——Rules for operation, Approval of commissioners sought, 824
American Telephone & Telegraph Co., Depreciation of property, 881
Anderson, Ind.:
——Benefit Association, 255
——Car, New limited, *249
——Fares, Readjustment of interurban, 1151, 1179
——Industrial locations offered by Indiana Union Traction Co., 327
——Side-door converted open car, *65
Angelo Power & Traction Co., Receivership, 704
Annapolis, "Reawakening," 391
Annunciator in cars, Chicago, *917
Annunciator station, London, 149
Appraisals:
——Consolidated Gas decision, 55
——Knoxville water case, 280; Comment, 270
——Methods of making valuations [Ford, Bacon & Davis], 1123
——Milwaukee Electric Railway & Light Co. [Cooley], 640
——Presidents Roosevelt and Taft quoted, 1122
——Wisconsin Public utilities law [Meyer], 103
——Wisconsin railway property [Pence], 22; Comment, 1
Apprenticeship course in New York, 981; Comment, 971
Ardmore (Pa.) street railway bonds, 704
Argentine Republic Transportation Fair in 1910, 687
Arkansas Association of Public Utility Operators, Annual meeting, 940
Armature coil former for GE—58A motor, *296

Armatures:
——Maintenance, New York, Third Avenue, *333
——Standardization, Brooklyn, 1108
Ash-handling at Michigan City, Ind., power station, 725
Athol & Orange Street Ry., Hearing on fares, 115, 390
Atlantic Shore Line Ry., Corporate control, 162, 484
Auburndale, Mass., Building of park theater, *1152
Aurora, Elgin & Chicago R. R., Parks, *177
Australia, Accident claims [Badger], c 475
Axle for pressing on split gear, *233
Axles:
——Illinois Traction Co., *637
——Straightening, Harrisburg, *604

B

Babylon (N. Y.) R. R., Increase in capital stock, 1140
Bailey, J. W., 164
Ballasting cars, *250, *455, 456
Baltimore:
——Accident fakirs, 309, 351, 568
——Park tax a franchise tax, 297
——Service of company commended, 528
——Switchboard of Pratt Street power station, *762
——Terminal plans under consideration, 1000
——Transfers, 797, 861
——United Railways & Electric Co., Annual report, 797
——Wheels, Removing steel, from axles, 398
Baltimore Terminal Co., Bond sale, 961
Berkshire Street Ry., Bond issue, 750, 852, 925
Berlin (Germany) Street Ry., Annual report, 661
Binghamton, N. Y.:
——Employees' Aid Association, 176
——Park system, *172
Block signal system:
——Cab signals and automatic stops, Report on, 127
——Des Moines, Iowa, *688
——Harrisburg, Pa., *514
——Installations in 1908, 22
——Spokane, Wash., *945
Blocking frogs and beveling guard rail ends, Indiana, *870
Blue Hill Street Ry., Higher fares, 30
Blue print case, *1047
Blue Ridge Traction Co., Officers, 348
Boilers:
——Combination fire and water-tube (Hawkes), *40
——Data of various power stations, 541
——Drafts, Significance of, 71
Bolster on cars of Illinois Traction Co., *636
Bolts, Lock (Brown), *475
Boone (Iowa) Electric Co., Option secured, 961
Boston:
——Advertising improved service, 116
——Annual report of Boston Elevated Ry., 81
——Cambridge subway:
Bids, 745
Design of stations, 760
Hearings, 302, 344, 386, 702
——Car defect records [Lindall], 335
——Car operation, Discussion on, 282
——Chief engineers' meetings, 876
——Coal tests [Randall], 1075
——Consolidation with West End Ry., 81, 114, 750, 798
——Development of transportation facilities, 747
——Edison Company's purchase of suburban plants, 434
——Electrification of steam terminals, Letters to Railroad Commission, 105; Comment, 91
——Financial problems of the elevated railway [Sergeant], 222; Comment, 219
——Fire protection of car houses, 144
——Joint committee of transit and railroad commissions, 999

(Abbreviations: * Illustrated. c Correspondence.)

Boston (Continued):
——New England Investment & Security Co., Trustees, 485
——Painting and varnishing practice, *613
——Power plant extensions, *318
——Protective committee, West End Street Railway, Report, 663
——Public Service Investment Co., Organization, 567
——Publicity campaign, suburban system, 962
——Repair shop practice, 648
——Snow removal, Cost, 959
——Stealing fares, Conductor sentenced, 706
——Taxation methods, 223
——Time saving, Comparison of horse and electric service, 223
——Track maintenance methods, *1047
——Transfers, Increase of, 225
——Transit extensions and changes, Hearing on, 564
——Transportation committee appointed, 706
——Washington Street subway:
Electrical equipment, *936
Ventilation, *780
Boston & Albany R. R., Electrification of Boston terminal [Smith], 105; Comment, 91
Boston & Eastern Electric R. R., Hearing on tunnel project, 564
Boston, Lowell & Lawrence R. R., Hearing, 1172
Boston & Northern and Old Colony Street Railways:
——Automobiles for superintendents, 927
——Bond issue, 1058, 1059, 1177
——Express service, Fall River and Newport, 854
——Fare reduction, Petition dismissed, 891
——Folder design contest, 952
——Transmission system, *1032
——Wages, Report on, 255
Boston Transit Commission, Annual report, 199
Boston & Western Electric R. R., Hearing, 1056
Boston & Worcester Street Ry., Higher fares, 33, 389, 568, 1003
Bow collector vs. pantograph [Varney), c73; [Muralt], c154
Brake-hanger holder, *603
Brake rigging for maximum traction trucks (Brill), *383
Brake shoe heads, Discussion in Newark, 196
Brake shoes:
——Economy in operation, 969
——Harrisburg practice, 604
——Public Service Ry. practice, *505
——(United States Brake Shoe Co.), 477
Brakes:
——Adjustable hand brake (National), *39, *1051
——Comparison of hand-brake and air-brake service on city cars [Miller], 781
——Hydraulic (Barber), *38
——Momentum (M. A. B.), *843
——Report of British Tramway Association, 42
Brakes, Air:
——Improvements [Turner and Dudley], 811
——Leakage, Prevention of, 575
——New York, Third Avenue, Maintenance, *332
Brantford-Hamilton line. (See Canada)
Brazil, Statistics, 410
Bridges:
——Permanent way on [Luten], *549
——Pittsburg 1200-volt line, *92
Bridges for catenary construction:
——Rochester, Syracuse & Eastern R. R., *943
——Syracuse, Lake Shore & Northern R. R., *943
Brill, J. G., Co.:
——Annual report, 345
——Memorial medal, 698
British Columbia Electric Ry., Bonus to employees, 262, 385
Brockton & Plymouth Street Railway, Higher fares, 30
Bronze, Anti-friction (Paulson), 655
Brooklyn:
——Annual meeting of Rapid Transit Co., 259
——Brake equipments, Modifying, 753
——Cars, Classification, equipment and wiring, *1070, *1108
——Dividend, 306, 961
——Employees' Benefit Association, 959
——Express service discontinued, 47
——Fenders, Re-hearing on, 927
——Legal decision in failure of overhead wires, 397
——Lighting system, 600-volt, with grounded circuits, 740
——Passenger traffic, 799
——Poles, Metal reinforcement, *607
——Quarterly report of subsidiary lines, 1057
——Recording pattern movements, *331
——Records, Storage of, 73
——Service order of Public Service Commission, 261
——Standardization of rolling stock:
Car lighting and heating, Changes in, *1157
Classification and power equipment practice, 972, *1070
Details of power equipment and wiring, *1108; Comment, 1106
Brooklyn (Continued):
——Track renewals, Forecasting and recording, 432
Brooklyn City R. R., Holders of securities, 161
Brooklyn & Coney Island R. R.:
——Annual report, 961
——Bond issue, 925
——Fare case, 485
——Holders of securities, 161
Brooklyn Bridge, Turnstiles on, 1179
Brooklyn Heights R. R., Proceedings to penalize, 569
Brush-holder springs of compressor motors, Device for restoring tension [Coleman], *955
Brushes, Carbon:
——(Speer), 296
——Tests, Brooklyn, 1108
Buenos Ayres, Semi-convertible cars, *1023
Buffalo:
——Annual report of International Traction Co., 662
——Fare order, 1179
——Transfer system, New, 391, 1003
Buffalo & Lackawanna Traction Co.:
——Bond issue, 566
——Mortgage, 162
Buffalo & Lake Erie Traction Co.:
——Cars, Interurban, *560
——Lease approved, 663
Bulletin board hints, 1

C

Cairns, L. S., *530
Calgary, Alta, Can., Railway progress, 741
California:
——Legislation, 386
——1200-volt d. c. line, Stockton to Lodi, 738, 844
Calumet & South Chicago Ry. Bond sale, 307
Cambridge (See Boston)
Camden & Suburban Ry., Reorganization, 925, 961
Camden & Trenton Ry., Reorganization, 852
Canada:
——Brantford & Hamilton Electric Ry., *8
——Construction during 1907, 523
——Electrification plans, 999
——Port Arthur municipal railway, 44
——Public Utilities Commission, 1056
——Sunday car question, 151
Capitalization of railway companies, New York Public Service Commissioners' report, 133, 339
Car construction:
——Decisions on alleged negligence, 399
——Progress sheet, Brooklyn, 1114
——Underframe, Illinois Traction Co., *636
Car defects [Lindall], 335
Car design:
——Barber single-truck car, *37
——Café car, *908
——Closed car, Dixon, Ill., *146
——Corridor prepayment car, *740
——Gasoline-electric car, *983
——Illinois Traction Co., *639
——Joliet & Southern Traction Co., *405
——Mexico City, *1017
——Pay-as-you-enter, Third Avenue, New York, *137
——Rapid transit lines and car design, 359
——Side-door cars, New York, *380
——Side-door converted open car, *65
——Steel car, St. Louis, *470
Car doors, Double mechanism, New York, *341
Car house door stop, *602
Car houses:
——Chicago City Ry., *864
——Chicago Rys., Leavitt Street, *623
——Design and operation [Fleming], 1045
——Fire protection (See also Fire protection) 585
——Harrisburg, Pa., *600
——Joplin, Mo., *459
——Roof lighting, Chicago Rys., *623
——Third Avenue, New York, *580
——(See also Pit construction)
Car steps, Height of, Toronto, 1142
Car ventilator, Automatic (Perry), *201
Car weights, Brooklyn, *1070
Car weights and seating capacity [Beeler], 588
Car weights as affecting operating costs [Ayers], 1119
Car window fixtures (Grip Nut Co.), *384
Car window glass, Cylinder vs. coach, 125
Car wiring, Specifications, Third Avenue, New York, 140
Cars, Ballast, Hanover, Pa., *250
Cars, Café, Chicago & Milwaukee Electric R. R. [Smith], *907
Cars, Closed:
——Buffalo & Lake Erie Traction Co., *560
——Chicago, Lake Shore & South Bend Ry., *679
——Dixon, Ill., *146
——Illinois Traction Co., *638
——Joliet & Southern Traction Co., *403
——Joplin & Pittsburg Ry, *459
——London Brighton & South Coast Ry., *411
——Mexico City, *819, *1016
——Oregon Electric Ry., *498
——Pará, Brazil, *410
——Washington, *995
Cars, Combination, Indiana Union Traction, *249
Cars, Convertible, Broad Ripple, Ind., *65
Cars, Decorated, Japan, *14
Cars, Express, Northeastern Ry., England, *609
Cars, Funeral:
——Los Angeles, 568
——Mexico City, *819, *820
Cars, Mono-rail, *75
Cars, Office, Illinois Traction Co., *639
Cars, Parlor, Illinois Traction Co., *639
Cars, Pay-as-you-enter:
——Chicago & Milwaukee R. R., *884
——Convertible, Third Avenue, *828
——Montreal, Rebuilt single-truck cars, *324
——New York, Metropolitan Co., *340
——New York, Third Avenue, 83, 117
——New York, Third Avenue, Combination car, *137
——Pittsburg corridor car, *739
——Washington, D. C., 443
Cars, Pay-within, Philadelphia, 74, *509
Cars, Semi-convertible, Buenos Ayres, *1023
Cars, Semi-open, Shreveport, La., *382
Cars, Side-door:
——Manchuria, *734
——New York subway, 350, *380, *821
——Seattle, Wash., *693
Cars, Sleeping, Illinois Traction Co., *639
Cars, Steel:
——Economies of, 492
——St. Louis, Mo., *469
Cars, Storage battery:
——New York, 714
——Palatinate Rys., 8
Cars ordered in 1908, 20; Comment, 3
Carbondale (Pa.) Railway Consolidation, 209
Catenary construction:
——Chicago, Lake Shore & South Bend Ry., *675
——New Haven road, Wear, 544
——Steel bridges, *943
Central Electric Accounting Conference:
Constitution and by-laws, officers, 472
——Meeting at Columbus, Ohio, 1161
Central Electric Railway Association:
——Address of President F. D. Carpenter, 197
——Annual meeting, 240, 315
——Committees, 292
——March meeting, 632
——June meeting, 1086
Central Electric Traffic Association:
——Annual meeting, 243
——Nominating committee, 46
——Resolutions concerning Indiana Retail Merchants' Association Convention, 83
Central States, New interurban railways in, 16
Champaign, Ill., Freight and passenger terminals, 959
Charlotte, N. C., T-rail in paved streets, *771
Chattanooga (Tenn.) Railways Co., Consolidation with Chattanooga Electric Co., 1058, 1140
Chicago:
——Accidents, Campaign against, 1046
——Annunciator in cars, 6917
——Breakages of welded rails, 100
——Car ventilation tests [Evans, Biehn and Gooken], 876
——Cars, Narrower, 963
——Cicero & Proviso Street Ry., Extension of time for depositing bonds, 114
——Consolidation plans, 527
——Depreciation allowance discussed in Milwaukee case, 502
——Dividend, Extra, 259
——Elevated consolidation, 924, 934, 1002
——Funeral car operating agreement, 800
——Maintenance charges, 642
——Merger of elevated railways, 799
——Newspaper advertising, 237
——Rehabilitation, 386, 522, 788 [Arnold, Fleming, Weston], 1044, [Weston], 1128
——Return from street railways a sinking fund, 480
——Subway plans and report, 113, 562, 1138
——Track reconstruction [Weston], *1154
——Transfer abuse, 26, 197; Comment, 2
——Transfer question, Results of crusade [Sullivan], 430
——Ventilation tests, 97
Chicago City Ry.:
——Annual report, 527
——Car house, *864
——Earnings, 348
——Leases Southern Street Ry., 566
——Wheels, Rolled steel, *379
Chicago Consolidated Traction Co.:
——Assessing bondholders, 888
——Deposit of bonds, 82
——Reorganization committee, 259
Chicago, Lake Shore & South Bend Ry.:
——Accidents, 761, 854, 1179
——Power station at Michigan City, *724; Comment, 714
——Single-phase installation, *674
——Timetable, 110
Chicago, Metropolitan West Side Elevated Ry:
——Annual report, 348
——Oil separator, Home-made, 150
——Painting railway structure, 589
——Reducing power consumption of trains, 1127; Comment, 1105
Chicago & Milwaukee Electric R. R.:
——Car, Café [Smith], *907

Chicago & Milwaukee Electric R. R. (Continued):
——Cars, Pay-on-platform, *884
——Foreclosure proceedings, 307
——Limited trains, Evanston-Milwaukee, *293, *907
——Stock issue, 704
Chicago, Milwaukee & St. Paul R. R. Electrification in Far West, 437
Chicago, Northwestern Elevated R. R.:
——Bond retirement, 307
——Impregnating plant, *283
——Merger plans, 349
Chicago Passenger Ry., Trusteeship, 440
Chicago Railways Co., 162
——Annual report, 749
——Bond sale, 348, 1177
——Car house at Leavitt Street, *622
——Reorganization plans, 82, 286, 344
——Reports, 924, 1176
——Substations at Lill Avenue and at Seventy-fifth Street, *6
——Transfers, Manipulation of, 26; Comment, 2
Chicago South Side Elevated R. R.:
——Annual report, 1176
——Finances [Weston], 12
——Inspection and repair work, 610
Chicago, Southern Street Ry.:
——Appraisal, 307, 345
——Bond issue, 852
Chicago & Southern Traction Co., Officers, 45
Chimney, Rochester power plant, *128
Cincinnati:
——Southwestern Ohio Traction Co.'s plans, 886
——Terminal for interurban lines proposed, 665
——Transfers, Return of unused, 486
——(See also Ohio Electric Ry.)
Cincinnati, Newport & Covington Light & Traction Co., Directors, 566
Circuit breakers:
——Adjustment of, 606
——Condenser-lead (Westinghouse) *1166
——Maintenance, Third Avenue, New York, *333
——Testing [Rolston], 243
Claim Agents' Association, Program, 1171
Claim department (See Accident claim department)
Clamp for drilling cotter-pin holes (Barnes), *1122
Clark, C. H., *569
Classifying and indexing technical matter, 535; [Hemming], 553; 811; [Morse], c841; [Herrick], c842
Clean cars on interurban roads, Possibilities, 1149
Cleaning cars [Rolston], 243
——Cost in Chicago, 612
Cleveland:
——Claims, Report on, 692
——Coal purchases on B. T. U. basis [Crecilius], 378; Discussion, 414
——Cost of injuries and damages, 415
——Examinations in service rules, sight and hearing, *474
——Fares increased, 254
——Interurban roads matters, 692
——Judge Tayler on fares, 157
——Judge Tayler on terms necessary to attract capital, 112
——Monthly report of receivers, 344
——Negotiations for new ordinance, 691
——Operation of railway by receivers, 371; Comment, 358
——Reorganization of Eastern Ohio Traction Co., 798
——Sale of Cleveland and Chagrin Falls division of Eastern Ohio Traction Co., 663
——Service, Good, Effect of, 400
——Situation, 43, 79, 157, 205, 302, 344, 385, 436, 479, 521, 562, 658, 744, 793, 847, 885, 921, 958, 998, 1053, 1093, 1135, 1172
——Statistics of 1907 and 1908 compared, 372
——Subway proposals, 746, 922, 999
——Traction situation [Hungerford], 147
——Transfer, Safeguarding the, 358, 371
Cleveland Lake Shore Electric Ry., Annual report, 439
Cleveland, Painesville & Eastern R. R., Earnings, 388
Cleveland, Southwestern & Columbus Ry. Officers, 209
Coal:
——Purchase on B. T. U. basis in Cleveland [Crecilius], 378; Discussion, 414
——Standard specifications, American Society for Testing Materials, 281
——Tests of coal for hand-fired plants [Randall], 1075
Coal bumpers, Rochester, 128
Coin wrapper (Detroit), *74
Collectors (See Bow collector; Pantograph; Rod collectors)
Columbus, Ohio:
——Cars, Pay-as-you-enter, 752
——Dividend for employees, 308
——Franchise, New, 701
——Franchise to Ohio Electric Ry., 1095, 1137
——Freight station proposal, 665
——Ledger of Ohio & Southern Traction Co., *560
——Terminal station proposed, 891
——Waiting station, Interurban, 701
Columbus Railway & Light Co.:
——Annual report, 258
——Bond sale, 1140
——Officers and directors, 114
Concord, Maynard & Hudson Street Ry., Higher fares, 32
Concrete, Cinder, for track substructure, St. Louis, 334
Concrete blocks, Interlocking, in power station walls, *726
Concrete mixer, Motor-driven (Cement Machinery Co.), *653
Condenser and cooling-tower design and operation [Bump], 1078
Conduit, Electric plows, New York, Third Avenue, Maintenance, *332
Conduit, Underground, Improvements [Way], *1132
Coney Island (See Brooklyn & Coney Island R. R.)
Conklin, L. H., 164
Conneaut & Erie Traction Co., Sale, 1001
Connecticut:
——Legislation, 119, 256, 304, 346, 386, 437, 659, 747, 795, 923, 959, 1000, 1056, 1095, 1138, 1174
——Vestiblue order, 1059
Connecticut Co.:
——Catenary construction, Test, 431
——Parks [Leary], 367
——Standards for overhead construction of 500-volt, d. c. railways, *591; Comment, 576
Connecticut Public Utilities Commission, Proposed, 226
Connecticut Railroad Commissioners, Report, 322
Connecticut Railway & Lighting Co., Reducing accident damages [Johnson], 98
Connecticut Valley Street Ry.:
——Earnings, 29
——Increased fares, 27
Controller circuits, Graphic methods of studying, 89
Controller regulators, Effect on accidents, 550
Controllers:
——New York, Third Avenue, Maintenance, *333
——Standard, in Brooklyn, *1110
Convention reports, Discussion at home, 3
Converting direct current into alternating current for shop testing, *101
Corporations, Government regulation of, Opinion of Judge Gary, 316
Corrosion of iron and steel, Preventing [Perry], 862
Cost keeping (See Accounting)
Costs:
——Car weights as affecting operating costs [Ayres], 1119
——Comparison of, by foremen, 217
——Inspection of equipment, South Side Elevated, 612
——Labor costs in power plants, 536
——Operation of light cars in Denver [Beeler], 588
——Painting elevated railway structure, 589
Couplers:
——Illinois Traction Co., 638
——Janney radial, on car, *679
Creosoting (See Timber preservation)
Current collectors (See Bow collector; Pantograph; Rod collector)
Curtains in car vestibules, Committee report, 618
Curtis Motor Truck Co., Plant at Decatur, Ill., 434

D

Damages. (See Accident claim department)
Danbury & Harlem Traction Co., Sale of, 209
Danielson, Ind., Blue Ridge Traction Co., Sale, 484
Davenport, Ia., Tri-City Railway & Light Co., Capital increase, 114
Davies, H. J., 961
Dayton & Xenia Transit Co., Financial troubles, 114, 566, 888, 925
Dedham & Franklin Street Ry., Fare increase, 928
Delaware, Legislation, 480
Delaware & Hudson Co., 259
——Annual report, 708
——Bond issue denied, 114
Denton (Tex.) Interurban Railway & Power Co., Sale, 1001, 1177
Denver, Costs of operating light cars [Beeler], 588
Denver City Tramway, 307
——Annual report, 440
——Bonds, 704
——Reorganization, 527
Depreciation:
——Accounting for small companies [Claflin], 1079
——American Telephone & Telegraph Co., 881
——Computation of annual, 504
——Elements of [Cooley], 468
——Maltbie on, 68
——Milwaukee. (See Milwaukee)
——New York subway [Arnold], 375
——Table presented in Milwaukee fare case, 685
Des Moines, Ia.:
——Block signal system, *688
——Franchise case decision, 1055
Destination signs, Discussion in New York, 199
Detroit:
——Annual report of United Railway, 305
——Appraisal of railway property, 303
——Car repair records, *66
——Franchise committee, Attitude of Detroit Company, 385
——Franchise question, 522
——Investigation of street railways, 578, 696, 923, 949
——Low-fare ordinance suit, 159
——Mayor on street railways, 255
——Milk rates, 148
——Newspaper advertising, 1142
——Service in, compared with British cities, 696
——Traction committee, 346
——Transfers, Verbal, Legal decision, 577
Detroit River tunnel, Electric locomotive, *1125; Comment, 1106
Diagrams, Use of, in studying controller circuits, 89
Disinfectant: Palustrol (Adams), 655
Dispatching systems:
——New Bedford & Onset Street Ry., *341
——Signal and dispatching system (Simmen), Toronto, *1080
——Transmitting train orders by telephone, Practice of various roads, 1117; Comment, 1107
District of Columbia:
——Commission, Proposed, 44
——Regulation of public utilities, 309
——(See also Washington, D. C.)
Dixon, Ill., Cars, *146
Drafts in steam boiler practice, 71
Dubuque, Iowa, Union Park, *360; Comment, 357
Duluth, Folder describing cities, 1142
Dummies for railway tests, Cost of, New York, 163

E

Eastern Pennsylvania Rys., Annual report, 258
Easton & Bethlehem Transit Co., Freight service, 1099
Easton (Pa.) Transit Co., Consolidation, 349
Egerton Tramway Co., Purchases, 961, 1001
Employees:
——Accidents, Rivalry lessens, Kansas City, 105; Comment, 90
——Aid Association, Binghamton, N. Y., 176
——Application for employment (letter), 72
——Auditor's office, Chart of duties, 1041
——Benefit association, 80
——Benefit association, Anderson, Ind., 255
——Bonus to, British Columbia, 385
——Bulletins issued to trainmen, Philadelphia, 230
——Club rooms in car house, Chicago, *864
——Club rooms, Third Avenue R. R., New York, 746
——Conductor and motorman exchangeable, Sheboygan, 273
——Courtesy bulletin, Spokane, 442
——Department of, Middleton, N. Y., 46
——Discharged employees [Funk], c 791; [Levinson], c 916; [Pagel], c 916; 956; Comment, 898
——Discipline discussed, 633
——Encouraging motormen to save power, Chicago elevated, 1105, 1127
——Examination [Carson], 627
——Examination in service rules, sight and hearing, Cleveland, *474
——Examination of trainmen, Lake Shore Electric Ry., 398
——Graphic methods of studying controller circuits, 89
——Hint cards for conductors and motormen, Milwaukee, *1082
——Instruction in accident work [Johnson], 62, 98, 141, 186, 230; Comment, 53; 322, [Carpenter], c 339
——Meetings of repair shop employees, Value of, 492
——Merit system, Newburgh, N. Y., 262
——Monthly meetings, Discussion of convention reports, 3
——Piece-work rates, Third Avenue R. R., New York, 903
——Piece-work system [Gohen], 1042; Discussion at C. E. R. A., 1086
——Premiums in Sheboygan, 274
——Preparing shop employees for the witness stand, 933
——Protecting shopmen at work under cars, 825
——Relations with manager, 626
——Selection and training, Data sheet, 1054
——Stockholders of company, Spokane, Wash., 303
——Terms of service arbitrated, Scranton, Pa., 1060
——Time-keeping and pay rolls and best method of paying employees [Rogers], 1164; Discussion, 1163
——Training school for, Kansas City, 155
——Traveling master mechanic, Newark, 399
England, North-Eastern Ry., Express car, *609
Erie R. R., Results of single-phase operation, 1106, *1115
Evansville, Ind., Injunction against boycott, 1178
Express. (See Freight and express)

(Abbreviations: * Illustrated. c Correspondence.)

F

Fare boxes, Prepayment cars (Recording), *516
Fares:
——City fares [Winter], 390
——Cleveland, Increase, 254
——Cleveland, Judge Tayler's letters, 157
——Connecticut Valley Street Railway, Increase, 27, 29
——Distributing fare increases, Decision of Mass. R. R. Com., 315
——Half-fares for school children, Manchester, Eng., 239
——Massachusetts Commission on, 70
(See also Massachusetts)
——Mexico City, 819
——Michigan United Rys., Revision, 854
——Milwaukee case (See Milwaukee)
——Reasonable return on the investment [Weston], 12
——Redeemable cash fare receipts, *742
——School fares on Staten Island, 47, 117
——School rates in New York, 262
——Sheboygan, Wis., 272, 275
——Uniform fares, German experience, 697
——Workingmen's tickets, Athol & Orange Street Ry., 115
Farm lore and railroading, 935
Feed-water heater, Closed (Goubert), *1050
Fence posts, Concrete, 505
Fender tests, New York Public Service Commission:
——Hearing of street railway companies, 287, 337, 428, 1093, 1141; Comment, 269
——Report, 233; Comment, 220
Fenders:
——Brooklyn, Re-hearing on, 927
——New York City, Order concerning, 889
Filing clippings (See classifying and indexing)
Financial:
——Boston Elevated Ry., 81
——Connecticut report, 322
——Connecticut Valley Street Railway, Earnings of, 29
——Earnings in Greater New York, 1001
——Earnings and expenses, Milwaukee, 766
——German street railways, 62
——Massachusetts, Commissioners' report, 70
——Operation statistics, Boston, 1888-1908, 224
——Raising local money to build railway, 404
——Reasonable return on the investment [Weston], 12
——Receiverships of 1908, 17
——Wisconsin railway appraisal [Pence], 22; Comment, 1
Fire insurance, Proposed central rating bureau, 827, 1012
Fire protection:
——Car houses, 144, 585
——Electric railway properties, 426
——Hose house, Illinois Traction Co., *722
Flanges, Car wheel, Reduction of height, 1150
Fond du Lac & Oshkosh Railway, Roadway signs, *599
Fonda, Johnstown & Gloversville R. R., Stock issue, 162, 349, 484, 705
Formulas, Electric railway, 54, 104
Ft. Wayne & Springfield Ry.:
——Annual report, 306
——Semi-annual dividend, 349
Ft. Wayne & Wabash Valley Traction Co.:
——Annual meeting, 567
——Bond issue, 484
——Limited service, 890
——Spy Run power house, Operating features [Kehoe], 1084, 1086
France:
——Railway statistics, 1050
——Street railways in 1905, 334
Franchises:
——Des Moines case, 1055
——Detroit matters, 522
——Limited, perpetual and indeterminate, Maltbie report, 452
——New York City [Wilcox], 970
Freight and express:
——Brooklyn, Discontinuance, 47
——Eastern & Bethlehem Transit Co., 1099
——Indianapolis and Garrett, Ind., Fast train, 1143
——Milford, Mass., 117
——Neglecting passenger for freight service, 451
——Ohio interurban railways, 928
——Pittsfield, Mass., 261
——Sheboygan, Wis., 275
——Springfield & Eastern Street Ry., 854
——Steam and electric railway interchange in Kentucky, 441
——Steam and electric roads, Toledo, Ohio, 753
Freight stations:
——New Bedford, Mass., *879
——Oregon Electric Ry., *497
Fritch, L. C., 309
Fuel (See Coal)
Fuse box (G.E.MA-13), *202

G

Gainesville (Ga.) Electric Ry., Sale, 82, 162, 484, 925, 1097, 1177
Gas engines:
——Power station design, *543
Gas engines (Continued):
——Report of N. E. L. A., 1079
Gas-producer engine plants for small central stations [Head], 982; Discussion, 985
Gas rates, New York City, Legal decision, 55
Gasoline-electric car (G. E.), *983
Gasoline motor cars:
——Interest in, 897
——Progress in (McKeen), 473
——(Stover Motor Car Co.), *910
——Union Pacific R. R., *252
Gear and pinion records, Brooklyn, 1074
Gears:
——Device for automatic disconnection (H. & H.), *201
——Maintenance, Third Avenue, New York, *333
——Pressing on split gears, Toledo, *233
——Standard, Brooklyn, *1109
General Electric Co., Annual report, 850
Generalized vs. specialized knowledge, 577
Generators, Performance specifications and rating [Waters], 1078
Georgia Railway & Electric Co.:
——Annual meeting and report, 259, 483
——Bond issue, 852, 925
Germany, Earnings, 62
Gibbs, W. A., 84
Glasgow, Comparison with Milwaukee, 555
Globe, Guarded waterproof (Bissell), *957
Gonzenbach, Ernest, *212
Goodrich, C. G., *529
Governors, Recommendations of, to State Legislatures, 107, 152, 237; Comment, 269
Grade crossings, Construction at, Report of Maintenance of Way Association, 552
Great Britain:
——Comparison of railway service with American, 555, 696
——Railway depression, 715
Great Northern R. R., Three-phase locomotive, 545
Greenfield, Mass., Connecticut Valley Street Ry., Hearing on bond bill, 439
Greensboro (N. C.) Electric Co., Sale, 307
Grinders:
——Motor-driven traveling head (Diamond), *383
——Rail corrugation, Philadelphia, *649, 700
Grounds for lightning arresters (E. S. S.), *792
——(Delta), *655
——Hygroscopic (Lord), *1134
Grout mixing machine, St. Louis, *323
Guard rail and lantern holder (McCarthy), *884

H

Hamilton (Ont.) Radial Electric Ry., Improvements, *559
Hangers, Sanitary, in New York subway cars, *883
Hanover, Pa., Ballast cars, *250
Harrisburg, Pa.:
——Block signals, *514
——Central Pennsylvania Traction Co., 440, 1177
——Line car, *944
——Paxtang Park, *184
——Power station records, 343
——Repair shop practice, *600
——Storage battery input and output, Ratio between, *431
Havana (Cuba) Electric Ry. earnings, 925
Haverhill & Southern New Hampshire Street Ry., Fare case, 350
Headlight rack, Dixon, Ill., *942
Headlights:
——City cars (T. S. Co.), *917
——Luminous arc [Culver], 198; Discussion, 240
Heating of cars:
——Brooklyn, *1157
——Cost of [Evans, Biehn and Gooken], 876; [Smith], c916
Heavy electric traction:
——Discussion by New York Railroad Club, 544; Comment, 537
——Smoke prevention and electrification [Gibbs], 673
Hield, W. J., *530
High-tension, direct-current, Pittsburg, Harmony, Butler & New Castle Ry. [Hewett], *92
Hoist, High-speed chain (Chisholm & Moore), *478
Honecker, J. G., 84
Honolulu Rapid Transit & Land Co., Annual report, 1058
Hood, J. M., Jr., 118
Hudson Valley Ry., Stop signal, *619
Hungarian railways, Statistics for 1907, 613

I

Idaho, Legislation, 238
Illinois:
——Legislation, 237, 346, 386, 747
——Statistics of surface and elevated railways, 690
Illinois Central R. R., Electrification, 346, 701
Illinois Traction Co.:
——Committees to assist manager, 316
——Increase of preferred stock, 259
——Maintenance, organization, traffic and extensions, *716
——Newspaper advertising, *406
——Shops and equipment maintenance, *635
——Ten-day comparative statement, 909
——Traffic agreement with Rock Island-Frisco lines, 927
Impregnating plant, Chicago, *283
Indexing, (See Classifying and indexing)
Indiana:
——Accidents, 1002, 1143
——Accidents due to trespass on railway tracks, 713, 800
——Employees, Rules governing, 664
——Legislation, 153, 160, 256, 304, 346, 386, 437, 524
——Paving decision, 218
——Steam roads must interchange passenger traffic with electric roads, 1180
——Switch stands and signal lights, Circular on, 801
Indiana & Michigan Electric Co., Power plant at Berrien Springs, Mich., 373
Indiana Railroad Commission:
——Annual report, 1121
——Blocking frogs and beveling guard rail ends, Circular, *870
——Constitutional body, 746
——Test of authority by steam road, 46
Indiana Union Traction Co. (See Anderson, Ind.)
Indianapolis, Terminal track elevation proposed, 848
Indianapolis & Cincinnati Traction Co., Annual meeting, 307
Indianapolis, Columbus & Southern Ry.:
——Line car, *880
——Trip of special car, 752
——Wood-preserving plant [Nelson], *631
Indianapolis, New Castle & Toledo Ry., Receivership, 567, 663, 798
Inspection in Boston, 283
Inspection of equipment, Proper [Rolston], 243; Discussion, 241
Inspection records, Chicago, South Side Elevated, 610
Inspection of rolling stock [Raber], 782; Discussion, 834
——Indiana, Railroad Commission, 665
Insulators:
——Connecticut Company, *596
——High-tension (Steinberger), *41
——High-tension, Swedish tests, *59
——Pittsburg 1200-volt line, *95
Interstate Commerce Commission, Report on cab signals and automatic stops, 127
Interurban railways of the Central States, New, Map, 16
Investments, Distant railway, 1011
Investments, Return on:
——Consolidated Gas decision, 55
——Discussion at Boston, 424
——Growth of communities as affected by corporations, 945
——Knoxville water case, 280; Comment, 270
——New York subway, Arnold report, 374; Comment, 481
——Reasonable return on the investment [Weston], 12; [Montgomery], c 1133
Iowa, Legislation, 152, 747, 795
Iowa Street & Interuban Railway Association, Convention, 831
Italy:
——Electrification of railways, 825
——Single-phase railway, 58

J

Jacks:
——Forged steel hydraulic (Duff), *515
——Track jack for third-rail lines (Barrett), *654
Jackson, Mich., Fare revision, 854
Japan:
——Decorated cars, *14
——Receptions to American sailors and merchants, *14
——Statistics, 367
Johnson, H. A., 47
Joliet & Southern Traction Co., Extensions, *402
Jones, P. N., *392
Joplin & Pittsburg Ry.:
——Construction details, *454
——Purchase, 389
Journal bearing, Two-part (Paragon), *843
Journals, Maintenance, Third Avenue, New York, *333

K

Kalamazoo, Mich., Fare readjustment, 568
Kansas, Legislation, 153, 207, 386, 438, 524
Kansas City, Mo.:
——Accident reports posted at car house, 105; Comment, 90
——Car window glass experience, 125
——Investigation of railway, 659
——Power station improvements, 239
——Training school for employees, 155

Kansas City, Olathe, Ottawa & Iola Ry., Construction notes, 71
Kenosha (Wis.) Electric Ry., Control of, 114, 307
Kentucky, Freight interchange between steam and electric railways, 441
Kingston (N. Y.) Consolidated R. R., Control, 1097
Knoxville water decision, 280; Comment, 270

L

Lamps:
——Arc, for 25-cycle circuits (G. E.), *656
——Incandescent (Clark), 655
——Signal, Flat flame (Adams & Westlake), *700
Lantern holder, *884
Las Vegas Ry. & Power Co., Sale, 750, 852
Lawrence & Methuen Street Ry.:
——Fare increases, Distributing, 315, 350
——Hearing on fares, 260
Legal:
——Accident after alighting, 423
——Accident releases, 1012
——Accidents to pedestrians, 899
——Boycott, Injunction against, made permanent, 1178
——Car construction, Decisions on alleged negligence, 399
——Condemnation of land for private purposes, 5
——Consolidated Gas case, New York City, 55
——Freight interchange, steam and electric, Kentucky decision, 441
——Knoxville water case, 280; Comment, 270
——Overhead wires, Responsibility for failure of, 397
——Paving decision in Indiana, 218
——Receiverships, Decisions in New York [Lake], 417
——Round-trip fare no precedent for intermediate fare, Indiana, 262
——Scenic railway passenger injuries, 204
——Telephone wires falling on trolley wires, 760
——Transfers, Philadelphia, 262
——Transfers, Verbal, 577
Legal department, Scope of, and relation to claim department [Cooper], 1034
Legal notes:
——Charters, franchises and ordinances, 78, 300, 918
——Miscellaneous, 919
——Negligence, 76, 299
Legislation affecting public utilities in various states, 862
Legislation affecting public utility corporations, Recommendations of Governors, 107, 152, 237; Comment, 269
Legislation affecting railways, 119, 160, 207, 256, 304, 346, 386, 437, 480, 524, 564, 659, 703, 747, 795, 849, 887, 923, 950, 959, 1000, 1056, 1095, 1138, 1174
Lehigh Valley Transit Co.:
——Annual meeting, 209
——Bond issue, 1058
Lewiston, Augusta & Waterville Street Ry., Water power, 325
Lewiston & Reedsville Electric Ry., Purchase, 961
Lexington, Ky., Service and improvements, 391
Lexington (Ky.) & Interurban Ry., Extension, 1058
Lighting car houses and shops, 4, 55
Lighting cars, Brooklyn, *1157
Lighting service from railway circuits [Kelsay], *244; Discussion, 242; Comment, 317
Lightning arresters:
——Ground-plates (See Grounds)
——Installing, Connecticut Co., *598
——Installing, Hints on, 433
——Multi-path (Gifford), *434
——Multi-vapo-gap (Lord), *957
Lightning phenomena [Creighton], 548
Lima & Toledo Ry., Maumee bridge [Luten], *540
Lincoln (Neb.) Traction Co., Organization, 389
Line car (See Work car)
Little Rock, Ark, Traffic diagram [Hegarty], *416
Little Rock Railway & Electric Co., Dividend, 45
Liverpool Corporation Tramways, Annual report, 925
Liverpool & Southport Ry., Performance of electrical equipment [Aspinall], 946
Load factor, Relation of, to power costs [Howlett, Waring and Lloyd], 469
Lockport, N. Y., International railway freight interchange, 1059
Locomotives, Electric:
——Detroit River tunnel, *1125; Comment, 1106
——Freight, N. Y., N. H. & H. R. R., 1168
——Oregon Electric Ry., *497
——Penn. R. R., 884
——Side-rod, *874; Comment, 863
——South America, *617
London:
——Letters from, 42, 253, 435, 657, 846, 1052
London (Continued):
——Metropolitan District Railway half-yearly meeting, 658
——Subway construction costs, 358
——Subway system, A. H. Stanley on, 149
London, Brighton & South Coast Ry., Cars on single-phase division, *411
London, Ontario:
——Annual report, 307, 661
——Receiver for Southwestern Traction Co., 705
Long Island R. R., Electrification plans, 795
Los Angeles, Cal.:
——Funeral car, 568
——Pacific Electric Ry., Tariffs for interstate traffic, 391
Louisville, Ky., Cars, Pay-as-you-enter, 962
Louisville (Ky.) Ry., Bond sale, 567, 705
Louisville & Eastern R. R., Purchase of construction notes, 389, 1177
Lowell & Fitchburg Street Ry., Fare reduction, 1003, 1099
Lowry, Thomas, *310
Lubrication of journals and gears, Discussion in Newark, 197
Lynchburg Traction & Light Company's Employees' Benefit Association, 80

M

McLimont, A. W., *444
Macon Railway & Light Co.:
——Control, 45
——Officers, 485
Magazines, The, and street railway improvements, 400
Mail boxes on trolley cars, Wilmington, Del., *823
Mail carriers, Transportation of, in various cities of U. S., 295
Maine, Legislation, 387, 481
Maintenance and depreciation charges, 1175
Maintenance department and accident prevention, 1013
Maintenance of rolling stock [Raber], 782; Discussion, 834
——Brooklyn, 972, *1070, 1106, *1108, *1157
——Cost, Marion, Ind., 829
——Records and forms, Brooklyn, *972
——Third Avenue R. R., New York, 332; Comment, 316
——Traveling master mechanic, Newark, 399
Maintenance-of-way records, Illinois Traction Co., 719
Manager's car, Illinois Traction Co., *639
Manchester, England, Half-fares for school children, 239
Manchuria, Side-door cars, *734
Manila, Carnival posters, *628
Manistee Light & Traction Co., Receivership, 162, 389
Mansfield (Ohio) Railway, Light & Power Co., Receivership, 705
——Banquet, 248
——Executive committee meeting, 913
Maps:
——Boston subway and elevated lines, 936
——Brantford & Hamilton Electric Ry., 8
——Chicago, Lake Shore & South Bend Ry., 674
——Illinois Traction System, 716
——Interurban railways in Central States, 16
——Joliet & Southern Traction Co., 402
——Joplin & Pittsburg Ry., 454
——Mexico City, 812
——Pittsburg, Harmony, Butler & New Castle Ry., 92
——Rome, Italy, 232
——Sheboygan, Wis., 272
Marion, Ind., Cost of rolling stock maintenance, 829
Martin, T. Commerford, Presentation to, *514
Maryland Electric Co., Bond subscription, 567
Maryland State Cabinet to consider public utilities matters, 1094
Massachusetts:
——Dividend-earning roads, 305
——Excise tax, Hearing on proposed abolition, 440
——Higher fares:
Connecticut Valley St. Ry., 27
Lawrence & Methuen Street Ry., 260
Oak Bluffs Street Ry. [Stewart], c 251
Various roads, 30, 53, 106, c 111; Comment, 90
——Legislation, 119, 160, 207, 256, 304, 347, 387, 438, 524, 660, 703, 748, 795, 849, 887, 923, 950, 1000, 1138
Massachusetts Electric Companies, Sale of stock, 209
Massachusetts Railroad Commission:
——Annual report, 70, 105
——Capitalization of roads, Attitude of commission, 339
——Hearing on Easthampton service, 162
——Hearing on Lawrence & Methuen Street Ry. fares, 260
——Hearing on Northampton 6-cent fares, 210
——Hearing on West Roxbury service, 309
——Report on control of street railways by steam lines, 228
Massachusetts Street Railway Association, Meetings, 147, 325, 563, 848
Master Car Builders' Association Convention, 1149, 1168
Mattoon (Ill.) City Ry.:
——Decrease of capital stock, 45
——Receiver discharged, 82
Meadville & Conneaut Lake Traction Co., Receivers, 926
Meadville (Pa.) Traction Co., 1097
Medfield & Medway Street Ry., Fare increase, 928
Melbourne electrification deferred, 237
Mercer, Howard Pennington, 349
Mexico Tramways:
——Constructional and operating features of tramway, *1014; Comment, 1011
——Directors, 45
——Organization and traffic of tramway system, *812
——Proposed extensions, 82
——Stockholders' meetings, 209
Miami (Fla.) Electric Ry., Sale, 798
Miami & Erie Canal Transportation Co., 45
Michigan, Legislation, 238, 256, 387
Michigan United Rys., 259
Middlesex & Boston Street Ry., Stock issue, 926
Middletown, N. Y., Department of employees, 46
Mileage records as a gage of shop efficiency, 970, 972
Milford, Attleboro & Woonsocket Street Ry., Freight service, 117
Milk rates, Detroit, 148
Milwaukee, Wis.:
——A.c lines changed to d.c. operation, 460
——Appraisal [Cooley], 640
——Bond issue, 1177
——Earnings and expenses, 766
——Expenses for operation, renewals and depreciation, 955
——Fare case:
Hearings, 419, 464, 499, 554, 640, 683, 729, 766, 955; Comment, 452, 536
Report by Dickinson, Wilmont & Sterrett, 683
Testimony of Beggs, 419, 464; Cooley, 466, 640; Davidson, 502, 769; Duffy, 499, 554, 766, 771; Marr, 501; Olds, 557, 732; Pence, 464; Rau, 503, 733; Simmons, 729; Starrett, 503
——Hint cards for conductors and motormen, *1082
——Limited train to Evanston, Ill., *293
——Power consumption of cars, 729, 823
——Valuation of street railway property [Pence], 23
Mineral Wells (Tex.) Electric system, Sale, 798
Minneapolis, Minn.:
——Advice to passengers, 854
——Annual report of Twin City Rapid Transit Co., 851
——Cast welding, *424
——Commutation rates, Legality of, 117
——History of Twin City Rapid Transit Co., 149, 205, 254, 291, 480
——Newspaper advertisements covering history of railway, 82, 102
——Power generating system and records, *1024
——Power station equipment, 845
——Request that city discontinue suit, 480, 523, 564
——Snow plow, *284
——Traffic circulars, 963
——Trolley pick-up, *276
Minnesota:
——Legislation, 238, 256, 304, 481, 703, 959
——Valuation of steam roads, 303
Missouri, Legislation, 152, 238, 257, 481, 564, 748, 923, 960
Missouri electrical convention, 792
Missouri Water, Light & Traction Co., Sale, 1097
Mohawk Valley Co., Reorganization plans, 45
Mono-railroad, Tunis, proposed, in New York City, *75
Montana, Legislation, 238
Montgomery (Ala.) Traction Co., Reduction of capital, 307
Montoursville (Pa.) Passenger Ry.:
——Control of, 750
——Option on Passenger Railway, 567
Montreal, Cars, Rebuilding for pay-as-you-enter service, *324
Motor tipping device for throwing out of gear (Herath & Hultman), *201
Motors, Electric:
——Brush-holder tension and commutator troubles, 575
——Detroit River tunnel locomotive, *1127
——Flashing of, Prevention, 171
——Lubrication and efficiency, 491
——Maintenance of field coils, 1151
——Mechanical failures, Preventing, 126
——Performance specifications and rating [Waters], 1078
——Single-phase industrial (Wagner), *516
——Specifications, Brooklyn, 1072
——1200-volt (GE-205), 738, 844
Mount Vernon, N. Y., Sale of North Mount Vernon R. R., 751
Munger, E. T., 47
Municipal ownership [Du Pont], 697
Musical instruments on cars, Committee report, 618

(Abbreviations: * Illustrated. c Correspondence.)

N

Nashville, Prize essays on how to avoid accidents, 953
Nashville Railway & Light Co. Earnings, 704
National Association of Railway Commissioners, Committee on construction and operating expense, accounts, 132
National Electric Light Association, Convention proceedings, 1078
National Railway Training Association, Kansas City, 155
Nebraska, Legislation, 239, 748
Neff, S. S., 310
New Bedford, Electric express station, *879
New Bedford & Onset Street Ry., Dispatching signal system, *341
New Canaan line (See New York, New Haven & Hartford R. R.)
New England electric lines, Through trips on, 569, 799
New England Investment & Securities:
——Directors elected, 45
——Separation from New Haven road, 750, 798
New England Railroad Club, Address by N. W. Storer, 159
New England Street Railway Club:
——Annual meeting, 616
——Co-operation with Am. St. & Int. Ry. Assoc., 159
——Meetings, 335, 922
New Hampshire, Legislation, 257, 387
New Hampshire Electric Rys., Restoration of 5-cent fare unit, 962
New Jersey, Legislation, 160, 257, 481, 524, 564, 660, 748, 795
New Jersey & Hudson River Ry., Folder, 1179
New Jersey & Pennsylvania Traction Co. (See Trenton)
New Jersey Public Service Ry. (See Newark, N. J.)
New Orleans, Paving question, 346
New Orleans Railway & Light Co.:
——Annual report, 888
——Bond issue, 1058
——Financial plans, 1002
——Officers, 798
——Purchase of bonds, 389
New York Central R. R., Notes [Katte], 545
New York Central Electric Power Association, 746
New York City:
——Accidents, 261, 800
——American Cities Railway & Light Co., dividend, 1176
——American Light & Traction Co., Dividend matters, 662
——Brooklyn Bridge rush hour service, 391
——Central Crosstown R. R., Notes, 852, 888
——Cent. Pk., No. & E. Riv. R. R., Joint rates with Third Avenue R. R., 34
——City Island Ry:
Bond issue, 750
Monorail system, 746
——Earnings of railways, 1001
——Fender order, 889
——Franchise assessments, 388, 704
——Franchises, Standard form of [Wilcox], 970
——Fulton Street Ry., Suit to annual franchise, 116
——Gas rates, Legal decision, 55
——Hudson & Manhattan R. R.:
Bond issue, 389
Condemnation of private property, Legal decision, 5
Directors increased, 926
Extensions in New York City, 346, 701, 745, 848
Separate cars for women, 665, 671, 705, 752, 807, c 843, 928
Stockholders, Largest, 889
Subway plan, Hearing on, 479, 493
Tunnel headings meet, 255
——Interborough Metropolitan, Suit of Continental Securities Co., 45
——Interborough Rapid Transit:
Annual meeting, 161
Annual report, 258
Bond issue, 1177
Holders of securities, 161
Publicity campaign, 747, 922
Quarterly report, 484, 1057
Sanitary precautions, 116
Statistics [Hedley], 424
Subway:
Construction costs, 358
Earnings and operation, Shonts on, 705
Express trains go to Brooklyn in rush hours, 443
Recommendations of Public Service Commission, 158
Return on the investment, Report by B. J. Arnold, 374; Comment, 401
Sanitary hangers, *883
Separate cars for women, Hearings, 308, 671, 853
Side-door cars, Design of, 808
Side-door cars, Discussion by Frank Hedley, 698
Side-door cars, Discussion by President Shonts, 699
Side-door cars, Experimental, 350, *380, *821
New York City:
——Interborough Rapid Transit:
Subway (Continued):
Side-door cars, Hearings, 432, 569, 664, 753, 822, 880, 913
Signs, Car destination, Hearings on, 199
Stations, Lengthening of, 702
Traffic, Arnold report, *188, 189; Comment, 169
Subway plans, New, 479, 493, 520
Ticket swindle, 568
Traffic record, 46
——Investigation, Hearings by Public Service Commission on joint rates and through routes, 34
——Manhattan Ry., Holders of securities, 161
——Metropolitan Securities Co., Suit settled, 746
——Metropolitan Street Ry.:
Apprenticeship course, 981; Comment, 971
Bond deposit, 307
Cars, New standard, *340
Cars, Pay-as-you-enter, 890
Dividend passed, 750
Eighth Street line operation, Letters of receivers and Commission, 108
Failure, Causes for, 1175
Foreclosure proceedings, 208, 259, 566, 662, 926, 1001
Sale of certificates, 1140
Service inquiry by Public Service Commission, 163, 391
Service orders, 351
Suit against Securities Co., 1058
Wheel guards, *997, 1002
——Monorail system, *75, 745
——N. Y. City Ry.:
Annual report, 749
Holders of securities, 161
——Public Service Commission:
Annual report, 133, 158, 339
Appeal of transfer decision, 117
Attendance of Receivers, Regarding, 308
Cost of dummies for railway tests, 163
Eighth Street line, Concerning operation of, 109
Electrification of New Haven road, Commission disclaims jurisdiction, 159
Fender and wheel guard hearings, 287, 337, 428, 1093, 1141; Comment, 269
Fender and wheelguard tests, Report on 283; Comment, 220
Fender test costs, 308
Hearings on car destination signs, 199
Hearings on rates (See above, Investigation)
Report by M. R. Maltbie on accounting, 67
Rules regarding filing of reports, 443
Service law upheld, 523
Side-door car hearing, 432, 569, 664, 753, 822, 880, 913
Standard classification, 67
Steinway tunnel purchase, 79, 206
Subway commissioners, 746, 795
Work accomplished by [Osborne], 326
——Rapid transit conditions:
Costs, 493
Notes, 921, 999, 1053, 1094
Report by Chamber of Commerce, 462
——Second Avenue, Legal matters, 799
——Spitting, Crusade against, 351
——Steinway tunnel proposition, 79, 206
——Street railway receivership decisions [Lake], 417
——Subway proposals, 563, 658
——Taxes uncollected, 1068
——Third Avenue:
Bulletin on use of tact, 443
Car house and shops, *580
Cars, Convertible pay-as-you-enter, *828, 928
Cars, Pay-as-you-enter, 83, 117, *137, 962
Certificates issued for purchase of cars, 485
Club rooms for employees, 746
Correspondence between Receiver and Commission, 336
Crosstown lines, Self-propelled cars for, 706
Earnings increase, 852
Joint rates with Cent. Pk., No. & E. River R. R., 34
Piece-work rates, 903
Record system, 546
Reduction of equipment failures and maintenance cost, 332; Comment, 316
Reorganization, 1097
Report for 3 months, 926
Sale, 961
Storage battery cars, Trial, 714
Suit for damages, 794
Wheel-turning record, 413
Whitridge on ambulance chasers, 163
——Ticket sales on subway and elevated, Statistics, 1098; Comment, 1068
——Traffic charts and exhibits, 890
——Traffic records—relief and historical charts, *979
——Transportation problem. By Judge Gaynor, 808
New York & Harlem R. R., Dividend on street railway property passed, 567
New York, New Haven & Hartford R. R.:
——Collectors [Varney], c 73; [Murray], c 74; [Muralt], c 154
——Contract for use of Grand Central terminal, 256
——Decision against road, in trolley holding case, 483
——Electrification [Murray], Discussion, 810, *838
——Electrification plans, 702, 922
——Electrification of Boston terminal [Mellen], 105; Comment, 91
——Electrification, Public Service Commission disclaims jurisdiction, 159
——Locomotives, Electric freight, 1168
——New Canaan branch, Change from d. c. to a. c. operation, *900; Comment, 897
——Notes [Murray], 544
——Replies to Massachusetts Legislature concerning holdings, 348
——Stock purchases, 485, 750
——(See also Connecticut Co.)
New York Railroad Club:
——Electrification committee, 1131
——Electrification problem, Discussion of, 544; Comment, 537
New York State:
——Ambulance chasers, Bill in Legislature, 163
——Capitalization of roads, Decisions of Public Service Commission, 134, 339
——Condemnation of land for private purposes, Legal note 5
——Legislation, 119, 160, 163, 207, 257, 304, 347, 438, 481, 524, 564, 660, 703, 748, 796, 849, 887, 960, 1056
——Public Service Commission:
Annual report, 133, 339
Freight interchange at Lockport, N. Y., Hearing, 1059
Rails, Broken, Request for information concerning, 159
Rules governing employees and operation asked for, 82
Standard classification, 67
Work accomplished by Commission [Osborne], 326
New York State Rys., 307
——Folder, 1180
——Increase in capital stock, 1140
——Organization, 259, 662
New York Street Railway Association, Meetings, 424, *618
Newark, N. J.:
——Brake shoe practice, *505
——Convertible notes of Public Service Corporation, 799
——Public Service Ry., Discussion of convention reports, 3
——Publicity campaign, 683
——Shop Foremen's Association, Meetings, 196, 377
——Traveling master mechanic, 399
——Wage scale, Uniform, 1143
Newport News & Old Point Railway & Electric Co., Receivership, 307, 349, 485, 527
Newspaper vending machine, Chicago, 255
Newspapers (See Advertising)
Newport News & Old Point Railway & Electric Co., 1177
Newton Street Ry., Transfer charge, 34, 53, 359
Niagara ice jam and the Gorge Railroad, 793, *824, 1054
Norfolk & Portsmouth Traction Co.:
——Annual report, 1096
——Bond sale, 961
——Officers, 663
Norris, H. H., 707
North American Co., Annual report, 798
North Carolina Public Service Co., Plans, 926
Northampton Street Ry.:
——Fares, 6-cent, 116, 210, 442
——Traffic statistics, 162
Northern Ohio Traction & Light Co.:
——Annual meeting and report, 209, 306
——Notes, 705
Northwestern Electrical Association, Annual meeting, 200
Nut, Wedge lock (Brach), *41

O

Ogden (Utah) Rapid Transit Co., Bond issue, 114
Ohio:
——Express business on interurban roads, 928
——Fare, Special excursion, 665
——Legislation, 119, 207, 257, 304, 347, 387, 438, 481, 525, 565, 748
——Statistics of interurban roads, 204
Ohio Electric Ry.:
——Annual report, 441
——Franchise ordinance at Columbus, 1095, 1137
——Limited service, 528, 753, 854
——Reduces limited schedule, 568
Ohio Railroad Commission:
——Asks for schedules, 891
——Distance and rate order rescinded, 962
Oil engines, Experience in Calcutta, 1068
Oil fuel, Rochester, N. Y., 129
Oil house, Design of fireproof, *553
Oil separator, Home-made, Chicago, 150

Old Colony Ry. (See Boston & Northern)
Omaha, History of railway, 256, 789
Ontario:
——Accounting, Uniformity in, 879
——Fare reduction, 928
——Legislation, 304, 960
——110,000-volt transmission line, 430
Ontario Railway & Municipal Board, Finding by, 442
Operation of electric railways, Economies in small [Carson], 625
Oregon Electric Ry. system, *494
Organization diagram, Sheboygan, Wis., 272
Oswego Traction Co. sold to City Traction Co., 566
Ottawa (Ont.) Electric Ry., Annual report, 441
Overhead construction:
——Connecticut Co.'s standards for 500-volt, d.c. railways, *591; Comment, 576
——European practice in high-tension current collection, *59
——Joplin & Pittsburg Ry., *457
——London, Brighton & South Coast Ry., *839
——New Canaan branch line, *900
——Oregon Electric Ry., *497
——Pick-up at Minneapolis, *276
——Pittsburg 1200-volt line [Hewett], *95
——Span protectors, High-tension, drop-out (Central Electric), *476
——(See also Catenary construction)

P

Pacific Claim Agents' Association, Organization, 1043
Paint:
——Anti-corrosion and insulating (Eldo), 476
——Mixing, 315
Paint mixing plant, Boston, *615
Painting:
——Canvas, Device for painting, Boston, *616
——Elevated railway structure, Chicago, Method and cost, 589
Painting cars:
——Boston Elevated Ry., *613
——Harrisburg, *605
——Renovating old cars, Costs, 125, 463
——Standardizing, 1009
——Testing durability of paint, 126
——Third Avenue, New York, 140
Pantographs:
——Contact shoe, Wear of, abroad, 61
——European practice, Swedish tests, *61
——Vs. bow collector [Varney], c 73; [Muralt], c 154
Pará, Brazil, Railway and lighting system, *407
Parks and pleasure resorts:
——Agencies for amusements, 204
——Amusements, 170
Boats, Steel (Michigan), *384
Card printing machine (U. V. M. Co.), *382
Helter-skelter (Thompson), *202
Racing dips (Ingersoll), *203
Scales, Talking (U. V. M. Co.), *382
Swings, Circle (Traver), 202
——Aurora, Elgin & Chicago R. R., *177
——Binghamton, N. Y., *172
——Buildings, 170
——Connecticut Co.'s parks [Leary], 367
——Dubuque, Iowa, Union Park, *360; Comment, 357
——Grand Rapids, Holland & Chicago Ry., 179
——Harrisburg, Pa., Paxtang Park, *184
——Location, Failure in, 171
——Norumbega, Building theater, *1152
——Philadelphia, Cost keeping and accounting at Willow Grove Park, 369
——Portland, Oregon, *180
——San Bernardino, Cal., *182
——Sayre, Pa., Keystone Park, *183
——Seattle, Wash., *366
——Sheboygan, Wis., 275
——Spokane, Wash. [Flagg], *364
——Theater, Building of, in eight days, *1152
——Theater building, Dubuque, Iowa, *362
——Transportation problem, 170
Patents, Statistics, 369
Pattern movements in shops, Recording, Brooklyn, 331
Pavement, Brick, between rails, *772
Paving decision in Indiana, 218
Pay rolls and best method of paying employees [Rogers], 1164; Discussion, 1163
Peekskill Lighting & Railroad Co., Improvements in operation, 371
Pennsylvania, Legislation, 257, 304, 347, 438, 481, 525, 565, 660, 703, 849, 923
Pennsylvania R. R., Electric locomotives, 884
Pennsylvania Railroad Commission, Annual report, 159, 1050
Pennsylvania Street Railway Association, 304
Philadelphia:
——Accident bureau, 861
——Accident instruction [Johnson], 62, 98, 141, 186, 230; Comment, 53; 322, [Carpenter], 339
——Accident prevention, Prizes for suggestions, 1180
——Accidents, Reduction in unreported, 187
——American Railways Co., Purchase of Interstate Railways gold bonds, 566
Philadelphia: (Continued)
——Banquet of employees, 437
——Bulletins issued to trainmen, 230
——Cars, Pay-within, 74, *509
——Depreciation, Committee report on, 701
——Fare complaint dismissed, 568
——Interstate Rys., 889
Protective committee, 441, 484
Railways controlled by, 68
Reorganization, 307
Reports, 209, 798
Specifications for special work, *68
——Painting cars, Cost of, 463
——Rail corrugation grinder, *649, 700
——Storeroom practice, 650
——Strike, 1049, 1087
——Tickets abandoned, 882, 914
——Transfer abuse, Report by committee, 663
——Transfer decision, 262
——Transit situation, 1000, 1094
——United Power & Transportation Co., Receivers for Southwestern Street Ry., 114
——Wage increase, 956
——Willow Grove Park, Accounting methods, 369
Philadelphia Co.:
——Annual report, 926
——Bond issue, 1002
Philadelphia, Bristol & Trenton Street Ry., Receivership and sale, 705, 1059
Philadelphia, Coatesville & Lancaster Passenger Ry.:
——Reorganization, 567
——Sale, 82
Piece-work system [Gohen], 1042
Pinion puller, Portable (A. G. E.), *742
Piping:
——Rochester power plant, *132
——Size of steam pipes, 217
Pit construction:
——Harrisburg, Pa., *600
——Illinois Traction System, *636
——Third Avenue car house, 6582
Pittsburg, Pa.:
——Car, Corridor prepayment, *739
——Magazine criticism, 400
——Reinforcing wooden poles, *646
——Stone & Webster report on conditions, 528, 889
——Traffic conditions to be reported on, 211
——Traffic suit, 753
Pittsburg, Harmony, Butler & New Castle Ry., Construction details [Hewett], *92
Pittsfield, Mass., Freight service, 261
Platform of St. Louis steel car, *471
Pleasantville, N. Y., Atlantic & Suburban Ry., Organization, 704
Pole-straightening device, San Francisco [Foster], *227
Poles:
——Destruction by insects, 1130
——Metal, Reinforcing, *607
——Poles and pole setting, Connecticut Co., *591
——Protection sleeve (Pittsburg), *845
——Reinforced (Pittsburg), *700
——Seamless steel (G.E.), 298
——Sectional steel (Sciple), *654
——Wooden, Reinforcing, Pittsburg, *646
Port Jervis Electric Light, Power, Gas & R. R. Co., 209, 259
Portland, Ore.:
——Oregon Electric Ry. system, *494
——Park property, *180
Portland Railway, Light & Power Co., Issue of notes, 799
Power consumption of cars:
——Milwaukee tests, 729, 823
——Opportunities for reducing, 4
——Reducing, Chicago elevated, 1105, 1127
Power service from railway circuits [Kelsay], *244; Discussion, 242; Comment, 317
Power station log frame, Minneapolis, 414
Power station practice:
——Cleanliness, Importance of, 713
——Economical operation, 935
Power station records:
——Graphical records, Minneapolis, 1025
——Harrisburg, 343
Power stations:
——Boston, Improvements, *318
——Design and date of various stations, *538
——Kansas City, Improvements, 239
——Labor costs, 536
——Michigan City, Ind., *724; Comment, 714
——Minneapolis, 845, *1024
——Pará, Brazil, *408
——Rochester, N. Y., *128, *328
——Sheboygan, Wis., *273, 274
——Spy Run, Ind., Operating features [Kehoe], 1084, 1086
——(See also Substations)
Power transmission, 110,000-volt, Ontario, 430
Prejudice, Overthrow of [Newton], 870
Prussian State Rys., Power consumption test, 765
Public morality and street railways [Whitridge], 397
Public relations, Overthrow of prejudice [Newton], 870
Public service corporations, Attitude of public toward [Hedley], 424
Public utilities, Recommendations of Governors to Legislatures, 107
Publicity:
——Announcement of plans by engineering department, 672
Publicity: (Continued)
——Newspaper advertising, 90, 683
——(See also Advertising)
Purchasing agent, Duties of [Carson], 625

Q

Quebec Railway, Light & Power Co.:
——Annual report, 161
——Control, 889

R

Rail corrugation grinder, Philadelphia, *649, 700
Rail deflectometer, Chicago, *1155
Rail fastenings, Chicago, *1155
Rail joints:
——Cast welding, Minneapolis, *424
——Continuous (R. J. Co.), *477
——Electrically welded, Experience in Chicago, 100
Rail saw grinding machine, Boston, *1048
Rail welding (See Thermit rail welding)
Rails:
——Broken, in New York state, 159
——T-rail exhibit at St. Louis, 102
——T-rail in paved streets, Charlotte, N. C., *771
——T-rails, Joliet & Southern Traction Co., *403
Railway curves, Easement, 759
Rate regulation:
——Consolidated Gas decision, 55
——Knoxville water case, 280; Comment, 270
Reasonable return on the investment (See Investments)
Receivers, Legal duties of [Lake], 417
Receiverships of 1908, 17
Records (See Power station records; Repair shop records)
Rensselaer, N. Y., Fare complaint, 665
Repair shop practice:
——Boston Elevated Ry., 648
——Coil impregnating practice, Binghamton, N. Y., 175
——Comparison of costs by foremen, 217
——Harrisburg, Pa., *600
——Motor locations, 90
——Paint, Mixing, 315
——Recording pattern movements in Brooklyn, *331
——Specialists in the shops, 316
——Store room, Philadelphia, 650
——Wheels, Removing steel, from axles, Baltimore, 398
Repair shop records:
——Chicago, South Side Elevated, 610
——Detroit, *66
——Pull-in records, 576
——Shop accounts, Joint data sheet on, Accountants' and Engineering Associations, 886
——Third Avenue R. R., New York, 546
——Value of, as legal evidence, 453
Repair shops:
——Binghamton, N. Y., *174
——Chicago, Lake Shore & South Bend Ry., *680
——Illinois Traction System, *635
——Mexico City, *1019
——Third Avenue R. R., New York, *580
Rhode Island:
——Freight revenue, 933
——Legislation, 796
Rhode Island Co., Separation from New Haven road, 209, 751
Richmond Railway & Power Co., 1177
Richmond, Va., Exit from front of car, 262
Ricker, C. W., 263
Ride, Length of, in different cities, 555
Rio de Janeiro Tramway, Light & Power Co., Increase of capital stock, 751, 926
Roanoke Railway & Electric Co., 1177
Rochester, N. Y.:
——Consolidation of railways, 485
——Power stations, *128, *328
——Stop signal, *619
Rochester, Corning & Elmira Traction Co., Bond issue, 45
Rochester Railway & Light Co., Bond issue, 45
Rochester, Syracuse & Eastern R. R., Overhead construction, 655, *943
Rockford & Interurban Ry., Sale, 1002
Rockland, South Thomaston & Owl's Head Ry., 1177
Rod collectors, European practice. Swedish tests, *60
Rolling stock ordered in 1908, 20; Comment, 3
Rome (Ga.) Railway & Light Co., Bond issue, 441
Rome, Italy, Proposed improvements, *232
Rules for city railways, Revision, 1088
Rules for interurban railways:
——Operating rules [Du Bois], 835; Discussion, 831
——Revision of rules, Conference at Washington, 957, 988, 1010, 1069
Rutland Railway Light & Power Co., Electrification matters, 999

S

St. Louis, Mo.:
——Annual report of United Rys., 526
——Beggs, J. I., resigns presidency, 259
——Bond issue of United Rys., 926
——Cars, steel, *469
——Cinder concrete in track construction, 334
——Directors, New, 259
——Grout mixing machine, *323
——Improvements, 346
——Officers of United Rys., 567
——Passenger traffic, 116
——Payment on gold notes, 751
——Stop order, 443
——Traffic folder, East St. Louis, 1142
——T-rail track exhibit, 102
Salem, Mass., Hearing on fares, 663
Salt Lake & Ogden Ry.:
——Bond issue, 567
——Electrification, 255, 285
San Angelo, Tex., Sale of Angelo Power & Traction Co., 1140
San Bernardino Valley Traction Co., Parks, *182
San Francisco:
——Annual report of United Railways Investment Co., 1096
——Calhoun trial, 1149, 1173
——Dividend declared, 349
——Merchants' report on railways, 891
——Pole-straightening device [Foster], *227
——Purchase of Stanislaus Power Co., 441, 799, 1059
——Stock issue of United Railways Investment Co., 961
Sanitary recommendations to railway companies, 1075
Sapulpa, Okla., Improvements, 1133
Sault Ste. Marie, Lake Superior Corporation, Control of, 82
Saw, Portable hack (M. S. W.), *845
Schedules, Preparing, from traffic curves [Hegarty], *416
Schenectady Ry.:
——Change in fares, 391
——Hearings on fares and service, 664, 671, 826
School fares:
——New York, 262
——Staten Island, 47, 117
Scranton, Pa.:
——Arbitration of wages, 1060, 1141, 1178
——Bond issue, 926
Seattle, Wash.:
——Handling of exposition traffic, *693
——Parks, *366
——Track construction, Concrete girder, *590
——Transfers not given on transfers, 1099, 1105
Seattle, Renton & Southern Ry., Trucks, *997
Seeley, G. T., 486
Sheboygan, Wis.:
——Development of road, *272
——Free rides for school children, 262
Sheboygan Light, Power & Railway Co. publish "Suburban Outlook," 928
Shelburne Falls & Colrain Street Ry., 1177
Shelter station, Reinforced concrete, *720
Short cuts in railway engineering, 54, 104
Shovel, Electric power:
——Cost record, *156
——Hamilton, Ont., *9
Shreveport, La., Semi-open cars, *382
Signals:
——Block signal installations in 1908, 22
——Cab signals and automatic stops, 127
——Car signal system (Ohio Brass Co.) *1166
——Des Moines, Ia., Block system, *688
——Dispatching signal system of New Bedford & Onset Street Ry., *341
——Harrisburg, Pa., Block system, *514
——Illinois Traction Co., *721
——Interurban cars, Signaling at way stations, Report on, *618
——Signal and dispatching system (Simmen), *1080
——Spokane, Wash., Block system, *945
——Stop signal, Hudson Valley Ry., *619
——Stop signal with semaphore arm, Rochester, *619
Signs:
——Destination signs, Discussion in New York, 199
——Electric, London subway, 150
——Right-of-way, Illinois Traction Co., *721
——Roadway, Fond du Lac & Oshkosh Ry., *599
Single-phase railways discussed at New York Railroad Club, 544
Single-phase railways, Switzerland, 15-cycle, 232
Sinking fund, Duffy testimony, 554
Smoke prevention and electrification [Gibbs], 673
Snow plows:
——Minneapolis, *284
——(Russell), *679
Snow removal:
——Boston, Cost, 959
——Detroit, Cost, 949, 969
Solder, tinol, 995
South Africa, Municipal railway system of Durban, 1043
South Bend, Ind., Michigan Electric Co., Power plant, 373
South Carolina, Legislation, 482
Southwestern Electrical and Gas Association:
——Convention, 985
——Question box, Abstract of, 1037
Specifications:
——Car wiring, Third Avenue, 140
——Metal painting in Chicago, 625
——Motors, Brooklyn, 1072
——Roof slabs of car houses, 623
——Special work, Interstate Railways, *68
Speed (See Acceleration of trains)
Sleet brush, Brooklyn, *1112
Spokane, Wash.:
——Block signal system, *945
——Employees as stockholders, 303
——Employees urged to be courteous, 442
——Parks [Flagg], *364
——Parlor car service on Inland Empire System, 706
Spokane & Inland Empire R. R.:
——Fruit special train, 753, *790
——Good roads prizes, 746
Spring, E. C., 1100
Springfield, Mass.:
——Employees' tickets, 351
——Hearing on service, 391
Springfield (Mass.) & Eastern Ry., Freight rights granted, 706
Sprinkling tracks, Cost, Detroit, 949, 969
Stamford, Conn., New York & Stamford Ry., Bond issue, 485
Standardization and old forms and methods, 759
Standardization of rolling stock, Brooklyn, 972, *1070, 1106, *1108, *1157
Standardization of trucks, Indifference to [Weston], 250
Stanley, A. H., on London subway system, 149
Staten Island, School fares, 47, 117
Statistics:
——Brazil, 410
——Brooklyn car mileage, 1903-1909, 972
——Canada, Electric railway construction, 523
——Car on special trip, 752
——Census report on electric railways, 1902, 1907, 147; Comment, 126
——Cleveland railway operation, 372
——Cost of rolling stock maintenance, Marion, Ind., 829
——France, 1905, 334
——Freight revenue in Rhode Island, 933
——French railways, 1050
——Hungarian railways, 613
——Illinois surface and elevated railways, 690
——Injuries and damages, cost of, Cleveland, 415
——Japan, 367
——Massachusetts, 70
——Milwaukee Electric Railway & Light Co., 501
(See also Milwaukee)
——New York subway, Return on investment, Arnold report, 374
——Ohio interurban roads, 204
——Operation of light cars in Denver [Beeler], 588
——Operating expenses, Milwaukee, 955
——Passenger traffic in Brooklyn, 799
——Passenger traffic in New York City, 890
——Patents, 369
——Power stations, *539
——Rolling stock ordered in 1908, 20; Comment, 3
——Snow and ice removal, Detroit, 949
——Sprinkling tracks, Detroit, 949
——Subway costs in London and New York, 358
——Taxation in Detroit, 949
——Ten-day comparative statement, Illinois Traction System, 909
——Ticket sales in New York City, 1068, 1098
——Track construction in 1908, 18; Comment, 2
——Traffic, New York subway, Arnold report, 188
——Traffic records, New York, 979
Steam consumption of reciprocating engine, low- and high-pressure turbines, 1036
Steam railroads:
——Control of electric lines, Report, Massachusetts, 228
——Interchange passenger traffic, 1180
Stephens, B. R., 1144
Stine, H. M., 351
Storage batteries:
——Automatic load regulation on traction systems [Laas], 836
——Finding ratio between input and output, Harrisburg, *431
——Regulating system (Westinghouse), *297
Storage-battery cars:
——Palatinate Rys., 8
——Third Avenue, New York, 714
Store room keeper, Duties of [Carson], 626
Store room practice:
——Philadelphia, 650
——Supplies, Keeping stock low, 358
Storm losses, Inquiry by Wisconsin Railroad Commission, 303
Substations:
——Asbury, Mo., *457, *458
——Binghamton Ry., *175
——Brantford & Hamilton Electric Ry., 10
——Chicago, Lake Shore & South Bend Ry., *677
——Chicago Railways Co., *6
——Mexico City, *1014
——Oregon Electric Ry., *496
Substations: (Continued)
——Pittsburg 1200-volt line, 93, *96
——Portable, Mexico City, *1017
——Rochester Railway & Light Co., 128, *328
Summer traffic season, 1105
Sunbury, Pa., Barber car, *37
Sunday service:
——Canada, 151
——Winona Interurban Ry., 261, 443, 568
Surface contact systems in England, 657
Susquehanna Railway, Light, Heat & Power Co., 259
Swedish Electric Railway Test Commission, Results of tests, *59
Switch rod, Adjustable (Buda), *792
Switch, Tongue and spring locking device (Lorain), *996
Switchboard:
——Pratt St. power station, Baltimore, *762
——Support for, in Chicago Railways substation, *8
Switching system, Electric, Washington, D. C., *735
Switzerland:
——Electrification of Spiez-Frutigen Ry., 232
——Single-phase railway, 58
Syracuse, N. Y., Fare reduction, Temporary, 486
Syracuse, Lake Shore & Northern R. R., Overhead construction, *943
Syracuse & Suburban R. R., Organization, 162

T

Tacoma, Wash., Bond issue of Pacific Traction Co., 1097
Tarrytown, White Plains & Mamaroneck Ry., Receivership, 162
Taunton & Pawtucket Street Ry., 349
——Higher fares, 32
Taxation of profits, 1150, 1175
Technical papers, Size of, 577
Telephone booth, Illinois Traction Co., *722
Telephone dispatching of trains. (See Dispatching systems)
Telephone wires falling on trolley wires, 760
Terminal stations:
——Hamilton, Ont., 11
——Joliet, Ill., *403
Testing set for shops, Alternating-current, *101
Tests, Trolley wire efficiency [Woods], 195
Texas, Belton & Temple Traction Co., increases fare, 706
Texas, Legislation, 304
Theater, Building of, in park, in eight days, *1152
Thermit rail welding, Success of, Union Ry., New York, 654
Third-rail:
——Feeder connections, Washington Street subway, *937
——Signal contact maker (U. S. E. S. Co.), *653
——Working conductors, Standard location for, 987
Third-rail shoe, Standard, Brooklyn, *1112
Ticket swindle in New York, 568
Tickets:
——Employees', Springfield, Mass., 351
——Employees' strip ticket, Brisbane, Aus. [Badger], c*1133
——Mexico City, *816
——Philadelphia, 882, 914
Tie plating device, Boston, *1048
Ties:
——Report, Maintenance of Way Association, 551
——Steel, Calculation of theoretical section [Tilton], 412
——Steel, Hamilton, Ont., *559
——Timber handling and preservation, 576
——(See also Timber preservation)
Timber, Ultimate and safe working stresses for various kinds of, 552
Timber preservation:
——Amount of preservative used in 1908, 915
——Creosoting in Louisiana, 433
——Forest Service methods and results [Nelson], *628
——Life of treated and untreated poles and ties, 629
——Report, Am. Ry. Eng. & M. of W. Assoc., 506
Toledo, Ohio:
——Franchise controversy [Lang], 672
——Limited service with Fort Wayne, 665
——Pressing on split gears, *233
——Transfer extension, 443
——Union depot, 528
Toledo Railways & Light Co.:
——Annual meeting, 209
——Payment of bonds, 1097
——Stockholders' committee, 799, 889
Toledo & Western Ry., Freight agreement with steam roads, 753
Toronto, Height of steps, 1142
Toronto (Ont.) Ry., Dividend increased, 307
Toronto & York Radial Ry., Signal and dispatching system (Simmen), *1080
Tower wagons:
——Mexico City, *1014
——Swing platform, for pole painting, Harrisburg, *602

Track construction:
——Charlotte, N. C., T-rail, *771
——Chicago, Lake Shore & South Bend Ry., *674
——Chicago reconstruction [Weston], *1154
——Cinder concrete, St. Louis, 334
——Concrete girder, Seattle, *590
——Hamilton, Ont., *559
——Joliet & Southern Traction Co., *403
——Milwaukee, History, 729
——Oregon Electric Ry., *494
——Pará, Brazil, *407
——Recommendations, Maintenance of Way Association, 550
——Solid roadbed on bridges [Luten], *549
——Special work specifications, *69
——Statistics for 1908, 18; Comment, 2
Track maintenance, Boston, *1047
Track renewals, Forecasting and recording, Brooklyn, 432
Track testing instrument, Penn. R. R., *738
Traffic diagrams as a basis for schedule [Hegarty], *416
Traffic promotion:
——Developments in traffic [Walker], 835; Discussion, 833
——Interurban lines [Cheney], 786; Discussion, 833
——Profitable traffic [Gonzenbach], 951
T-rails. (See Rails)
Train resistance, Liverpool & Southport Ry., 947
Transfers:
——Abuse of, Chicago, 26, 197; Comment, 2
——Age and sex indicated, Waverly, N. Y., *336
——Boston, Increase, 225
——Checking, Methods of, New York State, 621
——Chicago crusade, Results of [Sullivan], 430
——Extra charge, Newton Street Ry., 34, 53, 359
——Fractional fare ticket, 340
——"Generous system" in United States, 808
——Massachusetts commission on abuse of, 70, 89
——Metropolitan Street Railway, New York, 1175
——No transfer on a transfer, Seattle, 1099, 1105
——Philadelphia, 262
——Reduction of average fares, 797, 861
——Use and abuse [Griffith], 941
——Use and abuse, Discussion, New York State meeting, 619
——Verbal transfers, Michigan decision, 577
Transportation service reports [Carson], 627
Trenton, N. J.:
——Fare between Trenton and Yardley 963
——Fare increase, 443
——Reorganization, 114
Trolley base, Roller and ball-bearing (T. S. Co.), *957
Trolley catcher, short-pull (Lord), *1165
Trolley ears, Connecticut Company, *598
Trolley frogs, Wearing plates for (E. S. S.), 1051
Trolley guard, Automatic (A. T. G.), *743
Trolley harp, Standard, Brooklyn, *1111
Trolley pick-up, Minneapolis, *276
Trolley poles. (See Poles)
Trolley stands:
——(Fixer), *39
——Standard, Brooklyn, *1110
Trolley switch, Automatic (Rymco), 1087
Trolley wire:
——Copper, Factors determining efficiency [Woods], 195
——Standards of Connecticut Company, *595
Trolley wheels, Standard, Brooklyn, *1111
Trucks:
——Barber car, *38
——Plate frame motor truck (American), *1165
——Seattle, Renton & Southern Ry., *997
——Standards, Indianapolis to [Weston], c 250
——With non-parallel axles (Warner), 700
Turbines, Steam:
——Data of various stations, 540
——Exhaust, Chicago discussion, 922
——Low-pressure [Lege], 1036

U

Union Pacific R. R., Gasoline motor car, *252
Utah, Legislation, 238, 387, 565, 748
Utica & Mohawk Valley Ry., Lease of power plants, 82

V

Valuation. (See Appraisal of railway property)
Varnish, Insulating (Dolph), 478
Ventilation of cars, Tests in Chicago [Evans, Biehn and Gooken], 97, 876
Ventilation of Washington Street tunnel, Boston, *780
Ventilator, Car (G. R. S. Co.), *656
Vermont, Legislation, 154, 207
Vermont Public Service Commission, 304
Vestibule order in Connecticut, 1059
Vincennes (Ind.) Traction & Light Co., 799
Virginia Passenger & Power Co.:
——Reorganization, 1002
——Sale, 485, 799, 926
——Virginia Railway & Power Co., 1140, 1177

W

Waiting stations:
——Gary, Ind., *681, *682
——Illinois Traction Co., *720
——Oregon Electric Ry., *497
Washington:
——Legislation, 239
——Public service commission recommended by Governor, 380
Washington, D. C.:
——Annual report of Capital Traction Co., 388
——Cars, Pay-as-you-enter, 443, 751, 1003
——Report of H. C. Eddy on railway conditions, 115
——(See also District of Columbia)
Washington, Baltimore & Annapolis Ry.:
——Cars, New, *995
——Commutation rates, 753
——Interest delayed, 926
——Terminal bonds, 527
Water power:
——Berrien Springs, Mich., 373
——Drawbacks of hydro-electric service, 934
——Main developments, 325
——Rochester, N. Y., *128
Waupaca Electric Light & Ry. Co., Officers, 307
Waverly, N. Y., Transfers, *336
Waverly, Sayre & Athens Traction Co., Park, *183
Weber, H. L., 887
Weight classification of cars, Brooklyn, 1070
Welding (See Thermit rail welding)
West India Electric Co. Earnings, 663
West Virginia, Legislation, 153
Westchester Electric R. R.:
——Excursion service, 569
——Receivership, 1097
Western Massachusetts Street Ry., Higher fares, 33
Western New York & Pennsylvania Traction Co., Mortgage issue, 307
Wheelguard tests, New York Public Service Commission:
——Hearing of street railway companies, 287, 337, 428, 1093; Comment, 269
——Report, 233; Comment, 220
Wheel guards, Metropolitan Railway, New York, *997, 1002
Wheel records, Following up, 969
Wheel-turning record in shops of Third Avenue R. R., 413
Wheels:
——Flanges, Reducing height of, 1150
——Removing steel wheels, Baltimore, 398
——Rolled steel, Chicago City Ry., *379
——Solid steel and steel-tired, Illinois Traction Co., *638
——Steel-tired, Mileage of, *830
Wilmington, Del., Mail boxes on cars, *823
Winnipeg (Man.) Electric Street Ry.:
——Annual meeting, 389
——Negotiations for sale of, 159
——Stock issue, 567
Winona Interurban Ry.:
——Sunday service, 261, 443, 568
——Tariff field, 801
Wire (See Trolley wire)
Wiring of cars, Standard, Brooklyn, *1113, *1157
Wisconsin:
——Accounting system, New, 773, 1076; [Allison], 777
——Interurban railways, 432
——Legislation, 237, 482, 748
——Losses from casualties, 898
——Valuation of electric railway property [Pence], 22; Comment, 1
Wisconsin Electric Ry., Reorganization plan, 961
Wisconsin public utilities law [Meyer], 103
Wisconsin Railroad Commission:
——Annual report, 285
——Milwaukee fare case (See Milwaukee)
Wisconsin Society of Engineers, Organization, 385, 436
Wisconsin Traction, Light, Heat & Power Co., Excursions, 47
Work cars:
——Central Pennsylvania Traction Co., *944
——Indianapolis, *880
——Platform car for erecting Catenary trolley, *457
——Sheboygan, Wis., *274
Wright, W. D., *666

Y

Yazoo City, Miss., Operation by city, 43
Yonkers R. R.:
——Receiver, 162
——Reconstruction, 926
Youngstown, Ohio, Mahoning & Shenango Railway & Light Co.:
——Earnings, 567
——Officers and directors, 389
——Reported sale, 259

AUTHOR INDEX

A

Adams, W. L. Increase of fares, c 111
Allison, George. Practical application of the new Wisconsin accounting system, 777

B

Badger, J. S. Accident claims in Australia, c 475
——Strip tickets at Brisbane, c*1133
Beeler, J. A. Advantages and costs of operating light cars in Denver, 588
Biehn, J. F. Car ventilation tests, 876
Broad, B. G. Methods of changing the old accounts to the new, 779

C

Carpenter, E. C. Problem of reducing accident damages, c 339
Carpenter, F. D. Address, 197
Carson, W. A. Little things in connection with operation, 625
Cheney, C. M. Development of traffic on interurban lines, 786
Classen, A. H. Accident faking in the Southwest, c 111
Coleman, G. M. Restoring tension to brush-holder springs of compressor motors, *955
Cooper, H. S. Scope of legal and claim departments and their relation to each other, 1034
Culver, W. S. Luminous arc headlight, 198

D

Du Bois, J. A. Operating rules for interurban railways, 835

E

Ely, W. C. Are we getting our money's worth in the Association? 461
Erickson, Halford. Rate-making for public utilities, 775
Evans, W. A. Car ventilation experiments, 876

F

Farmer, Thoms J. New method of plotting speed curves, 1131
Flagg, C. E. Parks served by the Inland Empire system of Spokane, *364
Fleming, H. B. Car house design and operation, 1045
Forbess, W. C. Organization and operation of a claim department, 1034
Foster, S. L. How bent iron side poles were straightened, *227
Funk, J. T. Discharged employees, c 791

G

Gohen, J. A. Piece work system, 1042
Gonzenbach, Ernest. Promoting profitable traffic, 951
Gooken, J. B. Car ventilation tests, 876
Griffith, C. J. Use and abuse of transfers, 941
Gunn, R. T. Peculiar accident, c*956

H

Hathaway, E. C. Transportation of mail carriers, c 295
Head, W. B. Producer gas plants for small central stations, 982

(Abbreviations: * Illustrated. c Correspondence.)

Hegarty, D. A. Preparing schedules from traffic curves, *416
Herrick, A. B. Methods of classifying clippings from technical papers, c 842
Hewett, J. R. Pittsburg, Harmony, Butler & New Castle Ry., *92

J

Johnson, F. W. Problem of reducing accident damages, 62, 98, 141, 186, 230

K

Kehve, M. J. Operating features of the Spy Run power house, 1084
Kelsay, G. H. Practicability of light and power from electric railway transmission circuits, *244
Kenyon, O. A. Swedish electric railway tests, *50
Kidd, F. H. W. Problem of reducing accidents, c 382

L

Laas, F. W. Automatic load regulation on traction systems by storage batteries, 836
Lake, H. C. Street railway receivership decisions in New York, 417
Leary, M. J. Parks of the Connecticut Company, 367
Lege, F. M., Jr. Low-pressure turbines, 1036
Levinson, L. M. Discharged employees, c 916
Luten, D. B. Permanent way on bridges, *549

M

M'Aloney, W. H. Trailer operation, 588
Meyer, B. H. Wisconsin public utilities law, 103
Miller, F. D. Brakes, 781
Montgomery, F. W. Return on the investment in public utilities, c 1133
Morse, J. R. Methods of classifying clippings from technical papers, c 841
Muralt, C. L. de. Bow collectors vs. pantograph, c 154
Murray, W. S. Current collectors, c 74

N

Nelson, J. M. Preservative treatment of timbers used by electric traction companies, 628
Newton, H. S. Overthrow of prejudice, 870

O

Osborne, T. M. The New York Public Service Commissions, 326

P

Pagel, H. J. Discharged employees, c 916
Pence, W. D. Work of the joint engineering staff of the Wisconsin Tax and Railroad Commissions, 22
Perry, F. M. Increase of fares, c 111

R

Raber, W. F. Inspection and maintenance of rolling stock, 782
Rippey, A. G. How to handle accidents, 783
Rogers, S. C. Time-keeping and pay-rolls and best method of paying employees, 1164
Rolston, W. C. Proper inspection of equipment, 243

S

Sawyer, L. E. Damage suits, 942
Sergeant, C. S. Financial problems confronting the Boston Elevated Railway Co., 222
Shaw, J. F. Future of American Street & Interurban Railway Association, 56
Smith, D. W. Cost of car heating, c 916
Smith, L. L. Café parlor car equipment of Chicago & Milwaukee Electric R. R., *907
Stewart, C. A. Increase in fares in Massachusetts, c 251
Sullivan, J. V. Chicago's transfer crusade, 430

V

Varney, Theodore. Bow collector vs. pantograph, c 73

W

Walker, E. M. Recent developments in street railway traffic, 835
Way, S. B. Improvements in underground conduit construction, *1132
Weeks, H. E. Application of interstate system of accounts to street and interurban railways, 785
Weston, A. H. Indifference to "standards," c 250
Weston, C. V. Action necessary to assure a reasonable return on the investment, 12
Weston, George. Traction rehabilitation in Chicago, 1128, *1154
Woods, C. F. Factors determining the efficiency of trolley wire, 195
Wright, W. B. Accounting department, 1040

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JANUARY 2, 1909 No. 1

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum

25 shillings. 25 marks. 31 francs.

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Of this issue of the ELECTRIC RAILWAY JOURNAL 10,500 *copies are printed.*

Valuations of Electric Railway Property

The establishment of public utility commissions does not necessarily mean the appraisement of all public utility properties, but in Wisconsin the enlargement of the powers of the railroad commission in 1907 was coincident with the enlargement of the engineering staff of the tax commission to render service also to the railroad commission of the State. This staff now consists of from 20 to 30 members, and has been engaged in the appraisal of steam and electric railways and other public utility properties in the State. While appraisals of railway properties have been made many times in the past by banking and other interests, the objects sought by them and by a State board of a kind now in Wisconsin present radical points of divergence. The purpose of the private appraisal has nearly always been to determine the value of the property as a going concern—that is, its present and future earning power. In the valuations of the Wisconsin State Board, however, the study has been confined throughout to the physical property, without regard to the intangible elements —that is, the board has made complete inventories and valuations of the different properties, based upon their cost of reproduction—new, and "cost of reproduction—present condition." The novel character of the valuation lends interest to the paper on the organization and work of the board published elsewhere in this issue, written by Prof. William D. Pence, engineer of the railroad and tax commissions of Wisconsin. Prof. Pence also gives a summary of the valuations fixed. The largest electric railway system valuated was that of the Milwaukee Electric Railway & Light Company, and this work required 5½ months.

Bulletin Board Hints

The bulletin board forms a convenient medium through which the manager on the small road, or the division superintendent on the large road, can have daily talks with his men and can call their attention to methods by which he thinks that they can improve the service. The bulletin board should not be a substitute for weekly or monthly talks to the men on questions of operation, but as a means for calling attention to brief suggestions it is unrivaled, as every trainman sees it and practically every one reads what is posted on it. A number of roads have adopted the plan of placing on the bulletin board articles from the daily or technical press, which appear particularly advisable to bring to the attention of the trainmen. Clippings from this paper are often used for this purpose. Reports of legal decisions form excellent material for the bulletin board—not the decisions in which the railway company has been held non-liable, but those in which it has been held responsible for errors in judgment on the part of trainmen. Thus in a recent issue of this paper a case was reported in which a company was penalized because a conductor did not use special care to prevent an accident during alighting of a minor who was unaccustomed to riding on street cars and became frightened because she had been carried past her destination. Decisions on the amount of force which can lawfully be used during expulsions can also be treated to advantage in this way. It is impossible to formulate a set of rules to cover every possible case of contributory negligence or of legally justifiable expulsion. They can be defined only by reference to previous decisions, and each

court opinion is helpful in more nearly approximating the conditions under which any particular event takes place. A little thought will suggest other notices which can be posted to advantage on the bulletin board.

Manipulation of Transfers

The throttling of transfer frauds requires continuous vigilance. In nearly every large city it has been found that certain people make a business of manipulating street railway transfer slips and by selling them derive a variable but substantial income. As we recorded nearly a year ago, the United Railways & Electric Company, of Baltimore, until certain changes were made in the transfer form, suffered largely by these frauds because the date was not plainly indicated on the transfer slip. Upon the revision of the form it was discovered that the estimates of the amount of transfer manipulation had been low. The Chicago Railways Company has been making a crusade against trading in transfers, and the success of this determined resistance against swindling is recorded elsewhere in this issue. Publicity, it has been shown, is a strong weapon against a large number of people who manipulate or use manipulated transfers in riding to or from their daily work. The Chicago Railways Company has not hesitated to give due prominence by way of the daily press to such "patrons," and by use of the patrol wagon to transfer dealers in transfers to the station house. The results, as stated, have been all that could be desired. One company, operating 250 miles of track and 650 cars in a large city of the Central West, has found that some regular riders are going so far as to fill in the original punch marks of transfers and imitate the desired punching by carefully cutting out with a knife small holes of the same shape as those made by a punch, but relocated so as to change the time of day indicated. Examples will, no doubt, be made of these "regular riders." As with paper currency, it is hardly possible to devise for commercial use a transfer that cannot be manipulated, but it must be acknowledged that the forms used by some companies are an open temptation to those inclined to defraud. An interchange of ideas and possibly a slight additional outlay for printing a carefully arranged transfer slip will, in many instances, be rewarded by a surprisingly large decrease in transfer trafficking.

Obstacles to Track Construction in 1908

The records of track construction during 1908, published in another part of this issue, represent so far as can be shown by the figures which we have been able to secure, the curtailment of development resulting from the financial panic which started in October, 1907, and spread inevitably to all sections of the country.

The construction of electric railway track, whether undertaken as an ambitious new project or as an extension of an existing system, necessitates the expenditure of so large an amount of money that it can be raised ordinarily only through the issue of capital securities. When the sale of such securities cannot be negotiated, or if their disposal within a reasonable time cannot be foreseen by interests in control of railway properties, few ventures involving important construction are likely to be started.

From every point of view the year 1908 has been inauspicious for the promotion of new lines or the extension of existing properties. It is unfortunate that advantage could not have been taken by more companies with plans for profitable enterprises of the lower costs for labor and materials which could have been obtained during the year than appears to have been the case; but, with revenues reduced and prospects for improvement in traffic discouraging, few railways have been able to obtain the credit needed for capital improvements on terms that were reasonable.

Except in extraordinary cases, railways must depend upon bankers for the flotation of their securities. Since bankers who underwrite securities do not acquire them usually for permanent investment, but employ capital in buying and selling, as other merchants deal in merchandise, avenues of credit are difficult of access to the railways if banking interests, seeing investors frightened, decline to commit themselves to purchases.

Where track construction of importance has been conducted during the year, it has been due in most cases to the fact that the work had been started or commitments made before business conditions changed, and the continuation of building operations was therefore expedient. In instances of this character, the organization of the company being completed and the necessary capital subscribed, it was desirable to carry the construction work to a point permitting operation. To leave the capital invested unremunerative until conditions changed would have involved a loss which it was advisable to prevent.

Since the fundamental causes of the reduction in construction in 1908 are in the main those arising from business and financial conditions, it would seem to be a simple matter to predict that in 1909 new and postponed construction work will be conducted throughout the Union on a scale greatly in excess of that which has been known in any other year. A prediction of this nature, however, would fail to take into consideration the effect of the movement toward regulation which is manifested in many States. Theoretically, some of the advantages to the public of supervisory control of the construction of new lines would lie in the elimination of new competitive roads that are not necessary and the reduction of capitalization to a point representing the actual cost of the property; practically, however, the operation of rigorous laws on this subject restricts promoters. While it may be in the interest of the entire public to enact laws that will place restrictions upon the activities of promoters of some classes, such restrictions reduce materially the prospects for improved transportation in many communities. The practice of building roads in districts that could not support them at existing rates and extending lines into sparsely settled outlying districts has redounded much more to the benefit of the traveling public in the past than to the owners and creditors of the properties concerned in the improvements; and if such roads can be placed on a more profitable basis by careful analysis of operations, and the public will recognize the desirability of having service, even at a higher rate of fare than custom has sanctioned, transportation facilities now desired in many communities may be provided.

Rolling Stock Ordered in 1908

The statistics of the total number of cars in operation on the electric railways in the United States at the close of the year 1907 were published in the ELECTRIC RAILWAY JOURNAL for Aug. 29, 1908. The figures were compiled from the reports of individual roads prepared for the 1908 edition of "American Street Railway Investments," the average date of the reports approximating Dec. 31, 1907. In this tabulation 68,636 electric motor cars and 17,568 other cars were reported. Many persons have been under the impression that very few additions have been made to the number of electric cars in operation in this country during the past year. It is true that the electric railway companies have suffered from the inactive business conditions which have prevailed in other industries, but not to the same extent as the steam railroads. But, in spite of hard times, the number of cars included in the list ordered during 1908, published elsewhere in this issue, will probably be surprising to many manufacturers as well as railway officials. Every effort was put forth to make this list complete, and it is hoped that there are not many serious omissions. As a whole, the orders placed for new equipment aggregate 3262 cars. Compared with totals of last year, as reported in the ELECTRIC RAILWAY REVIEW for Jan. 4, 1907, this is a decrease of 48 per cent. The corresponding decrease in steam railway rolling stock purchases during the year was 72 per cent. The largest order placed by a single company during the year was that of the Chicago Railways Company for 700 double-truck cars. These cars were required under the terms of the rehabilitation ordinances in Chicago.

The records of the year show that out of a total of 3262 cars ordered, 8.8 per cent were to be built in company shops. In the year 1907, 12.02 per cent were so constructed. The statistics do not include, of course, the work on reconstruction of cars carried on in the companies' own shops, and also in the plants of manufacturing companies. Of this work there has probably been more than usual, not only because of the desire to save the large initial expense which a new car would require, but also because many existing cars have been reconstructed to adapt them to the prepayment system of fare collection.

Progress in car design during 1908 has followed lines already well established in 1907. The most important advances made during 1907 included the gradual introduction of more steel into car bodies, a rearrangement of the platform and door design to afford facilities for collecting fares as the passenger boarded the car and general improvements in motor and control apparatus. On roads which must subject their rolling stock to severe handling in order to carry traffic most efficiently there is a growing tendency to utilize steel more and more in the main structure of the car. The 700 new cars which are being delivered for use on the Chicago Railways Company's lines probably include in their makeup as much steel as it would be possible to use and yet not designate the car as being of steel construction. The underframe of these cars is similar to that found satisfactory in St. Louis and on the Twin City lines in Minneapolis and St. Paul, and is comprised mainly of two 18-in. steel side plates with the necessary end connections of steel and the reinforcing angles. The platform supports are of steel and the side panels and the window and deck sash are also of metal. Cars built entirely of steel are being ordered for use practically to the exclusion of any other for subway service, and are also being introduced for surface use. In general, however, the introduction of methods for prepayment of fares may be said to have been the most marked feature of car development during 1908.

The Discussion of Convention Reports at Home

The papers and reports annually presented before the Engineering Association have come to represent such rich mines for shop mechanics and foremen that they well deserve more thorough digestion than is possible in the hurly-burly of convention week, nor is there good reason why those who are not fortunate enough to attend the yearly meeting should not discuss with their fellow-craftsmen the value of recommendations made. A few weeks ago we mentioned the practice of one company in having the topics considered at the monthly meetings of the heads of departments. Where there is an association of shopmen another opportunity is afforded. This latter plan has been adopted in the Public Service Railway of New Jersey. The method followed is for the chairman of the organization to choose an appropriate convention report and divide it into assignments for different members who lead the discussion on the given topic at the next monthly meeting. The discussion is prefaced by a reading of the given section in open meeting so that others who are present may add their opinions.

Such a system as this should have beneficial results for both the employee and the railway. The criticisms of the various suggestions are made by men who have, through their daily labors, the closest possible intimacy with actual service requirements. This often renders it possible for them to advise their superiors that certain schemes are impracticable or to point out that peculiarities in the behavior of equipment are due to unusual external influences not suspected by those who lack minute knowledge of individual divisions. These home discussions bring out the important differences in the characteristics of the various lines forming parts of one system and make it easier to decide whether the same standards are applicable throughout.

But aside from the technical aspects of these meetings, there is the far greater benefit of making the shop and outside men realize how their attention and ability affect the entire service. The frequent interchange of opinion on the work of the national convention committees also trains them to analyze and weigh the thoughts of others and gives each the chance to develop along broader lines than afforded by the scope of his daily duties. The man who has learned in these domestic conferences to listen carefully and then give bold utterance to his thoughts has received just the kind of training that will make it worth while for his employer to send him to those larger conventions where he can commune with the most progressive men in the industry and return to his work with the feeling that he has taken the first big step upward to a more responsible position.

Saving in Power Consumption

The introduction of some new type of prime mover or perfected auxiliary machinery in an electric railway power house which would save 10 per cent of the cost of power generation would be hailed as a notable achievement in engineering. A reduction of 10 per cent in the amount of power consumed in the operation of cars would accomplish the same result, however, so far as the operating expenses of the road are concerned. With the present-day economy of power house machinery there is far less opportunity of effecting any considerable reduction in the unit costs of production than there is for lowering the total cost of power through stopping the leaks in the distribution system and putting an end to many of the wastes in consuming the power in the operation of cars. Broadly stated, the problem confronting electric railway managers is how to lower car mile operating costs and raise car mile receipts. The cost of operation, so far as the cars are concerned, may be divided under three general heads—wages, maintenance and cost of power consumed. Wages tend always to increase, and on most roads have grown materially greater during the last five or ten years. Maintenance cannot or should not be slighted, for any temporary reduction in this item is sure to carry compound interest at a large rate, as well as to be reflected in the additional power required and in some of the general expense accounts, particularly in damage claims. The cost of power consumed holds out the most encouragement of being kept within bounds if carefully watched and controlled.

The opportunities for reducing the power consumption per car mile on most roads are many and varied. First, and perhaps most important, is the weight of cars. Every pound of unnecessary weight in the cars requires extra power to transport it. One large city railway company has estimated the cost of running its cars at 10 cents per pound per year. Of this amount, which includes maintenance of track as well as cost of power and maintenance of the equipment itself, the cost of power represents by far the largest part. Lubrication, condition of the wheels and the riding qualities of the trucks all affect the running resistance of cars, and therefore the power consumption. Tight gage, bad joints and rail surface and alignment also have a direct effect on the car resistance. Insufficient feeder section and defective bonds constitute as great a loss of power as a partially grounded feeder or trolley wire. The source of greatest waste, however, and the one most difficult to restrict is the methods of manipulating the motor control apparatus on cars by motormen. This probably can never be wholly eradicated, but great improvements in this direction are possible through education and discipline. Some of the lesser channels of waste on cars are the motor compressors on air-braked cars, the lighting circuits and the electric heaters. A motorman who wastes air in making a stop wastes the power required to compress that air. The trainmen, too often, are careless in the handling of the heater switches and the lights, and supply more than is needed of both. These are a few of the leaks in the power circuit that exist to a greater or less extent on every railway system. Some of them are more easily stopped than others, but all are of sufficient magnitude to repay an effort to eliminate them.

Lighting Large Spaces

One of the troublesome questions which now and then arises in electric railway working is the proper illumination of large interiors like repair shops and car houses and of occasional railway yards. At present the situation is complicated by the common practice of subdividing car houses in order to lessen the fire risk, which reduces the size of the individual spaces, it is true, but at the same time gives them rather awkward shapes. As a rule, pretty good illumination must at times be available, especially in the repair shops, although for much of the time a very moderate degree will serve. Whatever the illuminants are, they must be so arranged that several degrees of illumination can be conveniently obtained without too much sacrifice of uniformity. As a rule, the early car houses were all lighted with 16-cp incandescents run in series off the regular circuit, and the result was none too good. The lamps, in the first place, were of very uneven quality, and the pressure generally varied over a wide range. At present the 16-cp lamp is too small a unit for the spaces commonly used, and it is also decidedly inefficient as compared with the newer lamps, both arc and incandescent. When it comes to the matter of yards, the illumination required is less than indoors, but still should be much better than one usually finds. The arc lamp is now, as it always has been, the main reliance in such situations.

Of the newer illuminants one must reckon in indoor work with high efficiency incandescents, mercury arcs and the various forms of intensive arcs. In many cases the ordinary tungsten lamps are worthy of very serious consideration. They are, when equipped with proper reflectors, much more efficient for the purpose than ordinary incandescent or enclosed arcs, and their negative temperature coefficient enables them to stand fluctuating voltage better than do carbon lamps. The 100-watt size is a very convenient one for general purposes. When fitted with a proper shade, it gives considerably better efficiency than its rated 1.25 watts per candle-power, so far as the lower hemispherical output is concerned, and the wiring can very readily be arranged so as to permit turning on half or a quarter of the total number of lamps when only moderate illumination is necessary. The weak point of the lamp is that it is somewhat fragile, and hence does not stand much rough handling or vibration. In many cases this danger can be avoided, and when it is possible the net result of a tungsten installation is most excellent. The economy possible is limited by the price of the lamps, which is at present rather too high to make their use actually pay well at a very low price for current, such as would customarily be charged to itself by an electric railway plant. This otherwise very attractive illuminant is therefore relatively little used for the purpose under consideration. Yet its use can show some saving, and it should be given a chance. At, say, 1 cent per kw-hour as the nominal charge, a 100-watt tungsten lamp will consume during its average life of about 1000 hours 100 kw-hours, costing $1.00, and the lamp itself will cost about $1.50, making the total cost for 100 hours $2.50. With carbon lamps, at least five would be required for the same service, costing, say $2.00 for 1000 hours burning, the ordinary useful life being a scant 500 hours. The

cost of current would be at least $2.50, giving a total cost of $4.50 for the equivalent service. It is therefore clear that it will often pay to use the lamp even with very cheap current, if the item of breakage can be kept down by careful installation and use.

The mercury arc has been somewhat serviceable for such work, and stands in power between the large incandescents and arc lamps. Its color is, from the æsthetic standpoint, rather dreadful, but as a practical illuminant it has done well in large interiors where the green color is not in itself objectionable. Its efficiency has been the subject of some debate, but it is probably a little better than that of the tungsten lamps plus their reflectors. The chief item to be considered is breakage of the tubes, which in the later lamps is less serious than it used to be, and the total cost is certainly much lower than with carbon incandescents. Were the mercury arc with quartz tube available in this country still better economic results would be obtainable. Unfortunately, however, the quartz tubes are at present made in quantity only in one factory in Germany, so that from the commercial standpoint the light is somewhat unavailable. The ordinary mercury arc is, however, well worth a trial in car houses and shops, and it will doubtless soon come to a renewal cost that will make it rather an attractive proposition.

For big spaces, especially out of doors, the arc is very much in the game. The common enclosed arc is, of course, out of the competition when efficiency is to be considered, as compared with either the tungsten lamps or mercury arcs. But the flame arcs are beyond any doubt the cheapest illuminants when a large amount of light is required, especially in places like storage yards. In Germany flame arcs are extensively used for lighting steam railroad yards, and give admirable results. They are hung high, say 30 ft. to 40 ft., on very simple poles, usually of steel lattice, and give very fine results in illumination. They are commonly of the inclined carbon type, and give a distribution that is well adapted to yard lighting. In this country they are beginning to find use for steam railroad purposes. As light producers they are in a class by themselves, but they require daily trimming and the carbons are as yet costly, especially on account of the duty, which, being specific, hits especially hard the cheap grades of mineralized carbons extensively used abroad. In spite of this, they furnish a cheap form of light, and some modified flame arcs are now coming along that promise relief from the present severe cost of trimming. Even now the flame arc is a straightforward commercial and economical proposition where a large amount of light is needed. No known illuminant, unless possibly the quartz mercury arc, is in the same class as they for efficiency or low cost per candle-power hour.

For interior use the flame arcs are commonly too powerful units. If, however, the space is big and high, such arcs hung high are very much to the purpose. There are now available flame units taking not over 250 watts and giving at least double the light of the best enclosed commercial arcs. Besides these, there are the intensified single enclosure arcs, giving far higher efficiency than the ordinary enclosed arcs, owing to their use of slender carbons, say not over ¼ in. in diameter. These require trimming every 24 to 36 hours, but give, perhaps, half as much light again as the ordinary enclosed type and a much better distribution for indoor work. They are certainly worthy of a trial for such work, like the flame arcs out of doors.

Condemnation of Land for Private Purposes

The Court of Appeals of New York handed down, Oct. 13, a decision in the case of the Hudson & Manhattan Railroad Company against Wendell et al. The suit has been in the courts for a number of years and establishes a ruling in New York State which is novel because it could be brought up in just this way only through underground railway operation. With steam railroads the combination of commercial office buildings with railroad terminal stations is rare. The smoke and noise from the steam locomotives would drive away most tenants, except possibly the employees of the railroad company whose business required them to be at or near the station. With an electric railway, however, the advantages of being near a station are great and in an underground railroad in lower New York every consideration of the conditions under which business is conducted suggested the erection over the Cortlandt Street terminal of the Hudson & Manhattan Railroad of a large office building whose tenants could reach New Jersey by descending to the ground floor. The law in regard to the condemnation of private property, however, is very strict. The convenience of the public may require that one private individual or corporation can take real estate away from another private individual or corporation, as in railroad condemnation proceedings, provided the land so acquired is to be used for railroad purposes. But it is another question whether an owner of real estate should be divested of his property when it is the intention of the railroad company not only to use the land for a railroad station, but also for the erection of a large office building from which rental for commercial purposes would be obtained.

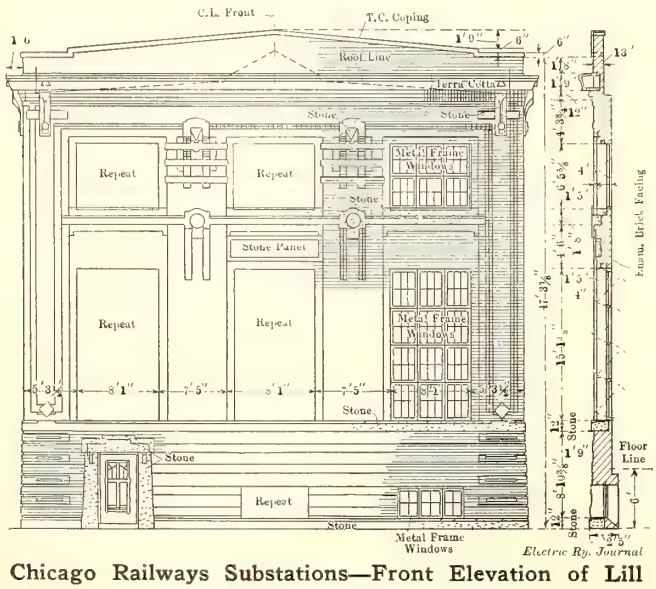
One of the plots on Dey Street which was included in the original plan of the Cortlandt Street terminal in New York had long been in the possession of one of the old families in New York, the Wendells, who are large owners of real estate in New York and, rarely, if ever, sell any land which they acquire. The Hudson & Manhattan Railroad had received permission for the construction of a terminal station on Dey Street and tracks under that street to New Jersey from the Rapid Transit Railroad Commission, as well as the right to acquire such real property for the station and road "as may be found convenient for the operation of the railroad." Under this authority the company proceeded to condemn the plot in question. The case which has just been decided was very involved, as both the general railroad law and the Rapid Transit act provide for condemnation of real estate by railroad companies and the company was the possessor of privileges under both acts. As a whole, however, the Court of Appeals holds to the theory that real estate acquired by railroad companies through condemnation should be held only for the purposes of the grant and that an unqualified fee in land cannot be taken by condemnation by a private corporation without express authority.

LARGE NEW SUBSTATIONS OF THE CHICAGO RAILWAYS COMPANY

Construction details of two new substations which will be erected immediately by the Chicago Railways Company as a part of the work of rehabilitating its lines are shown in the accompanying drawings. One of these substations, for which the foundations already have been completed, will be located at Lill Avenue near Sheffield Avenue in the north part of the city; the other will be built at Twenty-fifth Street and Leavitt Street in the central western portion of the city.

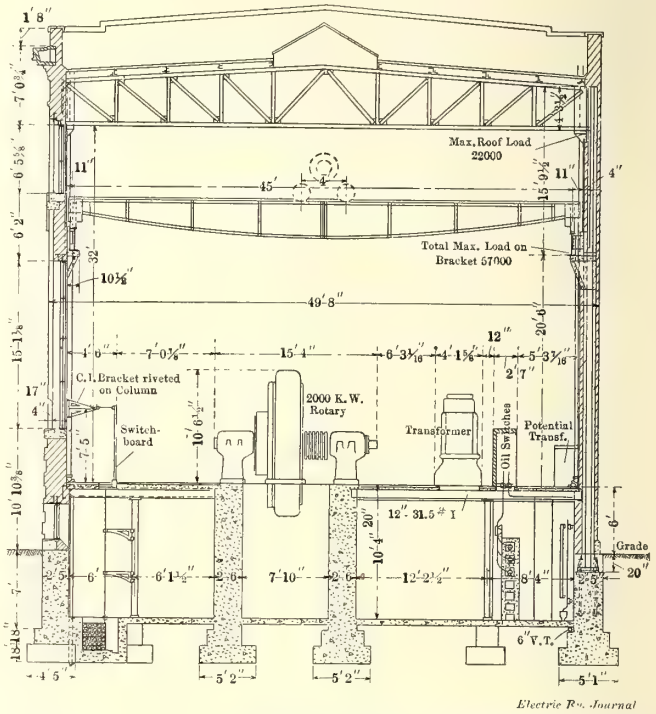
The Lill Avenue substation is located in a residence district and therefore an ornamental design has been chosen for the exterior. The over-all dimensions of the structure, which is rectangular in plan, are 49 ft. 8 in. x 96 ft. 6 in. The basement under the entire building will have a head room of 10 ft. 4 in. and the machine room from machine floor to bottom of roof trusses will be 32 ft. high in the clear. The structural materials used to support and enclose the steel frame are concrete, face brick and terra cotta. The exterior of the building will be finished in face brick ornamented as shown in one of the engravings, with white cut stone and a light-colored terra-cotta cornice. The windows, which will have metal frames, will be arranged in groups to swing horizontally about trunnions at the side of each sash. Features of interest which will add considerably to the appearance of these later substations as compared with those previously built are the ornamental design of the exterior, the paneling of the interior walls and the absence of pilasters for supporting the crane runway brackets.

The posts which support the five steel roof trusses have been designed sufficiently stiff to support the crane runway girders on brackets riveted to these posts. The side walls and steel frames are so designed that the roof-supporting columns are entirely enclosed by the brick walls. This detail of construction it is thought will add considerably to the appearance of the station interior and will afford a maximum floor space within the side walls. On top of the crane runway brackets will be placed a 24-in. 80-lb. I-beam tied to the main columns with ⅜-in. steel plates. To this I-beam will be bolted the crane rail weighing 50 lb. per foot. The crane will have a span of 45 ft. and a travel the entire length of the substation. It will have a lifting capacity of 25 tons and will be equipped with three electric motors. The clearance between the machine room floor and the crane hook when raised will be 20 ft. 6 in.



Chicago Railways Substations—Front Elevation of Lill Avenue Building

The interior walls of the substation above the machine room floor will be faced with enameled brick arranged in large panels enclosing the window groups. The brick used for this purpose will be of two colors, green and white. The green enameled brick will form the border of each panel enclosing the center of white brick surrounding the window frames. The wainscot also will be of green enameled brick to a height of 6 ft. Green was chosen for this purpose rather than white because the darker color will not show grease marks so readily.



Chicago Railways Substations—Cross Section Through Lill Avenue Station

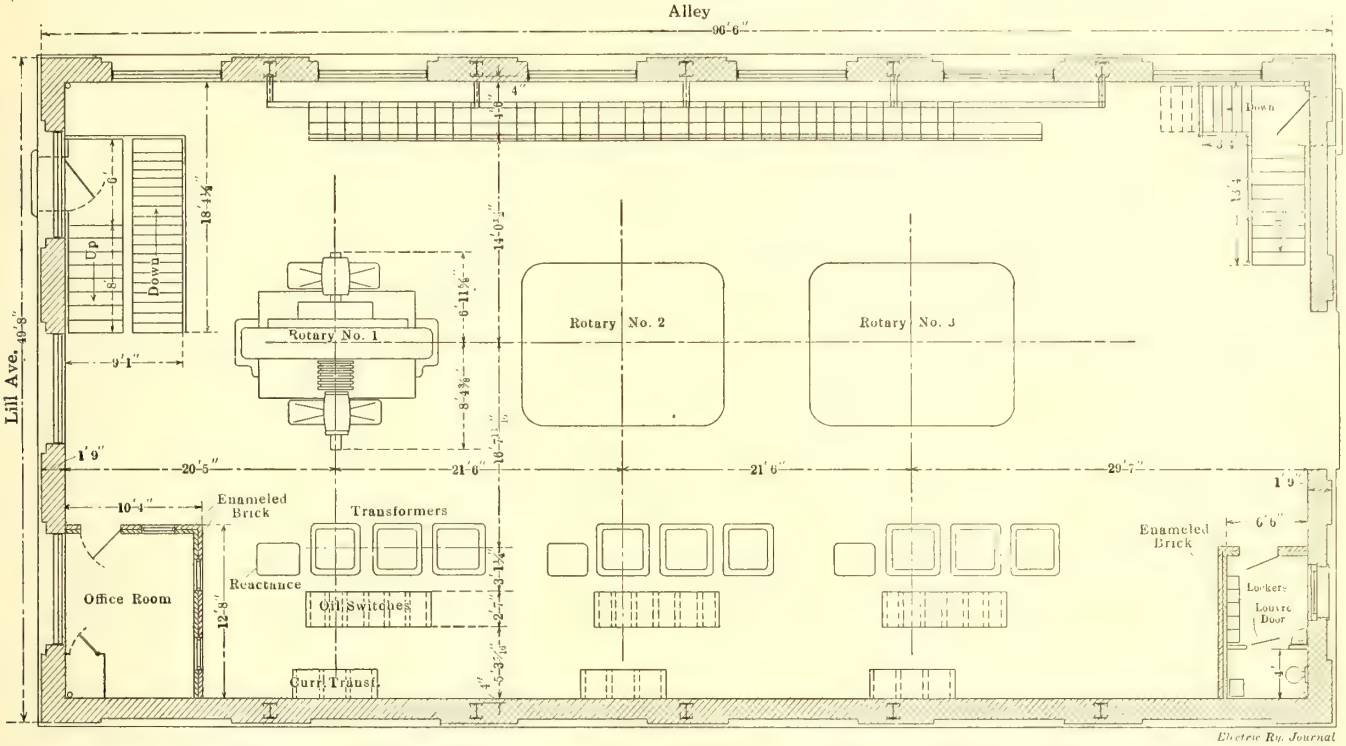
The roof of the substation building will be made of book tile covered with composition. The floors of the basement and machine room are to be reinforced concrete.

The accompanying floor plan and sectional elevation will serve to show the general arrangement of the principal electrical apparatus. Current for this substation will be purchased from the Commonwealth Edison Company and delivered into the substation by lead-covered underground cables terminating just at the floor level at the right-hand side of the substation, as shown in the sectional elevation. The lightning arrester equipment is installed between barriers directly above the cable potheads and in the same compartment on the opposite side of the aisle are six horizontal high-tension buses enclosed in concrete sections. Connections between the incoming cables and the high-tension buses and also between the buses and the step-down transformers are to be made by oil switches mounted in compartments on the machine room floor directly above the bus compartment and controlled from the main switchboard on the opposite side of the station.

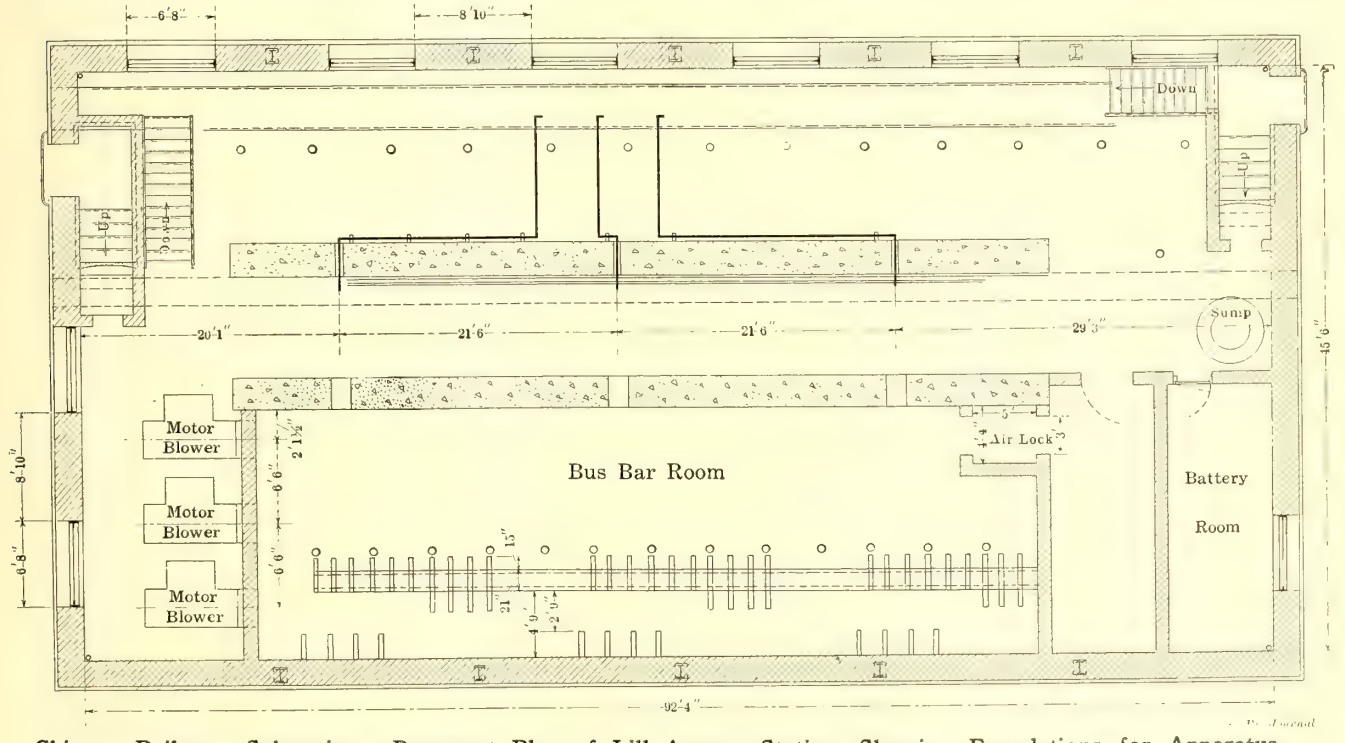
The floor above the busbar compartment is supported by 12-in. 35.5-lb. I-beams on which stand the step-down transformers. The entire busbar compartment will be kept under air pressure by three blower fans mounted in the basement at the end of the compartment. Three 2000-kw rotary converters will be mounted on wall foundations which will extend lengthwise of the station and form a

passageway through which the underside of the machines may easily be reached. One of these rotary foundation walls will form one side of the bus compartment which, as earlier stated, is to be kept under air pressure; and to provide against pockets of air becoming highly heated underneath the machines, this foundation wall will be pierced under each machine by a hole 18 in. square in section. The escape of air from the high-tension compartment through these holes directly under the machines has been found to give a valuable cooling effect and to assure a plentiful supply of fresh air under the rotaries.

The machine connections with the switchboard which stands on the opposite side of the substation from the incoming high-tension cables are carried underneath the machine room floor. The d.c. conductors are made of copper bars supported on cast-iron brackets. An accompanying sketch shows in detail the method of supporting the switchboard panels in the steel floor structure. Improvements have been made in this design of substation in the method of supporting the outgoing d.c. feeders beneath the switchboard. In substations of earlier design these trolley-feed cables have been carried on iron racks along the building wall below the switchboard. With the large number of heavy cables it was found a difficult task to satisfactorily arrange supports so that after a time the cables would not sag and become unsightly. Accordingly the new scheme of

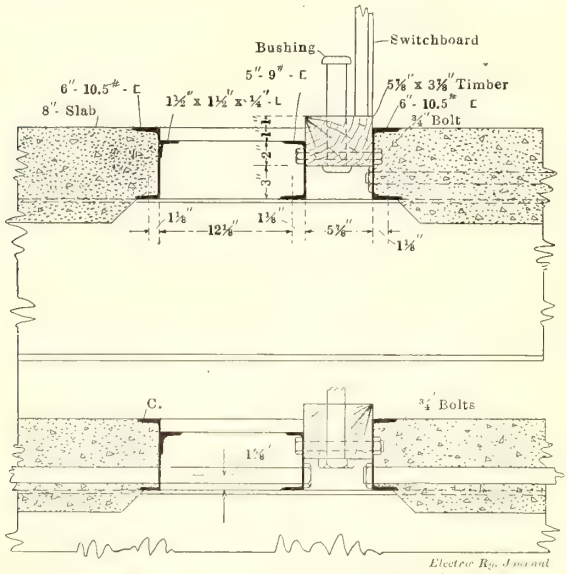


Chicago Railways Substations—Plan of Operating Room of Lill Avenue Station, Showing Location of Apparatus



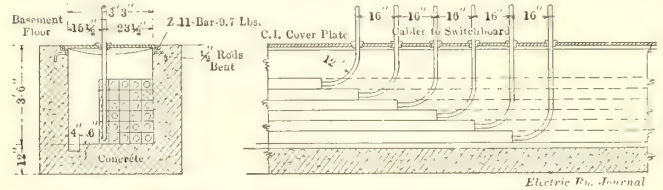
Chicago Railways Substations—Basement Plan of Lill Avenue Station, Showing Foundations for Apparatus

continuing the cable ducts under the full length of the switchboard has been introduced in the design of the present substations. An accompanying engraving shows the arrangement of the d.c. feeder ducts in a concrete trench



Chicago Railways Substations—Detail of Support for Switchboard

below the level of the basement floor. The general location of this trench also is shown in the sectional elevation of the substation. Thirty d.c. feeder ducts are accommodated at the Lill Avenue substation and these ducts, each enclosing one cable, are so arranged that the top cables



Chicago Railways Substations—Direct-Current Cable Trench Under Switchboard

may rise successively directly under the switchboard panel with which each is connected. Cast-iron checker-plate covers fit tightly over the trench and serve to keep the cables properly spaced. By this arrangement an unsightly cable rack is done away with and a considerable amount of copper for connection bends and fittings is saved.

The use of accumulator cars on main lines has latterly begun to assume some importance, and some particulars of experience gained during 10 years' trials on the main lines of the Palatinate Railways, which are given in the "Bulletin of the International Railway Congress," should not be allowed to pass unnoticed. The chief conclusion to be drawn from the experience of the Palatinate Railways, extending over a number of years, is that an accumulator motor car service can be economically successful if the battery is well and carefully maintained, and if the current can be generated at a cheap rate; in it we have a motor car system which is reliable to a high degree. These indisputable advantages probably outweigh the disadvantages inherent to accumulator cars, the allowance that has to be made, when drawing up the time tables, for time of charging, the very careful supervision required, and the fact that the possibility of using them is frequently limited by the capacity of the battery and the long distances between charging stations.

THE BRANTFORD & HAMILTON ELECTRIC RAILWAY

In the completion of the Brantford & Hamilton Electric Railway on May 23, 1908, the Dominion Power & Transmission Company, Ltd., of Hamilton, Ont., secured an important link in the all-electric system it has planned to join Toronto and Detroit—a distance of over 500 miles—via Woodstock, London, Chatham and Windsor. At the present time this company operates 22 miles eastward from Hamilton to Oakville, within 19 miles of Toronto, and 22 miles westward to Brantford. Bearing in mind the eventual operation of through long-distance service, these lines have been constructed on right-of-way wherever possible, with such low grades and easy curves



Brantford & Hamilton Electric Railway—Lines Operated by the Dominion Power & Transmission Company, Ltd., in and About Hamilton, Ont.

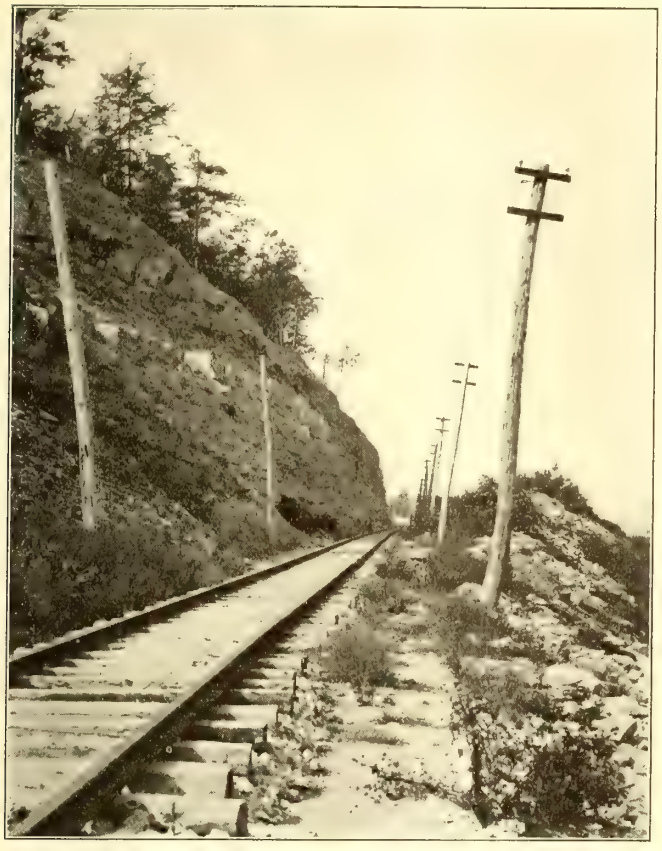
that real speed competition with steam trunk lines will be more than a possibility. The accompanying map covers the section between Brantford and Toronto, and shows the courses of the following railways centering at Hamilton controlled by the Dominion Power & Transmission Company: Brantford & Hamilton Electric Railway; Hamilton, Grimsby & Beamsville Electric Railway, and the Hamilton Radial Electric Railway.

BRANTFORD-HAMILTON ROUTE AND TRACK

The Brantford & Hamilton Electric Railway covers a route of 22 miles with 22½ miles of single track. The greater part of the road from Hamilton is a uniform climb to a height of 600 ft. in 6 miles along the side of a mountain overlooking the prosperous and picturesque Dundas Valley. The maximum grade, despite the ascent, is only 2½ per cent, and the tangent sections are unusually long —that from the summit west to Fairchild's Creek being fully 9 miles. The disintegrated limestone of which the mountain is composed, while easy to remove, makes a rather treacherous foundation. The track, therefore, has been well ballasted with gravel from the company's pits at Brantford, and the cuts and fills are more liberal than they would have to be in firmer strata.

The rails, which are of 80-lb. T-section, are laid on cedar ties spaced 2 ft. centers, with staggered angle-bar joints

carrying American Steel & Wire Company's No. 00 bonds. The same construction is followed in the city, except that the base is 6-in. concrete with brick paving. There are several concrete culverts and two steel bridges, one at Fairchild's Creek and one over the tracks of the Toronto,



Brantford & Hamilton Electric Railway—Span Suspension for Double Trolley Construction

Hamilton & Buffalo Railway (steam), and a short temporary trestle in Brantford. The cattle guards are homemade, consisting simply of a set of inclined slats laid across the track.

ELECTRIC SHOVEL

A valuable factor in the construction of the line has been an automatic shovel, built for electric operation by the Thew Automatic Shovel Company, of Lorain, Ohio. This shovel, unlike the steam apparatus, does not require three sets of engines for the independent control of the hoisting, swinging and crowding motions, but is operated by one 35-hp, shunt-wound constant-speed Westinghouse d.c. motor controlling the various motions through suitable frictions. The manufacturer has designed this electric shovel with planetary transmission gears for controlling the swinging and crowding motions from a main motor, to do away with many of the difficulties which friction clutches have given in this connection.

Current is supplied from the feed wire to the motor through flexible cables connected through switches to copper rings upon the upper side of the truck frame. The current is transmitted through carbon brushes suspended from the underside of the turntable coming into contact with these copper rings. This electrical operation eliminates the fireman, worry about fuel and water and trouble from freezing. In operating this shovel it is desirable to have the current supply independent of line fluctuations.

The shovel illustrated is mounted on one truck, weighs 25 tons, and has a 24-ft. cutting radius at a height of 9 ft. The dipper is 1 to 1 1/5 cu. yd capacity, according to the nature of the material. The horizontal crowding motion of the dipper is a special feature which makes it entirely practicable to dispense with a craneman, so that all movements can be controlled by one operator. In the construction of the Brantford-Hamilton line one man operated the shovel and another tripped it.

The average cost of handling material with this shovel runs about 0.10 cent per cubic yard, but in the following unusually favorable case the plain labor cost for a day was much less, as will appear from the following details: When this shovel worked in the gravel pit the depth of the cut was about 14 ft. The gravel was loaded onto flat cars having 14 cu. yd. capacity each, and frequently 100 loaded cars were hauled away daily. This meant an output of 1400 cu. yd. loose measurement, or 1050 cu. yd. placed measurement. The men employed and the wages paid in this work were as follows: Superintendent, $4; shovelmen, $3; pit men, $1.50; motormen, $3; trainmen, $1.50; dump men, $1.50. The labor cost for a day was $29.50, divided as follows: One superintendent, $4; shovel crew, consisting of two shovel men and two pit men, $6 and $3, respectively; one motorman at $3 and one signal man at $1.50 for spotting cars; transporting two trains, requiring two motormen at $3 each and two trainmen at $1.50 each; and two men at the dump at $1.50 each. With 1050 cu. yd. moved in a 10-hour day, the labor costs were as follows: Superintendence, $0.004; loading, $0.013; transportation, $0.009; dumping, $0.003; total, $0.029. When the output fell to 800 cu. yd. place measurement, the total unit labor cost was $0.037. This extreme minimum figure, of course, does not include charges for power, plant, repairs and track work.



Brantford & Hamilton Electric Railway—Fill and Crossing over Steam Railroad at Cainsville, Ont.

LINE CONSTRUCTION

The power supply for this railway comes from De Cew Falls, about 40 miles from Hamilton, and is transmitted at 40,000 volts, three-phase, 66 cycles to substations at the mountain top (No. 1) and Langford (No. 2), respectively

3 and 15 miles from Hamilton. There is also a general substation in Hamilton. Along the Brantford-Hamilton right-of-way this transmission is carried on 40-ft. cedar



Brantford & Hamilton Electric Railway—Rock Cut near Hamilton

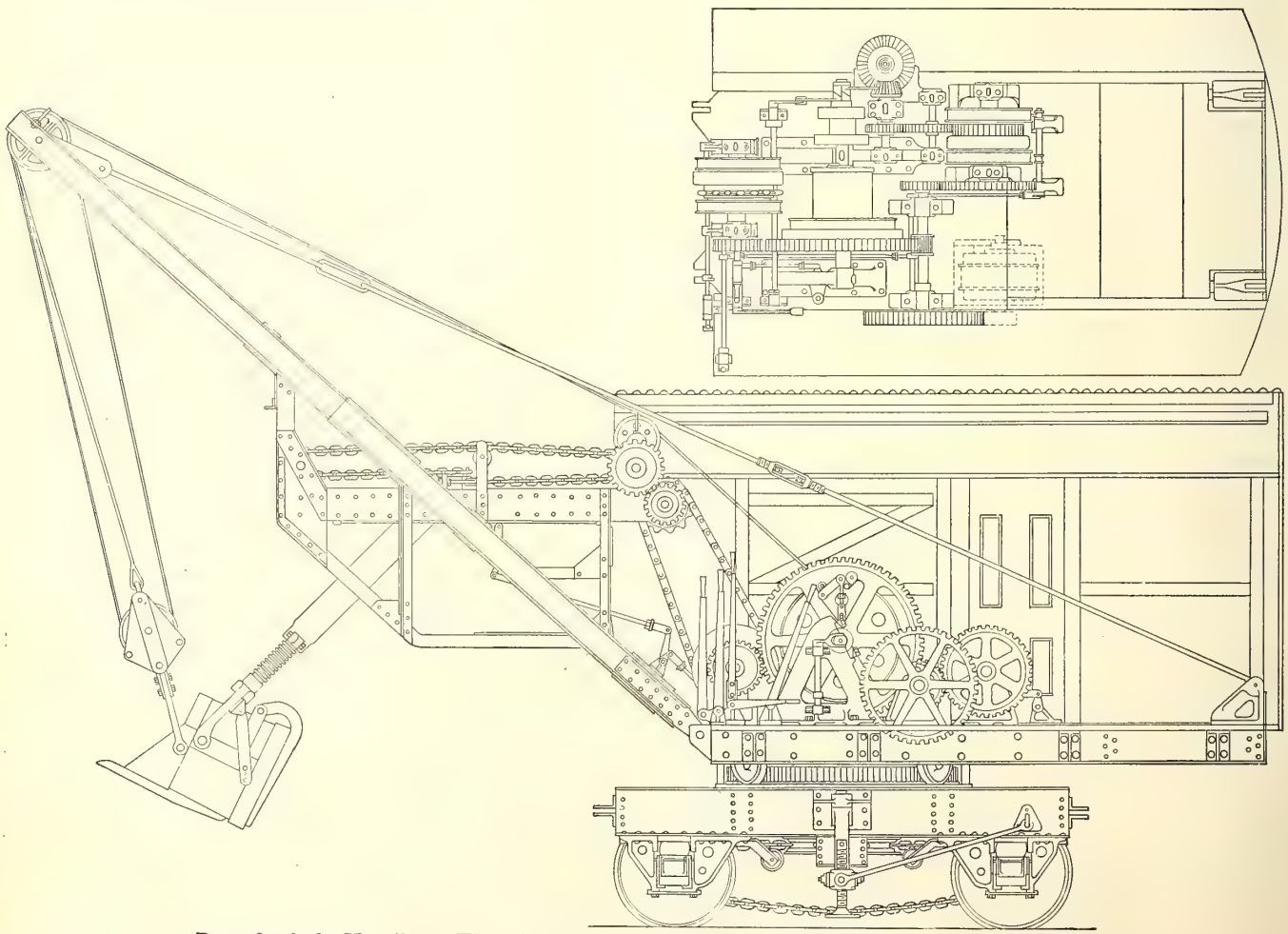
poles 180 ft. apart, over Thomas triple-petticoat insulators. A ground wire is carried above the high-tension wires for lightning protection.

The line for the d.c. circuits consists of 30-ft. cedar poles, which are spaced 90 ft. apart on tangents, except that the alternate poles on one side are those forming the carriers of the high-tension wires. From this it will be understood that the entire line construction is of the span type. The low-tension poles carry on glass insulators a No. 0000 feeder fed in one direction from substation No. 1, at the mountain top, and in both directions from station No. 2, at Langford. Feeder taps are made every quarter of a mile. The low-tension line is provided with GE lightning arresters every half-mile.

SUBSTATIONS

Both the Bartowville and Langford substations are designed for three 300-kw motor generator sets, but have at present only two-thirds of that capacity. Each generator set consists of a 440-hp, 2400-volt, 66-cycle, three-phase, 666-r.p.m. synchronous motor direct connected to a 300-kw, 600-volt, d.c. generator. Each set is furnished with an 11-kw exciter. The two 300-kw, 40,000/2400-volt transformers are of the oil-insulated, self-cooling shell type. Lightning protection on the low-tension circuit is given by tank arresters and on the high-tension side by low equivalent arresters. The switchboard in each station is composed of two a.c. panels and one d.c. panel, with the usual switches and instruments, including power factor meters. All of the electrical equipment is of Canadian Westinghouse manufacture.

Both stations are single-story structures, built of reinforced concrete, and, aside from the loading platform, cover an area of 56 ft. x 33 ft. 6 in. The columns, which are 18 in. square and 28 ft. high, are reinforced by a continuous hoop with six inside rods. These columns were concreted in one filling, and are believed to be the highest of this type in Canada. The column footings are 4 ft. square and the piers 2 ft. square. The roof, which was in place before the completion of the walls, is composed

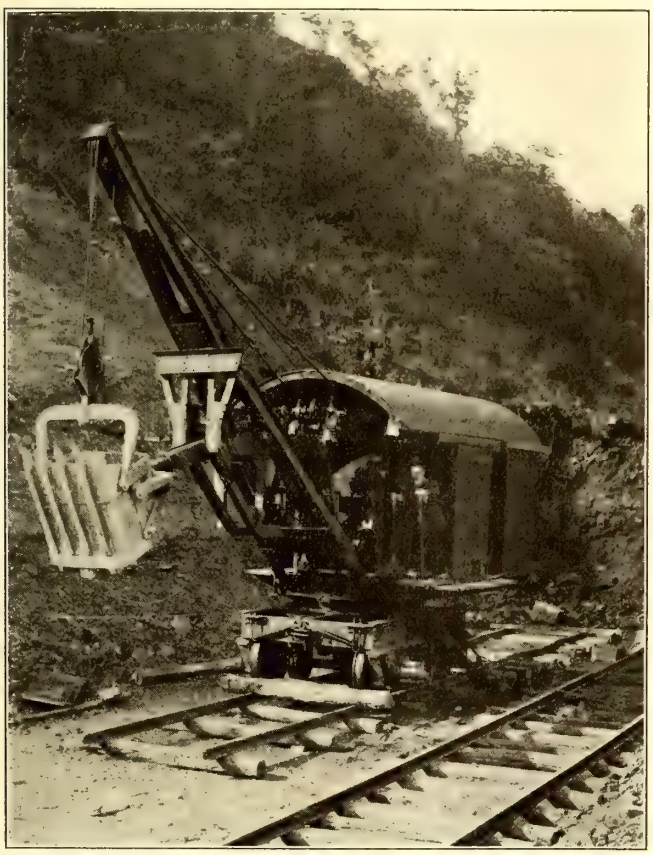


Brantford & Hamilton Electric Railway—Plan and Elevation of Electric Shovel

of 4-in. concrete slabs reinforced with plain round rods and laid over two 20-in., 65-lb. I-beams. Instead of a crane, each station has a 15-in., 42-lb. I-beam track, which carries an 8-ton Brown hoist and Yale & Towne triplex block.

PASSENGER ROLLING STOCK

All passenger service is now cared for by six double-end Kuhlman cars, 56 ft. over all, each equipped with passenger and smoking compartments. The cross seats in the coach section are of Brill "Winner" rattan, while longitudinal seats are used in the smoker to make room for trunks and other baggage. Both compartments have package racks. The trucks are of Brill No. 27 design, carrying four No. 112 Westinghouse 75-hp motors used with L-4 controllers; Westinghouse straight air brakes complete the power equipment. Among the other equipment features may be noted the following: Wilson trolley



Brantford & Hamilton Electric Railway—Electrically-Operated Shovel Carried on Single Truck

catchers, Crouse-Hinds headlights, Q & C steps, Consolidated electric heaters and Curtain Supply Company's window fixtures. The ventilator sash is wired glass. It will be seen from the foregoing that these cars are properly equipped with many essentials for high-class interurban service. Their approximate weight without passengers is 72,000 lb. each.

PASSENGER BUSINESS

The cities of Hamilton and Brantford have populations respectively estimated at 65,000 and 20,000, while the rich farming country between has only about 3000. The electric railway already has taken practically all the old steam railroad passengers, and through its hourly service naturally has created other traffic. The schedule on all its lines entering Hamilton includes a theater train, which brings the patrons to the terminal and gives them a covered walk to a nearby theater controlled by the railway interests

The fares on the mountain section approach a three-cent basis, but elsewhere the cost is nearer 2 cents a mile.

The Dominion Power & Transmission Company, Ltd., has no permanent station in Brantford as yet, but has erected in Hamilton a very handsome station for its various lines, making office provision at the same time for its 13 constituent companies. Terminal facilities are furnished for six railways. The building has a steel frame with solid masonry and terra cotta walls. The first story is Indiana blue limestone and the rest of the structure of pressed brick with Perth Amboy terra cotta trimmings. The cornices and balustrades are also treated with artistic designs in terra cotta. The roof carries an illuminated clock with 6-ft. diameter dial. The main entrance, which has a vestibule 22 ft. square, is a strong feature in the artistic ensemble, with its carved stone finish and two bronze electroliers on stone pedestals.

The interior columns and beams are of concrete reinforced with Kahn bars. The main floor is laid with ceramic tile, the office floors with hardwood, and the hallways with Terrazo. The walls are wainscoted with marble to a height of 10 ft., or half-way to the ceiling. The woodwork is of quartered oak.

The front part of the main floor contains the ticket office, and back of it a vault extending from the basement to the second floor. The stairway and elevator to the offices are on the right. To reach the tracks, passengers leave the main room through one of five double doors opening on fenced enclosures.

Part of the basement contains the room for general electrical supplies, and another section has a motor-generator set which supplies light to the building on the three-wire system and current to every electric elevator in Hamilton. The three boilers which supply steam heat to this terminal and the nearby theater are located under the tracks between these structures.

Particular attention has been given to both inside and outside lighting. The main floor is lighted by Nernst glowers placed in the ceilings and columns; incandescent lamps are used elsewhere. The metal passageways outside the building are studded with hundreds of small incandescents, which make this block the most brilliant spot in the city. Outlets are also provided for the illumination of the front of the terminal on gala occasions. The main distributing panel is on the station floor, and the sub-panels elsewhere are controlled by cut-out switches in the motor generator room.

FREIGHT AND EXPRESS BUSINESS

As the Brantford-Hamilton line has been in operation only a few months, it is possible to indicate the probable importance of the non-passenger business only by referring to an allied line like the Hamilton, Grimsby & Beamsville Railway Company, whose freight earnings are about 30 per cent of the gross. All of the lines carry freight according to the standard Canadian classification; accept and, where necessary, prepay advance charges on freight emanating on other lines; and, in general, comply with the legal requirements and practices of steam railroads. Wagon deliveries of freight are maintained at the important stations, the charge for this service being 2 cents per 100 lb., with a 12-cent minimum.

The company has a contract with the Dominion Express Company whereby the latter pays 12 cents per 100 lb. for all goods carried over its line, except interstation traffic, which is handled exclusively by the railway company.

ACTION NECESSARY TO ASSURE A REASONABLE RETURN ON THE INVESTMENT—II.

BY CHARLES V. WESTON, PRESIDENT, SOUTH SIDE ELEVATED RAILROAD, CHICAGO

Controversies with regulating bodies, such as Councils, State Legislatures and commissions, bid fair in time to work themselves out to an equitable basis, but in the matter of fare per passenger there is an immediate need for action. Immediate on the part of the urban transportation companies, because to them this item spells ruin or success.

In the United States the 5-cent piece is the basis of fare. Let us see whether that amount represents a reasonable payment for the service rendered. In the continental cities of Europe the average rate charged per passenger mile is 1 cent, and in Great Britain the average is 1.1 cents. In Berlin the average of all classes for the combined elevated and tunnel service is 1.25 cents per passenger mile.

What is the situation in Chicago?

On the South Side Elevated system the road is now receiving 0.8 cent per passenger mile for each person carried. Figures presented for the South Side Elevated are of particular importance, because the road is under and not over-capitalized. The capital stock of the company, $10,323,800, represents $10,500,000 of bonds issued for the original construction of the Chicago & South Side Rapid Transit Company, the promotion stock issue of $7,500,000 having been entirely wiped out in the reorganization of the company in 1897. The bond issue of $8,000,000 represents the cost of electrification in 1898, and the cost of the recent extensions. To these items should be added the so-called "reserve" of $1,376,484, since this sum has been expended in improvements and new equipment. This makes a total investment of $19,700,284, and to-day the property could not be replaced for that amount.

The company last year (1907), after paying operating expenses, bond interest and rentals on leased lines, had left only 4 per cent for dividends, and thus far this year, on account of the business recession, the net earnings are under 3 per cent per annum on the capital stock. The short-haul business of the company is decreasing largely because of the stronger competition of the surface lines, and the increase in total business shown is due to a disproportionately large increase in the long-haul traffic.

From year to year the line on one side of which the business of the company diminishes and on the other side of which its increase is steadily moving farther from the business center, and the length of the average haul is increasing.

The average haul on the South Side Elevated Railroad to-day on its main line, including one-half the circuit of the loop, is 6.6 miles. The average cost of hauling a passenger on the elevated railroads in Chicago is 3½ cents, leaving 1½ cents per passenger to pay fixed charges, depreciation, renewals and fair return on the actual investment in the property.

Let us now consider what the rate of fare should be under this condition of average-haul distance to yield the cost of operating, maintenance, fixed charges, depreciation and a return of 6 per cent on the investment. The heaviest month's business the South Side Elevated Railroad Company ever has had (outside the abnormal traffic created by the strike on the City Railway Company's line in October, 1903) was an average of 125,000 passengers per day, a greater average than the company will carry for the year 1908. Assume a daily average of 125,000 passengers for the year, this would give a total of 45,625,000 passengers per annum. The revenue at 5 cents per passenger would equal $2,281,200; operating expenses at an average of 70 per cent, which is about the actual average of operating cost, including charges and loop rental, $1,596,840. The operating expenses, including loop rental and taxes, include everything except interest on the bonds and rental of leased lines. The charges and interest on investment would be as follows:

Bond interest	$360,000.00	
Rental on leased lines	96,000.00	
Total		$456,000.00
Allowing for depreciation only 2½ per cent on $19,972,445	$499,311.00	
Interest on capital stock at 6 per cent on $10,313,000	618,780.00	
Total		$1,574,091.00

These charges, plus the operating expenses, would make the total cost of carrying 45,625,000 passengers $3,170,931. The cost per passenger would equal 6.95 cents. The cost per passenger mile on a basis of 6.6 miles, which is the average haul at the present time, would be 1.05 cents. Applying this cost of 1.05 cents per passenger mile to a flat rate of 5 cents, the average haul which an elevated railway company can afford to give for 5 cents is 4¾ miles.

It is quite evident that as to the elevated railroads in Chicago any increase over the present average haul will result in a heavy financial loss to the company.

It has been stated by those who have advocated the through routing of trains of the elevated roads in Chicago that the added facilities given to the public, enabling one to ride from one end of the elevated lines to the other for 5 cents, would result in an enormous increase in business. Such a scheme might result in a very great gain in business, but if it came it would be from long-haul passengers, because in competition with the surface lines the elevated roads never can hope greatly to increase their business from short-haul passengers.

What, therefore, would be the situation if through routing were established? It would mean simply that the long-haul passengers, on whom there is at present a loss, would have to be carried twice as far for the same rate, 5 cents, and they, therefore, would represent an increased loss to the company.

Through routing in itself is not opposed by the transportation companies. What they have a right to demand, however, is that any such scheme must be based on a rate of fare which will give to each of the carrying companies a reasonable profit.

Nor is there any great difference in its effect on the elevated companies between through routing and transfers. It has been stated by the consulting engineer of the local transportation committee of the City Council of Chicago that, in his judgment, the effect of giving transfers on the flat rate of 5 cents would not result in any great number of persons availing themselves of the privilege, and that the effect would not cause any large financial loss to the companies.

Let us consider for a moment the effect of the transfer system of other cities. The New York City Railway is now in the hands of a receiver. While there may have been some questionable financial transactions in the con-

duct of that property, they were not the prime cause for the company going into bankruptcy. The real reason for the failure of the New York City Railway Company may be placed to the credit of the imposition of universal transfers forced upon it by the State of New York.

For the year ending Sept. 30, 1888, the reports of the companies which, until the recent segregations, comprised the system of the New York City Railway Company, show that 193,933,484 passengers were carried and that there were 1,996,871 transfer passengers, or a percentage of transfer to revenue passengers of 1.1 per cent. The average fare received was 4.94 cents. The business of the New York City system up to 1895 showed that the percentage of transfer to revenue passengers ranged from 1.1 to 5.6 per cent, and in the year 1895 the average fare for each passenger was 4.76 cents.

The next year the State imposed upon the railway company transfer privileges between connecting lines, some of them of other companies, and in the year 1896 the percentage of transfer to revenue passengers jumped from 5.06 in 1895 to 16.42 per cent, and in the following year the transfers were 31.89 per cent, and the average fare per passenger was 3.79 cents. This increased steadily until 1907, when 53.13 per cent of the passengers rode on transfers, and the average fare was 3.16 cents.

No transportation company can maintain its equipment and roadway, give an adequate service and live under such conditions, to say nothing of providing for depreciation and a fair return to the investor. That is the reason that the New York City Railway Company is in the hands of a receiver to-day.

Search for a solution of the transportation problem of the large cities of America seems to lead to this: There should be a rearrangement of the fare system, and there should be a unification of interests. In other words, the flat 5-cent rate, irrespective of the length of haul, should be abandoned in favor of a scale which would mean a reasonable profit for the company for each passenger at all distances, and there should be a merging of companies which would make possible a centralization of power plants and management.

Competition, despite a public conception to the contrary, is not the ideal condition for urban transportation interests. We have, for instance, in Chicago a monopoly in the matter of gas, water and electric light. Water need not be especially considered, because it is a municipally owned business, but we know that both as to gas and electric light the cost to the people has been reduced very considerably in the last few years. Combination of capital has been chiefly responsible for this.

If the surface and the elevated roads of Chicago were operated as a single system, under the control of one company, conditions vastly better than those that prevail to-day undoubtedly would result. The elevated roads are essentially long-haul lines, and much greater speed can be developed on them than is possible on the streets where cars must share the right of way with other traffic. Under a unification of interests, the outlying surface lines naturally would constitute feeders to the elevated system. The short-haul business, therefore, could be diverted to the surface lines, to the manifest advantage of both the public and the transportation companies.

Under any scheme, save the unification of all the transportation systems in Chicago, the elevated roads, as the operators of through trains from the end of one line to the end of another in competition with surface lines, at a flat rate of 5 cents, could be considered only as permanently non-paying enterprises. An impartial view of the situation would seem to bring but one conclusion, and that is that the placing of additional burdens on these companies in the way of increased service, through the imposing of a system of unlimited transfers and increased distance of haul, for a flat rate of 5 cents, would be distinctly detrimental to the interests of both the public and the company.

Transportation men in this day are eager to get into fresh touch with the public, and there may come about a mutual understanding. The claim is made by the companies that the present rates of fare, with the long hauls, the extensive granting of transfers, and the menace of through routing, are such as to give much less than a reasonable return on the investment.

Rates should be readjusted. If, for instance, it is reasonable to charge 5 cents for hauling passengers 5 miles, then certainly it must be worth more to carry a passenger 8 or 10 miles. The elements of cost which would fix the compensation to be paid for service could be determined once an agreement was reached as to what should be the return on the capital investment. Unquestionably in any equitable adjustment of the fare question there must be adopted some system which will yield a compensation for the individual service rendered. Perhaps we may come to the zone system which prevails in Europe; not the elaborate scheme known there, but the fixing of an initial distance within and up to which the fare would be 5 cents, but beyond which an additional charge would be made. The elaborate European zone plan could not well be used in America, because our coins are not divided on the fractional basis they are abroad.

Under a unification of the transportation companies of Chicago there would come something which is very greatly needed, if the corporations are to receive a reasonable return on investment, and that is a reduction of the average distance of haul, through a proper routing of traffic and a minimizing of the use of transfers. There is one point which must not be lost sight of, and that is that whenever a readjustment is made it must be on the basis that for individual service there can be no rate less than is founded on the unit of 1 cent per passenger mile. Urban transportation companies have proved to their own sorrow that at any rate less than this they cannot earn those charges which they are justly entitled to receive.

It is a woeful story, that of the urban transportation companies of the United States. Founded in optimism, they have traveled through their devious ways to converge, in an appalling number of instances, at the doors of the courts. Spectacular dividends and eras of splendid prosperity have slowly vanished, and the traction shareholder who to-day is receiving 5 per cent on his money considers himself fortunate indeed.

Who is to blame? Both the company and the people. Pioneer street railway men paid dividends out of capital, though they did not realize it, and conducted their affairs so without regard to depreciation and increased cost that a comparatively few years found their concerns in a perilous financial condition. The people have much to answer for, in that they have permitted demagogues and self-seekers in their law-making bodies to viciously assail the transportation companies. For years it has been a popular thing for the alderman or the State legislator to prod the street car company, and a condition has resulted where the public service corporations and the people stand at

opposite poles, when a betterment of conditions for both is an absolute necessity.

What is the remedy? What shall be done to correct this unfortunate condition? It seems to me there is but one answer. There should immediately be a recognition by the companies and the public of their mutuality of interests; a recognition that each is absolutely essential to the other, and the only way that each can get the best returns in fair treatment is to "get together"; to meet on a basis of fairness; for each to say: "I have made mistakes, but the time has come for us to sit down, talk this thing over calmly, and reach an agreement."

JAPANESE RECEPTIONS TO AMERICAN SAILORS AND MERCHANTS

During October, 1908, the Japanese people had the opportunity of entertaining both our sailors and business men, and this they carried out with such ardor that their cordiality must long be agreeably remembered by their guests. It is pleasant to learn that the electric railways of Japan placed their transportation facilities at the command of the visitors with the most delightful hospitality, particularly in Tokyo and Amagasaki.

ENTERTAINING THE AMERICAN SAILORS IN TOKYO

The Tokyo Electric Railway Company (known at home as Tokyo Tetsudo Kabushiki Kwaisha) took a very active part in entertaining our sea-faring warriors. The accompanying half-tones are reproductions of a souvenir post card and complimentary ticket struck off in honor of the visitors. The souvenir card shows a group of decorated cars waiting to take the jackies about the city. The cars are not double-decked, although the height of the decorations on the monitor gives that impression. The artistic side of the Oriental host was well shown in the tasteful mingling of the Japanese and American flags on the tops of the cars and the Stars and Stripes bunting on the sides which was flanked by "Welcome" signs. The crowning beauty of the decorations was afforded by numerous specimens of the chrysanthemum, the favorite flower of Japan. The post card bears the imprint, "The Tokyo Railway, To commemorate the coming of Japan's respected and most welcome visitors from the great neighboring Republic, October, 1908."

The pass which was presented to every naval visitor is a lithographed card, 2½ in. x 4½ in. in size, the upper part of which shows the American eagle and shield flanked by the banners of the two countries and surmounted by a 13-star circle and the word "Welcome." The background of this part of the card is tinted the rosy color of the dawn, probably to symbolize the "Land of the Rising Sun." The lower portion of the card shows a trolley car, a bridge and some buildings to typify Japanese industry and art, to all of which the forest outlines and the famous snow-capped peak of Fujiyama give a dignified perspective.

The Tokyo Electric Railway is managed by S. Nambu. An interesting description of this company's line and methods, as observed by Henry K. Brent, was published in the Street Railway Journal of Dec. 7, 1907.

RECEPTION TO BUSINESS MEN IN AMAGASAKI

The following report on the treatment accorded the Pacific Coast Chamber of Commerce committee was written by a Japanese correspondent of this paper:

"October 31st was a memorial day to the Hanshin Electric Railway Co., Amagasaki, Japan, who owns a through double-track road between the cities Osaka and Kobe, situated about 20 miles apart, and enjoys the prosperity of running the cars at 3 minutes head time. The delegates of the Chambers of Commerce of the Pacific Coast of the United States were received this day by the special cars of the Company on their way from Osaka to Kobe. The Company owns some 50 cars, all of which are of one kind, similar in every respect. Each measures 44 ft. from end to end, and is mounted on double-trucks. Two such cars were specially decorated mainly with silks and chrysanthemums, supplemented with greeneries, while on each side were gilded four words 'Welcome' in big letters, and on all the roof edges were planted American and





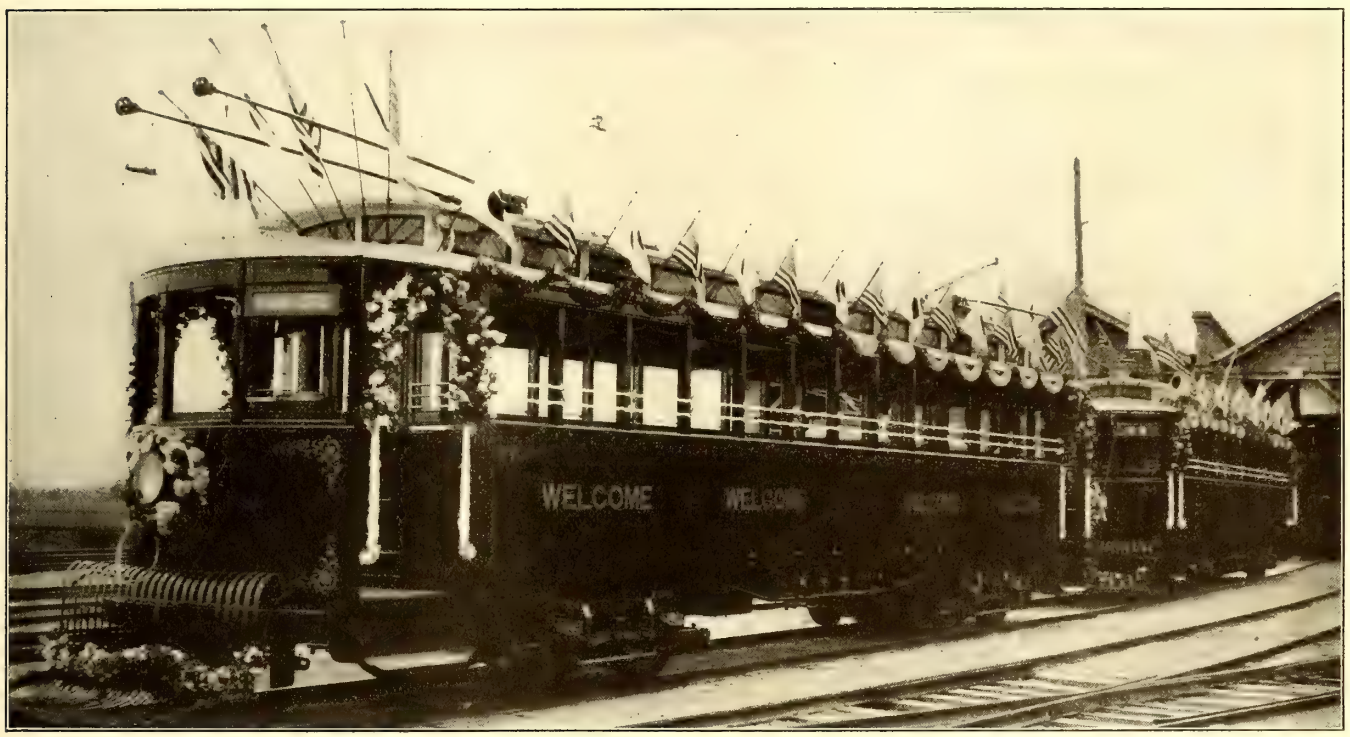
Group of Special Cars and Pass Prepared in Honor of the American Squadron's Visit to Tokyo

Japanese flags alternately. The Osaka terminus depot Deiribashi was also profusely decorated, a grand arch being erected at the entrance. Chrysanthemum vases in full bloom were put in a refined order on the platform by side of the Hanshin band stand, who were succeedingly playing "My Country, 'Tis of Thee," "The Star Spangled Banner," etc., the steel shed pillars being entwined with silks of several colors, and curtains enclosing the whole compound.

"The American guests arrived the depot at 4:20 p. m. Enthusiastic multitude, including school boys, poured in 'Banzais' in a loud roar, accompanied with bangs of fire works. In response, the American guests yelled out, swinging American flags and Japanese flags on their hands: Rah! Rah! Rah! A-me-ri-ca, Nippon, Nippon, Banzai, Rah!!! This was responded by several yells of respective schools, all waving American flags in their hands. The exchange of yells and Banzais had no interruption till the band played the American national song, when all the multitude kept silence by taking off their hats. After the music, Mr. R. Imanishi, managing director of the Company, addressed the guests. He said:

"'Ladies and Gentlemen: On behalf of the Hanshin Electric Railway Company, I take the liberty to tender to you a most hearty and cordial welcome to our road, which you honor by riding on to-day. I feel that we are especially qualified to welcome you, because throughout our whole system we owe you and your fellow countrymen a great help from its birth to the present prosperity. I beg you would allow me to cite a few instances. The car in which you are riding is a product of Stephenson Car Company of N. J., mounted on Brill trucks, equipped with Westinghouse motors and controlling apparatus, and Christensen air brake, runs on the rails and steel girders supplied from the Carnegie Steel Works, receiving current through overhead construction supplied by the Electric Service Supplies Company, of Philadelphia. The current is generated by General Electric generators coupled to McIntosh & Seymour engines, with steam delivered from Babcock & Wilcox boilers with Worthington pumps and condensers. The whole system was designed and constructed and is operated under the direction of our chief engineer, Mr. S. Misaki, a graduate of San Francisco Boys' High School, Stanford University and Purdue University, of Lafayette, Ind. The promoter and the first president of the company, Mr. S. Toyama, acquired the knowledge of constructing this first interurban electric railway in Japan during his journey through the United States. I am myself also one of America's sincere students, and in my present management I am following the instructions received during my journey through America. I wish you, the delegates of our teachers, would be able to examine whether your pupils have done well or not, and I am exceedingly happy if you feel thus at home even for a moment, on your way from Osaka to Kobe. I thank you heartily for your generosity to honor us with a ride.'

"When the speech ended, Mr. Misaki, the chief engineer, shouted, 'All abroad' in American manner, and the cars started off Deiribashi, leaving behind roaring cheers. Multitudes along the road through the way all waving American flags in hands, banzaied loudly when the cars passed them. At 5:20 the cars arrived Kobe depot, when the guests were received by roars of 'Banzai' of Kobe citizens and school boys, in no less enthusiasm. Mr. Matsukata, chairman of the Kobe Chamber of Commerce, accompanied them from Osaka. Mr. Minakami, mayor of the city, received them at the depot. Thence the 'rikishas carried them to Tor and Oriental Hotels amidst the cheers of the spectators. This evening both the Tor and the Oriental Hotels were visited by torchlight processions as a demonstration of good will."



Reception Cars for American Merchants Leaving the Amagasaki Car House

Subsequently the Hanshin Electric Railway Company received a letter from F. W. Dohrman, chairman of the American delegation, in which he expressed thanks for the splendid hospitality shown his party, and congratulated the railway company on its service and operation.

NEW INTERURBAN RAILWAYS IN THE CENTRAL STATES

The table of statistics on new track construction shows the extensions and new roads built during the past year in the Central States, but a comprehensive idea of the existing conditions of the electric roads in that part of the country can be obtained better from the accompanying map. This map has been prepared by The Arnold Company, of Chicago, has been carefully brought up to date from official reports and is believed to be very nearly complete. Information as to the new lines and extensions built during 1908 and their proper locations on the map have been supplied by the various electric railroads which have finished new work during the past 12 months, and this information has been used in revising and adding to the map which was published one year ago in the Electric Railway Review. Notwithstanding the care taken in compiling this map there may be errors, and if such are observed the Electric Railway Journal will be grateful for information tending to make its construction records more complete.

During the year 1908 the larger part of the track built by electric railways has been in extending the existing systems. It is interesting to note that one now may travel from Sheboygan, Wis., and Rockford, Ill., by electric cars to Port Huron, Mich., Louisville, Ky., or to Westfield, N. Y., with only one break in the continuity of electric service, and this gap of les than 20 miles is now rapidly being closed.

To travel by electric cars from Sheboygan, Wis., to Westfield, N. Y., one would pass over not only roads of the highest type built during the past two years, but also would travel along the lines of the large interurban systems of Indiana and Ohio, which, though built in the earlier days, have obtained most substantial roadways as the result of careful maintenance from year to year. From Sheboygan to Milwaukee, Wis., the intending passenger bound for New York State would travel over the Milwaukee Northern line, one of the very few large roads generating its power with gas engine-driven units. From Milwaukee south 75 miles to Evanston the Chicago & Milwaukee Electric Railroad operates hourly service over its recently completed double-track line in Wisconsin and the older four-track and two-track lines between Waukegan and Evanston. At Evanston the Chicago & Milwaukee Electric line has a joint terminal with the Northwestern Elevated Railroad, which, during the past year, has electrified a double-track surface line of the Chicago, Milwaukee & St. Paul Railroad, thus furnishing the elevated road with a surface extension from its former Wilson Avenue terminus to Evanston.

Across the city of Chicago there are many routes which a passenger can take in reaching Hammond, Ind. Arriving at Hammond, he would find the temporary terminus of the Chicago, Lake Shore & South Bend Railway, which has completed during the past two years a heavily built, high-speed, single-phase electric railway system of most modern design. The eastern terminus of this road is at South Bend and the present western terminus is at Hammond. However, only about two weeks' work remains before a connecting link between the Illinois Central suburban tracks at Kensington, Ill., and Hammond, Ind., on the Indiana-Illinois State line will be in operation. Then it is expected that the single-phase cars making the run from South Bend toward Chicago will be coupled onto the Illinois Central suburban expresses at Kensington and be taken to the heart of the city of Chicago. This will make a suburban service with terminal facilities such as no other interurban road in this country enjoys.

The long-distance electric passenger on his eastbound trip would be carried by the Chicago, South Bend & Northern Indiana Railway and the Winona Interurban Railway from South Bend to Warsaw, Ind., on through limited trains. The Winona Interurban Railway is now completing a 43-mile extension from Warsaw to Peru, Ind. Already the northern section of this connection from Warsaw to Mentone and the southern section from Peru to Akron have been finished, and there yet remain less than 20 miles, this being the only link missing in the chain of electric lines between Westfield, N. Y., and Sheboygan, Wis.

At Peru, when the Winona Interurban has completed its line from Mentone to Akron, its limited cars from South Bend can connect with the limited service of the Ft. Wayne & Wabash Valley Traction Company, operating between Lafayette and Ft. Wayne. The eastbound passenger will find fast and frequent service from Peru via the latter-named line to Ft. Wayne, and thence by the Ohio Electric Railway to Lima, where the choice of two routes is offered him from Lima to Toledo. The older one of these routes, and the one over which the Toledo & Dayton limiteds are operated, is via the Western Ohio Railway from Lima to Findlay, and the Toledo, Bowling Green & Southern from Findlay to Toledo. The more recently completed route is that of the Ohio Electric Railway, which during the past year has built a new line from Lima into Toledo, obtaining at this city a most satisfactory private entrance for its high-speed cars, terminating in the center of the business district. From Toledo to Cleveland the long-established limited service of the Lake Shore Electric Railway over its route of 121 miles is offered the traveler, and from Cleveland eastward the electric route takes a direct line through Painesville, Ashtabula, Conneaut and Erie to Westfield, the various companies operating service over this route being the Cleveland, Painesville & Eastern, the Pennsylvania & Ohio Railways, the Conneaut & Erie Traction Company and the Buffalo & Lake Erie Traction Company. The latter named company, it is stated, has a line under construction from Buffalo to Westfield.

To this long electric route, which with its ramifications connects the cities of Louisville, Ky., Indianapolis, Ind., Cincinnati and Zanesville, Ohio, Detroit, Jackson and Kalamazoo, Mich., with Chicago (granting that the short connecting link of the Winona Interurban will soon be put in operation), there will be added, if existing plans mature, the extensive interurban system of the Illinois Traction Company. With the resumption of normal business conditions connecting links between the Illinois Traction System at Danville and the Indiana lines at either Crawfordsville or Terre Haute and with Chicago by way of Joliet will add to the interurban network of Indiana, Ohio and Michigan 800 miles of street and interurban lines—this under a single management—and will make possible electric travel between Westfield, N. Y., and St. Louis, Mo.

New lines and extensions that have been completed during the past year include the following to which it may be interesting to refer: In Illinois and Wisconsin the Chicago & Milwaukee Electric Railroad has completed its through line, making possible the service earlier mentioned between Evanston and the business district of Milwaukee. For this service new three-car trains are now being equipped. Also tributary to Chicago the Joliet & Southern Traction Company has built a road from Joliet to the


ELBOW LAKE
WHEATON
MORRIS
ORTONVILLE
BENSON
WILLMAR
MADISON
GRANITE
MARSHALL
LAKE BENTON
SLAYTON
LUVERNE
JACKSON
SIBLEY
ORANGE
SPENCER
ELK PT.
LEMARS
POCAHONTAS
SIOUX CITY
SOUTH SIOUX CITY
DAKOTA CITY
HOMER
PENDER
ONAWA
DENISON
WEST PT.
TEKAMAH
LOGAN
AUDUBON
HARLAN
FREMONT
NOELA
ELKHORN
ATLANTIC
OMAHA
COUNCIL BLUFFS
PAPILLION
ASHLAND
RED OAK
UNIV. PL.
WAVERLY
BETHANY
LINCOLN
MILAND
NEBRASKA CITY
SIDNEY
CLARINDA
VILLISCA
TECUMSEH
ROCKPORT
BEATRICE
AUBURN
MARTON
PAWNEE
FALLS CITY
OREGON
SENECA
TROY
WESTMORELAND
ATCHISON
HOLTON
LEAVENWORTH
OSKALOOSA
ALMA
TOPEKA
BONNER SPGS.
ESKRIDGE
LAWRENCE
CARBONDALE
OLATHE
COUNCIL GROVE
LYNDON
OTTAWA
PAOLI
EMPORIA
GARNETT
BURLINGTON
MOUND CITY
YATES
IOLA
LA HARPE
EUREKA
HUMBOLT
CHANUTE
FREDONIA
ERIE
HOWARD
NEODESHA
GIRARD
CHEROKEE
CHERRYVALE
INDEPENDENCE
COLUMBUS
OSWEGO
CANEY
COFFEYV.
GALENA
PARIS
WOODSTOCK
BUFFALO
DUNKIRK
ERIE
NORTHEAST
CORRY
UNION CITY
CAMBRIDGE SPGS.
CONNEAUT
JEFFERSON
MEADVILLE
TITUSVILLE
OIL CITY
FRANKLIN
FAIRPORT
PAINESVILLE
CHARDON
MIDDLEFIELD
CHARDON
CORTLAND
SHARPSVILLE
MERCER
SHARON
S. SHARON
YOUNGSTOWN
NEWCASTLE
COLUMBIANA
BUTLER
SALEM
LEETONIA
EVANS CITY
LISBON
CANTON
LIVERPOOL
NEW CUMBERLAND
ALLEGHENY
PITTSBURGH
GREENSBURG
NEW PHILA.
DENNISON
STEUBENV.
WELLSBURG
WASHINGTON
ST CLAIRSV.
CONNELLSV.
WHEELING
BELLAIRE
MOUNDSV.
UNIONTOWN
WAYNESBURG
FAIRCHANCE
WOODSFIELD
NEW MARTINSV.
SISTERSV.
FAIRMONT
MIDDLEBOURNE
ST MARYS
CLARKSBURG
PARKERSBURG
WEST UNION
HARRISVILLE
ELIZABETH
GRANTSV.
SPENCER
MICHIGAN
OHIO
KANSAS
WEST VA.



Map Showing Electric Interurban Railways in Operation, Under Construction or Proposed in the Central States.

Indiana line. This new road forms a link in a line of interurban railroads which nearly encircle the city of Chicago at a distance of 40 miles. In Wisconsin the Milwaukee Electric Railway & Light Company has completed an extension to Watertown and the Milwaukee Northern has completed its road from Port Washington to Sheboygan during the past year. Practically no new lines or extensions have been built in Iowa and Missouri, but in Kansas out of the many ambitious projects which have been contemplated for some time an exceptionally substantial line has been built from Pittsburg in the southeastern part of the State to Joplin, Mo., the center of a densely populated mining district. A 40-mile line from Kansas City, Kan., to Olathe, which until recently has been operated with gasoline motor cars, is now being equipped electrically.

Material has been purchased for a 93-mile line in Illinois to be known as the Rock Island Southern. This new line, as announced in the ELECTRIC RAILWAY JOURNAL three weeks ago, will connect Rock Island, Moline and Davenport with Galesburg, Ill., and Burlington, Ia., and will be built so that heavy freight traffic consisting of trains of coal cars may be hauled with locomotives.

A most extensive project completed during the past year in Indiana is the Chicago, Lake Shore & South Bend Railway, which is now operated, as earlier stated, from Hammond on the Indiana-Illinois line to South Bend, Ind., by way of Michigan City, and early this year will be connected by a short line known as the Kensington & Eastern with the Illinois Central Railroad's suburban express service operating from Kensington into Chicago. The Chicago, South Bend & Northern Indiana Railroad has completed a line from La Porte to South Bend, 27 miles, connecting with its existing road from La Porte to Michigan City, so that there are now two lines giving service between South Bend and Michigan City. With the completion on Jan. 25, 1908, of a line between Brazil and Greencastle, Ind., the Terre Haute, Indianapolis & Eastern Traction Company inaugurated through service from Terre Haute to Indianapolis, Ind., over a direct route 73 miles long. Mention already has been made of the construction work which the Winona Interurban Railway has under way between Warsaw and Peru, Ind.

In Michigan a connection is being made between the Detroit, Flint & Saginaw Railway, which now connects Saginaw with Bridgeport, and the Detroit United Railway, which connects Flint with Detroit. The completion of this link will make possible electric railway travel between Bay City and Detroit, Mich., approximately 100 miles apart. At Port Huron the Grand Trunk Railway system has electrified its tunnel under the St. Clair River and is operating all of its freight and passenger service through the tunnel and its terminals by means of single-phase electric locomotives. This project is of especial interest because the locomotives in this service can be called upon to handle 1000-ton trains up grades of 2 per cent and at speeds of from 10 miles to 15 miles an hour. The Michigan United Railways Company has recently inaugurated service on a new line from Lansing to Mason, which link is a part of its high-speed third-rail division completed between Lansing and Jackson. Inasmuch as this company for a number of years has operated a single-track third-rail line from Jackson to Battle Creek, and also has as several divisions operated by overhead trolley, it is interesting to note that the third-rail will be used for distributing current to the cars on its new line from Lansing to Jackson.

In 1908 as in the preceding year several important connections have been built in Ohio. Among these are the Lima-Bellefontaine division, 34 miles long, and the Lima-Toledo division, 72 miles long, of the Ohio Electric Railway. These two connections offer a direct route from Springfield to Lima, Ft. Wayne and Toledo. The Columbus, Delaware & Marion has built an extension from Marion to Bucyrus and the Cleveland, Southwestern & Columbus has been connected with Mansfield over a new route by way of Seville and Ashland. Connecting links between the cities of Youngstown, East Liverpool and Wheeling have also been completed.

RECEIVERSHIPS

The following list of electric railway companies in the hands of receivers includes all of those reporting to the January, 1909, issue of the *Electric Railway Directory*, published by the McGraw Publishing Company. The date of the report is given in each case:

Colorado		
Canon City—Canon City, Florence & Royal Gorge Interurban Railway Company	December,	1908
Eureka Springs—Citizens' Electric Company	December,	1908
Delaware		
New Castle—Wilmington, New Castle & Southern Railway Company	December,	1908
Florida		
Miami—Miami Electric Railway Company	October,	1908
Georgia		
Gainesville—Gainesville Electric Railway Company	December,	1908
Illinois		
Aurora—Aurora, DeKalb & Rockford Electric Traction Company	December,	1908
Chicago—Chicago Consolidated Traction Company	December,	1908
Chicago & Milwaukee Electric Railroad Company	December,	1908
Suburban Railroad Company	December,	1908
Mattoon—Mattoon City Railway Company	December,	1908
Indiana		
Indianapolis—Indianapolis & Cincinnati Traction Company	December,	1908
Kendallville—Toledo & Chicago Interurban Railway Company	December,	1908
New Castle—Indianapolis, New Castle & Toledo Railway Company	September,	1908
Kentucky		
Somerset—Somerset Water, Light & Traction Company	December,	1908
Maine		
Lewiston—Auburn & Turner Railroad Company	December,	1908
Rockland—Rockland, South Thomaston & Owl's Head Railway Company	September,	1908
Michigan		
Owosso—Owosso & Corunna Electric Company	September,	1908
Missouri		
Nevada—Missouri Water, Light & Traction Company	December,	1908
New Jersey		
Camden—Camden & Trenton Railway Company	December,	1908
Trenton—Trenton, Lakewood & Atlantic Railway Company	September,	1908
Trenton & New Brunswick Railroad Company	December,	1908
New York		
Catskill—Catskill Electric Railway Company	December,	1908
Fulton—Fulton & Oswego Falls Street Railway Company	January,	1908
Mount Vernon—Westchester Electric Railroad Company	December,	1908
New York—Dry Dock, East Broadway & Battery Railroad Company	December,	1908
Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Company	December,	1908
Fulton Street Railroad Company	December,	1908
Metropolitan Street Railway Company	December,	1908
New York City Railway Company	December,	1908
Second Avenue Railroad Company	December,	1908
Third Avenue Railroad Company	December,	1908
Twenty-eighth and Twenty-ninth Streets Crosstown Railroad Company	December,	1908
Union Railway Company	December,	1908
Oneonta—Oneonta & Mohawk Valley Railroad Company	December,	1908
Ossining—Westchester Traction Company	December,	1908
Yonkers—Yonkers Railroad Company	December,	1908
Ohio		
Cincinnati—Cincinnati, Hamilton & Dayton Traction Company	December,	1908
Miami & Erie Canal Transportation Company	December,	1908
Cleveland—Municipal Traction Company	December,	1908
Eastern Ohio Traction Company	December,	1908
Toledo—Toledo, Ann Arbor & Detroit Railroad Company	December,	1908
Toledo & Indiana Railway Company	December,	1908
Toledo Urban & Interurban Railway Company	December,	1908
Pennsylvania		
Erie—Conneaut & Erie Traction Company	December,	1908
Gettysburg—Gettysburg Transit Company	December,	1908
Philadelphia—Philadelphia, Bristol & Trenton Street Railway Company	December,	1908
South Carolina		
Anderson—Anderson Traction Company	December,	1908
Tennessee		
Clarksville—Clarksville Railway & Light Company	December,	1908
Virginia		
Richmond—Virginia Passenger & Power Company	December,	1908
Norfolk—Norfolk & Southern Railway Company	December,	1908

NEW ELECTRIC RAILWAY TRACK CONSTRUCTION IN 1908

The accompanying table shows the miles of single track built by electric railways during the year 1908 in the United States, Mexico and Canada, and has been compiled from answers received from the railway companies whose names appear in the list. The figures as given are therefore official, but, unfortunately, replies were not received from all companies, hence there may be some omissions. The total new mileage represented in the table is 1258.51. This is a large falling off from the unofficial figures compiled last year, but in view of the unusual financial conditions and the appointment of various railroad commissions, much new construction was held in abeyance during the year.

New York heads the list of States, with a total of 183.76 miles of single track built. This total is made up largely of the 56 miles of double track of the Buffalo, Lockport & Rochester and 22 miles of double track of the Rochester, Syracuse & Eastern, representing a total of 156 miles of single track. Ohio is second, with 170.75 miles. Three important new lines were built in this State during the year, notably the Mansfield-Seville extension of the Cleveland, Southwestern & Columbus, 44 miles; the Lima-Bellefontaine extension of the Ohio Electric Railway, 34 miles, and the Deshler-Toledo extension of the same road, 36 miles. In Pennsylvania the Pittsburg, Harmony, Butler & Newcastle, with 62 miles, contributed the largest part of the total new construction, which amounted to 113.97 miles. Other important lines opened during the year include the Texas Traction Company, from Dallas (Tex.) to Sherman, 63 miles; the Denver & Interurban, from Denver (Colo.) to Boulder, 40 miles; the Lewiston (Me.), Augusta & Waterville Street Railway, 42 miles, and the Joplin & Pittsburg from Joplin, Mo., to Pittsburg, Kan., 30 miles. The extension of the Chicago, Lake Shore & South Bend from Michigan City to Hammond, Ind., 36 miles, was completed during the year, and was the longest line built in that State. The Lincoln-Mackinaw extension of the Illinois Traction system was the longest line built in Illinois. In Wisconsin The Milwaukee Electric Railway & Light Company opened a new line 30 miles long from Waukesha to Watertown.

ALABAMA.

	Miles.
Mobile Light & R. R. Co	0.50
North Alabama Traction Co	0.50
Total	1.00

CALIFORNIA.

East Shore & Suburban Ry. Co.—Stege to Oakland and Richmond	1.75
Fresno Traction Co	5.00
Hueneme, Malibu & Port Los Angeles Ry	5.00
Los Angeles & Mt. Washington Railway Co	0.57
Los Angeles Ry. Co	8.14
Los Angeles & San Diego Beach Ry.—Terminal loops	1.00
Peck Railroad Co	2.00
Point Loma Railroad Co	8.30
Total	31.76

COLORADO.

Denver & Interurban R. R.—At Ft. Collins; Denver to Boulder; Marshall to Eldorado Springs	40.00
The Grand Junction Electric Railway Co	3.00
The Kansas-Colorado Railroad Co	20.00
Southern Colorado Power & Ry. Co.—Sopris Plaza to Viola and Cokedale	5.00
Total	68.00

DISTRICT OF COLUMBIA.

Capital Traction Co	3.00
Washington Railway & Electric Co	4.10
Total	7.10

FLORIDA.

	Miles.
Tampa-Sulphur Springs Traction Co.—Between Ybor City and West Tampa	1.50
Total	1.50

IDAHO.

Boise Valley Railway Co.—Between Ustick and Meridian	10.00
Total	10.00

ILLINOIS.

Calumet & South Chicago Ry.	3.00
Chicago City Railway	6.67
Chicago, Ottawa & Peoria Ry.—(Illinois Valley Division)	0.37
Chicago Railways Co.	4.00
Dixon, Rock Falls & Southwestern Electric Railway Co.—Tampico to Yorktown	7.00
Illinois Traction System.—Mackinaw Junction to Lincoln	27.00
Illinois Valley Railway Co.—(See Chicago, Ottawa & Peoria Ry.)	.....
Joliet & Southern Traction Co.—Joliet to Chicago Heights.	14.90
Mississippi Valley Int. Ry.—Springfield to Rochester and Clear Lake	6.00
Murphysboro Street Railway Co	1.50
Northwestern Elevated R. R.	0.40
Sangamon Valley Railway Co	8.00
Sterling, Dixon & Eastern Electric Railway Co	1.00
Taylorville Railway, Light, Heat & Power Co	4.00
Total	83.84

INDIANA.

Chicago, Lake Shore & South Bend.—Michigan City to Hammond	36.00
Evansville Railways Co.—Between Evansville and Newburgh	10.00
The Evansville & Southern Indiana Traction Co.—Princeton to Patoka	4.30
Evansville Terminal Railway	9.62
Gary & Interurban Railway Co.—To Toleston	5.50
Marion Bluffton & Eastern Traction Co.—In Marion	0.33
Total	65.75

IOWA.

Albia Interurban Railway Co.—Albia to Hiteman	6.00
Clinton Street Railway Co	1.00
Colfax Springs Railway Co	1.00
Ottumwa Railway & Light Co	0.20
The Sioux City Traction Co	4.00
Tri-City Railway Co	2.33
Waterloo, Cedar Falls & Northern Railway Co.—In Waterloo	8.00
Total	22.53

KANSAS.

Girard Coal Belt Electric Railway.—Dunkirk to Crowberg	5.00
Hutchison Interurban Railway Co	2.00
Joplin & Pittsburg Railway Co.	13.00
Kansas City & Olathe Electric R. R. Co.—To Hocher's Grove, Shawnee	3.00
Total	23.00

KENTUCKY.

Lexington & Interurban Railway	2.00
Ohio Valley Electric Ry. Co.—Ashland to South Ashland	1.25
Paducah Traction Co., Inc	0.19
Total	3.44

LOUISIANA.

St. Tammany & New Orleans Ry. Co.—Covington to Mandeville and Abita Springs	13.50
Total	13.50

MAINE.

Bangor Railway & Electric Co	0.50
Lewiston, Augusta & Waterville St. Ry.—Lewiston to Winslow	41.90
Total	42.40

MARYLAND.

Maryland Electric Railways Co.	4.00
United Railways & Electric Co.	3.33
Washington, Frederick & Gettysburg Ry. Co.—Lewistown to Catoctin Furnace	3.50
Total	10.83

MASSACHUSETTS.

Boston Elevated Railway Co	10.06
Boston & Northern Street Railway Co	1.04
Concord, Maynard & Hudson Street Railway Co	0.18
Holyoke Street Railway Co	0.88
Old Colony St. Ry. Co	0.46
Shelburne Falls & Colerain St. Ry. Co.—Extension to Buckland	0.13
Total	12.75

MEXICO.

Compania Electrica y de Ferrocarriles de Chihuahua	7.00
Total	7.00

MICHIGAN.

	Miles.
Detroit United Railway	2.00
Michigan United Railways—Mason to Lansing	12.00
Houghton County Traction Co.—Allouez to Mohawk, and extension north of Calumet	5.00
Saginaw-Bay City Railway & Light Co.—In Saginaw	0.82
Total	19.82

MINNESOTA.

Northern Traction Co.—In Hibbing	0.75
Twin City Rapid Transit Co	2.00
Winona Railway & Light Co	0.25
Total	3.00

MISSISSIPPI.

Columbus Railway, Light & Power Co	1.25
Yazoo City Light, Water & Sewerage Plant	3.00
Total	4.25

MISSOURI.

Blue Valley Railway	1.25
Excelsior Springs & Suburban Ry. Co	2.50
Joplin & Pittsburg Railway Co.	17.00
Kansas City, Ozarks & Southern Mansfield Ry.—Mansfield to Ava	9.00
Total	29.75

MONTANA.

Great Falls Street Railway Co.	0.25
Total	0.25

NEBRASKA.

Omaha & Council Bluffs St. Ry. Co	6.00
Total	6.00

NEW JERSEY.

Atlantic City & Shore R. R. Co.—In Atlantic City	0.27
Orange Mountain Traction Co.—Orange Valley and St. Cloud	2.00
Total	2.27

NEW YORK.

Binghamton Railway Company	0.68
Buffalo & Lake Erie Traction Co	27.00
Buffalo, Lockport & Rochester Ry. Co.—Rochester to Lockport	112.00
Hornellsville & Canisteo Railway Co	0.13
Interborough Rapid Transit Co.—Brooklyn extension and to Van Cortlandt Park	8.50
New York, Auburn & Lansing R. R. Co	5.00
The New York & North Shore Traction Co.—Mineola to Hicksville	6.00
Orange County Traction Co	0.50
Rochester, Syracuse & Eastern Railroad Co.	44.00
Schenectady Ry. Co.—Schenectady and Scotia	0.50
Suffolk Traction Co.—In Patchogue	4.00
United Traction Co.	1.95
Western New York & Pennsylvania Traction Co.—Limestone, Salamanca and Little Valley	17.50
Total	183.76

NORTH CAROLINA.

Consolidated Ry. & Power Co.—Fayetteville to Hope Mills.	3.50
Goldsboro Traction Co	2.00
Weaverville Elec. Co	5.00
Total	10.50

OHIO.

Cleveland, Southwestern & Columbus Ry. Co.—Seville to Mansfield	44.00
Columbus, Marion & Bucyrus Ry.—From Marion to Bucyrus	18.00
Dayton & Troy Electric Ry. Co	0.50
Northern Ohio Traction & Light Co	0.75
Ohio Electric Railway.—Lima to Bellefontaine	34.00
Deshler to Toledo	40.00
The Scioto Valley Traction Co.—Extension into Chillicothe.	0.50
Toledo, Fostoria & Findlay Railway Co	4.00
Youngstown & Ohio River	29.00
Total	170.75

OKLAHOMA.

El Reno Interurban Ry. Co	1.00
Oklahoma, Kansas & Missouri Interurban Railway Co	4.50
Oklahoma Railway Co.—Oklahoma City to Britton	8.00
Total	13.50

OREGON.

United Railways Co.—Claremont to Holbrook	20.00
Total	20.00

PENNSYLVANIA.

	Miles.
Allen St. Ry. Co.—Nazareth to Bath	5.17
Chambersburg, Greencastle & Waynesboro Street Ry.—Greencastle to Chambersburg	11.50
Conestoga Traction Co.—Mount Joy to Elizabethtown	6.57
Easton Transit Co.—Northampton Heights to South Bethlehem	1.21
Hanover & McSherrystown St. Ry. Co.—Brushtown to Littlestown	5.50
Juniata Valley Elec. St. Ry. Co. & Big Valley St. Ry. Co.—To Cold Springs Park	3.00
Monongahela & Carroll Street Railway Co	0.32
Philadelphia Rapid Transit Co.—Elevated and subway	2.50
Pittsburg, Harmony, Butler & New Castle Ry. Co	62.20
Sunbury & Northumberland Elec. Ry. Co	3.00
Washington & Canonsburg Ry. Co.—From Canonsburg to Castle Shannon	13.00
Total	113.97

RHODE ISLAND.

New York, New Haven & Hartford Railroad.—Tunnel Providence to East Providence	1.98
The Rhode Island Co.	2.50
Total	4.48

TENNESSEE.

Johnson City Traction Co	0.50
Lake View Traction Co	4.00
Nashville Interurban Railway Co.—Nashville to Franklin	17.00
Total	21.50

TEXAS.

Amarillo St. Ry. Co	1.75
Angelo Power & Traction Co	4.50
Austin Electric Ry. Co	0.50
El Paso Electric Railway Co.	2.11
Gainesville, Whitesboro & Sherman Ry. Co.—Gainesville to Callisburg	12.00
Houston Electric Railway.—Houston to Harrisburg	3.50
Texas Traction Co.—Dallas to Sherman	63.00
Uvalde Electric Railway.—Uvalde Station to Uvalde	3.50
Total	90.86

UTAH.

Emigration Canyon R. R. Co—To Emigration Resort and Head of Emigration Canyon	14.00
Total	14.00

VIRGINIA.

Bluestone Traction Co	1.50
Total	1.50

WASHINGTON.

Puget Sound Elec. Ry.—Tacoma to Puyallup	6.00
Seattle Electric Company	15.00
Yakima Valley Transportation Co	3.00
Total	24.00

WEST VIRGINIA.

Fairmont & Mannington R. R. Co.—Fairmont to Downes	12.00
Elkins Electric Railway Co.—Elkins to Belington	3.00
Morgantown Interstate R. R. Co	2.00
Tri-State Traction Co.—At Follansbee, W. Va	0.50
Wellsburg, Bethany & Washington Traction Co.—Wellsburg to Bethany	8.00
Wheeling Traction Co	1.00
Total	26.50

WISCONSIN.

Chicago & Milwaukee Electric Ry. Co.	14.00
Janesville Street Railway Co	0.50
Milwaukee Electric Ry. & Lt. Co.—Waukesha to Watertown	30.00
Milwaukee Northern Railway Co.—Belgium to Sheboygan	26.50
Wausau Street Railway Co	1.50
Total	72.50

WYOMING.

Cheyenne Electric Railway Co.—Cheyenne to Fort D. A. Russell	5.00
Total	5.00

CANADA.

Berlin & Waterloo St. Railway	0.11
British Columbia Elec. Railway Co., Ltd	5.00
Chatham, Wallaceburg & Lake Erie Railway Co.—To Erie Beach	9.00
Hull Electric Company	1.84
Mount McKay & Kakabeka Falls Railway	3.00
Sarnia Street Railway Co	1.50
Total	20.45

ELECTRIC RAILWAY ROLLING STOCK ORDERED IN 1908

The accompanying table gives in detail a statement of all of the electric railway rolling stock equipment ordered by the roads of North America during the year 1908. The figures have been compiled from a canvass of all of the electric railway companies and from reports made by all of the manufacturing companies of the United States and Canada building electric railway cars. The statistics, therefore, are complete and accurate, with the possible exception of some few cars not reported, which were ordered built in companies' shops during the year.

The total number of cars ordered was 3226. Compared with the orders placed in 1907 this is a decrease of 48 per cent. In 1907 the number of cars ordered is given in the statistics published in the Electric Railway Review of Jan. 4 was 6311. In 1906 the total number of cars was 6127. The comparative figures for the three years, classified according to the service in which the cars are used, are given below:

	1906	1907	1908
Passenger cars—city	3730	3483	2008
Passenger cars—interurban	1523	1327	727
Freight cars	851	1406	176

The totals for 1906 and 1907 did not include snow plows, sweepers and other miscellaneous cars, but did include electric locomotives. The figures for 1908 include 315 work and miscellaneous cars and electric locomotives.

ROLLING STOCK EQUIPMENT ORDERED IN 1908

Purchaser	No.	Class	Length	Serv.	Trucks	Builder
Albia Int. Ry. Co.	2	Closed	23–0	Int.	S. T.	St. Louis
Algiers Ry. & Lt. Co.	2	Closed	30–5	.....	S. T.	Am. Car
Allentown & Reading Trac.	1	Pass.	.....	.....	.....	Stephenson
Amarillo St. Ry. Co.	2	Open	32–0	City	S. T.	Danville
Ardmore Trac.	2	Open	.....	.....	.....	St. Louis
	4	Closed	....	Int.	D. T.	St. Louis
	4	Semiconv.	21–0	City	S. T.	St. Louis
Ashville Elec. Co.	6	Semiconv.	....	City	S. T.	Brill
Athens Elec. Ry.	2	Semiconv.	30–1	City	S. T.	Am. Car Co.
Auburn & Northern Elec.	1	Closed	53–6	Int.	D. T.	Kuhlman
Aurora, Elgin & Chicago	3	Closed	..	Int.	....	Kuhlman
	1	Bagg.	...	Int.	D. T.	Brill
	1	Bagg.	46–0	Int.	D. T.	Am. Car Co.
Austin Elec. Ry. Co.	2	Closed	31–0	City	S. T.	South'n Car
Bangor Ry. & Elec. Co.	4	Closed	28–0	City	S. T.	Brill
	2	Comb.	38–0	Int.	D. T.	Brill
	1	S. Plow	22–0	Int.	S. T.	Russell
Bartlesville Int. Ry. Co.	2	Closed	43–0	Int.	D. T.	St. Louis
Benton Harbor & St. Joe Ry. & Lt. Co.	2	Semiconv.	30–8	.....	S. T.	Am. Car
Binghamton Ry. Co.	4	Closed	22–0	City	S. T.	Stephenson
	1	Work	20–0	City	S. T.	Co. Shops
Birmingham Ry., Lt. & Pr. Co.	1	Sprink.	...	Both	D. T.	McGuire C.
Black River Trac. Co.	3	Special	.....	.....	.....	Co. Shops.
Bluestone Trac. Co.	3	Semiconv.	28–0	City	S. T.	South'n Car
Boston & Northern St. Ry. Co.	4	Coal	38–4	Both	D. T.	Laconia
	4	S. Plows	33–6	City	S. T.	Wason
Brit. Columbia Elec. Ry., Ltd.	4	Closed	50–0	Int.	D. T.	Co. Shops
	10	Semiconv.	38–0	City	D. T.	Stephenson
	20	Semiconv.	42–0	City	D. T.	Co. Shops
	30	Flats	35–0	Int.	D. T.	Can. Pacific
	1	Flat	35–0	Int.	D. T.	Co. Shops
	6	Side Dump	15	City	S. T.	Co. Shops
	3	Ballast	10	Int.	S. T.	Co. Shops
	3	Elec. Loco.	.....	.....	.....	Dick, Kerr
Buffalo Const. Co.	2	Closed	31–8	City	D. T.	Kuhlman
Buffalo & Lake Erie Trac.	8	Comb.	52–0	Int.	D. T.	Cincinnati
	1	S. Plow	....	Int.	D. T.	Cincinnati
	1	Work Car	.....	.....	.....	Smith & W.
Buff., Lock. & Roch.	1	S. Plow	47 0	Int.	D. T.	McGuire C.
Capital Trac.	55	Semiconv.	42–0	.....	D. T.	Cincinnati
	11	Semiconv.	43–8	.....	D. T.	Cincinnati
Carbon St. Ry. Co.	3	Semiconv.	32–0	Both	S. T.	Brill
Central Kentucky Trac.	2	Closed	55–0	Int.	D. T.	Brill
Chambsb., G'castle & Waynesb.	3	Semiconv.	....	Sub.	D. T.	Brill
Chatham, Wallaceb. & L. Erie.	1	Closed	46–0	Int.	D. T.	Jacks'n-Shp.
	2	Trail	40–0	Int.	D. T.	Brill
	1	Elec. Loco.	....	Int.	D. T.	Baldwin
Chicago City Ry.	30	Work	...	City	D. T.	Co. Shops
	1	Freight	.	City	D. T.	Co. Shops
	1	S. Plow	....	City	D. T.	Co. Shops
	5	S. Plows	....	City	S. T.	Wason
	2	Elec. Loco.	....	City	D. T.	Co. Shops
	10	S. Sweep	....	City	S. T.	McGuire C.
	12	S. Sprink	....	City	D. T.	Co. Shops
Chicago Heights Ry.	1	S. Sweep	...	.....	S. T.	McGuire C.
Chicago, Lake Shore & S. Bend	2	Open	...	Int.	D. T.	Kuhlman
	10	Closed	.....	...	D. T.	Brill
Chicago & Mil. Elec. Ry.	3	Closed	52–0	Int.	D. T.	Jewett
	3	Comb.	52–0	Int.	D. T.	Jewett
	3	Parlor	52–0	Int.	D. T.	Jewett
	1	S. Plow	....	Int.	D. T.	McGuire C.
Chicago, Ottawa & Peoria.	1	Closed	40–0	Int.	D. T.	Danville
	4	Open	28–0	City	S. T.	Danville
	6	Trail C.	40–10	Int.	D. T.	Danville
	25	Gondola	25–0	Freight	D. T.	.....
	1	Elec. Loco.	30–0	Freight	D. T.	La Salle
Chicago Rys. Co.	100	Closed	....	City	D. T.	Pressed Steel
	600	Semiconv.	49–2	City	D. T.	Pullman
	15	S. Sweep	..	.....	S. T.	McGuire C.
Chicago, S. Bend & No. Ind.	10	Closed	32–0	City	S. T.	Cincinnati
Chicago & Southn. Trac.	1	Exp.	52–6	Int.	D. T.	Niles
	2	S. Plow	.....	.....	.....	Hicks
Chicago, Wheaton & Westn.	4	Closed	52–10½	Int.	D. T.	Kuhlman
Chillicothe El. R.R. Lt. & Pwr.	2	Semiconv.	29–0	City	S. T.	Kuhlman
Choctaw Ry. & Ltg. Co.	2	Trail C.	46–4	Int.	D. T.	Niles
Citizens' Ry. Co.	1	Pass	31–8	City	S. T.	McGuire C.
	3	Semiconv.	36–4	.....	D. T.	Am. Car Co.
	14	Pass	30–0	City	S. T.	Co. Shops
Clinton St. Ry. Co.	2	Semiconv.	30–8	City	S. T.	Am. Car
Columbia El. St. Ry., Lt. & Pr.	2	Semiconv.	....	City	D. T.	Brill
Columbus Ry. & Lt. Co.	10	Closed	28–5½	City	D. T.	Kuhlman
Columbus, Urbana & Westn.	1	Open	....	Int.	D. T.	McGuire C.
	1	Comb.	50–0	Int.	D. T.	Jewett
C. E. y de F. de Chihuahua	6	Conv.	30–0	City	S. T.	Am. Car Co.
Com. de Tran. Luz y Fuer.	3	Closed	32–6	.....	D. T.	Am. Car
	10	Conv.	30–7	.....	S. T.	Am. Car
	3	Work	30–0	.....	D. T.	Am. Car

Purchaser	No.	Class	Length	Serv.	Trucks	Builder
Connecticut Co.	4	Work	43–6	Int.	D. T.	McGuire C.
	3	Crane	43–6	Int.	D. T.	McGuire C.
Connecticut Valley St. Ry.	5	Open	43 -1½	Int.	D. T.	Wason
	2	Closed	42–0	Int.	D. T.	Wason
Cons. Ry. & Power Co.	19	Closed	....	Both	D. T.	Stephenson
Cornwall St. Ry., Lt. & Power.	1	Fr. Loco.	30–0	Yard	D. T.	Ottawa
Dallas Cons. Elec. St. Ry.	1	Sprink.	....	.....	D. T.	McGuire C.
Danbury & Bethel.	1	S. Sweep	....	City	S. T.	Brill
Danville Ry. & Elec. Co.	12	Open	31–0	Both	S. T.	Jacks'n-Shp.
	5	Closed	27–0	Both	S. T.	St. Louis
	6	Closed	32–0	Both	S. T.	Southern
	3	Trail, O.	25–0	.....	.....	Jacks'n-Shp.
Dayton City Ry. Co.	20	Semiconv.	31–10	City	S. T.	Barney & S.
Dayton & Troy Elec. Ry.	1	Pass	31–0	City	S. T.	Am. Car Co.
	2	Pass	31–8	City	S. T.	Am. Car Co.
Denver & Int. R. R.	8	Closed	55–6	Int.	D. T.	St. Louis
	4	Semiconv.	38-10½	City	D. T.	Woeber
	4	Semiconv.	40–1¾	City	D. T.	Jewett
	4	Trail., C.	53–10	Int.	D. T.	St. Louis
Des Moines City Ry.	1	S. Plow	30–0	City	D. T.	Co. Shops
	1	E. Loco.	30–0	Both	D. T.	Co. Shops
Dela., Lack. & Western Ry.	3	Elec Loco.	....	.....	.....	Westingh.
Detroit United.	25	Closed	29–0	City	D. T.	Kuhlman
Dominion Pwr. & Trans Co.	2	Semiconv.	32–0	City	S. T.	Kuhlman
	1	Scraper	.....	City	S. T.	Kuhlman
East Shore & Suburban Ry.	1	Flat	40–0	Both	D. T.	Co. Shops
E. St. Louis & Subur. Ry. Co.	15	Closed	45–4	Both	D. T.	Am. Car
	20	Pass.	....	Sub.	.....	Am. Car
Edmonton Radial Ry. System	6	Semiconv.	39–0	City	D. T.	Ottawa
	1	Semiconv.	30–0	City	S. T.	Ottawa
Elmira, Corning & Waverly.	1	Closed	33–0	Int.	S. T.	Stephenson
El Paso Elec. Ry.	1	Sprink.	....	Both	D. T.	Brill
Emigration Canyon R. R.	4	Gondola	20–9½	Int.	D. T.	Kil. & Jacobs
Evansville & S. Indiana.	1	Work	....	Both	D. T.	Co. Shops
Exe., Hamp. & Ames. St. Ry.	2	Open	40–9	Int.	D. T.	Co. Shop
Fairmont & Mannington.	2	Semiconv.	42–0	Int.	D. T.	Brill
Fargo & Moorehead.	1	Flat	36–6	Cattle	D. T.	MitshkumCo
Farmington St. Ry.	2	Closed	33–0	Int.	D. T.	Wason
Fifth Avenue Coach Co.	2	Buses	....	City	S. T.	Brill
Ft. Dodge, D. Moin. & S. R.R.	2	Closed	45–0	City	D. T.	St. Louis
Ft. Madison St. Ry. Co.	2	Open	30–0	City	S. T.	Brill
Ft. Smith Lt. & Trac.	6	Semiconv.	40–0	City	D. T.	Am. Car
Fort Wayne & Springfield Ry.	1	Refrig.	40–0	City	D. T.	Co. Shops
Fries Mfg. & Pwr. Co.	1	Semiconv.	....	City	S. T.	Brill
Galesburg Ry. & Lt. Co.	6	Semiconv.	....	City	D. T.	Danville
Gary & Int. Ry.	4	Closed	42–0	City	D. T.	Danville
	1	S. Plow	....	City	S. T.	McGuire C.
Girard Coal Belt El. Ry. Co.	1	Closed	40–0	.....	D. T.	Am. Car
	1	Closed	42–0	Int.	S. T.	St. Louis
Grafton St. Ry. Co.	1	Closed	30–0	City	S. T.	Jewett
Grand Trunk Ry.	1	Elec. Loco.	.....	.....	.....	Westingh.
Great Falls St. Ry Co.	2	Closed	28–10	City	S. T.	Am. Car
Green Bay Traction Co.	2	Semiconv.	30–38	.....	S. T.	Am. Car
Gulfport & Miss. Coast Trac.	3	Semiconv.	30–4	City	S. T.	Brill
Hanover & McSherrystown.	1	Convert.	41–0	Int.	D. T.	Brill
	1	Convert.	31–0	Both	S. T.	Brill
Havana Central R. R.	50	Freight	34–0	.....	D. T.	McGuire C.
Holyoke St. Ry.	3	Open	43–0	Int.	D. T.	Wason
	3	....	43–1½	....	.....	.....
Houghton County Trac.	4	Pass.	42–9	Int.	D. T.	Brill
	1	S. Plow	....	Int.	D. T.	Co. Shops
Hudson & Manhattan R. R.	50	Closed	48–0	Int.	D. T.	Pressed Steel
Hull Electric Co.	5	Semiconv.	42–0	Int.	D. T.	Ottawa
	1	S. Plow	45–3	Int.	D. T.	Russell
Hutchinson Int. Ry. Co.	1	Semiconv.	30–8	City	S. T.	Am. Car
Illinois Central Elec.	4	Open	30–0	City	S. T.	Danville
	2	Semiconv	41–0	Both	D. T.	Danville
Illinois Traction.	8	Closed	52–6	Int.	D. T.	Danville
	2	Sleepers	52–6	Int.	D. T.	Danville
	35	Gondola	40–0	Int.	D. T.	Hask.-Bark.
	1	S. Sweeper	....	Int.	S. T.	McGuire C.
Illinois Valley Ry.	4	Open	....	City	S. T.	Danville
	7	Trail., C.	40–10	Int.	D. T.	Danville
	25	Gondola	25–0	Frt.	D. T.	.....
	1	Elec. Loco.	30–0	Frt.	D. T.	Co. Shops
Indiana Union Traction.	1	Elec. Loco.	28–0	Frt.	D. T.	Co. Shops
Intermountain Ry.	3	Comb.	48–0	Int.	D. T.	McGuire C.
	1	Comb.	41–6	Int.	D. T.	McGuire C.
Inter-Urban Ry.	10	Gondola	35–7	Int.	D. T.	Hicks
Int. Ry. & Terminal Co.	2	Freight	45–0	Int.	D. T.	Co. Shops.
	7	Coal	45–0	Int.	D. T.	Co. Shops
Jacksonville Elec. Co.	5	Closed	44–0	Int.	D. T.	Brill
Jacobs Welding Co.	1	Closed	34–0	.....	D. T.	McGuire C.
Jefferson Traction.	1	Open	30–0	City	S. T.	Brill
Jersey Central Trac. Co.	4	Open	....	Int.	D. T.	Brill
Joliet & Southern.	5	Closed	46–0	Int.	D. T.	Am. Car
	1	Work	40–0	Int.	D. T.	Am. Car

Purchaser	No.	Class	Length	Serv.	Trucks	Builder
Joplin & Pittsburg Ry. Co.	1	Express	44–0	Int.	D. T.	Jewett
Kan. C., Ozarks & S. Mansf'ld.	2	Comb.	51–0	Int.	D. T.	St. Louis
La Crosse City Ry. Co.	3	Semiconv.	30–5	City	S. T.	Am. Car
	1	S. Plow	29–0	City	S. T.	McGuire Co.
Lancaster Trac. & Power Co.	1	Work	36–0		D. J.	Am. Car
Laredo Elec. & Ry. Co.	5	Open	26–0	City	S. T.	Brill
	1	Work	30–0	City	S. T.	Co. Shop
Lehigh Valley Transit Co.	4	Open	44–8	Int.	D. T.	Brill
Lewiston, Aug. & Waterville	4	Semiconv.	42–6	Int.	D. T.	Brill
	2	S. Plows	22–0	City	S. T.	Russell
Lexington & Interurban Ry.	2	Closed	55–0	Int.	D. T.	Brill
Little Rock & Pine Bluff Trac.	8	Closed		Int.	D. T.	Jewett
London Street Ry. Co.	2	Ballast	12–0		S. T.	C. Shop
Los Angeles & Redondo Ry.	6	Closed.	47–6	Int.	D. T.	Co. Shops
Los Angeles & San Diego Bch.	2	Gas. Mot.	55–0	Int.	D. T.	McKeen
Louisville & Southern Ind.	4	Closed	48–0	Int.	D. T.	Am. C. & F.
Mankato Elec. Trac.	4	Closed	30–8	City	S. T.	McGuire C.
	1	S. Sweep		City	S. T.	McGuire C.
Marion Bluffton & Eastn. Trac.	1	Closed	45–0	Both	D. T.	Cincinnati
Marquette County Gas & Elec.	1	Closed	41–0	Both	D. T.	Niles
Marshalltown Lt., Pwr. & Ry.	1	Closed	26–0	City	S. T.	Brill
Milford & Uxbridge St. Ry.	2	Semiconv.	39–0	Int.	D. T.	Jones
Meridian Lt. & Ry. Co.	1	Closed	28–0	City	S. T.	Co. Shops
Metropolitan Street Ry. Co.	75	Closed	46–11	City	D. T.	Brill
	50	Closed	46–11	City	D. T.	Jewett
	2	Closed	46–11	City	D. T.	Stand. Steel
	50	Closed		City	D. T.	Stephenson
Milwaukee Elec. Ry. & Lt.	10	Closed	53–5	Int.	D. T.	Kuhlman
Milwaukee Northern Ry. Co.	2	Closed	50–0	Int.	D. T.	Niles
	1	S. Plow	58–4	Int.	D. T.	Russell
Mississippi Valley Int. Ry.	2	Closed		Int.	D. T.	St. Louis
	2	Closed	42–0		D. T.	St. Louis
Missouri & Kan. Inter. Ry.	3	Closed	45–6		D. T.	Am. Car
Montgomery Traction Co.	8	Conv.	40–0	City	D. T.	Brill
Montreal St. Ry. Co.	2	S. Plows			S. T.	McGuire C.
Mt. Hood Ry. & Power Co.	40	Flat				Hicks
Municipal Traction Co.	1	Closed		Sample	D. T.	St. Louis
	1	Closed	52–0	City	D. T.	Cincinnati
	3	S. Sweep.		City	S. T.	McGuire C.
Nahant & Lynn St. Ry. Co.	1	Semiconv.	30–8	City	S. T.	Brill
Nashville & Int. Ry. Co.	3	Closed	40–0	Int.	D. T.	Danville
	1	Express	40–0	Int.	D. T.	Danville
New Bedford & Onset St. Ry.	1	Express	39–0	Int.	D. T.	Jones
N. J. & Pa. Trac. Co.	3	Closed	45–0	Int.	D. T.	Brill
New Orleans Ry. & Lt. Co.	35	Closed	30–8	City	S. T.	McGuire C.
Newport & Fall River St. Ry.	1	S. Plows				Wason
New York Central	12	Elec. Loco.				American
New York City Ry.	1	S. Plows		City		Smith-Wal.
N. Y., N. H. & Hartford	4	Motor	70	10½ Sub.	D. T.	Stand. Steel
	6	Trail	70–10½	Sub.	D. T.	Stand. Steel
	6	El. Loco.	38–1½			Westingh.
New York & North Shore	1	Flat		Int.	D. T.	Brill
Northern Cambria St. Ry.	3	Comb.	28–0	Int.	S. T.	St. Louis
	4	Comb.	28–0	Int.	D. T.	St. Louis
Northern Elec. Ry. Co.	1	Comb.			D. T.	Co. Shops
	1	Elec. Loco.			D. T.	Co. Shops
Northern Ill. Lt. & Traction.	1		29–0	City	S. T.	
Northern Ohio Trac. & Lt.	4	Closed	52–10¾	Int	D. T.	Kuhlman
Northwestern Elevated R. R.	20	Closed		Elev.	D. T.	Pullman
Oakland Traction Co.	20	Closed		City		Co. Shops
Old Colony St. Ry. Co.	4	Express	39–4	Int.	D. T.	Danville
	4	S. Plows	33–6	City	S. T.	Wason
Omaha & Council Bluffs.	10	Closed	40–0	City	D. T.	Am. Car
	8	Closed	42–0	City	D. T.	Co. Shops
	1	Sprink.		City	D. T.	Co. Shops
Omaha Lincoln & Beatrice	2	Closed	42–0	Int.	D. T.	St. Louis
Oneonta & Mohawk Valley	4	Closed	53–3	Int.	D. T.	Cincinnati
Ontario Construction Co.	7	Closed	49–9	Int.	D. T.	Cincinnati
Oregon Elec. Ry. Co.	6	Closed	57–8	Int.	D. T.	Niles
	2	Express	57–8	Int.	D. T.	Niles
Ottawa Elec. Ry. Co.	2	Closed		City	S. T.	Preston
	14	Semiconv.	31–0	City	S. T.	Ottawa
	1	Work	36–0	Work	D. T.	Ottawa
	1	S. Sweep	41–0	City	D. T.	Russell
	1	S. Sweep.		City		Ottawa
Ottumwa Ry. & Light Co.	3	Semiconv.	30–8	City	S. T.	Am. Car
Pen Yan, Keuka Pk. & Brav. Pt.	1	Elec. Loco.	35–0	Int.	D. T.	Jones
Philadelphia R. T. Co.	8	Ash		City	D. T.	Co. Shops
Pittsburg & Butler	4	Comb.	51–3	Int.	D. T.	Cincinnati
Pitts., Harm., Butler & N. C.	2	Express	46–0	Int.	D. T.	Niles
Portland Ry., Lt. & Pwr. Co.	5	Closed	47–10	City	D. T.	Am. Car
	20	Closed	45–0	City	D. T.	Am. Car
Porto Rico Rys. Co.	3	Semiconv.	40–0	Int.	D. T.	Brill
Puget Sound Elec. Ry.	3	Trail. C.	50–0	Int.	D. T.	St. Louis
	2	Comb.	50–0	Int.	D. T.	St. Louis
	1	Elec. Loco.	36–0	Yard	D. T.	Co. Shop
Quebec Ry. Lt. & Pwr. Co.	6	Open	29–0	City	S. T.	Ottawa
	5	Closed	27–0	City	S. T.	Ottawa
Quincy H. Ry. & Carrying Co.	8	Open	30–0	City	S. T.	Danville
	2	Closed	30–0	City	S. T.	Danville
Raleigh Elec. Co.	3	Semiconv.		City	S. T.	Brill
Reading & Wolmesdorf Ry.	5	Semiconv.	40–0	Int.	D. T.	Stephenson
Rio de Janeiro Lt. & Trac.	25	Open	27–0		S. T.	St. Louis
Rochester Ry.	2	S. Sweep.				Kuhlman
Rochester, Syracuse & East.	2	Closed	53–6	Int.	D. T.	Kuhlman
	1	S. Plow	39–3	Int.	D. T.	Russell
Rutland Ry., Lt. & Pwr. Co.	1	Express	44–0	Int.	D. T.	Laconia
Saginaw & Flint Ry.	4	Closed	50–4	Int.	D. T.	Niles
Salina St. & Inter Ry. Co.	2	Comb.	36–0	City	D. T.	Woeber
San Diego Southern	5	Closed	45–10	Int.	D. T.	Niles
San Diego Southern	1	Sight See.	45–10	Int.	D. T.	Niles
Sandy Spring Ry.	1	Gondola		City	S. T.	Brill
S. Francisco, Vallejo & Napa.	2	Closed	56–0	Int.	D. T.	Niles
Sapulpa Inter. Ry. Co.	2	Closed	30–5		S. T.	Am. Car
Sarnia St. Ry.	1	Semiconv.	42–0	City	D. T.	Ottawa
Savannah Elec. Co.	6	Closed.	30–6	City	S. T.	Co. Shops
Schuylkill & Dauphin Trac.	1	S. Sweep.		City	S. T.	Brill
Seattle Elec. Co.	140	Cal.	45–0	City	D. T.	St. Louis
Second Ave. R. R. Co.	4	S. Sweep.		City		Smith-Wa
Sheffield Car Co.	4	Semiconv.		City	S. T.	Brill
Shore Line Elec. Ry. Co.	8	Closed	50–0	Int.	S. T.	
Sioux City Trac.	2	Closed	37–0	City	D. T.	Co. Shops
Sioux Falls Trac.	2	Closed	33–0	City	S. T.	St. Louis
South Bend Constr. Co.	2	Closed	31–8	City	D. T.	Kuhlman
	10	Closed	40–0	Int.	D. T.	Kuhlman
Southern Ry. & Lt. Co.	2	Semiconv.	27–8	City	S. T.	Am. Car Co.
Southern Wisconsin Ry. Co.	1	Semiconv.	30–8		S. T.	Am. Car
Southwestern Inter. Ry. Co.	2	Semiconv.	41–8		D. T.	Am. Car
	3	Semiconv.	30–1		S. T.	Am. Car
Southwestern Traction Co.	6	Closed	49–4	Int.	D. T.	Preston
Spartanburg, Ry., Gas & Elec.	1	Closed	40–0	Int.	D. T.	Jewett
	1	Comb.	40–0	Int.	D. T.	Jewett
	1	Comb.	42–0	Int.	D. T.	Jewett
Spokane Trac.	4	Closed			D. T.	St. Louis
Springfield Cons. Ry.	1	Sprink.			D. T.	McGuire C.
Springfield & Washington.	1	Comb.	53–0	Int.	D. T.	Jewett
Sterl., Dixon & East. Elec. Ry.	4	Closed	32–0	City	S. T.	St. Louis
St. John Ry.	2	Closed	30–0	City	S. T.	Ottawa
St. Louis Mon.-Sano. & S. Ry.	4	Closed	56–10½	Int.	D. T.	St. Louis
	4	Trail-C.	45–6½	Int.	D. T.	St. Louis
	2	Bag.	45–0	Int.	D. T.	St. Louis
St. Louis, Rocky Mt. & Pac.	4	Elec. Loco.				Westingh.
Sunbury & North. Elec.	4	Open	34–0	Both	S. T.	Jackson
	2	Closed	34–0	Both	S. T.	Brill
	3	Semiconv.	34–0	Both	S. T.	Brill
	1	Work	25–0	Both	S. T.	Brill
	1	S. Plow	25–0	Both	S. T.	Brill
Sunbury & Selinsgrove Co.	3	Closed	34–0	Int.	S. T.	Barber
	1	S. Plow	25–0	Both	S. T.	Brill
Syracuse L. Shore & North'n.	1	S. Plow	39–3	Int.	D. T.	Russell
Syracuse R. R. Constr. Co.	3	Closed	42–9⅝	Int.	D. T.	Kuhlman
Syracuse R. T. Co.	1	S. Sweep				Kuhlman
Tama & Tol. El. Ry. & Lt. Co.	1	Closed	33–0	Int.	S. T.	St. Louis
Texas Traction Co.	1	Work	50–0	Int.	D. T.	
	1	Comb.	50–0	Int.	D. T.	St. Louis
Third Avenue R.R	50	Open	37–9	City	D. T.	Brill
	100	Open		City	D. T.	Brill
	75	Closed	37–2	City	D. T.	Brill
	150	Semiconv.	41–1	City	D. T.	Brill
	2	Scrapers		City	S. T.	Brill
	3	S. Sweep.		City	S. T.	Brill
Toledo & Indiana Ry.	1	Exp.	44–0	Int.	D. T.	Jewett
Toledo Urban & Int.	3	Exp.	45–0	Int.	D. T.	Niles
Twin City R. T. Co.	100	Closed	46–7⅛	Both	D. T.	Co. Shops
	4	S. Plows	44–2	Both	D. T.	Co. Shops
Union Traction Co.	1	Closed	30–5		S. T.	Am. Car
	1	Work	40–0		D. T.	Am. Car
United Rys. Co.	2	Comb.	57–3	Int.	D. T.	Am. Car
Utica & Mohawk Valley.	1	S. Sweep				Kuhlman
	1	S. Sweep				Smith-Wal.
Van Brunt St. & Erie Basin.	6	Open		City	S. T.	Brill
Vancouver Traction Co.	2	Semiconv.	39–4		D. T.	Am. Car
Walla Walla Valley Traction.	2	Comb.	46–0		D. T.	Am. Car
Warren & Bisbee Ry.	4	Closed	43–2	Int.	D. T.	McGuire C.
	1	Work	36–0		D. T.	McGuire C.
Warren St. Ry.	1	Semiconv.		Int.	D. T.	Brill
Wash., Alex. & Mt. Ver. Ry.	6	Semiconv.		Int.	D. T.	Brill
Wash., Arl. & Falls Church.	6	Semiconv.	40–0	Int.	D. T.	Stephenson
Washington Ry. & Elect.	15	Closed		Int.	D. T.	Brill
	35	Closed		Int.	D. T.	Brill
Washington Water Power Co.	2	Closed		Int.	D. T.	Brill
	20	Closed		City	D. T.	Brill
	3	Trail., C.		Int.	D. T.	Brill
	2	Comb.		Int.	D. T.	Brill
Waterloo, Cedar Falls & N. Ry.	13	Open	31–0	City	S. T.	McGuire C.
	13	Closed	32–0	City	S. T.	McGuire C.
	2	Closed	57–0	Int.	D. T.	McGuire C.
	4	Trail., C.	30–0	City	S. T.	McGuire C.
	1	Gas. Mot.		Int.		Stoever
Wausau St. R. R. Co.	2		36–0	Int	D. T.	
Waverly, Sayre & Athens Tr.	2	Closed	33–0	Int.	S. T.	Stephen
Web., Mon., Bell. & Fay. City.	1	Open	28–8⅜	City	S. T.	Kuhlman
Westchester Elec. R. R.	20	Closed	40–0	Int.	D. T.	Brill
Western, New York Cons. Co.	8	Closed	50–6	Int.	D. T.	Cincinnati
	1	S. Plow.	40–0	Both	D. T.	Cin. Car Co.
West Penn Railways.	7	Closed	53–4	Int.	D. T.	Cincinnati
	1	S. Sweep.		Int.	S. T.	McGuire C.
West Side Elec. St. Ry.	1	Open	28–8¾	City	S. T.	Kuhlman
Wichita R. R. & Light Co.	4	Open	40–6		D. T.	Am. Car
	12					Am. Car Co.
Windsor, Essex & Lake Shore.	1	Box	33–0			Co. Shops
Winnebago Trac. Co.	4	Open	40–4½		D. T.	Am. Car
Yakima Valley Trans. Co.	3	Closed	29–6	City	S. T.	Danville
Yazoo City Lt., Water & Sewage Plant.	4	Semiconv.	30–8	City	S. T.	Am. Car
Yonkers Railroad.	15	Closed	40–0	City	D. T.	St. Louis
	2	S. Sweep.	28–0	City	S. T.	Brill
	1	Sprink.		City	S. T.	Brill
York Rys. Co.	1	S. Sweep.		City	S. T.	Brill

At a recent Conservation Conference in Washington, Ambassador Nabuco, of Brazil, spoke of the immense resources belonging to the Southern Republic in the rivers Amazon and Sao Francisco and said: "The present century, I hope, will see that immense canalization all ploughed by steam and electricity. When the connection of the Amazon with the sources of the River Plate, to which we supply nearly the whole of its waters, will be established, the earth will see an inland water system of a magnitude never dreamed before. I think we ought to be proud of those immense prospects of river and forest combined, by the side of powerful falls, destined to supply all the electricity we may need. With that vision of the future I do not like to speak of our rivers as they appear to-day. Take the Sao Francisco. The men of science who have been on its banks agree that the Sao Francisco is a great river of the future and that the central region it drains will show one day immense wealth. I think it is a good thing for a nation to have a part of its assets under lock, kept for a time of greater progress in agriculture, metallurgy and electricity."

SIGNALS INSTALLED ON ELECTRIC RAILWAYS IN 1908

Information received from the manufacturers of signal apparatus for electric railways shows that there were installed during the year of 1908 486 automatic block signals, protecting 75.17 miles of single track, and 111 dispatchers' train order signals, operated from central dispatchers' offices, protecting 265.5 miles of track. Statistics of installations of signals were received from all of the signal manufacturers in the United States except two companies, who failed to reply. They are given in detail in the accompanying table.

Included in the table are all of the installations made on railways operated electrically, including electrified steam roads. There are two types of automatic block signals in use for overhead trolley lines: (1) Signals actuated by the passage of the trolley wheel under a contact device inserted in the trolley wire, and (2) signals controlled by electric track circuits. Comparatively few signals of the latter type have yet been installed on interurban electric railways operated by overhead trolley, chiefly on account of the expense involved. The installations on the Boston & Worcester Street Railway and on the Rochester, Syracuse & Eastern, included in the table, however, are both of this type. The installation on the Rochester, Syracuse & Eastern follows closely steam railroad signal standards, and is, we believe, the first of its kind. Alternating current is used for the track circuit.

Included in the table are five roads on which dispatcher's train order signals have been installed. This type of signal has met with the approval of a large number of roads, and it undoubtedly adds much to the safety of operation, but it is not to be considered in the light of a block signal.

The comparatively small mileage equipped with signals during the year reflects, as do the other statistics published in this issue, the financial stringency which prevailed during the greater part of 1908, and from which the railways are just beginning to recover. The signal manufacturers, however, report having received several large orders to be installed during the coming year; these are not included in the table, which shows only the signals put in actual operation.

TABLE OF BLOCK SIGNAL INSTALLATIONS IN 1908.

Name of Railway	*Type of Signal*	*No. Signals*	*No. Miles Protected*	*Maker*
Boston & Worcester	O'Bryan Auto Block Elec. Tr. Cir.	22	....	F. L. O'Bryan Co.
Brooklyn Bridge	Auto Block Lt. Sig. Elec. Tr. Cir.	64	1.953	Union Switch & Sig. Co.
Chicago, Lake Shore & So. Bend	Dispatcher's Sig.	20	77.00	Telegraph Sig. Co.
E. St. Louis & Sub.	Dispatcher's Sig.	4	10.00	Blake Sig. & Mfg. Co.
Hudson & Man.	Home and distant Lt. Sig. A. C. Tr. Cir.	185	6.6	Gen. Ry. Sig. Co.
Indiana Un. Trac. Co.	Dispatcher's Sig.	52	111.00	Telegraph Sig. Co.
Interbrgh. R. T.	Au. Blk. Elec. Pneu. Slide A.C. Tr. Cir.	23	8.50	Un. Switch & Sig. Co.
Interna. Ry. Co.	Dispatcher's Sig.	20	37.00	Telegraph Sig. Co.
Lebanon Valley	Auto Block	14	12.50	Smith Sig. Co.
Long Island	Elec. Sema. Auto Bl. 2 arm home and dist. Elec. Tr. Cir.	7	3.50	Hall Sig. Co.
Newton & Boston	O'Bryan Auto Block Elec. Tr. Cir.	1	....	F. L. O'Bryan Co.
N. Y. C. & H. R.	Au. Bl. Elec. Motor Sema. Home & Dist. A. C. Tr. Cir.	50	18.8	Gen. Ry. Sig. Co.
N. Y. C. & H. R.	Au. Bl. Home & Dist. Lt. Sig. A. C. Tr Cir.	77	11.3	Gen. Ry. Sig. Co.
Phila. R. T.	Au. Bl. Lt. Sig. A.C. Tr. Cir.	17	3.75	Un. Switch & Sig. Co.
	Elec.-Pneum. Sema. A. C. Tr. Cir.	11		
Rochester, Syracuse & Eastern	Au. Bl. Elec. Motor Sema. A. C. Tr. Cir.	6	6.865	Un. Switch & Sig. Co.
Toronto & York Rad.	Cab Sig. Disp. Cont.	4	10.00	Simmen Au. Ry. Sig. Co.
Wash. Balt. & An.	Dispatcher's Sig.	11	20.50	Blake Sig. & Mfg. Co.
Williamsb. Bridge	Au. Bl. Tr. Cir. Lt. Sig.	9	1.4	Un. Switch & Sig. Co.

WORK OF THE JOINT ENGINEERING STAFF OF THE WISCONSIN TAX AND RAILROAD COMMISSIONS*

BY WM. D. PENCE, ENGINEER, RAILROAD COMMISSION OF WISCONSIN AND WISCONSIN TAX COMMISSION; PROFESSOR OF RAILWAY ENGINEERING, UNIVERSITY OF WISCONSIN

The engineering staff which jointly serves the Wisconsin Tax Commission and the Railroad Commission of Wisconsin was organized in June, 1903, under authority of the law providing for the assessment of the steam railroad properties of the State on an ad valorem basis. The size of this staff ranged from a maximum of about 25 engineers and inspectors at the busiest portion of the first year's work down to the minimum of two persons assisting the chief engineer after the completion of the initial valuation report. Upon this latter basis it was found to be practicable to carry forward the annual revaluations of the steam road properties. In February, 1906, the first incumbent in the position of engineer for the Tax Commission resigned, and his successor was appointed (July 1, 1906) to render joint service for the Tax Commission and the then recently created Railroad Commission of Wisconsin.

The 1905 law prescribing the ad valorem basis of assessment for street railroad properties provided for the valuation work to begin on the initial inventory date of June 30, 1907, but the work was actually undertaken some six months earlier than that date because of a complaint lodged with the Railroad Commission respecting street car fares in the city of Milwaukee. To meet this emergency the staff was reorganized and greatly extended in January, 1907, and since that date a staff of from 20 to 30 members has been required continuously to meet the joint demands of the two commissions. Immediately upon the completion of the Milwaukee valuations in July, 1907, the field work for the valuation of the physical property of the remaining street railway and associated lighting companies of the State was undertaken, and before the completion of that work active service under the newly enacted public utilities law was inaugurated. Numerous inspection duties have also arisen in connection with several other laws recently enacted or amended.

The staff engaged in the 1903 steam road valuation work was organized under three general heads or chiefs of departments, respectively responsible to the chief engineer for the valuation of the permanent way, the lands and the mechanical features. With the reorganization for the purpose of making the street railway valuations there were still but three heads, the land valuations being associated with the "roadway" group, and an electrical department added. Under the still wider scope to the work of the staff arising under the administration of the public utilities law within the past year or so the civil and mechanical engineering groups have been extended to cover water works plants, the electrical engineering group to include telephones, and two additional groups or departments have been established, viz., gas engineering and the department of gas and electric service inspections.

In its present form the working organization includes the following groups or subdivisions: (1) Administrative, (2) office staff, (3) civil engineering staff, (4) mechanical engineering staff, (5) electrical engineering staff, (6) gas engineering staff, (7) gas and electric service inspections and (8) miscellaneous. The duties of these several departments of service cover all phases of the work of the two State commissions.

The work of three of these groups is as follows:

Civil engineering staff—Engaged in the inspection and valuation of those details of the physical property of steam and electric railways and public utilities plants which are customarily purchased, constructed or maintained under the direction of civil engineers, including such items as the following: Lands; track, track structures and bridges; buildings and miscellaneous structures, such as gas holders, stand-pipes, reservoirs, dams, wells and foundations; earthwork and paving; pipe distribution systems for water, gas and steam heating plants, includ-

*Abstract of a paper read before the Western Society of Engineers, Chicago, Dec. 16, 1908.

ing tunnels for same; office furniture and appliances; horses and wagons; tools, stores and supplies pertaining to the foregoing items, etc. Also investigations, in cooperation with other departments, with a view to suggest improvements in the operating conditions of railways, water works plants, etc.

Mechanical engineering staff—Engaged in the inspection and valuation of those details of the physical property of steam and electric railways and public utilities plants which are customarily purchased, constructed or operated under the direction of mechanical experts or engineers, including such items as the following: Power plant machinery and equipment (exclusive of electrical features), steam and hot water plants (except street mains), steam road locomotives and rolling stock, shop tools and machinery, tools, stores and supplies pertaining to the above items, etc. Also investigations, in cooperation with other departments, with a view to suggest improvements in the operating condition of water works, heating plants, power plants, etc.

Electrical engineering staff—Engaged in the inspection and valuation of those details of the physical property of steam and electric railways and public utilities plants which are usually constructed, purchased or operated under the direction of electrical experts or engineers, including electrical machinery and appliances in power plants and elsewhere, electric railway rolling stock, electrical distribution systems, overhead and underground, telephone plants, signaling appliances, tools, stores and supplies related to the above items, etc. Also investigations, in cooperation with other departments, with a view to suggest improvements in the operating conditions of electric railways, power plants, telephone properties, etc.

The basis of appointment of the staff is provided for in part by a formal rule of the Civil Service Commission, and in part by special authorizations given from time to time by the Railroad Commission for the employment of experts under the provisions of the public utilities and railroad commission laws.

It should be stated that membership on the staff is based upon ascertained fitness for the special service for which the appointment is made. There is entire freedom from political or other influence both in the matter of appointment and in the tenure of position on the staff. The tenure of service has been steady, the roll, except for the additions, being much the same as that established early in 1907.

The present membership of the technical staff consists almost exclusively of graduates of engineering schools, and about 60 per cent of the permanent staff are graduates of the University of Wisconsin. Seven members of the regular staff are also members of the faculty of the College of Engineering, University of Wisconsin, among this number being the engineer in charge, the chief mechanical inspector and the expert on light and heat. Five other members of the teaching force of the engineering college also render occasional service on the commissions' staff.

VALUATION WORK BY THE STAFF

The valuations reported to the commissions by the engineering staff have been confined throughout to the physical property, without regard to intangible elements. For a given inventory covering the items of any particular property, a definite value is fixed upon a fair basis as to unit prices, etc., and the results are reported by the staff at a definite amount, irrespective of the uses to which the figures are to be applied. These determinations are, by intention, entirely free from bias. Every reasonable effort is made to get at the exact truth in regard to local conditions. The figures are subject to revision upon finding evidence of defects of inventory, errors of judgment or otner element likely to vitiate results. After submitting the valuation reports to the commission, opportunity is given for further conference and hearing upon any or all items of the physical valuation.

In certain public utilities cases the owners, and in a few cases the cities as well, have employed experts to give testimony on values before the Railroad Commission. In one or two such cases the State engineering staff has submitted to the representatives of the utilities company and the city an "informal" valuation report to serve as a basis for preliminary conference and discussion. This preliminary report, after due consideration in the light of added data and information, is succeeded by the "tentative" valuation report which is submitted to the Railroad Commission as a part of the formal record in the case to be considered with other evidence. Before making up a final decision in the case the commission gives the engineer an opportunity to review the record and submit a supplementary report, in which are presented revisions or comments bearing upon the original or "tentative" valuation report.

The valuation work performed by the engineering staff falls under four heads, viz.: (1) Valuations of the physical property of the steam railroads of the State, (2) of the street railway and associated properties, (3) of the public utilities properties and (4) of public service corporation properties in connection with stock and bond issues. The accompanying tabulation includes the total valuations for one year's work each for the steam railroad and electric railway properties and all of the physical valuation work thus far reported upon under the public utilities and bond issue laws, the last two classes covering a period of somewhat more than a year's time:

SUMMARY OF RECENT PHYSICAL VALUATIONS MADE BY THE JOINT ENGINEERING STAFF OF THE RAILROAD COMMISSION AND THE TAX COMMISSION.

	Cost of reproduction. Property, new.	Cost of reproduction. Present condition.
Steam Railroad Properties.		
Fifty-two properties aggregating 7090 miles; inventory date June 30, 1907; fourth annual revaluation under the 1903 ad valorem law	$244,128,868	$196,239,314
Street Railway Properties.		
Twenty-four street and interurban properties with 10 associated lighting and heating properties; inventory date June 30, 1907; first valuation under 1905 ad valorem law	26,783,620	21,208,010
Public Utilities Properties.		
Twenty-four public utilities properties; varying inventory dates; valuations under 1907 law	6,405,521	5,440,605
For Stock and Bond Issues.		
Five properties valued and reports made under 1907 law	305,576	270,008
	$277,623,585	$223,157,937

VALUATION OF MILWAUKEE STREET RAILWAY PROPERTIES

The staff as organized in the initial work at Milwaukee in January, 1907, included the following roll:

Engineer of the two commissions.
Consulting engineer.
Assistant engineer.
Chief roadway inspector.
Chief mechanical inspector.
Chief electrical inspector.
Field roadway inspector.
Field mechanical inspector.
Field electrical inspector.

A staff of assistant inspectors, office assistants and stenographers.

Total staff roll, 23 persons.

The more responsible staff positions were filled chiefly from those previously engaged on the steam road valuations of Wisconsin in 1903-1904 and from the staff employed in the 1906 electric railway appraisals at Chicago. Bion J. Arnold, of Chicago, was called in consultation and arrangements made whereby several members of the special staff previously engaged under his direction in the Chicago valuation work were transferred temporarily for service on the Wisconsin engineering staff. George Weston, previously assistant chief engineer on the Chicago appraisals, was appointed chief electrical inspector on the Milwaukee work, and field electrical and mechanical inspectors were similarly engaged. Other experts were drawn from various sources, each person being selected with particular reference to his fitness for the intended service. Within three weeks' time after authorization was given to proceed with the work practically the entire staff was on the ground engaged in the preliminary examinations of the property to be valued.

At the preliminary conference held early in February between representatives of the two State commissions, the City of Milwaukee and the street railway company, it

was agreed that the date of inventory should be Dec. 31, 1906, for the purposes of the Railroad Commission and June 30, 1907, for the report to the State Board of Assessment, the latter date being in accordance with the 1905 ad valorem assessment law. It was stipulated by the representatives of the State commissions at this conference that the basis of the valuation of the physical property would be identical except as the inventory and the condition of the property itself might differ at the two inventory dates. It was the original idea that the street railway company should furnish a complete inventory of its property, but certain delays occurred which led to a change in plan whereby the State engineering staff undertook the preparation of the inventory from the company's records and by field examinations. It was roughly estimated at the start that the work could be completed in about 3 months' time, but the actual time required was 5½ months, the final report being submitted on July 13, 1907.

The classification of the property adopted in this report on the Milwaukee properties was as follows:

Group 1. Land (right-of-way and other).
Group 2. Track and track structures.
Group 3. Cars and car equipment.
Group 4. Electrical distribution system.
Group 5. Power plant equipment.
Group 6. Buildings and miscellaneous structures.
Group 7. Office furniture and appliances.
Group 8. Tools, implements and machinery.
Group 9. Horses, wagons and miscellaneous.
Total of items 1-9.
Group 10. (See note below.)
Total of items 1-10.
Group 11. Stores and supplies.
Total of items 1-11.
Group 12. Paving.
Total of items 1-12.

Note.—Group 10 is the addition of a percentage to cover engineering and supervision, interest during construction, contingencies, etc.

The final report included the entire property owned by the Milwaukee companies, known locally as the "Beggs properties," viz., the city railway lines (123.6 miles) and the associated lighting properties (Milwaukee Electric Railway & Light Company), the country or interurban railway lines (144.2 miles) and the associated lighting properties at Racine and elsewhere (Milwaukee Light, Heat & Traction Company), and the Milwaukee steam heating company (Milwaukee Central Heating Company). One exhibit in the report showed the property classified under the heads "railway only," "light and power," "steam heat" and "other property." Another exhibit classified the railway property only under "operating" and "non-operating." A third showed the operating property under city lines and interurban lines. A fourth classified the non-operating railway property in a similar way. The total physical valuation, including all the properties mentioned above for the inventory date of Dec. 31, 1906, amounted to $18,435,960 for the property new and $14,864,849 for the property in existing condition.

PHYSICAL VALUATION OF OTHER WISCONSIN STREET RAILWAY PROPERTIES

Immediately upon the completion of the formal report upon the valuation of the Milwaukee street railway properties the field work for the valuation of the remaining electric railway lines of the State was undertaken. The size of the staff was somewhat reduced and the organization modified in some respects to meet the varying conditions. Of these additional electric railway lines, numbering in all 22 properties, about one-half are operated in association with public utility properties supplying electric lighting and power service. This field work on the street railway properties chanced to be undertaken immediately after the enactment of the public utilities law (July, 1907), and it was then foreseen that the results of such work might ultimately be required by the Railroad Commission in rate complaint cases. In view of this development the methods and basis used in the work were critically reviewed in the light of the experience in the Milwaukee valuations, and certain modifications and improvements adopted. The field work on these remaining electric railway properties occupied a period of about 3 months, and the office work an additional period of approximately 2 months.

The methods of field work employed on the street railway properties had much in common with those used in the steam road valuations, particularly as regards the details relating to roadbed, track structures, etc. However, the inclusion of so many electric lighting plants with these operating properties placed many features of these street railway valuations upon an identical basis with the utilities valuations.

An effort was made to have each street railway company throughout the State prepare a detailed inventory and valuation of its own property, as in the case of the larger roads in the 1903 steam road valuation. It was soon found, however, that the smaller electric lines were in much the same condition as were the smaller steam roads in 1903 in that they lacked the records and the requisite skilled staff to prepare these valuation reports. The Milwaukee company, operating roughly one-half the street railway mileage of the State under one management, alone of all the 23 street railway companies concerned in these valuations had the necessary records and staff. It is believed that the Milwaukee company would have submitted its own valuation to the commissions for review had there been sufficient time for its preparation, as in the 1903 valuations of the larger steam roads.

PHYSICAL VALUATIONS UNDER THE PUBLIC UTILITIES LAW

The law prescribes that "the commision shall value all the property of every public utility actually used and useful for the convenience of the public," and further provides that "in making such valuation the commission may avail itself of any information in possession of the State Board of Assessment."

As stated, the methods now employed by the engineering staff in the valuation of the physical property of public utility plants are in many respects in close agreement with those adopted early in 1907 for the valuation of the electric railway properties of the State for the joint purposes of the two commissions. These methods in general embrace the following distinct steps or processes:

1. The preparation of a detailed decriptive inventory.
2. Field examinations of the property by a trained staff.
3. Determination of the "cost new" of each item.
4. Estimation of the depreciation on each item of property.
5. Calculation of the present value.
6. Summing up the detailed valuations by groups.

As an initial step in each important utilities valuation, it is customary for the commission's engineer to hold a joint conference with representatives of the company and the city, at which conference a formal request is extended on behalf of the commission that all interested parties cooperate to the fullest extent possible with the commission's staff in getting at the facts with reference to local conditions. These conferences have, as a rule, resulted satisfactorily and in but few instances have the responsible officials of utilities companies or cities seemed disposed to withhold information and assistance, and then only temporarily.

The preparation of preliminary inventories or descriptive check lists of the properties has been entrusted to the responsible officials of the public utilities companies wherever practicable. Although in some cases this process has been found to lead to undesirable delays in the earlier stages of the work, it is believed, in general, to result ultimately in a saving of time. In cases where no inventory is supplied in advance by the company, the engineering staff before taking up the actual field work examines such office records as the company may have and prepares a tentative check list for field use.

The field examinations of the physical property begin with a careful checking up of the inventory. The record includes such matters as the following: A comprehensive description of the machine in its original or new condition; whether new or second hand when installed in its present service; if reconstructed at any time, the extent and character and also the reasons for such reconstruction; date of installation, and also of reconstruction if any;

character of service rendered by the machine, whether severe or moderate, continuous or intermittent, etc.; quality or character of maintenance, whether good, fair or poor; and any other information which may have a bearing in fixing the final value of the item or in judging of its operating value.

Throughout the progress of these field investigations due consideration is given to the fact that the public utilities law provides for periodical revaluations of each property examined, necessitating a permanent record from the very start. This view of the situation, coupled with the rate-making feature, has naturally led to an open-minded attitude on the part of the commission's staff and of the interested parties with respect to rectifying any discrepancies discovered in the descriptive record.

With a view to establish a definite and reliable basis for fixing costs, extensive investigations have been made relative to existing commercial conditions, with the result that a vast amount of cost data as to the purchase and installation of the various kinds of physical property embraced in the public utilities plants is now available in the confidential records of the engineering staff. This information has been gathered from many sources, one of the most important of these being the actual contracts and other records of costs kept in the offices of the various public utilities companies of the State. The records of the utilities companies are made available to the commission or its authorized agents by the terms of the public utilities law. These records combined with the confidential quotations and cost data of many kinds supplied through direct solicitation by manufacturers throughout the country, provide a substantial basis upon which the unit costs are kept up to date. In responding to the requests for information, the manufacturers in a number of instances have found it necessary to carry on considerable research work. In such cases it has been the practice to offer to defray the necessary clerical expense involved in compiling the desired information. In but few instances, however, have these offers of reimbursement been accepted. The invaluable assistance thus extended by the manufacturers is believed to have resulted not only from their being frankly and fully informed at the outset as to the special purposes for which the information would be employed, but also because of their desire to co-operate in an important public movement based primarily upon substantial justice to all concerned. It scarcely need be said that the figures obtained from manufacturers are treated as confidential and used only for the specific purposes for which they are solicited.

It should be stated in this connection that the utilities companies of the State have shown but little disposition to interfere with this free co-operation on the part of the manufacturers. In the very few instances where such interference has actually been noted, the utilities officials have usually been quick to respond to the suggestion that such action was not only shortsighted, but also in direct violation of the spirit of fairness pervading this entire matter. In like manner, citizens and officials of certain cities of the State where a feeling of antagonism had previously developed against certain public utilities companies have in a number of instances desisted from what seemed to be an effort to withhold essential facts required by the engineering staff.

In addition to the sources of information above referred to, the members of the staff have been able to supplement their personal records of cost data through many voluntary contributions from the professional notes of prominent engineers and by figures gathered from publications of technical societies, the columns of trade and technical journals, etc. Reference may also be made to the accumulation of valuable data included in the sworn testimony given by experts at the formal hearings of the commission.

In order to avoid extreme variations in unit prices due to the fluctuations in market quotations and also with a view to approximate as closely as practicable the conditions which usually prevail in building up public utilities properties, it has been the practice of the staff to use average prices for a term of years rather than to apply the current quotations or unit costs prevailing at the actual date of inventory. For this purpose the average price for the 5-year period immediately preceding the date of valuation has been used whenever in the judgment of the staff such rule was practicable.

DEPRECIATION OF VALUE

In determining the allowance to be made for depreciation in value due consideration is given by the staff to the actual condition of each machine or other item of the property, taking into account the age of the device in connection with its probable ultimate efficient life, the character of the service, the standard or quality of maintenance, and such other elements as may aid in reaching a reliable judgment in the matter. In the steps leading up to such final conclusions, accumulated experience with reference to closely similar property, maintained to a like standard and operated under identical or similar conditions as to service, etc., receives due consideration. An individual item of physical property is judged with reference to its agreement with or departure from the average of such related group or class of property in fixing the probable useful life and in estimating the depreciation. Results obtained by this method in the valuation of physical properties of Wisconsin railroad and public utilities companies aggregating many millions of dollars have established the trustworthiness of the method here described.

The depreciation percentage is customarily applied against the net or service value found by deducting the scrap or residual value from the "new value," and the so-called "present value" is determined in the usual way by combining the scrap value and the depreciated service value. The treatment of scrap values has perhaps been carried somewhat beyond the degree of refinement customarily used by most engineers engaged in waterworks and other like appraisal work, although, it is believed, not beyond what is consistent and proper, considering the magnitude and permanence of these Wisconsin valuations. However, undue refinements in this respect are guarded against, and in cases where the scrap value is slight or much in doubt, the depreciation percentage is applied directly to the cost new to determine the present value.

OTHER VALUATION WORK

In addition to the railroad and public utilities valuations covered by the foregoing description, the engineering staff by special instructions from the Railroad Commission has made a number of valuations of "public service corporation" properties under the terms of the stock and bond issue law of 1907. These valuations have been based upon a detailed inventory, but in most instances it has not been necessary to enter into the refinements called for in the more formal valuations. Only five cases of this class of valuation are included in the tabulated "summary of recent valution." Two other properties, one involving values of large magnitude, were valued approximately for bond issue purposes, in advance of the completion of the more exact physical valuation for the primary purposes of the Tax Commission. A few approximate valuations of utilities properties have also been made by the staff under special instructions from the Tax Commission to assist in the more equitable apportionment of values between adjacent assessment districts. The Railroad Commission has received a number of informal requests for valuations of utilities properties intended to serve as a basis for preliminary negotiations between cities and utilities companies looking toward the municipal purchase of such plants. Curiously enough, several requests or inquiries of this sort have reached the commission indirectly from a neighboring State.

In exercising the broad powers conferred upon it with respect to service regulation of railroad, express, telephone, and the municipal utilities companies, it has been the uniform policy of the Wisconsin Railroad Commission to insist upon adequate service, but without undue intrusion upon the routine of actual management. The inspections of service made by the technical staff under instructions from the commission are directed primarily to the actual results. When the results are found to be unsatisfactory, the commission frankly reports the facts to the company and also to the complainant if any, with such recommendations or suggestions as may seem necessary or desirable. In the more important matters publicity is usually given through the daily press in order that the general public

may be kept fully informed. Such publicity is often the only means of fixing in the public mind the responsibility for poor management or in establishing substantial justice where there have been false reports or wrong impressions as to the facts.

TRANSFER CRUSADE IN CHICAGO

Within the last few months the open abuse of the transfer privilege on the lines of the Chicago Railways Company has been reduced approximately 75 per cent. At certain busy junction points, where illegal trafficking in transfers was most objectionable, it has been practically abolished. Favorable results were brought about through a carefully planned crusade, based on constant vigilance and publicity. The Electric Railway Journal has been supplied with the following account of the transfer crusade by Joseph V. Sullivan, general supervisor, Chicago Railways, to whom acknowledgment is made:

The cars of the north and west side lines operated by the Chicago Railways Company carried during the last year about 367,000,000 passengers, of whom 151,000,000 were transfer passengers. This proportion of transfer patrons, owing to the generous privilege granted to the public by ordinance, is among the highest in the country. It was reasonable to expect, therefore, that the abuse of this privilege would be correspondingly large. It is, of course, impossible to estimate what share of the passengers made improper use of their transfers, though there must have been a large percentage who took advantage of crowded cars to ride on slips for which they had not paid, or on others of which the time limit had expired or the direction of travel was not the one intended.

It is known that hundreds of men, women and children rode on the cars every day with transfers purchased of boys at intersections or picked up or traded on the street or in stores. At one point alone, according to a statement made by witnesses in court, each of a dozen newsboys had an income of from $1 to $3 per day through the sale of these slips. It developed during the "crusade" that there were about 100 points where, during the morning and evening rush hours, these slips were exchanged or sold. Numerous factories were discovered where employees traded transfers on the premises in the morning and secured others for the return trip in the evening.

The ordinance governing the use of transfers issued by street railway companies in Chicago is supposed to be broad enough to give ample protection against such trafficking, and in one important case the claims of the city and the company as to its validity were sustained in the Supreme Court. The law provides a penalty of from $5 to $100 for each offense of giving away, receiving for improper use, selling, bartering or exchanging these slips. But the company has not always had full support in its efforts to check these abuses. Until the Juvenile Court was established it was not easy to reach youthful offenders, and for adults there was unusual leniency, with the result that the company was put to greater expense than the convictions seemed to warrant.

With the passage of the new franchise ordinance under which the company now is operating, the city became a partner in the receipts, and a change in the attitude of the public, the police and the courts was soon apparent. The misuse of hundreds of thousands of transfer tickets every day then seemed to become an important item. About this time, also there was established a new system of courts, from which the influence of ward politics was removed and where laws were more strictly enforced.

Transfer trafficking at this time appeared to be at its worst, and officials of the company determined to take steps to abolish the nuisance. Notice to the public was given in a statement printed on the reverse side of transfers, as follows: "Warning—It is unlawful to give away or to receive for use, or to sell, barter or exchange this transfer slip. Penalty, from $5 to $100 for each offense. Section 1500 A, Revised Municipal Code of Chicago." Investigators meanwhile, had been detailed to locate the points where violations of this ordinance were most numerous, and when they had reported the police department was called on for help. Officers in plain clothes, accompanied by several investigators, began a series of raids under the direction of the company's secret service and legal departments. Junction points were visited, and whenever arrests were made the patrol wagon was called, to make the raids more impressive.

In all, more than 200 arrests have been made since the crusade started. Many of the offenders were boys of tender years, and these were either taken to the Juvenile Court to be reprimanded or to their parents for prompt punishment. It was a rare case when the same boys had to be taken into court for severe punishment on a second charge. In nearly every case where adults were arrested for purchasing, giving away or picking up transfers a conviction and fine were secured. Newspaper publicity concerning arrests was frequently resorted to, and when, as occasionally happened, the defendant was a business man of some prominence, the publicity in the daily press was something to be feared more than the fine.

As a further step in the campaign, concerns employing large numbers of men were asked to aid in checking violations of this ordinance. For the most part they agreed cheerfully, and as a result placards have been distributed by the company and posted in many factories and stores, warning employees against misuse of transfers on the premises, and quoting the section of the city ordinance under which prosecutions are threatened. These cards, printed in English, German and Polish, bear the signature of the firm or corporation in whose place they are posted. Other notices have also been prepared for display in the cars of the company, worded practically the same as the reverse side of the transfer slips. Employees of the company also have been asked to give information as to points where they discover misuse of transfers, and conductors have been forbidden to leave their transfers at any place where they might tempt improper use.

The company and the city have both profited by the crusade. Publicity and prosecutions have had their effect, and where hundreds have been educated by arrests it is probable that thousands have been enlightened through printed notices in the newspapers and elsewhere. The following quotation from an editorial in the Chicago *Tribune* is evidence of the attitude of the better element in the city concerning the campaign:

The man who trades off his street car transfer for a newspaper and the man who buys the transfer and a newspaper from a scalper are both contemptible thieves. They are quite as deserving of punishment if they could be caught as the go-between who makes a living out of their petty dishonesty. They are guilty of a double offense, for they are robbing both the traction company and the city. As long as the company alone was a loser, one can understand why their undeveloped consciences did not trouble them. Now that they are robbing the city of rather more than they are the company, they ought to have some compunctions.

The crusade is still being pressed, with the chances in favor of stamping out this evil entirely.

THE REASONS FOR INCREASED FARES ON MASSACHUSETTS STREET RAILWAYS.—VI.

CONNECTICUT VALLEY STREET RAILWAY

The Connecticut Valley Street Railway, operating 48 miles of line, has had disproportionately low car-mile earnings on one of its four divisions. The directors, upon consideration of this condition, voted to increase the fare for a through trip on the backward division, the Millers Falls division, from 10 cents to 15 cents by charging an additional fare of 5 cents for part of the ride. The Board of Railroad Commissioners, on petition from merchants affected, disapproved this increase. The company thereupon withdrew the increase and then announced as a substitute an advance from 10 cents to 12 cents. The Railroad Commission, after protest had resulted in a reopening of the case, held this change to be reasonable.

The company announced just before the close of 1908 that it would increase the unit of fare on all its lines to 6 cents on Jan. 1, 1909. This remedy is adopted by the company in the belief that it has been shown to be the idea of the Railroad Commission, in various decisions, to consider the necessity of changes in fares with respect to the total results of operation of all the lines of a system rather than on any particular division the operations of which may be proved to be unprofitable.

HISTORY OF THE CASE

The directors did not decide upon the original advance in fare on the Millers Falls division until a reduction in car-mileage had proved inadequate to effect the desired improvement in net revenue.

The Millers Falls division is located substantially in the shape of the letter T, with Turners Falls at the base, Lake Pleasant nearly at the connection of the vertical and the horizontal line and Millers Falls and Montague at the left and right ends, respectively, of the horizontal line.

The necessity of changes that would produce greater revenue was brought before the board of directors in a communication presented on March 24, 1908.

This communication discussed the financial and legal aspects of the existing conditions. An abstract of its principal points follows:

STATISTICS AND ARGUMENT

On Oct. 1, 1908, a change of schedule was inaugurated by the management. The schedule as changed was planned with the object of taking care of the business on the various divisions as well as possible and also with an idea of bringing, as near as the business would warrant, the various divisions of our line to a common earning capacity per car-mile.

For the year ending Sept. 30, 1907, we have the following record before us:

The average passenger earning capacity of the system for the year was 19.2 cents per car-mile.

The Amherst division averaged during the year 22 cents per car-mile and the range of the earnings was from 18 cents in January to 28.6 cents in June.

The Deerfield division averaged 17.8 cents for the year and the range of earnings was from 12.2 cents in February to 27.2 cents in August.

The Greenfield division averaged 23 cents and its range was from 19 cents in February to 30.2 cents in July.

The Millers Falls division averaged for the year 14 cents and its range was from 8.9 cents in January and February to 22.8 cents in August.

The Amherst division in the two months, namely, January and February, was below the average of the system for the year; the receipts of the Deerfield division per car-mile for November, December, January, February, March, April and May were below the average of the system; the Greenfield division, with the exception of February, showed above the average for the system and in that month its receipts per car-mile were at the average; the Millers Falls division, with the exception of July and August, was below the average all the time.

As you have undoubtedly noted from our last year's report, our average operating expense per car-mile was 14.4 cents and by this you will see that the operation of the Millers Falls line on the basis of averages was conducted at a loss during the year, not mentioning at all the proportionate part of fixed charges.

Using these figures as a basis, we inaugurated on Oct. 1, 1907, a new schedule decreasing the service on the Millers Falls and Deerfield divisions.

For the period ending Feb. 29, 1908, or five months, we have the following figures:

Amherst division, passenger receipts, $18,690; car-miles run, 79,277; receipts per car-mile, 23.6 cents.

Deerfield division, passenger receipts, $19,399; car-miles, 118,181; receipts per car-mile, 16.4 cents.

Greenfield division, passenger receipts, $21,747; car-miles, 91,291; receipts per car-mile, 23.7 cents.

Millers Falls division, passenger receipts, $4,004; car-miles, 32,077; receipts per car-mile, 12½ cents.

During these five months we have operated an average per month of 64,165 miles, against an average of 69,770 miles in the previous year; have averaged 285,908 fares per month, against 259,443 fares per month in the previous year, and have increased our receipts per car-mile from 16½ cents to 19.8 cents. The Amherst division has shown an earning capacity per month of receipts per car-mile from 27½ cents in October to 21 cents in January, against 22.6 cents in October and 18 cents in February of the preceding fiscal year. The Deerfield division shows receipts per car-mile of 21 cents in October and 14 cents in February, against 16½ cents from October and 12.3 cents in February a year before. The Greenfield division shows 25.2 cents in October and 22 cents in February, against 21.4 cents in October and 19.6 cents in February of one year previous. The Millers Falls division results were 15.8 cents in October and 9.8 cents in February, against 11 cents in October and 8.9 cents in December and January of the previous year.

These figures convince us that on two divisions, namely, the Deerfield and the Millers Falls divisions, we are transporting the public at too low a rate of fare and one of the purposes of this meeting is to discuss certain recommendations that we have to make as to changes of fares on the divisions in question.

The first aspect of the matter which we discuss is our right legally to make changes in the rates of fare.

We find no conditions in any of our franchises holding us to any particular rate of fare and even if such conditions did exist the decision of the Supreme Court of Massachusetts in the case of Keefe against the Lexington & Boston road [see ELECTRIC RAILWAY JOURNAL, Nov. 28, 1908, page 1463.—Eds.] gives us the legal right to alter our rates of fare even though they were conditions incorporated in the franchise. In this case the Supreme Court of this State held that conditions incorporated in franchises as to rates of fare were non-enforcible and unconstitutional. The two questions legally involved seem to be: First, the power of directors to fix fares; second, whether the statute permitting consolidations of street railway companies has the effect of fixing as the maximum fares forever thereafter to be charged and as the minimum amount of service and other details of accommodation to be furnished, the fares and service in fact actually enforced at the date of consolidation of companies, regardless of any and all changes and conditions which would otherwise affect the rates to be charged or facilities to be furnished.

The power of directors of street railway companies to raise fares is left entirely with them subject always to the revisory power of the Railroad Commissioners.

We do not believe the statute of 1897 authorizing consolidations of street railway companies was intended to limit their rates of fare, service or other details to the precise system that happened to be in use at the time of the consolidation. The intent of the Legislature, we think, was to guard against increases of fares as a result of consolidation of competing lines.

The section of the statute to which we refer reads as follows: "If the facilities for travel on the railway of each of the said companies shall not be thereby diminished or the rates of fare increased." The question of whether such a fact was involved in our consolidation of 1905 is probably conclusively settled by the approval of the Railroad Commissioners thereto. In our case we were the only street railway line between the points in question and did not parallel any other.

REDUCED FARES NOT THE SOLUTION

That the raising of fares in our case is not due to consolidation is obvious from the lapse of time, almost three years. From what we have done by experiments of reduced fares, with a view to increasing traffic, we do not believe any one can contend that experiments of reduced fares have not been fully tried. It is known to all of us that the cost of living, labor and materials and the cost of maintenance and operating street railways have greatly increased since April, 1905. These suggestions lead directly to this proposition in support of our contention that the statute was not intended to make permanent fares or facilities without regard to changed conditions. The very nature of the street railway business, the changing interest to be served, as well as frequent changes in the commercial and financial conditions in the country—all negative legislative intention to limit by any such restrictions upon the management of the consolidated company. The case of the village of Boyleston, which was entirely wiped out by the commonwealth in the building of the reservoirs at that point, is a good illustration of the situation in which a consolidated company might find itself if by this statute it was unable to vary its service in accordance with changed conditions of business. In the case of the commonwealth against the Fitchburg Railroad the court recognized the right of the carrier to vary its service; so in the matter of fares, unless the company can meet the exigency rising from higher cost of labor, supplies and materials, the service rendered by the company is likely, in every respect except that of fares, to be impaired. To give to the law any different meaning from that which is here contended would almost paralyze the railroad business in this commonwealth, as almost every railway to-day is the result of one or more consolidations and the railroad field in this State is reduced from 36 companies in 1873 to six at present.

The statistics in P. F. Sullivan's address [see Street Railway Journal of Feb. 15, 1908.—Eds.] before the Massachusetts Railway Association give valuable information as to the proportionate charges of various items which go to make up the cost of operation on a street railway. From the statistics therein given it is apparent that our interest charge, namely, 18 2/3 per cent of our income, is too high a proportion of the gross for full satisfactory results in the net.

We operated last year an average of 10.2 car days of 18 hours each, substantially one-quarter of a car per track-mile. This is a low average, but we know that we operate all the cars which the traffic will justify. It is apparent, therefore, that we cannot expect more than a normal growth in our gross business and this growth is largely necessary to take care of increased maintenance, particularly maintenance of equipment, which will be high in view of our high average speed.

The Millers Falls division appears to be the worst offender and is lowest in earnings. This division made less than one-eighth of our car-miles last year and its income was less than one-twelfth of our total.

INCREASED FARES ESTABLISHED

The directors acted upon the recommendation in the foregoing and the increased fares were established on the Millers Falls division. Under the new schedule the fares were as follows: Turners Falls to Lake Pleasant (5 miles), 10 cents, no change; Turners Falls to Millers Falls (7 miles), 15 cents, increase of 5 cents; Turners Falls to Montague (7 miles), 15 cents, an increase of 5 cents. An arrangement by which coupon tickets were sold at the rate of 4 cents each was discontinued and a round-trip ticket between Millers Falls and Montague on Turners Falls and return for 25 cents was introduced.

On the same date on which these changes were introduced, April 1, 1908, certain readjustments were made on two of the other divisions. On the Deerfield division the rate of fare between Greenfield to Hatfield (15.5 miles) was made 25 cents, an increase of 5 cents; between Greenfield and Laurel Park (19 miles), 30 cents, an increase of 5 cents; between Greenfield and Northampton (22.2 miles), 35 cents; an increase of 5 cents. The rate for a round-trip ticket between Greenfield and Northampton was made 60 cents instead of 50 cents. These changes were effected by the introduction of additional fare-limit points. On the Greenfield division the rate for the coupon ticket was advanced from 4 cents to 4 1/6 cents.

Public announcement concerning the changes was made late in March to the newspapers in the communities affected. This announcement referred to the desire of the company to bring the four divisions as nearly as possible to equality in the car-mile earnings, and continued: "To obtain the desired result without a revision of the fares the management in the past has tried various experiments of reduced fares with a view to increasing traffic. The costs of labor and materials and the maintenance in operating street railways have increased greatly within the past few years and a great many street railway companies in the State have already revised their fares to meet the changed condition."

At the same time that this action was taken the company petitioned the Railroad Commission for authority to withdraw the transfer privileges to Lake Pleasant. This petition and the complaint of merchants of Turners Falls against the increase in fare on the Millers Falls division were heard together. The other readjustments were accepted without appeal to the Railroad Commission.

The decision of the commission rendered on May 9, 1908, was that it was unable to adjudicate the increased fare a reasonable one. Recommending a reduction in the rate of fare the commission at the same time withheld its approval of the petition for withdrawal of the free transfer at Lake Pleasant. The commission ordinarily disapproves the withdrawal of free transfer privileges after the public has received the advantage of them in any locality.

Complying with the recommendation of the commission, the company withdrew its rate of 15 cents on the Millers Falls division on June 1, but on June 2 announced a rate of 12 cents and at the same time discontinued the sale of workingmen's tickets. These changes resulted in a protest to the Railroad Commission from residents of Montague and the adjoining town of Ewing. The evidence submitted by the company at the resultant hearings consisted of both statistics and arguments. The action of the company was upheld by the commission in a decision in which it was stated:

DECISION OF THE COMMISSION

The board has thoroughly investigated the situation and caused the company to file with it a statement of passenger receipts on the Millers Falls division from Oct. 1, 1907, to July 1, 1908, compared with the previous year. A study of these tables discloses that the income received by the company under the present rate is not in excess of the reasonable return to which it is entitled from this division, taken in connection with the rest of its system. Making due allowance for the existing industrial depression in the township and computing the riding of 1906-7 on the basis of the existing rate, it is clear that the company is not requiring of the public an undue compensation for service rendered. The rate, tested by comparison with existing

rates for like service under like conditions elsewhere in the State, responds to the test of reasonableness.

This case is readily distinguished from the one formerly before us. In that case a new fare zone was established causing every patron of the road traveling between Turners Falls and the other villages on this division to pay an additional 5 cents. The present case results from the action of the company in charging an additional cent for each of its original fare zones. On Nov. 2, 1907, the board, upon complaints of service on this division, made this statement:

"The character of the territory traversed and of the patronage given would seem to fortify the claim that the line is operated under present conditions at a loss." It is apparent that these conditions have not improved since that time, and the company is therefore justified in making some increase in its passenger fares. The former fare case disclosed an excessive increase; the present case presents a reasonable one.

We cannot ask the company, in view of its annual financial returns and its comparative statements of passenger receipts, to reinstall the special workingmen's ticket formerly issued, as this would compel part of the public traveling on this division to bear the burden that should be shared by all. Doubtless the workingmen's ticket issued by the company contributed in no small measure to the selection of the several villages as the homes of many workingmen employed in the town, and to withdraw this ticket entirely would work a hardship. Every endeavor consistent with the rights of all should be made by the company to provide for this portion of the traveling public. We are satisfied that a workingmen's ticket should be issued, at least experimentally, but it is obvious that it must be sold at a rate in excess of that formerly charged, and we therefore recommend the issue by the company of workingmen's tickets at such a rate as will make effective the spirit of the foregoing statement; these to be sold in books of such size as will permit their ready purchase by those for whom they are intended. If a six months' trial should prove the inability of the company to continue their use, the board will, upon application, again consider the matter.

Following the recommendation of the commission the company reissued the workingmen's tickets on this division, but at the rate of 3.6 cents apiece instead of 3 cents, as heretofore, the percentage of increase being the same as that upheld for the regular fares.

In the discussion before the commission it was shown on behalf of the company that the withdrawal of the transfer privilege was one step by which it was hoped to make the Millers Falls division self-supporting. Transfers, under the suggested scheme of fares, became of no use, because Lake Pleasant became a fare limit point for passengers bound in all directions. The following comprises part of the argument that was presented:

ARGUMENT FOR WITHDRAWAL OF TRANSFERS

Lake Pleasant is a small village in the town of Montague. During the winter months the village is composed of about 25 families and from June 1 to October more or less pleasure business is drawn to Lake Pleasant by the natural attractions. The Millers Falls division runs from Turners across Montague plain to Lake Pleasant, Millers Falls and Montague. These four villages have an aggregate population of approximately 7300 people with five-sevenths of the total in Turners Falls. During the summer months Lake Pleasant will probably be increased by 500.

It is probably a safe statement to make that the Millers Falls division, from the time of its first operation in 1895 to the present time, has not been self-supporting. During all of this time it has been operated in connection with other divisions and the fare has been maintained at the old figure with the idea that if business increased the revenue would increase to a point where the division would be self-supporting. Despite some increase in business at times business on the whole is smaller at present than in years gone by and conditions, both as to cost of operation and others, have changed so that it has been thought wise by the management of the street railway company to at least attempt to bring this division to a self-supporting basis. In years past up to 1904 the cars on this division were largely operated by one operator. This was changed due to the recommendations of the Board of Railroad Commissioners and two men are now on all cars that operate on this line.

In 1895, when this company first started operation, power was supplied entirely from a water power station at Millers Falls. This station has been made less effective since 1903 by the raising of the water in the pond below the dam of this power station so that the available head has been diminished and the power which can be produced there has been curtailed. This raising of the water was by interests entirely foreign to the street railway and at the present time is a matter of litigation, but nevertheless the fact exists that the loss of power at this point has compelled the street railway to purchase power at a larger price elsewhere which, in itself, adds to the cost of operation of the cars.

The following table shows the passenger earnings and traffic by months on all divisions of the Connecticut Valley Street Railway, with a comparison, since April 1, 1908:

	Car-miles.	Total fares.	Revenue passengers.	Car-mile revenue, $.	Passengers per car-mile.
April, 1907	70,214	275,485	$12,380.13	0.176	3.92
April, 1908	63,636	275,422	12,496.08	0.197	4.33
May, 1907	73,091	318,934	14,391.54	0.197	4.36
May, 1908	66,985	354,896	16,342.11	0.244	5.31
June, 1907	72,813	371,971	16,959.38	0.233	5.10
June, 1908	66,071	365,106	17,075.77	0.259	5.53
July, 1907	78,733	443,279	20,207.07	0.257	5.63
July, 1908	71,565	384,934	18,290.86	0.254	5.38
Aug., 1907	75,451	437,074	19,824.99	0.263	5.79
Aug., 1908	70,919	389,273	18,352.15	0.261	5.49
Sept., 1907	72,388	357,918	16,174.58	0.223	4.95
Sept., 1908	65,776	340,120	15,906.49	0.242	5.17
Oct., 1907	65,420	338,387	15,183.79	0.232	5.18
Oct., 1908	66,354	326,164	15,108.01	0.228	4.92
Nov., 1907	64,692	304,365	13,618.85	0.211	4.70
Nov., 1908	63,975	288,851	13,277.67	0.208	4.52

UNIT ON ALL LINES ADVANCED TO 6 CENTS

The formal announcement to the public concerning the increases in fares established by the Connecticut Valley Street Railway as of Jan. 1, 1909, making the unit on all lines 6 cents, states in part:

While it might be a debatable question as to what constitutes a fair return or a proper ratio of profit to capitalization, we submit that it would probably be agreed if a company like the Connecticut Valley Street Railway, which had on Sept. 30, 1908, capital stock of $500,000, funded debt of $500,000, net current liabilities of $192,934, or a total capitalization in round numbers of $1,200,000, were allowed to convert its debt into stock, a net yearly income of $85,000 above its operating expenses would not constitute an unfair return for interest, taxes, dividends and depreciation.

We submit that the Connecticut Valley Street Railway has a conservative capitalization, and that its gross income per dollar invested is low.

Total cost of permanent property Connecticut Valley Street Railway, Sept. 30, 1908, was $1,200,458; cost per mile of single track, $25,378. Average cost per mile of single track (81 companies State of Massachusetts) for year ending Sept. 30, 1907, $37,540; year 1908 not available.

This average does not include companies in Boston, Worcester or Springfield.

Ratio of gross income Connecticut Valley Street Railway to cost of permanent property for year ending Sept. 30, 1907, was 15½ per cent. Above mentioned 81 companies same year was 17 2/5 per cent.

The operating expenses of the Connecticut Valley Street Railway, we submit, are economical and not extravagant.

Year ending Sept. 30, 1906, they were $0.116 per car-mile.
Year ending Sept. 30, 1907, they were $0.144 per car-mile.
Year ending Sept. 30, 1908, they were $0.164 per car-mile.

Average operating expenses per car-mile year ending Sept. 30, 1906, (excluding the companies in above cities and covering 90 companies in Massachusetts) were $0.166 per car-mile; for year ending Sept. 30, 1907, (81 companies), $0.167 per car-mile; year ending Sept. 30, 1908, not available.

The earnings per car-mile of the Connecticut Valley Street Railway, we submit, are low.

Year ending Sept. 30, 1906, they were $0.192 per car-mile.
Year ending Sept. 30, 1907, they were $0.208 per car-mile.
Year ending Sept. 30, 1908, they were $0.230 per car-mile.

Average earnings per car-mile year ending Sept. 30, 1906, above 90 companies, were $0.255 per car-mile; for year ending Sept. 30, 1907, above 81 companies were $0.258 per car-mile; year ending Sept. 30, 1908, not available.

A condensed statement of earnings and expenses for the three years ended Sept. 30, 1908, was submitted, showing net divisible income and dividends as follows: 1906, net divisible income of $22,199 and dividends of 2 per cent, or $9,718; 1907, net divisible income of $15,737 and dividends of $9,948, or 2 per cent; 1908, net divisible income of $10,240, and no dividend disbursement. The statement to the public continued:

Taxes during these three years amounted to $15,011 and amount paid to stockholders $19,666. Since the life of this company as a consolidated one, namely, April 1, 1905, it has, in order to provide better service for its patrons, expended in additions to property the sum of $173,929. It has credited to its property accounts in the same period $47,103, of which $20,852 represents direct charge to profit and loss as depreciation, the difference of $26,251 being property sold or destroyed. It has, therefore, added net to its property by the sum of $126,826.

From these three years' statements it is apparent that the return for interest, taxes, dividends and depreciation has been insufficient, and that if the property is to give the public service it demands and its stockholders the dividends to which they are entitled, the net earning capacity must be increased.

The present condition is due primarily to the following facts:

1. The wages paid are very much in excess of those paid a few years ago.
2. The cost of motive power has increased 20 per cent.
3. The cost of all material used in the construction and operation of street railways has increased in a varying ratio from 20 to 100 per cent.
4. The distance which patrons can ride for one unit of fare has been gradually extended by transfer facilities.
5. The roadbed and equipment have been gradually and constantly wearing out, with the result of necesary replacement.
6. Increased burdens have been placed upon us by legislation and by municipalities at the time of added construction.

In the three years, while gross earnings have increased 5 per cent, operating expenses have gone up by 9.8 per cent.

The result of all of the above conditions makes it absolutely imperative that some legitimate means be taken to increase the net income.

Although the wages paid are very much higher than those paid a few years ago, the directors, in considering the matter, decided not to reduce the wages of employees, and thereby possibly render poorer service, believing that the public, as a whole, prefers good service at a reasonable rate, to poor service at a cheap rate.

The details of the changes in fares were published in the Electric Railway Journal of Dec. 26, 1908, page 1668. The statement to the public continues:

While it is hoped that the changes suggested above will bring satisfactory results, should they not, a withdrawal of tickets may be necessary.

To the 230 stockholders up and down the Connecticut Valley who have invested funds in the stock of this corporation, it is due that a just return should be paid them on their investment. It is part of the principle and spirit of the law and must be done if this company or any other public service corporation is to secure new capital for further additions or improvements.

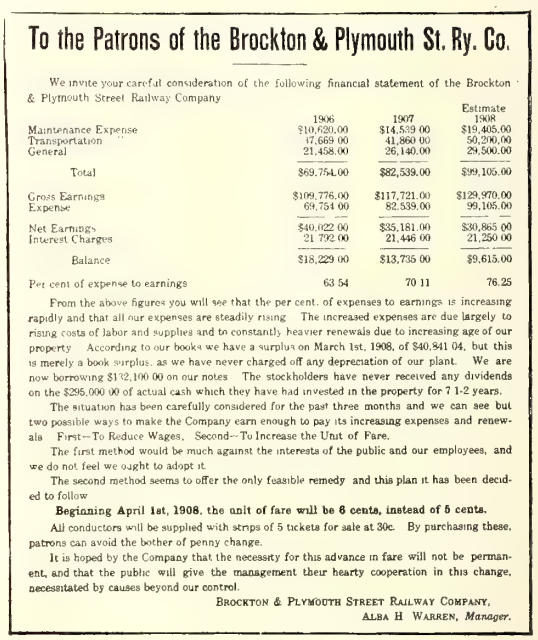
It has been imposible for this company, in common with others in the recent past, to market its securities except at a price that was prohibitive. The result has been that in order to finance its improvements, it has had to borrow money in the market, which for a concern of this kind is unsatisfactory and hazardous in time of financial stringency.

We believe that the majority of the citizens and patrons, when they have sufficiently familiarized themselves with the real situation to permit of their looking at it from an entirely and equitable standpoint, will accept this necessary change in a spirit of fairness.

It is hoped that the necessity for this advance in fares will not be permanent, but until a return to the former unit is made possible by an improved financial showing of the company, the directors ask the reasonable co-operation of the public as a whole.

Brockton & Plymouth and Blue Hill Street Railways

The two roads in Massachusetts of which Stone & Webster are the general managers—the Brockton & Plymouth Street Railway and the Blue Hill Street Railway—have increased their units of fare from 5 to 6 cents. The change of fare by the Brockton & Plymouth road was made on April 1, 1908, and was not followed by complaint to the Board of Railroad Commissioners by the residents of the communities affected. Before the 6-cent fare was placed in effect Alba H. Warren, who was local manager for



To the Patrons of the Brockton & Plymouth St. Ry. Co.

We invite your careful consideration of the following financial statement of the Brockton & Plymouth Street Railway Company

	1906	1907	Estimate 1908
Maintenance Expense	$10,620.00	$14,539 00	$19,405.00
Transportation	17,669 00	41,860 00	50,200.00
General	21,458.00	26,140.00	29,500.00
Total	$69,754.00	$82,539.00	$99,105.00
Gross Earnings	$109,776.00	$117,721.00	$129,970.00
Expense	69,754 00	82,539.00	99,105.00
Net Earnings	$40,022 00	$35,181.00	$30,865 00
Interest Charges	21 792.00	21,446 00	21,250 00
Balance	$18,229 00	$13,735 00	$9,615.00
Per cent of expense to earnings	63 54	70 11	76.25

From the above figures you will see that the per cent. of expenses to earnings is increasing rapidly and that all our expenses are steadily rising. The increased expenses are due largely to rising costs of labor and supplies and to constantly heavier renewals due to increasing age of our property. According to our books we have a surplus on March 1st, 1908, of $40,841 04, but this is merely a book surplus, as we have never charged off any depreciation of our plant. We are now borrowing $132,100 00 on our notes. The stockholders have never received any dividends on the $295,000 00 of actual cash which they have had invested in the property for 7 1-2 years.

The situation has been carefully considered for the past three months and we can see but two possible ways to make the Company earn enough to pay its increasing expenses and renewals. First—To Reduce Wages. Second—To Increase the Unit of Fare.

The first method would be much against the interests of the public and our employees, and we do not feel we ought to adopt it.

The second method seems to offer the only feasible remedy and this plan it has been decided to follow

Beginning April 1st, 1908, the unit of fare will be 6 cents, instead of 5 cents.

All conductors will be supplied with strips of 5 tickets for sale at 30c. By purchasing these, patrons can avoid the bother of penny change.

It is hoped by the Company that the necessity for this advance in fare will not be permanent, and that the public will give the management their hearty cooperation in this change, necessitated by causes beyond our control.

Brockton & Plymouth Street Railway Company,
Alba H Warren, *Manager.*

Circular to Patrons of Brockton & Plymouth Road

Stone & Webster at Plymouth at the time, addressed a meeting of influential citizens on the subject. Facts and figures in relation to the financial history of the company, together with an estimate of results for the current fiscal year, were laid before the citizens.

Stone & Webster state that the arguments and public announcement were made with the "idea of educating the public to know the exact situation and to realize that adequate service could not be given through a long term of years unless the company received a fair return on the investment."

The unit of fare on the Blue Hill Street Railway was increased from 5 to 6 cents on Jan. 5, 1908. The residents of Stoughton, Mass., protested to the Railroad Commission against the increase of fare, and an investigation, with hearings, resulted. Statements of daily passenger earnings were filed with the commission. These showed the follow-

ing results for the first few days after the change in unit of fare became operative:

	1907.	1908.	Per cent. Increase.	Per cent. Decrease.
Jan. 5	$253.05	$206.28	—	11
" 6	166.20	145.50	—	12
" 7	129.70	148.08	14	—
" 8	148.10	168.96	14	—
" 9	144.45	158.68	10	—
" 10	157.40	149.16	—	5

The gross revenue decreased six days in January, as compared with the corresponding days of January, 1907, and increased 21 days. Nine days in February showed a decrease and 20 an increase. Fourteen days in March showed a decrease, 15 an increase and two substantially no change. Decreases were shown in April until and including April 5, the last date covered by the statement. The gross earnings from Jan. 5 to April 5, 1908, both inclusive, were shown to be $15,520.44, as compared with $14,797.24 in the corresponding period of the previous year, or an increase of 5 per cent. Figures showing the operating expenses per car-mile, average expenses per passenger and number of passengers per car-mile were published. Included in the statistics presented were the following:

Year ended Sept. 30.	1904.	1905.	1906.	1907.
Gross earnings	$72,864.10	$78,294.73	$86,344.05	$85,227.48
Operating expenses—				
Per cent of gross	71.1	80.6	71.1	70.8
Maintenance—				
Per cent of gross	11.5	13	12.7	16
Results after payment of interest and taxes—				
Loss	$6,358.78	$6,070.34	—	$7,040.32
Gain	—	—	$1,078.88	—

In 1906 and 1907, after these figures were shown, entries to profit and loss were made of $4,426 and $10,061.46, respectively, "constituting mainly damage claims covering previous periods." The accumulated deficit on Sept. 30, 1907, was $55,622.07.

In announcing its decision upholding the increase, the commission said that the figures submitted "convince the board that the company is unable to operate profitably for a 5-cent fare over its established fare limits, and must of necessity advance the charge." The decision continued:

It is of the greatest importance that a community served by a public service corporation should receive reasonable accommodations, and increased receipts tend to increased facilities for transportation. An unsuccessful street railway company is a poor public servant. It is not in a condition financially to render the service that it ought or that the public has a right to expect.

The province of this board with respect to facilities for transportation and rates, therefore, is primarily to see that the public is well served at a reasonable toll; and it is a proposition too clear for discussion that no company can or ought to be asked to furnish the high standard of railway equipment and service that Massachusetts laws demand without at the same time being assured of sufficient income from the public to maintain such equipment and service. The foregoing statistics in themselves decide the main question before us.

RESULTS OF FARE CHANGES

The result of the change in fare on the Blue Hill Street Railway is shown by the following statement:

BLUE HILL STREET RAILWAY.

Comparative Monthly Earnings.

	5 ct. fare. 1907.	6-ct. fare. 1908.	Increase.	Decrease.
January	$5,125.44	$5,538.65	$413.21	.....
February	4,892.54	5,304.54	412.00	.....
March	6,055.96	5,991.08	.....	$64.88
April	6,013.64	6,584.93	571.29	.....
May	7,672.93	9,236.31	1,563.38	.....
June	9,387.75	10,909.82	1,522.07	.....
July	11,253.09	11,061.69	.....	191.40
August	11,020.86	11,392.22	371.36	.....
September	8,688.38	9,281.65	593.27	.....
October	7,689.62	8,252.63	563.01	.....
	$77,800.21	$83,553.52	$6,009.59	$256.28

Number of Passengers Carried Per Month.

	1907.	1908.	Increase.	Decrease.
January	94,988	88,475	.....	6,513
February	84,488	81,580	.....	2,908
March	109,640	92,622	.....	17,018
April	113,995	102,678	.....	11,317
May	145,235	146,307	1,072	.....
June	174,510	169,083	.....	4,827
July	215,984	177,130	.....	38,854
August	211,431	182,595	.....	28,836
September	165,511	153,773	.....	11,738
October	145,914	131,076	.....	14,838
	1,461,696	1,325,919	1,072	136,849

A net gain of 7.4 per cent was shown in revenue and a net loss of 9.3 per cent in the number of passengers carried.

The following statement shows the corresponding results on the Brockton & Plymouth Street Railway:

BROCKTON & PLYMOUTH STREET RAILWAY.

	5 ct. fare. 1907.	6-ct. fare. 1908.	Increase.	Decrease.
April	$7,814.88	$8,154.57	$339.69	.....
May	9,771.92	10,643.49	871.57	.....
June	12,359.81	12,152.06	.....	$207.75
July	17,451.55	15,955.93	.....	1,495.62
August	17,326.82	16,515.09	.....	811.73
September	11,620.07	12,602.77	982.70	.....
October	9,057.08	9,767.25	710.17	.....
	$85,402.13	$85,791.16	$2,904.13	$2,515.10

Number of Passengers Carried Per Month.

	1907.	1908.	Increase.	Decrease.
April	149,789	129,388	.....	20,401
May	189,178	167,686	.....	21,492
June	240,420	204,103	.....	36,317
July	340,547	275,134	.....	65,413
August	344,960	286,700	.....	58,260
September	228,136	207,865	.....	20,271
October	171,168	148,921	.....	22,247
	1,664,198	1,419,797	.....	244,401

On this road there was a net gain in revenue of 0.5 per cent and a decrease in the number of passengers carried of 14.7 per cent.

In further explanation of the foregoing figures, the following statement has been made by A. Stuart Pratt, district manager of the Stone & Webster Management Association:

"In regard to the figures shown by the Blue Hill Street Railway, I would say that there was some reduction in car-miles in 1908 and general business was very poor in the district served by this company, which accounts, as we believe, very largely for the decrease in the number of passengers carried.

"In regard to the Brockton & Plymouth Street Railway figures, the same conditions apply, except that the loss in gross for the summer months is partially due to the fact that we sold an extra coupon with every five 6-cent tickets, which was redeemable at the railway park for 5 cents' worth of food or fun, and part of these redeemed tickets were charged up against the gross earnings.

"We do not feel that the comparative figures show the true effect of the 6-cent fare, as the condition of general business was quite abnormal."

Alba H. Warren, who was manager of the Brockton & Plymouth Street Railway and the Blue Hill Street Railway at the time the changes in fares were made, and who is now manager of the Pensacola (Fla.) Electric Company, has expressed an opinion in response to a request from the ELECTRIC RAILWAY JOURNAL regarding the meaning of the decline in traffic. Mr. Warren said:

"Careful comparison of figures and conductors' trip sheets, making due allowance for general business conditions, convinced me that the advance in fares on the Blue Hill and Brockton & Plymouth lines had almost no effect on the number of passengers carried. The very slight decrease in short riding will undoubtedly come back when business is good and mill operatives are again working full time. I am safe in saying that in these two instances

there was no material decrease in traffic, and no permanent loss of traffic will result."

CONCORD, MAYNARD & HUDSON STREET RAILWAY

The Concord, Maynard & Hudson Street Railway increased its unit of fare from 5 cents to 6 cents on March 1, 1908. The following statement regarding the reasons for the increase and the effect thereof has been given to the Electric Railway Journal:

Regarding the raise of fares on the Concord, Maynard & Hudson road it might be well to review briefly the early history of the line. At the time the road was built the same mistake was made regarding fares that was common with roads 8 to 10 years ago, namely, of promising low fares and transfers, with no thought for the future, if only a franchise was received. The fare for the whole line, approximately 15 miles, was fixed at 20 cents and the zones were arranged in such a way that in some cases the fare was less than a cent a mile and in others 2 cents to 2½ cents a mile.

With the general depression in business lessening the amount of traffic and with the advance in the cost of labor and materials it was imperative that some legitimate means be taken to increase the net income, certainly if the stockholders were ever to receive any dividend. The matter was considered carefully by the management and the directors and it was decided to raise the unit of fare to 6 cents for the time being and see what the result would be.

The public was somewhat prepared for the raise by articles which appeared for two or three weeks in the local papers, and accepted the situation in the spirit of fairness.

While the figures show that for a time the numbers of passengers carried from week to week, as compared with the corresponding weeks of the two years preceding, were perceptibly less, the receipts show quite an increase, some weeks as high as 20 per cent. The falling off in the number of passengers is attributed more to the hard times than to the raise in fares. It is felt that the decrease in traffic would have been practically the same without any change in fares and that in reality the road is a gainer to a larger extent than was anticipated.

It is a question, however, which is the better policy to adopt in the method of increasing the receipts, the raising of the unit of fare or the establishment of more zones. It is felt even now that a change in the zones with the fare at 5 cents would be productive of even better results than have been secured by the advance in the unit of fare. There are now four zones and a charge of 6 cents in each zone. In this way the short rider has to pay a share of the expense of the longer rider or, in other words, the long rider gets more in proportion for his ride than does the short rider.

There is no question but that a readjustment of fares should be made on all the suburban lines in order that an adequate return can be had on the investment. The public feels that in a general way it should pay more for the rides, as it is constantly getting better accommodations through cars, quicker service and better transfer privileges.

The policy of the early promotors of the roads of promising anything and everything has caused the failure of many roads and the time has come when the owners have a right to expect a fair return on the money invested. The increase in wages, the demands of labor organizations, excise taxes, expenses incident to changes due to State highways, relocation of streets and many other things tend to deplete the treasury of the companies; and in order that they may live, a higher rate of fare must be charged and the public is beginning to realize this fact.

The raise of fare of the Concord, Maynard & Hudson Street Railway may mean the possibility of a small dividend in the near future.

Much more could be said on the fare question, but the experience of the Concord, Maynard & Hudson road is the same as that of a majority of the Massachusetts roads.

TAUNTON & PAWTUCKET STREET RAILWAY

The Taunton & Pawtucket Street Railway, operating 18.6 miles of track, increased its fares on Feb. 1, 1908, by adding another fare zone. A statement concerning the effect of the change has been made for the Electric Railway Journal by A. C. Ralph, general manager of the company.

Mr. Ralph said that about a year ago the management came to the conclusion that, in view of the great advance in the costs of supplies and labor, it must necessarily increase the revenue of the road. To do this, it was finally decided, after other methods had been considered, to insert another fare zone. This was done by dividing a zone where passengers were carried a distance of 6½ miles for 5 cents, most of the way through a sparsely settled territory.

This change affected locally about 20 families, and it naturally seemed to them a great hardship. These people have not ridden as often since the company raised the fare as they did before, but it has not been discovered that any appreciable amount of through travel has been lost, while the 20 families have undoubtedly paid a gross sum equal to what they did previously. Another section of the line of equal length was earning approximately $24,000 per annum, while the section in which the new fare zone was inserted was earning about $14,000 per annum, with practically the same amount of expense for operation as the section earning $24,000 per annum. This the company considered unfair and wholly improper.

Mr. Ralph said that the figures compiled before the change was made showed that if no loss of patronage resulted from the advance in rates, the new fare zone would increase the gross revenue about $9,000. The probable increase was placed, however, in view of all the possibilities, at $5,000.

"The results thus far," Mr. Ralph added, "show that this estimate was conservative, although we cannot make a true calculation upon just what the results would be under normal business conditions."

Although the new fare zone was established on Feb. 1, the effects of hard times did not begin to be felt in the locality in which this road operates until about March 1. During the month of February the operations showed a substantial gain in gross receipts, which came almost wholly from the new fare zone. The gross revenue from operation for the fiscal year ended Sept. 30, 1908, was $1,500 less than in the previous year, but Mr. Ralph attributes this decrease almost wholly to business conditions, and believes that if the company had not established the new fare zone the loss would have been much greater. While the decrease in gross receipts of this road from the previous year was about 3 per cent, other roads in the same locality have shown a decline of from 6 per cent to 8 per cent, and some a trifle more.

Concerning the attitude of the public, Mr. Ralph said: "In discussing this matter with our patrons we have assumed the attitude that we do not desire and they would

not wish to have us curtail the service, nor would they wish to have us reduce our expenses to a point which would mean that the cars, track and overhead construction would be out of repair and in a dangerous condition for operation. We have argued that the public ought to be willing to produce revenue enough to keep our property in good physical condition consistent with economical operation. We have maintained the property in first-class shape and have not reduced the schedule anywhere upon our system. Our patrons admit that the service is perfectly satisfactory, but, unfortunately, to some the rate of fare seems too high."

The average rate of fare on the lines of the company is about 1.4 cents per mile.

The increase in fare of the Taunton & Pawtucket road was taken before the Board of Railroad Commissioners on a petition from citizens of Rehoboth and Taunton, stating that the advance "works a hardship on patrons of the line and is unjust and unnecessary." Statements of daily earnings were presented to the commission. From Feb. 1 to 29, 1908, the gross earnings were $3,174.05, as compared with $2,994.90 from Feb. 1 to March 2, 1907; from March 1 to 31, 1908, the gross earnings were $3,436.95, as compared with $3,528.55 from March 3 to April 2, 1907; from April 1 to 30, 1908, the gross earnings were $3,387.40, as compared with $3,474.30 from April 3 to May 2, 1907; from May 1 to 7, 1908, the gross earnings were $868.45, as compared with $854.50 from May 3 to 9, 1907. A statement of the annual earnings and expenses of the road and its predecessor line, the Bristol County Street Railway, beginning with the fiscal year 1901, was also presented. This showed that out of the seven years ended with Sept. 30, 1907, a deficit was shown, after meeting fixed charges, in four years. The only dividend paid on the stock in that time was one disbursement of 2 per cent. The net deficit as of Sept. 30, 1907, was $8,147.52. The following statistics are for the year ended Sept. 30, 1907:

Gross earnings per mile	$3,005
Expenses per mile	$2,579
Net earnings per mile	$426
Miles main track operated	17.612
Passengers carried	1,045,082
Car-miles run	270,446
Car-mile earnings, cents:	
Gross earnings	19.57
Expenses	16.80
Net earnings	2.77

The decision of the commission showed that the Taunton & Pawtucket Company acquired the property of the unsuccessful Bristol County Street Railway at receiver's sale, and had never received a return on its investment satisfactory to its shareholders. The decision stated:

Since the change in fare the company, at the request of the board, has furnished a daily comparative statement of the gross income, from which it appears that its earnings are substantially the same as before the increase. This result is in large measure accounted for by the decrease in travel, owing to the general financial depression. Making due allowance, however, for the income so to be received by the company under its newly established fare in times of normal travel, the board learns nothing that justifies it in finding the fare now established to be excessive, and, when compared with existing fares for like service under like conditions in the Commonwealth, the fare does not appear to be unreasonable. Petition dismissed.

WESTERN MASSACHUSETTS STREET RAILWAY

The situation on the Western Massachusetts Street Railway has been before the Board of Railroad Commissioners for consideration at various times within the last year or so.

The subject was considered in a decision rendered by the board on Dec. 4, 1907, which made certain recommendations, leaving the problem of working out the details to the company. Changes which were made shortly afterward resulted in a protest to the board by citizens of Westfield and Holyoke. The board was unable to find that the withdrawal of the free transfers was in the interest of the whole public, but declared that if there was merit in the statement made at the hearing, that the company's fares in Westfield ought to be readjusted, it would, upon petition involving the whole subject, take appropriate action. The petition of the company for the withdrawal of free transfers was therefore dismissed without prejudice.

The subject was considered by the board several months later. No petition that the entire subject be reopened was made in the meantime, but citizens asked for a reduction in fare on one portion of the lines, on the ground that the existing fare was unreasonable and excessive. The board, after examination of the returns, concluded that it ought not to recommend a reduction.

BOSTON & WORCESTER STREET RAILWAY

The Boston & Worcester Street Railway made formal announcement on Dec. 21 that on and after Jan. 1, 1909, the unit of fare would be 6 cents on all the lines owned and operated by the company. The official notice which has been issued states in part:

The company will continue to sell the round trip and book tickets at its local ticket agencies at the same price as at present.

Books of 50 single-fare rides, price $2.75, or 5½ cents per ride will be on sale at the company's local ticket agencies. This book will be good anywhere on the system and may be used by more than one individual.

For special convenience of passengers paying cash fare, conductors will have for sale 6-cent tickets in convenient form, so that passengers may purchase tickets to cover the fare to be collected on car.

Conductors are instructed, in collecting cash fare from passenger, to sell them 6-cent tickets for the succeeding collections.

By allowing the payment of a through cash fare to all points on the system, the company aims to relieve its patrons, as far as possible, of the inconvenience of continual change-making.

The following statement in regard to the change in fares by the Boston & Worcester Street Railway has been made to the ELECTRIC RAILWAY JOURNAL by James F. Shaw:

STATEMENT OF JAMES F. SHAW

"The Boston & Worcester Street Railway Company establishes an increased rate of fare on its lines as of Jan. 1, 1909. This increase is necessary, as the revenue from the company's railway, after paying its operating expenses, fixed charges and taxes, is not sufficient for a fair return to the stockholders for the investment which they have in the property.

"As in all other Massachusetts street railways, the outstanding securities represent actual cash invested, no issue of securities being authorized by the Board of Railroad Commissioners exceeding the actual value of the property as determined by an appraisal of engineers approved by the board. Under Massachusetts laws, the board of directors of a street railway has the sole right to establish the rates of fare. The public, however, has the right of appeal to the Board of Railroad Commissioners in case the rate as fixed by the directors seems excessive and unreasonable. The fares on many street railways in Massachusetts have been increased recently, and in most cases where an appeal has been made to the board, after careful investigation and

public hearings have been held, the increased rates, as fixed by the directors, have been approved by the board.

"It is my belief that the public has begun to realize that the rates heretofore charged have been too low for the service rendered, and will not object to a reasonable increase in fares to allow the company to maintain the present standard of service, with a view of improving that service, rather than decrease the standard. The Boston & Worcester company has been maintaining a 30-minute schedule on its lines during the winter months and a 15-minute schedule during the four summer months, and the routes to the various points on its lines are so laid out that the 30-minute winter schedule gives a 15-minute service to South Framingham and all points east, while the 15-minute summer schedule gives a 7½-minute service to South Framingham and all points east.

"The earnings per car-hour for the past year, including both main line and slow-speed branch lines, average $4.74, and the earnings per car-mile average 29 cents, and while these earnings per car-hour and per car-mile might seem high, they are due mainly to the high speed at which the cars are operated, and the fixed charges due to the high standard of construction and equipment necessary to make the required speed have to be considered. The Boston & Worcester company has expended fully $1,000,000 on boulevard construction through the various cities and towns, and some of the demands made by local authorities in the orders of location, when granted, seem very excessive and unnecessary. This expenditure for boulevard construction represents a fixed charge of $45,000 each year, and while the local authorities evidently considered it good judgment to impose such conditions upon the company, it must now be apparent to them that the rate of fare necessarily must be based on the actual cash investment in the property.

"Fortunately, the company's property is located in a community which is not surpassed for character and intelligence, and it is not anticipated that any material objection will be made.

"The company will advance the unit of fare from 5 to 6 cents, but as it will not increase any ticket rate now existing, the regular patrons will not be affected materially.

"While the earnings during the fiscal year ending Sept. 30, 1908, were received in large part from the sale of tickets, 7,000,000 passengers paid cash fares. If all the 7,000,000 passengers paid the extra cent, the earnings would increase $70,000.

"After careful analysis, deducting the estimated decrease in number of passengers on account of the increased fare, and taking into calculation the increased use of tickets for the same reason, it is estimated that the net improvement in earnings will yield the company about $51,000.

"This increased revenue, together with the receipts from the new line recently built into Natick and the normal increase in business, which has never been less than 4 per cent, should give the company sufficient earnings to justify the payment of its regular dividend of 6 per cent and allow the company to maintain the property in its high state of efficiency and continue the excellent service for which it is noted."

CONCLUSION

The articles comprising the series in relation to the fare situation on the Massachusetts lines have contained figures in regard to the earnings and traffic of the various lines on which increases in rates have been made.

These figures can now be supplemented by a statement received from Matthew C. Brush, vice-president and general manager of the Newton Street Railway, on the lines of which a charge of 1 cent each for transfers was established, with the approval of the Board of Railroad Commissioners, on Sept. 1. The statement shows the numbers of cash passengers carried and transfers issued on each of the divisions of the Newton Street Railway for the months of September, October and November, 1908, as compared with the corresponding months of the previous year. The figures are as follows:

NEWTON STREET RAILWAY

	Cash passengers.		Transfers issued.	
	1908.	1907.	1908.	1907.
September—N. St.	365,355	380,906	32,614	47,684
C. A.	145,733	112,769	14,813	12,830
W. B.	108,382	116,360	21,806	24,101
Total	619,470	610,035	69,233	84,615
October—N. St.	359,643	367,127	30,435	45,052
C. A.	104,671	88,851	10,331	12,938
W. B.	107,129	110,250	17,310	22,246
Total	571,443	566,228	58,076	80,236
November—N. St.	330,846	340,445	27,838	41,497
C. A.	84,539	87,889	8,480	11,875
W. B.	97,122	100,670	15,183	19,952
Total	512,507	529,004	51,501	73,324
Total three months	1,703,420	1,705,267	178,810	238,175

Percentage of transfers issued to cash passengers.

	1908.	1907.
September	11.18	13.87
October	10.16	14.17
November	10.05	13.86
Three months	10.50	13.97

The totals for three months show a decrease of 24.92 per cent, or 59,365, in the number of transfers issued and a decrease of 0.11 per cent in the number of cash passengers carried.

The movement for increased fares in Massachusetts has already progressed much farther than was disclosed when the first article in the series prepared by this paper was published. It has not yet reached an end, and the ultimate result, in its bearing upon the question of fares on urban and interurban railways, will be significant.

HEARING ON THROUGH ROUTES AND JOINT RATES IN NEW YORK

The hearing before the New York Public Service Commission, First District, on the order requiring the establishment of through routes and joint rates between the Third Avenue Railroad and the Central Park, North & East River Railroad was concluded on Dec. 24.

At a hearing on Dec. 19 the closing arguments were made by counsel. An abstract of the argument of John M. Bowers, counsel for the Central Trust Company of New York, trustee under the mortgage securing the bonds of the Third Avenue Railroad, follows:

STATEMENT OF JOHN M. BOWERS.

One—The public service act, appointing the commission, is unconstitutional and void.

Two—There is no power vested in the commission by such act to compel transfers or establish through routes between street railroad corporations.

Three—Section 49, of the public service act, gives no such power, and is, by its terms, applicable only to railroads other than street railroads.

Four—The lines of railroad operated by either the Third Avenue Railroad or the Forty-second Street road and the lines of railroad operated by the Fifty-nines Street road, are not, and cannot be, made by construction and maintenance of switch connections or otherwise to form a continuous line of transportation. On the contrary, the Fifty-ninth Street line operates practically at right angles to either the Third Avenue or the Forty-second Street lines.

Five—That such lines are not connecting, but intersecting lines.

Six—Even if it could be held that the commission had power, under Section 49 of the public service act, to estab-

lish through routes on street railways, there would still be no power in the commission to compel transfers.

Seven—That the commission, under no circumstances, has any power to make an order which would apply to three different railroad corporations.

Eight—That the order made by the commission, on which this proceeding is based, is void and in violation of the fourteenth amendment of the constitution, because it was made without any hearing of the parties proposed to be affected, and because the commission had declined to specify the facts or the inquiries it made or the facts or evidence on which it based such order, and that an order thus made, without a hearing, being the basis of the present proceeding, by which the commission calls upon the receiver of the Third Avenue Railroad and the receiver of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway to proceed with the hearing without an opportunity of knowing the evidence or confronting the witnesses, or being advised of all the facts on which the commission intends to act, and will act if it makes any further order in this proceeding, even if it also considers the evidence that has been produced by the receiver of the two railroad corporations above specified.

Nine—That upon the evidence in this case it is clear that the proposed order would be confiscatory and in violation of the provisions of the fourteenth amendment to the constitution, and especially such provision as provides that no State shall deprive any person or property, without due process of law, or deny to any person within its jurisdiction the equal protection of the laws.

I quite appreciate that the public service act is an act that has undoubtedly come to stay. I quite appreciate that the future of these roads of this city, and the future of their use for the public and the benefit to be given to the public and to those interested in the railway securities, are going to be dependent upon the provisions of that act. I quite appreciate the enormous responsibility that attaches to the commission, the first commission appointed under the act, because the success, or non-success, it is plain, is entirely dependent upon the ability, and care, and wisdom, and progress in their work, of the members who constitute that commission.

We can move neither to the right, nor to the left, in the resuscitation and development of these properties, except by the exercise of the best judgment of this commission. No capital can be obtained, except such as the Third Avenue is obtaining on receiver's certificates, for the developing or resuscitation of these properties, except upon securities to be approved by this board. No new capital can be invited, except upon terms which will seem reasonable, and allow some reasonable interest to those who are to advance it.

In dealing with this situation, it seems to me that the first and most important requirement is the safety of operation. Cars cannot be permitted to run in the streets of this city, operated by electricity, or any other power, unless every possible device that protects the passenger or wayfarer, that is known is put upon the cars, and unless every possible step that human ingenuity can devise, is availed for their protection, and that this board is justified in ordering, without reference to any one fact, except the safety of operation. If a corporation wishes to operate cars in the street of this city, or is engaged in that business, that operation must be had at the highest point of safety whether it has the revenue with which to pay for it or not, or else it must not operate. On that point minds cannot very well disagree.

Now, the comfort of the passengers is secured by the condition of the cars: their cleanliness; their being properly painted; the courtesy of the employees hired to operate them; and the convenience required by the running of sufficient cars, with allowance for the reasonable number of detentions that must obtain in the management of a road; and the carrying of passengers and seating them, except during hours where it is impossible to give them all seats. Now, that, too, has been done under this administration; done by the receiver of this road; done, probably, of his own motion and partly in accord with your order, and possibly the same acts moving at the same time.

The cars are clean; the cars are painted; the conductors and motormen are polite, and there is fairly convenient operation. We have got thus far with the work, and thus far there have been means found, from the receipts of the road, or otherwise, to meet these requirements. There is a vast difference between the condition of operation on that road to-day, and one year ago this day.

But we have come to a somewhat difficult problem, because it involves so many interests, and yet one that we cannot throw out of consideration, and that is, the revenue that goes to the State; that goes to the municipalities; franchise taxes; license taxes; direct taxes on real estate; taxes of very many kinds, under various laws. The franchise tax has not been paid on this road ever since it was levied. We have got to meet it. It is a lien on that property at some amount. And therefore it is, I suggest to this commission, that those who are engaged in the operation of this property—and for this purpose I treat this commission as overlooking it—in looking for any operation at all in the future, have first to consider the other questions that I have specified, and then see where the revenue is to come from the property to pay these taxes.

Of course, that is not a conceivable position, but the position is conceivable, and right upon us, of considering how much money the State is to get, and what the State ought to take. Of course, the real estate taxes here are to be fixed in the same method as all other real estate taxes. The franchise tax is to be fixed here, according to the proceedings now in existence, unless there be some amelioration or amendment of the law.

And, having got that far, and found the necessary expenditures for these three things which must be made, before anything can go to capital, then, of course, the commission is confronted with the proposition as to what, if any, return shall be made on the capital that is invested or to be invested. As to what that return shall be depends upon whether the statutes of this State are to apply, or whether it has to be a reasonable return. When I say the wording of the statute of this State, I do not want to be understood to use it as saying it does of necessity apply, but there is a statute which allows 10 per cent return, or rather seems to forbid a reduction of fares until the total earnings of the road have reached that point, and then there are the decisions of courts, in many cases, where they have indicated that 5 or 6 per cent return is a reasonable return.

In arguing this question to this commission, I do not address myself very much to the confiscation question. After all, there is a higher question than that, which we are discussing; that is, this city cannot go on without its street surface roads. It has subways; it has elevated roads; it may have more subways, and it may have more elevated roads, but these surface roads do serve a public convenience which cannot be served in any other manner, and, of course, are largely of avail for short rides, which is the reason the roads are able, so far as I can ascertain, to live; because of the considerable profit they get in short hauls.

To assist in this matter, we have placed in evidence before you all the sums of money ever paid by the Metropolitan system, from the time it took this lease, for maintenance of way or equipment, as best we could, in order that you could determine the real results of this road. The exhibit of maintenance charges of the Third Avenue road, commencing for the year ending June 30, 1901, and running up to Sept. 30, 1908, which included the items in the receiver's accounts, aggregated $2,753,000. That is for a period of seven years, three months and a few days.

The owners of these properties for the future are interested in the property depreciation fund, and so is the commission. The days are gone by in which dividends can be paid out of capital and in which a physical construction of the road can be permitted, and nothing laid aside to invite new capital, or to give good operation in the future, for the citizens of the city. Any depreciation fund that is fixed, whatever percentage it may be of the earnings, is a matter in which the people of the city are just as much concerned as are the owners of this property. If it be 10 per cent of the earnings, it must be kept and I think this commission will see that it is so kept. If it be 5 per cent, it is sufficient to keep, and there is always reason why those interested should see to keeping enough, but on

that question I submit that neither the owners of the property nor this commission want to minimize.

In other words, the owners of that property may have to take it now, with that 5-cent fare, and be barely able to pay all the expenses which I have outlined, and keep up the operation as it must be for the future, and they may be getting a precious small return on the true value of their property. In that I cannot help them; you cannot. When they came to me and employed me in the business, to help them on this reorganization, I quite appreciated the situation in which they stood, and I never expected, and we cannot ask, that there shall be anything more done for them than to put them in a position, so far as their affairs are concerned, as the law now puts these affairs, and let them work out their own salvation; unless, indeed, you shall find that on the fair value of the properties, that would result in an earning to them greater than the law justifies or requires.

If the result of ordering the transfers is likely to be—and I think that is all I need say—to reduce the present earning capacity of that road, it will be a mistake to order it. It is exceedingly unfortunate that such questions have to be met in a time of reorganization. It is unfortunate if anything must be done to destroy the effort of the receiver, or those behind him, to get the property foreclosed, and get the whole thing on a basis which is to stand for all time to come.

ARGUMENT ON BEHALF OF CENTRAL PARK LINE

William N. Dykman, counsel for the Central Park company, moved to dismiss the proceedings, stating the grounds as follows:

1. There is no power vested in this commission by the act creating it, to compel transfers or establish through routes, between the street railroad corporations.

2. Section 49 of the act gives no such power, and is limited to railroads other than the street railroads.

3. The lines of railroads operated by the Third Avenue Railroad, Forty-second Street Railroad, and the line in question operated by the Central Park road will not, and cannot be made, to form continuous lines of transportation; they are intersecting lines, intersecting at right angles.

4. The commission has not power, under Section 49, to compel the Central Park road, from the Fifty-ninth Street line, to carry passengers between the Third Avenue Railroad Company and the Forty-second Street, Manhattanville & St. Nicholas Railway.

Now, may it please the commission, since we were here before, and since the testimony was closed, a judgment has been made in the Appellate Division, in this department, which changes this proceeding materially. It makes the testimony that has been taken here a record upon which this proceeding, and any order that may be made, will stand or fall. Concerning the Fifty-ninth Street line, the facts are absolutely undisputed. The cost has been ascertained to the fraction of a cent, and not even the pleasantries of cross-examination by the counsel for the commission have materially or at all varied the figures. I am not going to go over those figures again, but ask the commission to remember that the testimony of the cost to carry each passenger of the 20,000,000 that were carried on the Fifty-ninth Street line, the last year of the full and free transfers, was 1.77 cents. I am going to make the confession to the cross-examination that the cost of power has been materially reduced by the installation of the meter, and that has made a difference of perhaps 30 per cent in the cost of power, which would make a difference of about 0.1 per cent in the total cost of carrying each passenger, so that as near as I can ascertain, by the corrections, which I have been asked to have made, those figures would be reduced to 1.67 cents per passenger.

We ought to be allowed an opportunity to make some agreement; we ought not to be handed over to these north and south lines, with a rate less than cost or approximating cost. We ought to be given a generous profit, because if we do not have a profit this road cannot continue to run. This road must be abandoned if it cannot collect. Absolutely it costs more than the receipts to run the east and west Belt line, and that is in evidence in this case. And if the east and west Belt lines are to continue for the present, they must be supported by the paying of the only part of the lines that pays anything. So, I submit, that if we are to have transfers you must give to the Central Park company the 1.6 cents which a ride costs, and the return on capital; you must give it well above 2 cents, considerable above 2 cents, and there is no dispute or no difference in the testimony in this regard, and this is the record according to which your decision must, I very respectfully submit, be made.

Another hearing in the case took place on Dec. 11. Henry W. Brown, auditor of the Metropolitan Street Railway, was recalled for further examination, and testified that since his statement had been made showing the number of transfer passengers carried during the six weeks ended Sept. 16 an error in the figures had been discovered. The following corrected statement was presented:

Statement of receipts, revenue passengers, transfer passengers and total passengers on the lines operated by the receivers of the Metropolitan Street Railway during the six weeks ending Aug. 5, 1908, and the six weeks ending Sept. 16, 1908, the lines of the Central Park, North & East River Road not being included in the figures for the six weeks ending Aug. 5, 1908:

	Receipts.	Revenue passengers.	Transfer passengers.	Total passengers.	Average fare per passenger in cents.
Six weeks ending Aug. 5, 1908...	$1,539,112.85	30,782,257	16,418,704	47,200,961	3.2608
Six weeks ending Sept. 16, 1908..	$1,517,543.25	30,350,865	15,033,797	45,384,662	3.3437

By agreement between Oliver C. Semple, counsel for the commission, and Herbert J. Bickford, counsel for the receiver of the Third Avenue Railroad, part of the testimony in the case involving joint rates and through routes between the Metropolitan Street Railway and the Central Park, North & East River Railroad was offered in the Third Avenue case.

The following statement regarding the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway was presented:

For six months ending April 10, 1908:	
Number of revenue passengers	14,220,770
Number of transfer passengers	5,475,215
Total	19,695,985
Gross earnings from passengers	$707,905.00
Average rate of fare	3.59 cents
Ratio of revenue passengers to total	72.20 per ct.
Ratio of transfer passengers to total	27.80 per ct.
For six months ending Oct. 10, 1908:	
Number of revenue passengers	11,596,363
Number of transfer passengers	2,602,844
Total	14,199,207
Gross earnings from passengers	$578,654.47
Average rate of fare	4.08 cents
Ratio of revenue passengers to total	81.67 per ct.
Ratio of transfer passengers to total	18.33 per ct.

An affidavit was presented from Thomas F. Mulaney, chief engineer for the receiver of the Third Avenue Railraod, stating that he had had general supervision of the operation of the Kingsbridge power plant and of all the substations of the Third Avenue Railroad. The amount of the electrical power generated at the Kingsbridge plant from Jan. 12, 1908, to Sept. 30, 1908, both dates inclusive, was 55,849,840 kw-hours of a.c. There was a loss of approximately 11 per cent in transmission and conversion. Some of the power produced by the plant was sold to other companies. The cost of the power produced from and the price received for the power sold to the receivers of the New York City and the Metropolitan companies was 0.012386 cent per kw-hour for a.c. and 0.018181 cent per kw-hour for d.c. Prior to July 1, 1908, the power purchased from and the power sold to the receivers of the New York City and the Metropolitan companies was not measured by meters, but was estimated upon a car-mileage basis. The amount of power used between Jan. 12 and Sept. 30, 1908, both dates inclusive, in the operation of the railways of the Third Avenue company was 14,434,297 kw-hours of d.c., partly estimated upon a car-mileage basis.

THE BARBER SINGLE-TRUCK CAR USED ON THE SUNBURY & SELINGSGROVE ELECTRIC RAILWAY

The STREET RAILWAY JOURNAL of Feb. 8, 1908, contained an article entitled, "Notes on the Black River Traction Company," in which A. H. Lefevre, general manager of that company, described the novel double-bolster, single-truck car invented by Edward A. Barber, superintendent of the same railway. This type proved so successful in Watertown that several months ago the Barber Car Company was organized, with headquarters at York, Pa., to build such cars for other companies. The first railway which has followed the example of the Black River Traction Company is the Sunbury (Pa.) & Selingsgrove Electric Railway, a 6-mile single-track line which began operation on May 15, 1908, with three Barber cars, two ordinary single-truck cars and four open cars. In view of the novelty of the Barber design, this second installation offered a favorable opportunity to examine it in other surroundings and to learn what the general public thought of its riding qualities. All of the people interviewed expressed a decided preference for the new car as against the ordinary single-truck cars, and many of the points they mentioned with favor brought out the fact that passengers give a great deal more attention to details of car design than many railroad managers suppose.

THE CAR BODY

It is readily apparent from a glance at the accompanying views of the car exterior that the most radical change in the body has been the elimination of the monitor roof. The change of outline thus produced gives the front of the car a rather squat appearance compared with the monitor-roof design, but it is a very small sacrifice in comparison with the benefits which accompany the single flat-curve roof.

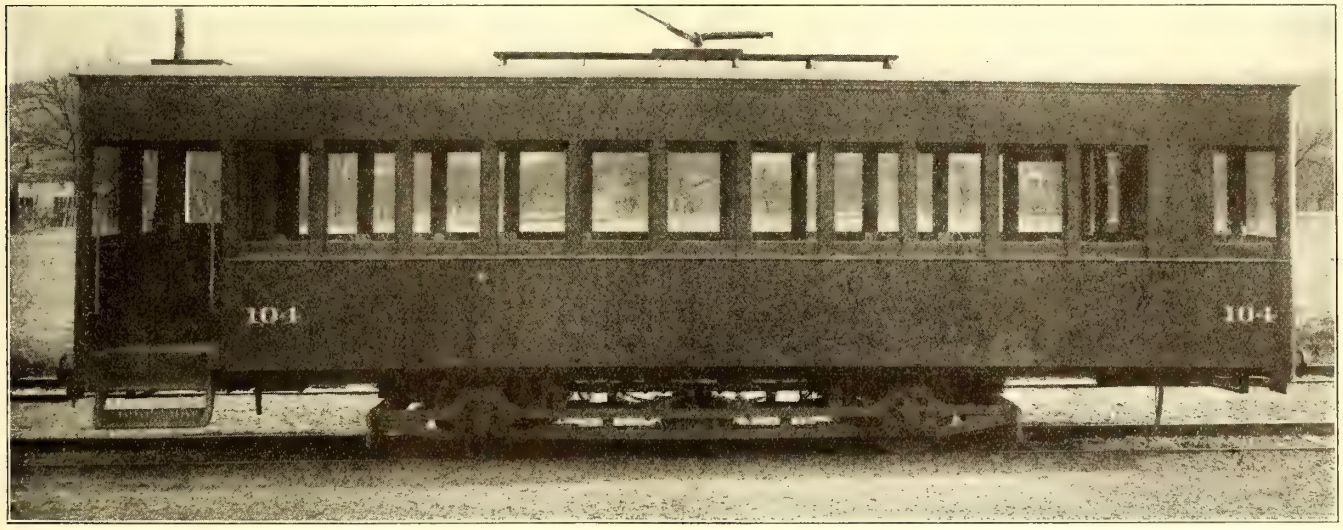
In the first place, it has permitted so much more headroom that the lower side sash can easily be raised above the passenger's line of vision, and as the ends also have a liberal sash area, these cars are ideal for pleasant riding, whether summer or winter. No advertising cards are installed, so that the highly reflective white enamel is carried down the sides to the tops of the window sills. This arrangement gives the desired effect of finish and roominess, besides permitting the efficient and pleasing arrangement of lamps shown in the illustration of the car interior. The use of grab handles on the seats naturally obviated unsightly car straps.

So far as the outside of the car is concerned, the elimination of the monitor has made it possible to place the headlight and markers in the upper part of the car, where they are far better protected from mud and breakage than otherwise. Even a comparatively trifling change like this has been favorably noted by lay observers.



The Barber Car in Sunbury, Pa.—End-on View, Showing Absence of Monitor, Front Sash Arrangement and Advantageous Positions of Headlight and Markers

The car body is carried on a steel framing consisting of the side sills, end sills and a pair of I-beams tied into the bolster at each end of the truck. The sides of the car are perfectly straight, thereby affording the maximum inside width desirable on lines where clearances are important. The straight construction, of course, also makes it easier and cheaper to replace woodwork which has been badly sidewiped or otherwise damaged. It would seem, however that the plainness of the sides of the car, and



The Barber Car in Sunbury, Pa.—General Exterior View, Showing the Straight Outlines of the Body and the Type of Vestibule

possibly the ends, could be greatly relieved by arching the window framing.

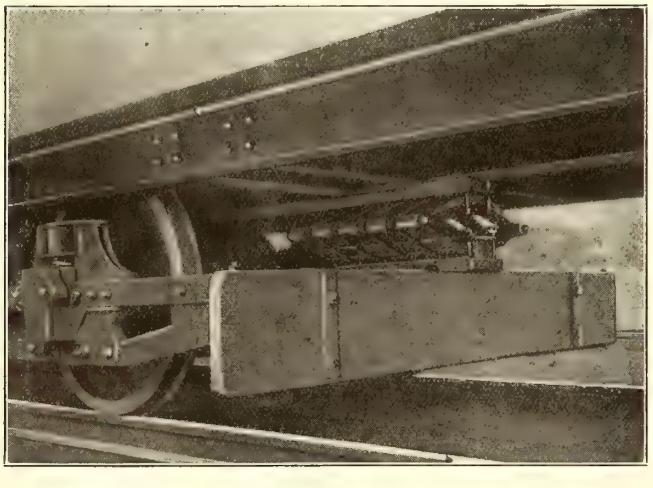
The platform and door arrangement are exceptionally interesting. Each platform is provided with an electrically



The Barber Car in Sunbury, Pa.—Interior, Showing the High Windows, Lighting Arrangement, Body, End Door, Etc.

heated motorman's cab, which contains a leather padded bench over compartments for sand and the personal effects of the crew. The cab is locked by an ordinary hinged door, and is provided with curtains for use when desired. The body end-doors are also of the hinged type. In summer each one is latched together with the motorman's door. It is apparent that standing on platforms is not encouraged by this design, as passengers must move immediately into the car to avoid blockading others. Safe ingress and egress is facilitated by the double Stanwood step and the grab handles.

Mention already has been made of the interior appearance of the car as affected by the roof and side construc-



The Barber Car in Sunbury, Pa.—One of the Two End Bolsters which Carry the Car Body

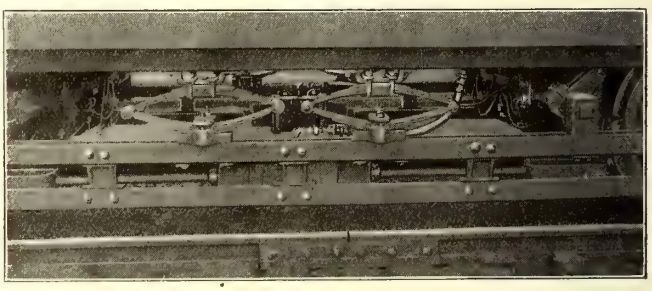
tion. The absence of all moldings or other dirt-catching parts, the use of linoleum flooring and Wheeler rattan cross seats make the matter of cleanliness simplicity itself. The Simplex electric heaters are set like wall radiators in the sides of the car, where they cannot gather dirt, and are much less likely to get into trouble. It is worth mentioning that despite the simplicity of the car all of the fittings are as substantial and well finished as in the highest class of high-speed rolling stock. In fact, the car is expected to prove economical not only on account of its design, but because every part in it has been made for wear.

VENTILATION

The elimination of the monitor roof naturally did away with the ventilator sash which are so objectionable at times, especially in winter. A novel form of ventilation, therefore, has been installed, by which a partial vacuum is created in the open front vestibule when the car is moving. This vacuum draws the air from the car interior through a grating over the door between the car and the front vestibule, fresh air being allowed to enter through very small openings around the windows and rear door. The rear ventilator is opened when many people enter the car at one time, but it is not kept open very long.

THE TRUCK

The truck of the Barber car is as novel in construction as the car body, which is supported on the truck by bolsters at each end in just the same way as if it were mounted on the single-center bolsters of two trucks. As shown in the detail view, each bolster is made up of five elliptic springs set in a rocker plate. The side sway thus permitted is limited to about 12 in. either way by the pairs of elliptic springs mounted on the side framing between the truck wheels. The arrangement of bolster and side



The Barber Car in Sunbury, Pa.—View under the Car, Showing Direct Application of Brake Pistons, Truck Springs, Etc.

springs obviates lurching or oscillation. As the springs are very heavy in comparison with the weight of the body, their sluggish response to sudden changes in the track avoids sudden shocks to the car body and its passengers.

The truck wheel base is 12 ft., which has been found entirely satisfactory on the Sunbury line, the sharpest curve on which has a radius of 75 deg. This long wheel base has permitted the use of a body 34 ft. over all, 8 ft. 3 in. wide and seating 40 people. The motors are rigidly suspended, and can be very easily inspected from the pit because of the trifling room required for the springs and hydraulic braking mechanism. Whatever apparatus is required is carried directly on the truck, thus minimizing the transmission of sound and other vibrations to the body framing.

THE HYDRAULIC BRAKE

An interesting feature in the operation of these cars is the use of an hydraulic brake in place of the usual hand and air brakes. This brake is constructed on the principle of the hydraulic jack. The braking mechanism in the motorman's cab, as shown in the illustration, consists of a long metal lever operating a small piston. This piston is connected on one side to an adjacent 10-gal. supply tank and on the other side is joined to piping, which is carried under the car body along the top of the side sills, with flexible hose connections to the brake cylinders. The

latter are set on the truck frame in line with the wheels so that the brake plungers are applied directly on all four wheels.

To apply the brake shoes the motorman draws the cab lever back and forth two or three times, thereby pumping water to the brake cylinders. This water entering between the brake pistons, pushes them apart and thus causes the application of the brakes. The pistons have spring recoils which allow them to return to their normal position when the motorman allows the water to return to the tank by pressing his lever against the valve stem of the platform piston. Both the braking application and release may be graduated to suit the condition of the shoes. This hydraulic brake has been found very serviceable under the conditions obtaining on the Sunbury line. The platform apparatus takes up very little room, the tank itself being placed in the space ordinarily needed for the clearance of the controller handle. To avoid failure from freezing, the water is supplied with a quantity of calcium chloride.



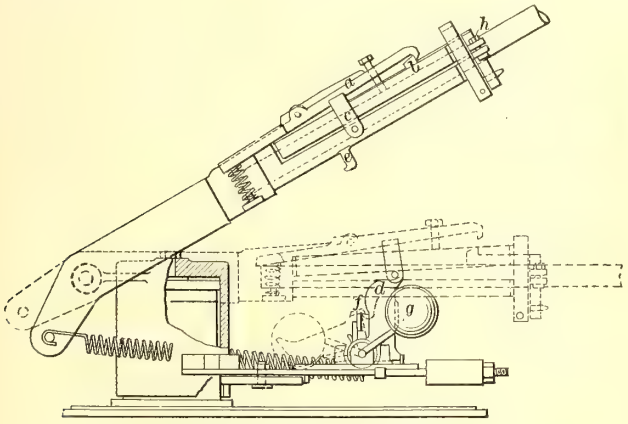
Hydraulic Brake Handle and Cylinder

MISCELLANEOUS CAR DATA

The total weight of each car is 23,000 lb., and the seating capacity 40, or 575 lb. per seated passenger. By examining the "Car Weight and Seating Capacity" table published on page 667 of the Sept. 19, 1908, issue, it will be seen that on the basis of passenger seats this car is remarkably light, whether compared with single or double-truck cars. The operating equipment consists of two GE-54 motors, K-10 controllers, Wilson retrievers, Van Dorn couplers and the hydraulic brake previously mentioned. Since May 15, when the cars began operation, the only money spent on them for maintenance has been the renewal of motor brushes and one new set of brake shoes per car.

A NEW TROLLEY STAND

The Fixler Trolley Stand Company, of Delta, Ohio, has placed on the market a trolley stand invented by Edgar L. Fixler, who as a motorman on the Toledo & Indiana Railway had an ideal opportunity to observe the behavior of stands in service. The new stand was designed specifically to save time in changing poles and it appears to satisfy the purpose admirably since its manufacturer reports that on the cars of the Toledo & Indiana Railway poles fitted to this stand have been changed in from 12 to 20 seconds. The pole can be inserted in the socket in one position only and when once installed nothing but breakage above the socket can cause its loss. No tools whatever are required to make the change.



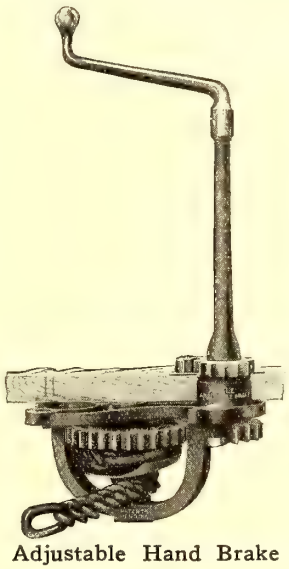
Fixler Trolley Stand

The accompanying illustration shows the pole in the socket held by the clutch *A* and *B*. When the pole must be removed, it is pulled down until the band *C* touches fulcrum *D* and the clutches *E* and *F* interlock. The lowering of the pole has the effect of raising the clutch *A* and thereby releasing the pole. The stand will remain with the clutches interlocked until the weight *G* is thrown over by hand or foot. After inserting the new pole, the stand is restored to its original position by pressing down the clutches *E* and *F* for release, thus permitting the fulcrum *D* and weight *G* to drop out of the way.

The clamps *H* are clamped on the pole in the shop and lined up with the wheel in the harp. This arrangement makes it impossible to place the pole in the stand and not have the wheel perfectly straight on the wire, even in heavy darkness. Two sets of pole clamps are furnished with each stand so that an extra pole can always be carried on top of the car.

ADJUSTABLE HAND BRAKE

The National Brake Company, Buffalo, N. Y., manufacturer of the well-known Peacock brake, has recently begun the manufacture of a new type of geared hand brake, invented by G. S. Ackley, president of the company. The new brake, which employs the same principle as the Peacock brake, is to be placed on the market under the trade name, Ackley adjustable brake. It is designed for use on cars where, owing to obstructions under the car body, the installation of the Peacock brake is difficult. The accompanying illustration shows the construction of this new brake, from which it will be observed that there are a number of differences between it and the standard type of Peacock brake. The same spiral chain drum and gearing is employed, but the chain drum is supported under a yoke which is bolted to a separate casting mounted under the platform floor. The bearing casting contains the roller bearing for the brake shaft and a shaft and roller bearing on which the brake drum revolves. The yoke forms a step bearing for the brake drum and is attached to the upper casting by two bolts. The entire brake can be dismantled by removing these two bolts and dropping the yoke, whereas in the Peacock brake the brake drum is enclosed in the yoke, which is integral with the main casting and secured to the platform floor. The adjustable feature of the new brake consists in the means provided for shifting the yoke to either side of the brake shaft pinion so as to permit the brake chain to be led off the drum from either side of the rear leg of the yoke. The new brake has been patented in the United States and in foreign countries.



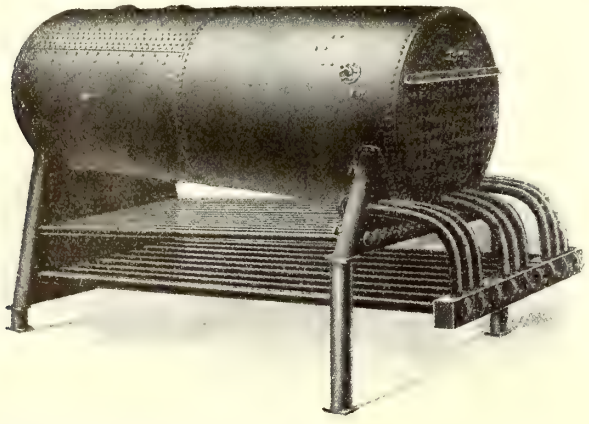
Adjustable Hand Brake

COMBINATION FIRE AND WATER-TUBE BOILER

The accompanying engravings illustrate the construction of the Hawkes boiler, which is a combination of the horizontal return-tubular and the water-tube types. The lower or water-tube member consists of two rows of water tubes, the upper row connecting into a front water-saddle at the forward end of the tubular boiler and with the water leg at the rear. These tubes are covered with a special tile or split firebrick on the top, and form a covering or roof over the furnace, preventing the hot gases from coming in contact with the shell of the tubular member. The water tubes in the lower row connect the rear water-leg with a series of steel box-headers at the front end, which are in turn connected to the front head and saddle by means of independent arch or circulating tubes.

The upper tubular boiler is made of 60,000-lb. tensile-strength flange steel, the riveted joints and shells being designed on the basis of a factor of safety of five. The tubes are expanded and beaded into the heads and liberal manholes and handholes are provided. The front water-saddle and rear water-leg are made without riveted joints, except where they are attached to the shell of the tubular boiler. Handhole plates are provided opposite each tube, giving access for cleaning and renewal. The legs are provided with staybolts. The front saddle is provided with compression plugs, placed opposite each tube, thus eliminating gaskets. The front box headers for the lower water tubes are made of flowed steel, the bearings for the handhole plates being faced on the inside to insure perfect contact for the gaskets. Each header is independently connected to the upper tubular boiler, with extra gage or thickness of circulating or arch tubes, causing the circulation of each tube to be taken care of independently and preventing any by-passing of the water.

The water circulation is as follows: The colder water passes down the rear water-leg into the water tubes, which are inclined upward toward the front end of the boiler. The water passes upward and forward through these tubes

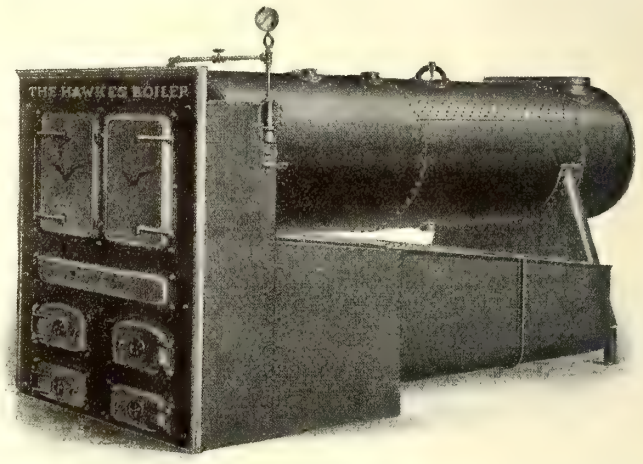


Combination Fire and Water-Tube Boiler Without Casing

in the same direction as the travel of the gases into the front water-saddle headers and circulating tubes into the front end of the upper tubular boiler, and to the rear through the tubular boiler, depositing the scale on the bottom of the shell of the upper tubular member, away from any fire action. This rapid circulation is said to keep the lower water tubes free from scale.

The boiler rests on cast-iron columns beneath the corners of the front water-saddle and rear water-leg, supporting the boiler entirely independently of the setting. One of the illustrations shows the boiler as constructed with a steel jacketed casing instead of the usual brick setting. The casing is lined with tile insulated from the steel plates with non-conducting material. With a brick setting the method of support is such that the masonry walls are relieved of any weight or strains due to expansion of the boiler shell. The brick side walls, where used, extend to the top row of the water tubes, and the rear wall to the bottom of the rear water-leg. The front expansion chamber between the boiler front and front head of the upper tubular boiler is cased with steel lined with firebrick.

The rear supporting column is provided with expansion



Combination Fire and Water-Tube Boiler with Steel Casing

plates; rollers support the rear water-leg, and the front water-saddle rests on the front columns, expansion being taken care of to the rear of the setting and away from the masonry walls. The lower water tubes expand to the front, the box-headers being mounted on expansion plates. These lower water tubes will not sag on account of the extreme high temperature of the furnace, and they are flooded at all times.

The furnace is of the reverberatory-arch or Dutch-oven type, the arch being self-contained, and consisting of a series of interlocking tiles carried on the lower row of water tubes extending well back of the bridge wall. This arch dips downward over the grates toward the rear. The products of combustion come in direct contact with the heated arch, as well as the furnace brickwork, and the bridge wall over which the gases travel into an adequate combustion chamber to the rear of the bridge wall, before reaching the conduit or passage formed between the top of the arch over the grate and the roof or covering of the upper tubes to the front end of the tubular boiler, where the gases are equally distributed through the tubes of the upper tubular member. This construction is designed to promote combustion and reduce smoking to a minimum.

The tubes of the upper tubular boiler are accessible for either cleaning or renewal. The lower water tubes are also accessible from the front and rear, the boiler being provided with a removable panel at the front, giving access to handholes. The upper shell for its full length is jacketed with asbestos or other non-conducting material. The shell being accessible from the side and rear, hidden leaks and corrosion to the plates cannot exist undetected. The smoke outlet or connection is at the rear of the boiler, where it can be taken in any direction, or into a duct or flue beneath the floor, to the stack.

This type of boiler is adaptable to the conditions of low head room and limited length and width. The travel of

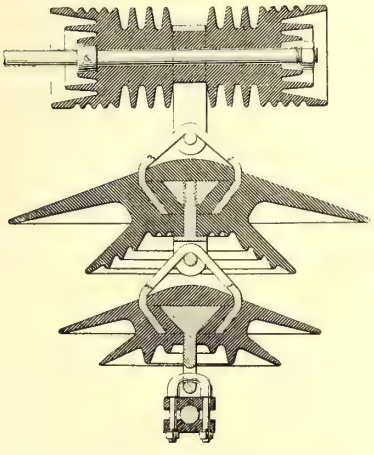
gases being practically three times the length of the shell, permits of building short boilers with a long passage for the products of combustion. This boiler is constructed by the Traylor Engineering Company, Allentown, Pa.

NEW TYPES OF HIGH-TENSION INSULATORS

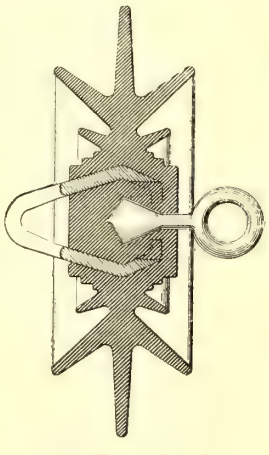
The accompanying illustrations show three types of high-tension insulators for which patents have been issued to Louis Steinberger, of the Electrose Manufacturing Company, Brooklyn, N. Y. It is claimed that they cover the entire field of application of insulators to the transmission of electric power up to the highest voltage that now appears will be reached in the future. In the design of the flexible suspension type shown, provision is made not only for insulating the conductor, but also for insulating the cross-arm or support, which in effect insulates the insulator. Owing to the flexibility of this structure all direct strain on the insulating material is avoided. The dead weight of the conductor, including snow or sleet and the effect of wind pressure, is supported by insulating material which is wholly under compression. The form of the metal suspension members makes it quite impossible for the line wire to drop, even though the insulating material were totally destroyed.

The disk type of strain insulator shown provides large interrupted insulating surfaces for limiting surface leakage, while the design prevents moisture, soot or dust from forming a continuous conducting path extending from one strain member to the other over the surface of the insulator. The form of the strain members and their relation to each other and to the insulating disk are such as to provide an insulator of exceptionally great mechanical strength combined with the highest form of electrical insulation. The disk type of strain insulator may be used separately, or a number of them may be linked together for supporting a line, or used in any other desired relation where currents of very high potential are employed.

In the wall or barrier insulator shown the several sections of which the bushing may be composed are separable; should any of the parts become injured or destroyed,

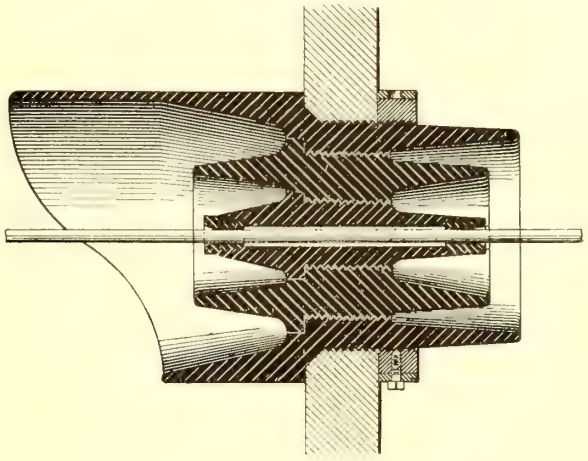


Double Petticoat Suspended Insulator



Disk Type Strain Insulator

they may readily be removed and a new section put in place, thereby avoiding the loss of the entire bushing. It will, of course, be evident that either one of the several bushings may be made of any predetermined length. The bushing is provided with a "protector," which shields the exposed parts from rain, snow, sleet, etc., and which may be made integral with the bushing or attached separately thereto. The central bushing is provided with detachable members for supporting the line centrally with relation to the bushing. By means of these members the central bushing may be made watertight, thereby maintaining at all times a dry surface within the bushing. Finally, an

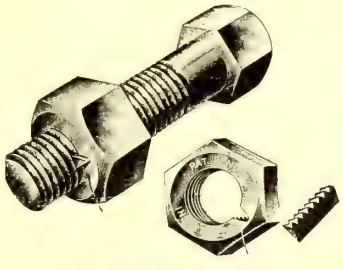


Wall Bushing with Hood Protector

insulating locking member is provided for securing the bushing relatively to the wall or barrier, thereby obviating the trouble and expense incident to cementing a bushing into place or removing it. These bushings may be mounted into or removed from the wall very readily.

AN EFFICIENT LOCK NUT

The accompanying engraving shows the construction of a recently devised lock nut, which, it is claimed, will not only lock securely in place at any point on the bolt, but will actually tighten by vibration. The Vibration lock-nut is similar in appearance to the usual nut, and is pressed cold or hot, with either hexagon or square heads. It has a longitudinal V-shaped slot holding a threaded wedge-shaped key that fits into this slot so as to form part of the nut. On account of its angle, this wedge plays no part in the operation of the nut while the nut is run on the bolt, but in reversing the nut to remove it, the key is carried over against the other side of the slot, forcing the teeth against the bolt so as to grip the bolt tightly. If the nut is to be removed it can be readily accomplished by inserting a pointed wire or piece of wood in the larger opening on the side of the key. This will prevent the key from acting as a wedge, and the nut can be removed in the usual way, without any more difficulty than with the ordinary nut. No tools other than the ordinary wrench are needed.



Wedge Lock Nut

Unless it is taken off in a proper but simple way, it will be necessary to break the bolt before the nut can be removed. It is claimed that the lock-nut does not distort or damage the threads of the bolt, and that it will take up lost motion of the parts held that may be caused by wear, shrinkages or other conditions.

The L. S. Brach Supply Company, New York, is the sole manufacturer and distributor.

LONDON LETTER

(FROM OUR REGULAR LONDON CORRESPONDENT)

The subject of passenger traffic in London has been very much to the fore during the last month. The 173d volume of the Minute of Proceedings of the Institution of Civil Engineers, which was issued in October, has just come to hand, and brings the records down to March 17, 1908. Although this would appear to be rather stale news, it is the first time that the majority of the members of the Institution have been able to ascertain the particulars of the discussion on the paper particularly affecting this subject of transportation in London. Mr. William Barclay Parsons' paper on the New York Rapid Transit Subway, which he read on Feb. 25, takes up about 50 pages of the proceedings. This was followed by a discussion, the report on which takes up another 50 pages, and in which the most important men, engineers and others, who had had to do with the subject took part. The principal fact that was brought forth was the striking difference in the conditions between New York and London, a difference which greatly enhanced the difficulty of dealing with the subject in the latter town. Great admiration was expressed by all the speakers for the excellent design and the extraordinarily rapid construction of Mr. Parsons' undertaking, but it was clearly shown that such methods and rapidity of construction would be quite impossible in the English metropolis.

The speakers seemed to be divided into two camps, the shallow subway camp and the deep tube camp, and all that can be said on the subject is that whereas the shallow subway is certainly the most convenient, the tube railways have been able to accommodate the traffic along lines in which it was absolutely impossible, owing to cost and other reasons, to put in the other system. One very important difference between the English and the American systems was that of making provision for express traffic; had this provision been made in London much of the competition to which underground lines were subjected from the overhead tramways would have been obviated. One serious objection to the tubes was the enormous cost of, and delay occasioned by, lifts at the deep stations. This delay, according to Sir Herbert Jekyll, of the Board of Trade, was not really as long as it appeared to impatient passengers, and he quoted the following interesting question: "Why do married men live longer than single men?" and the answer, which is: "They don't, but it seems longer." Sir Herbert Jekyll is at the head of a traffic branch of the Board of Trade. Singularly enough, the president of the kindred Local Government Board, Mr. John Burns, at a recent dinner given in honor of Mr. Dickinson, one of the original Progressive members of the London County Council, spoke as follows: "In this vast city with so many millions of people in their midst they must strive to revive at once the old bold spirit of the first Progressive party of wider roads, broader streets, nobler buildings, more parks and better parks, and they wanted no Traffic Board for these. The Traffic Board sat in Spring Gardens (the headquarters of the London County Council) and in 20 years they had carried out 600 street improvements, built bridges, tunnelled rivers, made ferries and did their best to give greater order in the streets than previously prevailed." It must be confessed that the "greater order in the streets" exists only in Mr. John Burns' vivid imagination.

The London County Council's treatment of the G. B. Surface Contact Company, in the case of the Mile End Road Tramways, does not appear to an outsider as being altogether encouraging to anyone trying to help them out of the difficulty. The local authorities vetoed the overhead system; it was reported to the Council that the conduit system was impossible owing to an underground railway tunnel being too near the surface (this has subsequently been denied); and naturally their attention was directed to a surface contact system which had been in successful operation for some time at Lincoln. It is difficult in these matters to arrive at the truth, but it appears that the County Council, while accepting the designs of the company, insisted upon carrying out this installation themselves and in their own way. The result has not been satisfactory. According to the speech of Sir John Williams Benn, who may be described as the Leader of the Opposition in the Council, the "record was 50 live studs a day, injured people, roasted horses, fireworks at night, and the danger of a fatal accident to anyone who chanced to strike a live stud." This highly colored version was considerably toned down in the statement of the Chairman of the Highways Committee, which was to this effect: "There were 927 occasions recorded on which alarm indicators showed that studs remained alive immediately after the car left the studs. Seven hundred and twenty-eight of these cleared themselves; 185 cleared after being hammered; seven studs would not clear and remained alive" (leaving seven unaccounted for). "The total number of cases in which it has been reported that accidents occurred, or were alleged to have occurred, is seven. In three cases claims were received and dealt with by payments amounting in all to £60 4. 0." including one for a roasted horse. The most curious part of the whole affair is that throughout the negotiations regarding the laying-down and the subsequent unsatisfactory working of the system the company have offered to install and maintain the system to the satisfaction of the Council on the "no cure no pay" principle, an offer which has been persistently refused.

Another proposal which has also exercised, and it might almost be said electrified, the London County Council, is that of Sir Clifton Robinson, the engineer and manager of the London United Tramways. This gentleman actually has the audacity to ask for running powers over the lines of the London County Council from Tooting and Somers Town to two of the Thames bridges, along the Victoria Embankment and to Victoria Station. It is true that he proposes to give the Council a *quid pro quo* in the shape of running powers over his lines to Hampton Court Palace, etc., but it is exceedingly doubtful whether this very-much-to-be-desired consummation will materialize. In some cases where the county tramways stop at the boundary the tracks of the outside authorities start at a distance of a few feet from these dead ends, and, indeed, the respective rails are often not even in line with one another. The old objection that the Council had to adapting cars for both the conduit and the trolley wire systems has been overcome on their own lines to Camberwell, where cars on what might be called the "compound" system have been running for some time now. Another futile objection is that during busy hours it would be impossible to interpolate any more cars, but even if this were so (which is more than doubtful) it surely is not impossible to devise a time table whereby the through cars would take the place of certain local cars.

Another belated report is that of the Municipal association on the subject of brakes. This report is much shorter than that of the Tramways & Light Railways Association, and it naturally goes over very much the same ground and arrives at similar conclusions, or, rather, want of conclusions. The same reports of the Board of Trade on the same accidents are mentioned in both reports at great length; but, admirable as the Municipal report may be said to be, there is not any internal evidence in it to account for the delay in its issue. The only important difference in the recommendations is that the Municipal advocates one brake to be used for all kinds of stops, to be worked by one handle or lever, which, when the brake proved ineffective at one stop, should obtain further power by putting that one handle still farther over. The other association prefers to have two brakes in case of the failure of one of them from any cause. This would appear to be the most practical recommendation at present, as the single handle brake has not yet been produced.

Many of the tramway undertakings are beginning to feel the pinch of the cost of maintenance charges, and, as few of them have set aside a sufficient amount for depreciation, the case from the ratepayers' point of view is becoming serious. This question of maintenance, both of rails and of rolling stock, is indeed a most important one from every point of view. On account of the necessity for renewals it is impossible to reduce expenses *pari passu* with the reduction of the number of passengers which has followed the universal commercial depression. Some sections of rails, given by Mr. Parsons in his paper, go to show the fearful wear and tear to which the permanent way is subjected on the underground electric railways, and this wear is also going on in a lesser degree on tramway lines. Of course, where rails are worn out in less than three months it stands to reason that the wheels of the vehicles must have suffered to an equal degree, and the crying need at present is for some form of rolling stock which will not be so cruel to its own wheels and to the rails. This can only be accomplished by making the connection between the body of the vehicle and the truck more flexible than it is at present, and it is not unlikely that a satisfactory solution of this problem will soon be found.

Another problem which also appears to be in a fair way of being solved is that of the electric power and lighting supply to London in general. After an expenditure of some quarter of a million in promoting various ways of meeting this want the London Electric Supply bill has at last been read a third time, and it is probable that the linking-up of the many individual supply companies in London will eventually be effected. This linking-up of the various undertakings was successfully accomplished in the case of the different water companies, and it is to be hoped that the result will be equally satisfactory in the case of electricity.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

On application of the receivers of the Municipal Traction Company, Cleveland, Judge Tayler of the United States Circuit Court ordered that before Jan. 1, 1909, $50,650 be paid to the Central Trust Company, New York, out of the earnings of the railway. This is the interest due on $2,026,000 bonds of the Cleveland Cable Railway. The court also ordered that $3,000 be paid to the Society for Savings of Cleveland for semi-annual interest due Dec. 1 on $100,000 indebtedness, secured by $125,000 bonds of the Cleveland Electric Railway; that $750 be paid to the Guardian Savings & Trust Company for quarterly interest due Dec. 15 on $50,000 indebtedness, secured by $63,000 bonds of the Cleveland Electric Railway, and that on or before Jan. 1, $750 be paid to the Citizens' Saving & Trust Company, as quarterly interest on $50,000, secured by $63,000 bonds of the company. The question of interest subsequent to Jan. 1 will be considered further by the court. Judge Tayler has also ordered that the receivers be paid $1,000 per month each until further order of the court.

The receivers of the company and Judge Tayler conferred on Dec. 23 with Mayor Johnson to secure the Mayor's views regarding a possible readjustment of fares that will at least meet the expenses. The Mayor criticised the schedules that have been prepared by the receivers as being better than are necessary. He said that the service on some lines where the profits are not heavy is too good, and is said to have asserted that a 3-cent fare with a charge of one cent for a transfer during the winter months will pay the operating expenses and meet the fixed charges, provided the service is kept strictly within the demands of traffic. He also pointed out the loss involved in long hauls. The receivers, Judge Tayler and the Mayor met again on Dec. 26 and considered the question of service in detail. It will have to be ascertained whether the franchises of the Woodland Avenue and the West Side lines of the Cleveland Railway have expired before a decision can be arrived at on the fare question. During the negotiations conducted between the Mayor and the Cleveland Electric Railway the members of the committee disagreed as to the dates of expiration. If the franchises have not expired, any fare up to 5 cents may be charged on these lines and on all the other lines whose grants have longer to run. If the grants to the Cleveland Electric Railway have expired, the ones made to other companies will hold, it is supposed. They provide for a 3-cent fare, with transfers to lines that were then operated by the new companies.

Receiver Warren Bicknell was in Philadelphia last week and looked into the merits of the Brill fare box. As a result one of the lines may be equipped with the box as an experiment.

Mr. Johnson has objected to certain matters appearing in the report of Ernst & Ernst, accountants for the receivers. He states that the claim against the city for balance of the cost of constructing the loops about the Public Square should not have been considered as worthless, as it can all be collected. He also objected to withdrawing the $25,000 claim against the village of East Cleveland because that village enforced its contract for the same fare as is charged in the city, and protested against the increased service given that village by the receivers and the change of the division headquarters from Lake View to the Windermere car house, which is located half way between the east and west boundary lines of the village. The receivers state that traffic has been much heavier from that section of the line since better service was inaugurated.

Attorneys for the various claimants failed to agree upon rules for the classifications of claims when the hearing began before Special Master Belford on Dec. 28. Harry J. Crawford, representing the Cleveland Railway, objected to proceeding with the hearing on the ground that the court had not fixed the scope of the examination. He also objected to proceeding if the classification of claims, preferred or otherwise, would tend to prejudice the Cleveland Railway in any way. Judge Tayler stated that the special master should go into every claim before and after April 27, the date of the lease, and that he had instructed the receivers to have an accounting made between the Cleveland Railway and the Municipal Traction Company and that the special master should also go into this. Accountants have been instructed to begin this work at once.

H. J. Davies, secretary of the Cleveland Railway, and A. B. duPont, president of the Municipal Traction Company, who have been considering the classification of claims, have failed to agree in several instances. Ernst & Ernst will prepare a new report embodying the changes that have been made and carrying the claims that have not been agreed upon.

Ernst & Ernst, expert accountants, filed their revised report of the classification of claims with the United States Circuit Court on Dec. 29. The changes in it from the original are based upon the agreements reached by H. J. Davies, secretary of the Cleveland Railway, and A. B. duPont, president of the Municipal Traction Company, and the totals are practically the same as the first ones, it is said. This classification will act as an aid to the master commissioner in the hearing on claims, but there is nothing final about the matter until that hearing has been completed.

Attorneys for the Cleveland Railway claim that rent should be paid that company during the time the Municipal Traction Company is in the hands of the receiver, and this matter has also been referred to the special master to be considered with the other claims.

The receivers have fixed Jan. 5 as the last day for giving former employees of the Cleveland Electric Railway preference over others applying for employment as motormen and conductors. Several hundred of the old men have already been taken back.

General Manager of Ohio Electric Railway to Have Headquarters at Springfield.—W. A. Gibbs, general manager of the Ohio Electric Railway Company, has made arrangements to move his office from Columbus to Springfield. The auditing department of the company will also be moved to Springfield from Cincinnati.

Proposed Traction Committee for Detroit.—Philip Breitmeyer, Mayor-elect of Detroit, has made public the names of 40 of the persons invited by him to become members of a committee of 50 to consider the readjustment of the franchise under which the Detroit United Railway operates, and who have agreed to accept places on the committee.

Philadelphia Rapid Transit Replies to Employees.—Representatives of employees have asked the board of directors of the Philadelphia Rapid Transit Company for a conference regarding the demands of the association for a new working agreement between the employees and the company. The contents of the company's reply have not been made public.

Yazoo Line to Be Operated by the City.—It has been decided by the City Council of Yazoo City, Miss., not to lease for private operation the electric railway recently built in Yazoo City by the city, and the property is now being operated under the management of T. W. Pocklington, who acted as superintendent of construction while the line was being built.

Court Will Apportion Cost of Making Crossings.—In the case of the Cincinnati Northern Traction Company against the Pennsylvania Railroad and the Cincinnati, Hamilton & Dayton Railroad, involving crossings in Butler County, the Ohio Supreme Court has handed down a decision to the effect that the costs shall be equitably distributed among the companies.

Increase in Wages in Indianapolis.—The directors of the Indianapolis Traction & Terminal Company voted on Dec. 21 on recommendation of Hugh J. McGowan, president of the company, who is in Europe, to increase the wages of all motormen and conductors who have been in the employ of the company for two years or more 1 cent an hour, the increase to date from Jan. 1.

Transit Committee Selected for Pittsburg.—The Chamber of Commerce of Pittsburg has selected D. P. Black, A. J. Logan, John M. Goehring, W. Clyde Wilkins and William Campbell as members of its rapid transit committee to consider the transit facilities of the city and to report to the Chamber at the earliest possible date plans for improving the present service. Mr. Black has been elected chairman of the committee.

Pennsylvania Tunnel Nearing Completion.—Within the next few weeks the four tubes of the Pennsylvania Railroad tunnel system under the East River between New York and Long Island City, which were built by Pearson & Son, will be turned over to the Pennsylvania Railroad for installing the operating equipment. The four tubes were joined about 10 months ago and later the rock work was finished and the air locks taken out. Since then the contractors have been at work lining the tubes.

Court Confirms New York Subway Route.—The First Department of the Appellate Division of the Supreme Court of New York has confirmed the report of the Public Service Commission of the First District of New York regarding

the Lexington Avenue subway. This action removes all legal obstacles to the building of the line. The commission will now prepare detailed plans for building the proposed line and will apply to the Board of Estimate of New York for an appropriation for construction.

Telegraph Lines Said to be Affected by Induction.—The Western Union Telegraph Company and the Lake Shore & Michigan Southern Railway have applied to the Porter County Circuit Court at Gary, Ind., for a permanent injunction to restrain the Chicago, Lake Shore & South Bend Electric Railway from operating its 6600-volt, single-phase line. The alternating current on the trolley at the voltage used is said to interfere by induction with the operation of the telegraph circuits.

New Jersey Conductor Convicted of Stealing Fares.—One of the two conductors arrested at the instance of the Public Service Railway, Newark, N. J., for stealing fares while in the employ of the company on its pay-as-you-enter cars has been convicted of larceny and is awaiting sentence. The other conductor will be tried on Jan. 18. The men are said to have withheld cash 5-cent fares paid to them by women who did not deposit the fares themselves in the fare boxes, and also, when making change, to have withheld fares which should have been deposited in the fare boxes.

Electric Signs on Elevated Railways in Chicago.—F. J. Gurnsey, superintendent for the Union Elevated Railroad, Chicago, is planning to install large illuminated electric signs on all of the elevated railroad stations located on the elevated loop. Large signs reading "Elevated Stations" will be installed on the elevated structure at the principal street corners, and smaller signs, reading "To All Trains," will be installed at the entrances to the elevated stations. Mr. Gurnsey's plans also include the installation of additional incandescent lamps on the platforms and in the waiting rooms of all elevated stations.

Port Arthur Municipal Railway.—The commission in charge of the municipal electric railway operating in Port Arthur and Fort William has voted to have the offices of the system in Port Arthur. The system was originally built by Port Arthur and was extended to Fort William, and that part of the system in Fort William was subsequently sold to that city. The question of management then came up and the Ontario Railway & Municipal Board, to which appeal was taken, decided that a joint commission of five members, one of whom was to be neutral, should manage the property.

New Commission Proposed for District of Columbia.—It is stated that as a result of the recommendations of one of the members of the Interstate Commerce Commission that the jurisdiction of the District Electric Railway Commission of Washington be extended to all the public service corporations of the District of Columbia, President Roosevelt will recommend the appointment of a public service commission for the District to be entirely independent of the Interstate Commerce Commission. Regulation of the street railways of the District of Columbia was entrusted to the Interstate Commerce Commission by act of May 23, 1908. That commission shortly afterward created a sub-commission, known as the District Electric Railway Commission.

Commendation for Rescuers.—The crew of a car of the Walkill Transit Company, Middletown, N. Y., who on Dec. 16 saved two boys from drowning in the Walkill River, received the following letter under date of Dec. 21 from William Venamee, receiver of the company: "The splendid judgment and energy manifested by you on Dec. 16 in rescuing two boys from death by drowning in the Walkill River is worthy of high praise. Such conduct is not only an inspiration to your associates, but it is an assurance to the public that you can be depended upon for fidelity, courage and sound judgment in any emergency. Not in any sense as a reward but simply as a mark of respect I desire that you spend Christmas at home with your families, your pay to run on as though you were in actual service."

Conference on Cambridge Subway Stations.—Mayor Wardwell, City Solicitor Pevey and City Engineer Hastings, of Cambridge, and President Bancroft and J. L. Prendergast, of the Boston Elevated Railway, considered the question of station designs for the Main Street subway on Dec. 28. A number of suggestions were presented to the company for consideration. The appeal of the company to the Railroad Commission from the adverse decision of the Mayor of Cambridge regarding the station designs was taken largely to preserve the company's rights in the matter. If the company and the city authorities are unable to agree the case will be placed before the Railroad Commission as a reviewing tribunal, with the introduction of such technical evidence as is required to prove the adaptability of the designs to the conditions of traffic.

Financial and Corporate

New York Stock and Money Markets

December 29, 1908.

After a week of steady advances and activity, the market to-day received something of a check. While the net losses in the day's transactions were not important, the fact that this reaction was brought about by extensive selling in Europe indicated that those who had been instrumental in causing the recent advances were taking profits. As a whole, the stock market has been almost unreasonably buoyant for the last three weeks. The prosperity in commercial lines has not been sufficient to warrant great advances in stocks after the rise of the last few months. There has not been much outside buying, and yet the volume of transactions has averaged about 1,000,000 shares a day. The people who observe the stock market are wondering what will happen in January, when an enormous volume of investment funds seeks an outlet, resulting usually in the absorption of a large amount of securities.

The market for bonds continues to be strong and active. Every large bond offering recently has been over-subscribed, and the bond houses are diligent in searching for information as to new issues which are contemplated. It is now said that the Chicago & Northwestern road will issue $10,000,000 in bonds to take up security maturing in 1909. It is also said that the Chicago, Burlington & Quincy road and one or two other Western lines contemplate new issues of securities.

Money rates continue at about the same figures, although contraction of the loan account, as shown in the bank statements, indicates that many loans have been called. Requests for money from Europe and the demand which always arises for dividend purposes at the first of the year has, in a measure, curtailed the offerings by the banks. Call money to-day was quoted at 2 to 3¼ per cent, and 90-day paper at 3½ to 3¾ per cent.

Other Markets

In the Boston market, activity has been shown in Boston Elevated stock and especially in the rights to subscribe to the new issue. The stock has been selling at 123 to 123½ and the rights at 3 to 3⅛. There was very little trading in traction bonds.

Tractions were the feature of the trading in the Philadelphia stock market, but the net changes in price were unimportant. Philadelphia Rapid Transit was particularly active and the transactions for several days reached thousands of shares. Union Traction securities were traded in extensively.

In the Chicago market the traction issues were inactive. The various series of the Chicago Railways were offered to some extent, but the price changes were unimportant. Chicago Subway was in the market, the current price ranging from 29¾ to 30¼.

In Baltimore, as usual, the only interest that developed in tractions was in the bonds of the United Railways & Electric Company. These continue to be active with prices advancing. The 4s sold up to 85¼ and the "incomes" up to 51½.

Five shares of Rutland (Vt.) Railway, Light & Power Company stock were sold at auction in New York at 25.

Quotations of various traction securities as compared with last week follow:

	Dec. 22.	Dec. 29.
American Railways Company, Philadelphia	45¾	45½
Boston Elevated Railways	128½	123½
Brooklyn Rapid Transit Company	63½	67½
Chicago City Railway	180	180
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a76	a76
Consolidated Traction Company of New Jersey, 5 per cent bonds	a104½	a104½
Detroit United Railway	*53¾	*53¾
Interborough-Metropolitan Company	19⅞	18⅝
Interborough-Metropolitan Company (preferred)	46¾	47¼
Manhattan Railway	151¾	153
Massachusetts Electric Companies (common)	12	11¾
Massachusetts Electric Companies (preferred)	57	58
Metropolitan West Side Elevated Railway, Chicago (common)	a18	11
Metropolitan West Side Elevated Railway, Chicago (preferred)	a54	50
Metropolitan Street Railway	35	50
North American Company	73⅛	74⅞
Philadelphia Company, Pittsburg (common)	44	44
Philadelphia Company, Pittsburg (preferred)	*44	44⅛
Philadelphia Rapid Transit Company	21⅝	23½
Philadelphia Traction Company	90½	90⅞
Public Service Corporation, 5 per cent collateral notes	a99½	a99½
Public Service Corporation certificates	a76	a75½
Twin City Rapid Transit Company, Minneapolis (common)	93	96¼
Union Traction Company, Philadelphia	*49	50⅜

a Asked.
* Last sale.

Reorganization of Mohawk Valley Lines

Special meetings of the stockholders of the Rochester Railway, Rochester & Sodus Bay Railway and the Rochester & Eastern Rapid Railway have been called for Jan. 18 to vote on the question of merging the companies into the New York State Railways, as the first step in accordance with the plan approved by the Public Service Commission of the Second District of New York for the reorganization of the Mohawk Valley Company. The plan is outlined in a circular addressed to the preferred stockholders of the Rochester Railway by the Guaranty Trust Company, New York, which is to act as depositary for the stock. Of the $20,000,000 stock of the Mohawk Valley Company 60 per cent is owned by the New York Central & Hudson River Railroad and 40 per cent by the unincorporated association known as the Central Railway Syndicate.

As a first step in the proposed reorganization, the Mohawk Valley Company will reduce its capital stock by distributing railroad stocks owned by it to the amount of $17,065,800 par value pro rata among the stockholders. The New York Central & Hudson River Railroad being a stockholder to the amount of $12,000,000, this stock would be reduced by the proposed operation, and it will receive in lieu thereof the stock of the various companies held by the Mohawk Valley Company to the amount of $10,239,480.

As a second step the New York Central & Hudson River Railroad will purchase 29,987 shares of common stock of the Rochester Railway, having a total capitalization of $6,000,000, of which $3,000,000 is common stock. All of this common stock, except 13 shares, is owned by the Rochester Railway & Light Company. It is proposed to pay for such stock the sum of $4,500,000 or substantially $150 per share. It is provided that the purchase price shall not be paid until the stock is free from the lien of the mortgage of the Rochester Railway & Light Company by which it is covered, but that such purchase price shall be placed in escrow ready to be delivered whenever the proper arrangements can be made freeing the stock from its present lien.

The net result of the changes involved is that instead of owning the surrendered capital stock of the Mohawk Valley Company the New York Central & Hudson River Railroad will be the owner of the stock to the amount of $10,230,480, and that instead of holding the indebtedness against the Mohawk Valley Company of $4,500,000, it will own the capital stock of the Rochester Railway of the par value of $2,998,700 and of the assumed value of $4,500,000.

The following statement shows the balance available for dividends for the year ended Dec. 31, 1907, after deducting expenses and first charges, and also shows the proportion applicable to the stock of the companies entering into the consolidation or to be owned by the consolidated company:

Consolidated company, consisting of—			
Rochester & Eastern Rapid Railway			*$16,793.66
Rochester Railway			566,856.66
Rochester & Sodus Bay Railway			39,060.12
Total			$589,123.12
The consolidated company's proportion of net earnings available for dividends on account of stock ownership in the following companies:			
Utica & Mohawk Valley Railway	100%		$260,653.20
Oneida Railway	96.13%		78,338.00
Syracuse Rapid Transit Railway..Pref.	28.85%	$20,249.24	
Syracuse Rapid Transit Company..Com.	72.01%	89,238.85	
			109,488.09
Schenectady Railway	50%		91,228.23
Total			$539,707.52
Total			$1,128,830.64

Equal to 29.22% on $3,862,500 first preferred capital stock.

The following statement shows the balance available for dividends for the year ending Dec. 31, 1908, based upon actual figures, except December, which is estimated, after deducting expenses and first charges, and also shows the proportion applicable to the stock of the companies entering into the consolidation or to be owned by the consolidated company:

Consolidated company, consisting of—			
Rochester & Eastern Rapid Railway			*$3,541.05
Rochester Railway			445,150.92
Rochester & Sodus Bay Railway			36,128.22
Total			$477,738.09
The consolidated company's proportion of net earnings available for dividends on account of stock ownership in the following companies:			
Utica & Mohawk Valley Railway	100%		$250,007.54
Oneida Railway	96.13%		56,606.97
Syracuse Rapid Transit Railway..Pref.	28.85%	$20,249.24	
Syracuse Rapid Transit Railway..Com.	72.01%	65,527.30	
			85,776.54
Schenectady Railway	50%		72,465.56
Total			$464,856.61
Total			$942,594.70

Equal to 24.40% on $3,862,500 first preferred capital stock.

*Deficit.

Chicago & Southern Traction Company, Chicago, Ill.—At the annual meeting of the Chicago & Southern Traction Company the following directors were re-elected: Wm. H. Conrad, A. J. Law and V. R. Rink. The directors organized by re-electing the following officers for the year: Matthew Slush, president; Wm. H. Conrad, vice-president; V. R. Rink, treasurer; Francis Lowes, secretary.

Interborough-Metropolitan Company, New York, N. Y.—The suit of the Continental Securities Company to dissolve the Interborough-Metropolitan merger and to restore to the Interborough Rapid Transit Company the subway and the elevated systems, must be brought to trial, according to a decision handed down on Dec. 29 by Judge Ray in the United States Circuit Court. Judge Ray overrules the demurrer to the suit interposed by Paul D. Cravath on behalf of the defendants, the Metropolitan Street Railway, the Metropolitan Securities Company, the Interborough-Metropolitan Company, the Windsor Trust Company, the New York City Railway, Thomas F. Ryan, August Belmont, Edward J. Berwind, John D. Crimmins, Andrew Freedman, Thomas P. Fowler, Gardiner M. Lane and Cornelius Vanderbilt. Judge Ray, in overruling the demurrer, held that he was justified in dissenting from the position taken by the Appellate Division in spite of the rule that a Federal judge must follow the decisions of the highest State court in interpreting a State statute, because the Appellate Division was not the highest court, but had simply temporarily constituted itself as such by refusing to allow the motion to be carried to the Court of Appeals. He thought the State court had erred in holding that a monopoly could not be oppressive if under State regulation. The contrary position, he said, had already been taken by the United States Supreme Court.

Little Rock Railway & Electric Company, Little Rock, Ark.—The annual dividend on the Little Rock Railway & Electric Company common stock has been increased from 4 per cent to 5 per cent by the declaration of the semi-annual dividend of 2½ per cent on the $1,500,000 outstanding stock of this issue, payable Dec. 31, 1908.

Macon Railway & Light Company, Macon, Ga.—W. J. Massee, president of the Macon Railway & Light Company, and his associates have purchased the holdings of common stock of the Happ estate and others, thus giving Mr. Massee and his associates control of the property. It is said, unofficially, that Mr. Massee will remain as president of the company and that negotiations are under way with the Central Georgia Power Company for a long-term contract to supply power to the Macon Railway & Light Company.

Mattoon (Ill.) City Railway.—The stockholders of the Mattoon City Railway have voted to decrease the capital stock of the company from $500,000 to $250,000. The stockholders will receive one share of new stock for every two shares now held of the par value of $100.

Mexico Tramways, Mexico, Mex.—E. N. Brown and Julio Lemantour have been elected directors of the Mexico Tramways.

Miami & Erie Canal Transportation Company, Cincinnati, Ohio.—A conference was held recently between the Cincinnati stockholders of the Miami & Erie Canal Transportation Company and D. B. Spandauer and S. Spandauer, bankers, of Baltimore, and it is said that an application will soon be made to the courts for the sale of the canal property and the discontinuance of the receivership. The company was organized to build an electric railway along the Miami & Erie Canal between Cincinnati and Dayton for passenger service and for hauling canal boats.

New England Investment & Securities Company, Springfield, Mass.—The recent decree of the Supreme Court of Massachusetts, directing the New York, New Haven & Hartford Railroad to relinquish its interests in 16 electric railways in Massachusetts, was complied with on Dec. 29 at a meeting of the New England Investment & Securities Company, when Nathaniel Thayer, Boston, and William Skinner, Holyoke, who are directors of the New York, New Haven & Hartford Railroad, retired as trustees of the New England Investment & Securities Company. A Willard Damon, Springfield, and Henry L. Higginson, Boston, were elected to succeed them in the New England Investment & Securities Company.

Rochester, Corning & Elmira Traction Company, Rochester, N. Y. This company has filed with the Carnegie Trust Company, New York, as trustee, a mortgage to secure an issue of $1,000,000 of 5 per cent 30-year gold bonds.

Rochester Railway & Light Company, Rochester, N. Y.—The Public Service Commission of the Second District of New York has authorized the Rochester Railway & Light Company to issue bonds to the amount of $10,000 bearing interest at the rate of 5 per cent, payable July 1, 1954.

Traffic and Transportation

Holiday Service in Brooklyn

It is understood that the traffic records of the Brooklyn Rapid Transit Company were broken during the Christmas shopping period and that traffic has been very heavy for more than a month. Figures are not available of the actual number of passengers carried, but it is expected that the returns for the month will show an increase in earnings of approximately $1,000 a day. In the early summer earnings fell off appreciably, but since the fall they have been improving steadily and, in fact, have advanced rapidly since Dec. 1.

This year the company's arrangements for handling shoppers were more thorough than ever before. Trunk line service was increased as much as 25 per cent in some instances during the afternoons in order to accommodate the shoppers, and the service on all the Eastern District lines was increased 10 per cent. Additional trippers were operated to Borough Hall, and the complete evening rush-hour service was continued for an hour each evening for several weeks before Christmas. The large Brooklyn department stores only kept open until 7 p.m., and so it was not necessary to increase the evening service materially.

In this connection the interesting announcement is made that an additional new time-table has been prepared for the Putnam-Halsey line and that hereafter an increased number of cars will be operated over this route in both the morning and evening rush hours, as well as in the middle of the day and at night. During the morning a new short-line service is to be operated over this route from Nostrand Avenue and Halsey Street to the Borough Hall. This will provide an independent increase in accommodations for patrons in the Bedford district and will act as an important feeder to the subway.

On the Greene-Gates line additional service has been provided between 7 p.m. and 12 p.m. Perhaps the most interesting schedule changes are those at the Atlantic Avenue subway terminal. In addition to the short-line service to this point by the Flatbush Avenue cars, new services have been established to and from that point during the morning and evening rush hours by the St. John's Place and Flatbush-Seventh Avenue lines.

The company also announces an increase in the main line through services of the Flatbush Avenue and the Flatbush-Seventh Avenue line, giving improved accommodations on these routes to and from Borough Hall and Park Row. In South Brooklyn the company has increased its surface car accommodations by running more cars on Fifth Avenue to and from Bay Ridge in connection with the elevated system at Thirty-sixth Street.

A Letter to Employees on Deportment

William Vanamee, receiver of the Walkill Transit Company, Middletown, N. Y., addressed the following letter to the employees of the company, under date of Dec. 21:

"Beginning Christmas, Dec. 25, 1908, hot coffee will be furnished, free, to motormen and conductors during the winter months between 6 a.m. and 9 a.m. and between 6 p.m. and 12 p.m.

"Motormen and conductors are expected to abstain entirely from the use of intoxicating liquors. This regulation constitutes no reflection upon the many excellent employees as to whom it is unnecessary. Like all rules, it is aimed at the few in respect to whom it is necessary. It is desired to bring them within the wholesome, restraining influence of public observation and official discipline.

"This regulation applies to the time when the men are off duty as well as to the time when they are on duty. They are never 'off duty' to the public. The use of alcohol while off duty is followed by its effects when on duty.

"The motorman who comes to the performance of his responsible duties with efficiency impaired or faculties benumbed by alcohol, already imbibed, is a dangerous public servant.

"I say public servant because all who are engaged in operating public conveyances under a public franchise sustain as direct a relation and duty to the public as though such utilities were owned and operated by the municipality itself.

"The experiments of Furer, Rudin, Kurz, Kraepelin and Aschaffenburg, as recently summarized by Dr. Williams, show that a single glass of beer involves a loss of 10 per cent in working efficiency.

"In the case of electric railway or railroad service, loss of efficiency means less safety for the public. Experience has shown that this requirement is a reasonable and necessary one to insure the safety of the public. No motorman himself would be willing to ride upon a railroad train with a locomotive engineer who violates it."

Permission Asked to Sell Tobacco in Boston Tunnel.—The Boston (Mass.) Elevated Railway has petitioned the Massachusetts Railroad Commission for approval of the sale of cigars, tobacco, etc., at the news stands in the stations of the Washington Street tunnel.

Suggestions for Patrons and Employees.—The Scranton (Pa.) Railway had a half-page advertisement in the daily papers of Scranton just before Christmas in which were recounted the difficulties of handling traffic and the obligations of employees to the public and their employers.

Traffic Records Broken in New York.—The Interborough Rapid Transit Company, New York, established a new passenger record on Dec. 21. In all, 1,800,000 passengers were carried in 24 hours. Of this number 861,000 were transported in the subway and approximately 939,000 on the elevated lines.

Line to Railroad Terminals in Chicago.—Milton J. Foreman, chairman of the Committee on Transportation of the Chicago City Council has asked the Board of Supervising Engineers of Chicago to report on the feasibility of operating a new street railway line to all the railroad terminals in downtown Chicago.

Proposed Through Service Between Indianapolis and Michigan.—Tentative plans have been made by the Winona Interurban Railway, the Indiana Union Traction Company and the Chicago, South Bend & Northern Indiana Railway for establishing a through parlor car service between Indianapolis and Michigan City as soon as the Warsaw-Peru division of the Chicago, South Bend & Northern Indiana Railway has been completed.

Steam Railroad Will Test Indiana Commissioner's Authority.—Attorneys for the Cleveland, Cincinnati, Chicago & St. Louis Railway have notified the Indiana Railroad Commission that the company will disregard the order of the commission directing it to interchange freight with the Winona Interurban Railway in order to contest the order of the commission in the courts. The decision of the commission was published in the Electric Railway Journal for Dec. 26, 1908, page 1667.

Guide to New Orleans.—The New Orleans Railway & Light Company has published a tourist's guide to New Orleans for general distribution. It describes points of interest in and about the city, the railroad stations, places of amusement and the routes of the company's lines. A map of the city shows the street railway lines, the steam railroads and the railroad depots, and has the shopping, office and theater districts and such other sections as are concentrated, indicated by boundary lines in red.

Central Electric Traffic Association.—At the recent meeting of the members of the Central Electric Traffic Association to establish a tariff for 1909, and which was adjourned until Jan. 4 and 5, the following nominating committee was appointed to recommend a suitable person as chairman of the association for 1909: C. M. Paxton, general manager of the Dayton & Troy Electric Railway, chairman; F. D. Norveil, general passenger and freight agent of the Indiana Union Traction Company; C. C. Collins, traffic manager of the Western Ohio Railway. The committee on increased rates will also report at the meeting on Jan. 4.

Service in Cincinnati.—W. Kesley Schoepf, president of the Cincinnati (Ohio) Traction Company, has explained to the Board of Public Service of Cincinnati that the power system is being remodeled to furnish more current to the lines in the west end of the city, and that after this work has been finished service on all lines will be greatly improved. Mr. Schoepf says that conductors exercise their own judgment in regard to heating the cars. He also explained that it is absolutely necessary in case of delays to turn cars back on certain lines before the terminal is reached, but that cars are turned back only when long gaps would result if they were not rerouted.

Special Cars for Children's Christmas Festival in Los Angeles.—Howard E. Huntington, general manager of the Los Angeles Railway, placed 15 cars at the disposal of the organizers of a Christmas festival for the children of Los Angeles on Dec. 23. Mr. Huntington addressed the following note to those in charge of the celebration: "Noting the announcement of your Christmas festival and wishing to co-operate with you in giving the children of our city a Merry Christmas, the Los Angeles Railway desires to place at the disposal of all children under 16 years of age who are not able to pay fare, 15 special cars, to leave the *Examiner* Building between the hours of 12:30 p.m. and 1:15

p.m. on Thursday afternoon, Dec. 24, for the Chutes and return to the *Examiner* Building, leaving the Chutes between 4 p.m. and 6 p.m."

Brooklyn Rapid Transit Company Discontinues Express Service.—The failure of the American Express Company and the Brooklyn Rapid Transit Company to come to terms for a continuation of the lease to operate an electric express service in Brooklyn was announced on Dec. 28. The contract will expire at midnight on Dec. 31. With the discontinuance of the express trolley service the American Express Company will return to the wagon deliveries. The trolley express service was operated throughout Brooklyn proper and to such outlying suburban districts as Jamaica, Flushing and College Point.

Residents of Staten Island Object to Withdrawal of School Tickets.—Residents of Staten Island and representatives of the Board of Education appeared before the Public Service Commission of the First District of New York on December 28 to protest against the abolition of the $2 monthly school rate by the Staten Island Rapid Transit Company on Jan. 1, under a decision of the Interstate Commerce Commission that such rates are discriminatory and illegal. Joseph P. Cotton, Jr., counsel and a director of the road, was asked by Commissioner McCarroll to make some statement as to the railroad's reasons for abolishing the school rate. He explained that the road had not been summoned to appear, so he was not present in any official capacity. Personally, he said, he believed the railroad was under the jurisdiction of the Interstate Commerce Commission, and that it could not avoid abolishing these reduced rates.

Holiday Shoppers' Excursion in Wisconsin.—The Merchants' Association of Appleton, Wis., conducted two very successful excursions over the lines of the Wisconsin Traction, Light, Heat & Power Company to Appleton from nearby towns just before Christmas as a means of increasing the sales of its members. As the association was prevented by law from giving free excursions or reduced rates, it bought 3300 car tickets, half of which were distributed among the members of the association and the other half to passengers boarding special cars of the association in certain cities along the lines on specified days, by men hired by the association to ride on the special cars. Each ticket given to a passenger was accompanied by a coupon redeemable for a return fare at any of the stores of the members of the association. The members of the association defrayed the expenses of the excursions by subscription.

Transportation Facilities to North of Boston to be Considered.—The Massachusetts Railroad Commission has been petitioned to investigate the relations existing between the Boston & Maine Railroad and the Boston, Revere Beach & Lynn Railroad, and the service between the Boston subway and territory to the east and north of the city, including additional transportation facilities between the Tremont Street subway and the South station, Boston. The petitioners, the Selectmen of Revere, claim that the Boston, Revere Beach & Lynn Railroad should be independently owned and operated; that grade crossings should be adopted where advisable; that the road should be electrified and changed to standard gage for local freight service; that a transfer agreement should be made with the Boston Elevated Railway and a tunnel connection provided between the Narrow Gauge terminal in East Boston and the city proper. The petition opens the question of local facilities between Boston and the East, on the lines of the Boston & Northern Street Railway and the Boston Elevated Railway.

Coney Island & Brooklyn Railroad Increases Service.—The Coney Island & Brooklyn Railroad has instituted a number of short trips during the rush hours of the evening which assure quick service to people desiring to leave from the vicinity of Borough Hall or the shopping districts. During the rush hours cars run from the intersection of High and Washington Streets under short headway. They leave High Street empty and run up Fulton Street, touching the Borough Hall subway station and passing through the shopping district, and through DeKalb Avenue to Broadway. During the crowded hours empty cars leave the junction of Fulton and Jay Streets and go up DeKalb Avenue to Broadway. Empty cars also leave DeKalb Avenue and Gold Street, and run to the depot at Covert Avenue. Shoppers' and business cars start empty from the junction of Fulton and Smith Streets on the Smith Street line every few minutes and go to the Park Circle. During the rush hours on the Franklin Avenue line the service has been increased by the institution of short-trip cars from South Eighth Street and the Eastern District ferries at the foot of Broadway and the Williamsburg Bridge to the depot at Franklin Avenue and Carroll Street.

Personal Mention

Mr. Harro Harrsen, general manager of the Mexican Tramway Company, City of Mexico, is in New York on a short trip. This is the first visit made to this country by Mr. Harrsen in two years. Mr. Harrsen was connected with the Toledo Railways & Light Company before going to Mexico.

Mr. John G. Honecker has resigned as vice-president and general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J. Mr. Honecker has also retired as a director of the Trenton, New Hope & Lambertville Street Railway, Yardley, Morrisville & Trenton Railway, Trenton, Lawrence & Princeton Railway and the Trenton City Bridge Company.

Mr. Frank Burton, Jr., has just resigned his position as general superintendent of the Montgomery Traction Company, owing to a change in ownership of that property. Mr. Burton had been connected with the Montgomery Traction Company for 18 months. Previous to that time he was for eight years general superintendent of the Yonkers division of the Union Railway, New York City.

Mr. G. S. Shinnick, assistant to Mr. W. A. Gibbs, district manager of the Ohio Electric Railway, Columbus, Ohio, has been appointed general manager of the Mattoon Light, Heat & Power Company and the Mattoon & Charleston Railway, Mattoon, Ill. Mr. Shinnick has been connected with the Ohio Electric Railway for nine years, having been appointed secretary and treasurer of the Newark & Granville Railway, Newark, Ohio, in 1899. Mr. Shinnick is also secretary of the Licking Light & Power Company, Newark, Ohio.

Mr. Thomas F. Ryan has announced that hereafter he will be actively connected with the Morton Trust Company, the National Bank of Commerce and the American Tobacco Company, having withdrawn from official connection with all the other companies in which he is interested. Among the companies from which he has retired as a director are the Central Crosstown Railroad, New York; Thirty-fourth Street Crosstown Railway, New York; Union Elevated Railroad, Chicago; Metropolitan Street Railway, New York; New York City Railway; Consolidated Gas, Electric Light & Power Company, and the Electric Storage Battery Company.

Mr. E. T. Munger, heretofore superintendent of motive power and equipment of the Metropolitan West Side Elevated Railway, Chicago, Ill., on Jan. 1 assumed the duties of general superintendent of the Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey. Mr. Munger was graduated from the University of Wisconsin in 1892 and became connected with the Hall Signal Company as draftsman and construction foreman. In 1894, he entered the employ of the National Switch & Signal Company, but resigned a year later to become foreman of construction of the Metropolitan West Side Elevated Railway, in charge of wiring cars, stations and power houses. In 1898, Mr. Munger was appointed engineer of the Englewood & Chicago Railway in charge of the construction and installation of that company's storage battery surface line between Englewood and Blue Island. On the completion of the road, he became general manager of the Havana Telephone & Electric Light Company, Havana, Ill., but re-entered the service of the Metropolitan West Side Elevated Railway in 1903 as master mechanic, and continued in that position until March 14, 1908, when he was appointed superintendent of motive power of the company.

Mr. H. A. Johnson, engineer of car equipment of the Metropolitan West Side Elevated Railway, Chicago, Ill., has been appointed master mechanic of the company, assuming part of the duties of Mr. E. T. Munger, who as noted elsewhere in this issue of the ELECTRIC RAILWAY JOURNAL has been appointed general superintendent of the Hudson & Manhattan Railroad, New York. Mr. Johnson was graduated from Purdue University, with the degree of mechanical engineer, and immediately after graduation entered the employ of the Chicago, Burlington & Quincy Railroad as an apprentice, specializing in locomotive work. For the last 3½ years he has beeu connected with the Metropolitan West Side Elevated Railway in the inspection and electrical departments, the armature shop, the power house, and the drafting department and as engineer in charge of the Douglas Park extension, and as engineer of car equipment. With the resignation of Mr. Munger, Mr. J. T. Lovitt, chief engineer of power stations, will report direct to the general manager. Mr. E. J. Blair, engineer of substations, will also report direct to the general manager hereafter, and will have charge of all outside electrical work and the maintenance of distribution lines, lighting circuits, telephones and the third-rail.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—This company has been incorporated in Georgia to construct an electric interurban railway from Fairburn through Stonewall and Red Oak to College Park. From the latter place it is said that the lines of the Georgia Railway & Electric Company will be used into Atlanta, or some traffic arrangement will be made between the two companies by which they will exchange passengers. The road will be about 11 miles in length. Capital stock, $75,000. Incorporators: J. F. Golightly, Atlanta; W. T. Roberts, J. H. Harris, W. H. Mims, L. M. Hobgood, J. E. Longino, J. H. Longino, W. H. McLarin, D. A. Carmichael and J. B. Carmichael, all of Fairburn. [E. R. J., Dec. 5, '08.]

***Bluffton, Berne & Celina Traction Company, Indianapolis, Ind.**—This company has filed articles of incorporation with the Secretary of State. Capital stock, $50,000. It is the intention to construct and operate an electric railway from Bluffton, Ind., to Celina, Ohio, by way of Berne and other intervening towns. The principal office will be in Bluffton. Incorporators: Robert Saurer, B. A. Batson and Adolph Schurg.

Ohio & Michigan Southern Railroad, Toledo, Ohio.—Incorporated in Michigan with an authorized capital stock of $1,000,000. This company will take over the property of the Toledo, Ann Arbor & Detroit Railroad, which has partially completed an electric road between Toledo and Ann Arbor. It is said that the new company will push the completion of the road as rapidly as possible. It is proposed to equip the road both for freight and passenger business. Headquarters, Toledo. Directors: Andrew E. Lee, Vermillion, S. D., president; De Courcy F. Niles, Duluth, Minn., vice-president; William E. Niles, Sioux Falls, S. D., secretary-treasurer and general manager; John O. Zabel, Toledo, general counsel, and N. A. Rees, Chicago, Ill. Curtis W. Steudel, Chicago, Ill., superintendent of construction.

Somerset Street Railway, Rockwood, Pa.—Application will be made on Jan. 11 for a charter for this company which proposes to construct and operate a street railway from Rockwood to Somerset. The applicants for the charter are: John A. Berkey, Frank B. Fluck, Clarence L. Shaver, James C. McSpadden, John C. Lowry, A. L. G. Hay and A. K. Miller. [S. R. J., July 20, '07.]

FRANCHISES

***Globe, Ariz.**—A petition has been presented to the Globe City Council by George W. P. Hunt, asking that a franchise be granted for an electric street railway through Globe.

Berkeley, Cal.—The City Council has granted a franchise to the Southern Pacific Company for the operation of an electric road over California, Ninth and Ellsworth Streets, for which the company bid $25,000. The franchise which Duncan McDuffie applied for, an extension of the present Grove Street line in Northbrae on Marin and Alameda Avenues, was sold to him for $250.

Bristol, Conn.—Notices of an application to the General Assembly have been filed by the Bristol & Plainville Tramway, for an extension of time for its right to build between Thomaston and Terryville.

South Haven, Mich.—The City Council has granted a franchise to the Chicago, Benton Harbor & Grand Rapids Railroad Company for the building of an electric railroad through South Haven. Three trustees are the grantees of the traction franchise—Joseph W. Hosmer, William E. Dodson and George S. Hannaford, all of Chicago. [E. R. J., June 20, '08.]

Albany, N. Y.—The United Traction Company has presented a petition to the Common Council asking for an extension of one year in which to construct the proposed line across Arbor Hill.

Seneca Falls, N. Y.—The Town Board of Seneca Falls has granted a franchise to the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company to extend its road from the east line of Seneca Falls to the west shore of Cayuga Lake, along the highway. The company has also been granted a franchise to extend its line through Aurelius.

Kenmore, Ohio.—Thomas L. Childs, promoter of the Turkeyfoot Traction Company, Akron, Ohio, has made application to the Council of Kenmore, Ohio, for a franchise. It is proposed to build the line below grade at a point known as Wingerter crossing, just south of the business center of the village, and carry the public highway with the line under the tracks of the Erie, Cleveland, Akron & Columbus and the Baltimore & Ohio roads.

Philadelphia, Pa.—The ordinance granting a franchise to the Delaware Tunnel Railroad Company has passed both branches of the Philadelphia Council. The company has already secured legislation on the New Jersey side of the river. Beginning at Market and Second Streets, on the Philadelphia side, one tube will extend south to Chestnut Street and will gradually curve toward the river. At the center line of Chestnut Street it will extend east to Third Street in Camden. The north tube will extend from Third Street, in Camden, diagonally to the river front, thence diagonally to Second and Arch Streets, on the Philadelphia side. It will then curve in Second Street to the south to join the first tube at Market Street. There will be spur tracks to Third Street in both Arch and Chestnut Streets. The combined mileage will be slightly more than 4 miles. [E. R. J., Dec. 19, '08.]

Rapid City, S. D.—The City Council of Rapid City has granted a street railway franchise to the Rapid City & Wyoming Railway. It covers the streets of that town generally and the line is to be several miles in length. It it authorized to use either gasoline or electric motors for operative power. L. A. Richards, president. [E. R. J., Oct. 3, '08.]

El Paso, Tex.—J. A. Happer has been granted a 50-year franchise to build a street railway to the Government Hill addition from the Fort Bliss electric line.

***Gainesville, Tex.**—The Gainesville City Council has granted a franchise for the construction and operation of a street railway to E. S. Alnut and C. R. Ball. Construction is to begin not later than April 15, 1909. It will be 4 miles long. It is the intention of the promoters to operate gasoline motor cars.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—This company is rebuilding 4 miles of double track and paving the line for a considerable distance. The work is being done under the direction of Ford, Bacon & Davis.

British Columbia Electric Railway, Vancouver, B. C.—Announcement is made that this company will soon begin the construction of a line extending to the eastern boundary of Hastings townsite.

Southern Colorado Power & Railway Company, Trinidad, Col.—It is stated that this company will build 2 miles of additional track in Trinidad this year.

Denver (Col.) City Tramway.—This company is said to be planning to extend one of its lines to Valverde. The extension will be about two miles long.

New London, Conn.—Petitions for charter amendments which will be asked at the coming session of the General Assembly are advertised by the New London & East Lyme Street Railway and the Groton & Stonington Street Railway. The change asked by the East Lyme Street Railway will permit it, if granted, to extend its tracks to the Connecticut River. The Groton & Stonington Street Railway asks for permission to lay its tracks through several of the streets of Groton borough and to Eastern Point. The Norwich, Jewett City & Voluntown Street Railway will also petition the General Assembly for an extension of time for the right to construct its line over the route named in the charter. This is up the east side of the Quinebaug to Jewett City and through Glasgow to Voluntown.

Norwich, Colchester & Hartford Electric Railway, Norwich, Conn.—This company is said to have begun making surveys for the electric railway which it is planning to build between Norwich and Hartford. It is intended to begin construction in the spring. [E. R. J., Dec. 5, '08.]

***Pensacola, Fla.**—The Pensacola Investment Company is said to be planning to build an electric railway from Pensacola to Magnolia Bluff. Negotiations are now said to be on with Stone & Webster, Boston, Mass., for the construction of the line. The road will connect with the present line of the Pensacola Electric Company at some point on Sixteenth Avenue and will run to Bayou Texar, crossing that body of water and running through selected streets of East Pensacola Heights to Magnolia Bluff. The company expects to apply for a franchise at the next meeting of the City Council.

***Lewiston, Idaho.**—It is said that Spokane and eastern capitalists, headed by Judge George W. Bolt and W. N. Bourke, Spokane, are organizing a company to build a city and interurban electric railway system and lighting plant at Lewiston, Idaho. The railway is to cover 90 miles.

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill.—W. H. Conrad, promoter of this proposed line, announces that he has completed arrangements for building

an interurban line between Blue Island, Ill., and Oak Forest. This line will be about 4 miles in length and will be operated in conjunction with a line which will run from Blue Island to Midlothian, where the Midlothian golf links are located. At present steam trains are operated between Blue Island and Midlothian, but Mr. Conrad states that the Chicago, Blue Island & Joliet Traction Company will take this line over and equip it for the operation of cars by electricity. These lines will be used as feeders for the Chicago & Southern Traction Company's lines at Blue Island. Ultimately it is intended to extend the line from Oak Forest to Tinley Park and on southwest to New Lenox, where it will join with the Chicago Heights branch of the Joliet & Southern Traction Company's lines, and thus complete a direct route from Joliet, Ill., to Chicago. The project, it is said, has been financed and plans are now being made to begin construction work between Blue Island and Oak Forest early this spring, at which time the electrification of the Midlothian branch will also begin. Power for the operation of cars will be rented from the Chicago & Southern Traction Company.

Peoria Railway Terminal Company, Peoria, Ill.—This company expects to construct 2½ miles of additional track in Peoria this year.

Joplin & Pittsburg Railway, Pittsburg, Kan.—Announcement is made that this company will build from 10 to 30 miles of new track during this year. Two lines will be built, one from Pittsburg to Cherokee, Kan., and the other from Pittsburg to Mulberry, Kan.

Portland, Gray & Lewiston Railroad, Lewiston, Maine.—Charles C. Benson writes that the survey for the route of this projected electric railway has been completed and the rights of way secured. It is the intention to begin construction on the road early this spring. The line will extend from Portland to Lewiston through Falmouth, Gray and New Gloucester. Headquarters: 165 Main Street, Lewiston. Officers: E. W. Gross, Berlin, N. H., president; J. D. Clifford, Lewiston, vice-president; Charles C. Benson, Lewiston, treasurer; J. A. Jones, Lewiston, chief engineer.

Boston & Western Electric Railroad, Boston, Mass.—This company is stated to have requested the Railroad Commission to dismiss its petition for a certificate of exigency, on account of a technical error in the pending petition. It is said that a new petition will be filed.

Newton Street Railway, Newtonville, Mass.—The ELECTRIC RAILWAY JOURNAL is informed that this company is planning to double-track about 5 miles of its line this year.

El Dorado Springs, Tiffin, Monegaw Springs & Lowry City Railroad, Tiffin, Mo.—J. S. Harrison writes that this company is planning to begin construction within the next three months on its proposed electric railway, which is to connect El Dorado Springs, Tiffin, Oyer, Monegaw Springs, Chalklevel and Lowry City, Mo. It will be a standard-gage road, consisting of about 30 miles of track. It is expected that the overhead trolley system will be adopted. Mr. Harrison states that the power station will be erected on the Osage River. The repair shops will be built at El Dorado Springs. Officers: Dr. C. A. Edgar, El Dorado Springs, Mo., president; J. W. Kennerly, Tiffin, Mo., vice-president; J. S. Harrison, Tiffin, secretary and general manager; J. W. Reeder, El Dorado Springs, treasurer. [S. R. J., Dec. 7, '07.]

***Jefferson City, Mo.**—It is reported that A. T. Sparta, New York, N. Y., is interested in a plan to construct an electric railway from Jefferson City to Columbia via Fulton.

Oklahoma & Golden City Railway, Kansas City, Mo.—The ELECTRIC RAILWAY JOURNAL is advised that this company contemplates the construction of an electric railway, connecting Springfield, Mo., Pawhuska, Okla., and Jefferson City, Mo. No definite date has been set for beginning construction on the line. The overhead trolley system will be used. Officers: Winfield S. Pope, Jefferson City, Mo., president; E. W. Dempsey, Pawhuska, Okla., vice-president; F. A. Griessel, Golden City, Mo., general manager; W. K. Palmer, 717 Dwight Building, Kansas City, Mo., chief engineer. [S. R. J., Jan. 25, '08.]

Springfield (Mo.) Traction Company.—This company is making preliminary surveys for its proposed extension from Springfield to Carthage, Mo. The southern route parallels the Frisco line from Springfield to Carthage. The northern route runs north of Mount Vernon about 7 miles, and passes through Miller. After leaving Miller the road will extend to Avilla and then to Carthage.

Butte (Mont.) Electric Railway.—This company expects to construct about 3 miles of new track in Butte this year.

Central Western Railroad, Omaha, Neb.—This company, which contemplates establishing an electric railway between Kearney, Neb., and Holdredge, Neb., has completed the surveys for one section of the route and has also secured a portion of the right of way. It is stated that the company will not award any contracts before next March. The road, which is to be standard-gage, will have about 38 miles of track. The company expects to handle both freight and passengers. Power for the operation of the road will be rented from a local power company. The company expects to erect its repair shops at Kearney. Capital stock, authorized, $250,000; issued, $50,000. Office, 600 Bee Building, Omaha, Neb. Officers: T. E. Brady, president; S. C. Nelson, treasurer and general manager; N. R. Denham, chief engineer, all of Omaha. [E. R. J., Sept. 5, '08.]

Morris County Traction Company, Morristown, N. J.—The ELECTRIC RAILWAY JOURNAL is advised that this company expects to place contracts during the next five weeks for the construction of 20 miles of new track.

Dunkirk, N. Y.—Passenger service over the Buffalo & Lake Erie Traction Company's road between Buffalo and Dunkirk and the adjoining village of Fredonia was begun on Dec. 24.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—This company expects to build this year a 6-mile extension to its system, from Bowling Green to Tontogany.

Ohio & Southern Traction Company, Columbus, Ohio.—It is reported that this company is considering the extension of its line south from the Hartman farm to the Gould farm, a distance of about 2.5 miles.

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.—A. E. Townsend writes that the surveys for this line will be completed within a few days. Arrangements have been made for starting construction this spring. The following cities will be connected by this road: Uhrichsville, Dennison, Franklin, Laceyville, Cadiz, New Athens, Harrisville, Colerain, Georgetown, Adena, Martin's Ferry, Bridgeport and Wheeling, W. Va. It will be a standard-gage line and will have about 55 miles of track. It is planned to use the overhead trolley. The power station and repair shops will be built at Cadiz. Power for lighting and other purposes will be furnished to manufacturing concerns along the route. Capital stock, authorized, $10,000. Officers: A. E. Townsend, president and general manager; Robert P. Scott, vice-president; George W. Grissinger, secretary; John E. Lacey, treasurer, all of Cadiz, Ohio. [E. R. J., Sept. 12, '08.]

Oklahoma City, Shawnee & El Reno Rapid Transit Company, Oklahoma City, Okla.—John W. Burchinal writes that rights of way are now being completed, estimates being prepared and arrangements made for the financing of the road. It will be 70 miles in length and will extend from Oklahoma City to Spencer, Horrah, Choctaw, McCloud, Yukon, El Reno and a number of smaller towns. The overhead trolley will be used. Capital stock, $1,500,000. Officers: W. M. Sawyers, president; J. A. Niblo, vice-president; C. A. Huber, secretary; S. M. Niblo, treasurer; John W. Burchinal. [E. R. J., June 13, '08.]

Mount McKay & Kakabeka Falls Railway, Fort William, Ont.—G. R. Duncan writes that construction has been stopped on this road for the winter, but work will again be resumed early this spring. About 3 miles of track have been laid. The road will connect Kakabeka Falls and Fort William, a distance of about 20 miles. The overhead trolley system will be installed. An amusement park, located about 6 miles from Fort William, is owned by the company and will be reached by the road. Headquarters, Fort William. Officers: W. F. Hogarth, president; Joshua Dyke, vice-president; C. W. Jarvis, secretary; C. H. Jackson, treasurer, all of Fort William. G. R. Duncan, 413 John Street, Fort William, consulting electrical engineer. [E. R. J., June 20, '08.]

***Marshfield, Ore.**—M. M. Johnson, Portland, is said to be considering the possibility of an electric railway between Cuss Bay and Roseburg.

Royalton & Elizabethtown Street Railway, Philadelphia, Pa.—According to an official report, construction will begin on this road in about three months. It will connect Middletown, Royalton, Elizabethtown, Florin and Mount Joy, a distance of 40 miles. A branch line will also be built to Lebanon. The road will be a standard-gage one, and it is the intention of the company to adopt the overhead trolley system. Ten cars will be operated upon the completion of the line. Power from a station to be erected at Conewago will be furnished to towns along the route. The repair shops will be built at Elizabethtown. Headquarters, 1324 Real Estate Trust Building, Philadelphia, Pa. Wm. Trimble, Minneapolis, Minn., president; E. M. Raymond, Philadelphia, secretary and general manager.

Washington & Canonsburg Railway, Washington, Pa.—This company contemplates the construction of 6 miles of new track this year.

Sioux Falls & Sioux City Electric Railway, Sioux Falls, S. D.—The ELECTRIC RAILWAY JOURNAL is informed that this company is planning to begin construction on its projected standard gage line this year. The road will be about 90 miles in length, joining Sioux Falls, Worthing, Bensford, Elk Point, S. D., and Sioux City, Ia. Up to the present time about 50 miles of the right of way have been secured. It is probable that both electric and gasoline motor cars will be operated on the line. It is the intention of the company to build two power stations, one at Sioux Falls, S. D., and the other at Sioux City. The repair shops will be erected at Sioux Falls. Capital stock authorized, $1,000,000. Headquarters, Sioux Falls, S. D. Officers: O. H. Smith, president; Charles Fantle, vice-president; E. D. Morcom, secretary and treasurer; Geo. W. Burnside, general manager; F. C. Whitehouse, superintendent, all of Sioux Falls, S. D.

Corsicana (Tex.) Transit Company.—This company is ballasting its track and will also relay a portion of it with larger rails. The company is also planning to establish a park and other attractions.

Puget Sound Electric Railway, Tacoma, Wash.—An extension of this company's line was recently opened for traffic from Tacoma to Puyallup. It is stated that it is the intention of the company to extend its line on to Sumner, McMillan, Orting and finally to South Prairie and other points.

Seattle (Wash.) Electric Company.—The ELECTRIC RAILWAY JOURNAL is advised that this company expects to construct 30 miles of new track this year. Approximately $550,000 will be expended in street paving.

Spokane, Columbia & Western Railway, Spokane, Wash.—This company is at work securing the rights of way for its projected line which is to extend from Spokane to Reardan, Davenport and Peach. The road will be standard gage and it will be about 70 miles in length. When completed it will be operated as part of the Spokane & Inland Empire Railroad. Officers: Clyde M. Graves, Spokane, president; Waldo G. Paine, vice-president; W. G. Davidson, secretary; H. B. Ferris, treasurer; J. B. Ingersoll, electrical engineer; A. M. Lupfer, chief engineer. [E. R. J., Sept. 12, '08.]

Morgantown & Interstate Railroad, Morgantown, W. Va.—It is announced that this company will build 12 miles of new track this year. An extension will be built from Morgantown to Star City, W. Va., and Point Marion, Pa.

Wellsburg, Bethany & Washington Traction Company, Wellsburg, W. Va.—Announcement is made that this company expects to extend its line next year from Bethany to Washington, Pa., a distance of about 21 miles.

Central Wisconsin Transit Company, Kilbourne, Wis.—It is announced that this company expects to begin construction early this spring. The general contract for the building of the road has been awarded to Burns & Company, 705 Isabella Building, Chicago, Ill. Kilbourne, Portage, Friendship and Grand Rapids, Wis., will be connected by this line. It will be about 65 miles in length. Both steam and electricity will be used for motive power. The repair shops will be located at Friendship, Wis. Capital stock authorized, $1,000,000; issued, $25,000. Bonds authorized, $1,000,000. Headquarters, 705 Isabella Building, Chicago, Ill. Officers: J. J. Burns, president and general manager; Clyde F. Burns, secretary and treasurer. [E. R. J., Aug. 15, '08.]

POWER HOUSES AND SUBSTATIONS

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—The ELECTRIC RAILWAY JOURNAL is informed that this company has under consideration the installation of some additional boilers and possibly a coal conveyor. The company also expects to develop a lake for condensing purposes.

Boise & Interurban Railway, Boise, Idaho.—This company is said to have closed a contract with the Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., for machinery to double the capacity of its substation at Pierce Park. The machinery is to be delivered March 1 and will be installed in time to give additional power to take care of the summer traffic to and from the park.

Morris County Traction Company, Morristown, N. J.—It is officially announced that this company will award contracts during the next six weeks for the construction of a new central power station together with three substations.

Pittsburg (Pa.) Railways.—The ELECTRIC RAILWAY JOURNAL is advised that this company contemplates installing three or four new boilers in its Glenwood power station.

Manufactures & Supplies

ROLLING STOCK

Tampa-Sulphur Springs Traction Company, Tampa, Fla., expects to purchase early in 1909 six 12-bench cars.

Los Angeles-Pacific Railway, Los Angeles, Cal., has fitted all of its interurban cars with locomotive pilot fenders.

Angelo Power & Traction Company, San Angelo, Tex., expects to purchase in 1909 six light, single-truck motor cars.

Humboldt Transit Company, Eureka, Cal., will be in the market in 1909 for two or four 34-ft. combination passenger cars.

Des Moines City Railway, Des Moines, Ia., is rebuilding at its shops a number of cars for pay-as-you-enter operation.

Portland (Ore.), Eugene & Eastern Railway has ordered two new cars, which will be delivered before the end of January.

Salt Lake & Ogden Railway, Salt Lake City, Utah, will be in the market soon for a number of new cars and equipment.

Milwaukee Northern Railway, Cedarsburg, Wis., will buy additional passenger equipment and a complete freight equipment early in 1909.

Ernesto Turco, 27 Vingaglio, Torino, Italy, is making inquiries in this country as to prices and utility of various electric car fenders.

New York & North Jersey Railway Company, Paterson, N. J., a line now under construction is sending out specifications for cars and other equipment.

Tacoma Railway & Power Company, Tacoma, Wash., has decided to install automatic gates on all of its city cars. The gates cannot be opened when the car is in motion.

Morgantown Interstate Railroad, Morgantown, W. Va., will be in the market in 1909 for four passenger cars. The specifications for these cars have not yet been determined upon.

Chicago & Southern Traction Company, Chicago, Ill., will purchase early in 1909 six or seven trailer cars for interurban operation. The specifications have not yet been completed.

Erie Railroad has sent out specifications for six new cars to be used on the Rochester division. Reference to this contemplated purchase was made in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1908.

R. D. Apperson, Lynchburg, Va., president of the Lynchburg Traction & Light Company, and several other public service corporations in the South, is asking for the names of the makers of rattan for snow sweepers.

British Columbia Electric Company, Vancouver, B. C., will build 24 semi-convertible cars 42 ft. long, two observation cars, two locomotives, 13 box cars and two flat cars. This equipment will be all that the cmpany will require in 1909.

Rock Island Southern Railroad, Monmouth, Ill., which was reported in the ELECTRIC RAILWAY JOURNAL of Dec. 19 as being in the market for equipment, has placed an order for 17 combination baggage and passenger cars and eight trailers with the St. Louis Car Company, St. Louis, Mo.

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill., announces through W. H. Conrad, one of the promoters of the railway, that it will purchase two or three interurban cars early in 1909. These cars will be used on the Oak Forest and the Midlothian branches of this road.

Springfield & Washington Railway, Washington, C. H., Ohio, has ordered one car from the Jewett Car Company, Newark, Ohio. It is intended for interurban service and will be equipped with American Locomotive Company trucks, and Westinghouse Electric & Manufacturing Company 112 B motors.

Indiana Union Traction Company, Anderson, Ind., is rebuilding a car at its shops to be used on the "Marion Flyer" run which operates on a fast schedule between Marion and Indianapolis. The car is to be 62 ft. in length and will be of the three-compartment type. Revolving chairs, upholstered in leather, will be used in the smoking compartment of this car.

Third Avenue Railroad, New York City, has contracted with the Westinghouse Electric & Manufacturing Company for 200 two-motor car equipments, to be used on the 200 new cars referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1908, for which specifications have been issued. The

motors will be the same special design No. 310, interpole, box type, that were built for the 127 cars of the Metropolitan Street Railway. They are to be delivered in June. The contracts for building the cars and for furnishing the other equipment have not been let as yet, the engineers of the company still having the specifications under consideration.

TRADE NOTES

Green Engineering Company has moved its St. Paul, Minn., office from room 510 to room 415 in the Pioneer Press Building.

National Brake Company, Buffalo, N. Y., reports that it has just closed one of the most successful business years in its history. During the last nine months of 1908 it sold more Peacock brakes than during any other previous nine months.

New York Car & Truck Company, Kingston, N. Y., announces the appointment of Giles S. Allison as general sales agent, with headquarters at 42 Broadway. The New York Car & Truck Company owns the plant, assets, patents and good will of the Peckham Truck Company.

American Blower Company, Detroit, Mich.—James Inglis, the president of this company, made an address to the employees just before Christmas, extending holiday greetings and expressing the satisfaction of the management at the continued cordial relations which exist between the company and its men. For several years the company has made cash presentations to its employees at Christmas time, but owing to the condition of the trade in 1907 and 1908 these contributions were necessarily foregone.

Falk Company, Milwaukee, Wis., reports that it is receiving many orders for its hardening center type railroad crossings. It has made a departure from the regular method of holding the inserts by binding the intersections with a mass of open hearth steel, thus preventing any possibility of loosening and consequent wear. A carload of crossings of this type has just been shipped to the Northern Electric Company, Chico, Cal., and several have been recently placed on the Chicago & Northwestern and Chicago, Milwaukee & St. Paul Railroads.

American Diesel Engine Company, Providence, R. I.—This company, which for some time has been manufacturing oil and gas engines in the United States, under foreign patents, has made an assignment to John L. Wilkie, 2 Wall Street, New York. The principal creditor of the company is Adolphus Busch, of St. Louis, who has claims aggregating $200,000. This was for money loaned in the attempt to sustain the company's business. It was stated at the time the bankruptcy petition was filed that the total assets of the company were something more than $100,000.

Elmer P. Morris Company, New York City, announces that as the result of the reorganization of the Eagle Iron Works (formerly Eagle Iron Foundry), Cory, Pa., it has arranged to place on the market a special mixture of gray iron brake-shoes which several New York and Philadelphia electric and steam railways are stated to have found unusually efficient and economical. The Morris Company is prepared to receive orders for both standard and special shoes made according to this secret formula and states that such orders will be filled promptly in view of the foundry's increased manufacturing facilities.

Bruce Peebles & Company, Ltd., Edinburgh, Scotland, announce that the company has been reorganized and is actively engaged in the manufacture of all the different classes of electrical machinery with which their name has for so long been associated. The business has been conducted without interruption, and its control is now in the hands of an entirely new board of directors. The new board consists of A. W. Tait, M. B. Mountain, C. J. Shiells, Alex. Mackenzie, Chas. H. McEuen and F. E. Andrews. The company owns the sole manufacturing rights in Great Britain and the colonies of the well-known Motor Converter.

Electric Service Supplies Company, Philadelphia, Pa., announces that E. R. Mason, who has been connected with the sales department of the Chicago branch for the past 11 years, has been appointed manager of the New York office of the company. He assumed his new duties on Jan. 1. He will retain the office at 50 Church Street. Mr. Mason is one of the best-known salesmen of electric railway apparatus in the Middle West, having traveled continuously in Indiana, Illinois, Michigan and Wisconsin. He succeeds, as manager of the New York office, Henry R. Swartley, Jr., who has been appointed special representative in the interest of the Pay-Within Car, for which the Electric Service Supplies Company is general agent.

Peter Smith Heating Company, Detroit, Mich., has recently received orders for heaters from the following roads: Rochester Railway Company, 50 heaters, 30 No. 3-C, 20 No. 2 Type C; Atlantic Shore Line Railway Company, Kennebunk, Maine, 20 No. 2-C heaters; Omaha & Council Bluffs Street Railway Company, 25 No. 2-C heaters; Illinois Traction System, 10 No. 1-C; Detroit United Railway Company, 10 No. 1-C; Mankato Traction Company, Mankato, Minn, six No. 3-B; North Ohio Traction Company, eight No. 1-C; Eastern Wisconsin Railway & Light Company, 10 No. 2-C; Pennsylvania & New Jersey Traction Company, four No. 2-C; Clinton (Ia.) Street Railway, two No. 3-B; Louisville & Southern Indiana Railway Company, three No. 1-C; Saginaw & Flint Railway Company, six No. 2-C; Sheffield Car Company, four No. 3-C; Western Ohio Railway Company, four No. 2-A; East St. Louis & Suburban Railway Company, two No. 1-C; Houghton County Street Railway, four No. 2-C; Green Bay Traction Company, two No. C; Nashville Interurban Railway Company, Nashville, Tenn., two No. 2-C; Valley City (N. D.) Street & Interurban Railway Company, six No. 2-C; Cedar Rapids & Marion City Railway Company, one No. 2-C; Sioux City Traction Company, two No. 3-C; Walsh Construction Company, Davenport, Ia., two No. 2-B; Walla Walla Valley Traction Company, two No. 2-B; Chicago & Milwaukee Electric, 10 No. 2-C; Windsor, Sandwich & Amherstburg Railway, two No. 2-B; Winnipeg Electric Company, eight No. 1-B; Inter-Mountain Railway Company, Denver, Col., four No. 2-B; McGrath Construction Company, Davenport, Ia., two No. 2-B. The Rochester Street Railway and the Atlantic Shore Line have supplanted electric heaters with Smith hot water car heaters after thorough tests.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y.—Bulletin No. 4628, just issued by this company, describes its new mercury arc rectifier.

Hess-Bright Manufacturing Company, Philadelphia, Pa.—This company is sending to its friends a New Year's souvenir in the shape of a vest-pocket celluloid calendar, which is so arranged with revolving disks as to be of perpetual service.

H. B. Underwood & Company, Philadelphia, Pa.—This company is sending to the trade a large wall calendar, printed in two colors, advertising the merits of its portable tools and machines.

Western Electric Company, New York and Chicago.—Bulletin No. 5910, which is devoted to the electrical equipment of textile mills, contains a description of the installation of motors at the plant of the Sanquit Silk Company, Philadelphia, Pa.

The J. G. Brill Company, Philadelphia, Pa.—"Brill's Magazine" for December 15 contains descriptions of Kuhlman sweepers, Brill pay-as-you-enter cars, semi-convertible cars, and a description of the steel underframe box cars recently ordered for South America and the yearly index.

Harrison Safety Boiler Works, Philadelphia, Pa.—"Cochrane Separator Talks," a recent leaflet issued by this company, treats of the first principles of separating water or oil from steam or gases, and contains a study of various devices and their action in taking water out of live steam.

Independent Pneumatic Tool Company, Aurora, Ill.—A new leaflet describing "Thor" air tools which are manufactured by this company, has recently been issued. It contains specifications for various sizes of drills, augers, hammers, chippers and other tools. The leaflet is thoroughly illustrated, showing many views of the apparatus at work.

Coleman Fare Box Company, Buffalo, N. Y.—A pamphlet issued by this company describes the operation of its hand fare boxes. The conductor presents the box to the passenger as he enters the car and the passenger drops his coin into the box. The catalog also contains a number of complimentary expressions from those who have used the collecting apparatus.

Utah Light & Railway Company, Salt Lake City, Utah.—James Kennedy has been awarded the contract by this company to build a conduit along Seventh East Street, from Tenth to Eleventh South Streets, to take care of the waters from the ditch bordering the company's lines on Seventh East Street and from the swamps in the neighborhood of that street and Eleventh South Street. The conduit is to be 3 ft. in depth and 6 ft. wide.

Pettingell-Andrews Company, Boston, Mass.—The January issue of "Juice," the house organ of this company, is a very interesting and instructive number. One of the leading articles is devoted to "Opalux" high-efficiency reflectors and "Opalux" tungsten fixtures. It is claimed for these reflectors that the patented inner surface gives an intense light and a brilliant, pearly luster. Another interesting article is devoted to the determination of the power factor of three-phase circuits by means of wattmeters.

TABLE OF MONTHLY EARNINGS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. * Including taxes. † Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Nov. '08	151,934	87,976	63,958	44,012	19,947
	1 " " '07	146,123	88,180	57,943	43,351	14,591
	11 " " '08	1,730,019	1,000,275	729,743	479,798	249,946
	11 " " '07	1,761,198	1,013,469	747,730	469,880	277,849
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Oct. '08	31,758	17,766	13,991	9,026	4,965
	1 " " '07	32,379	17,949	14,431	7,181	7,250
	12 " " '08	358,466	205,398	153,067	97,139	55,928
	12 " " '07	344,105	193,816	150,289	85,480	64,809
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Nov. '08	188,414	*128,699	59,715	44,468	15,246
	1 " " '07	202,141	*135,800	66,341	42,579	23,762
	11 " " '08	1,968,510	*1,299,362	669,148	482,910	186,238
	11 " " '07	2,020,032	*1,340,336	679,696	436,426	243,269
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Nov. '08	63,912	40,559	23,353	14,907	8,446
	1 " " '07	62,551	40,543	22,007	15,077	6,930
	9 " " '08	569,663	368,223	201,440	134,270	67,169
	9 " " '07	545,212	344,998	200,213	133,793	66,421
DALLAS, TEX. Dallas Electric Corporation.	1m., Oct. '08	134,140	73,767	60,373	27,554	32,819
	1 " " '07	125,771	72,291	53,481	28,481	25,000
	12 " " '08	1,156,874	774,684	382,189	352,151	30,039
	12 " " '07	1,098,263	761,771	336,492	310,103	26,389
DETROIT, MICH. Detroit United Ry. Co.	1m., Nov. '08	577,208	*374,685	202,523	132,818	69,705
	1 " " '07	565,835	*370,259	195,576	134,609	60,967
	11 " " '08	6,566,611	*4,182,588	2,384,023	1,485,058	898,965
	11 " " '07	6,603,486	*4,152,937	2,450,549	1,435,218	1,015,331
DULUTH, MINN. Duluth St. Ry. Co.	1m., Nov. '08	76,661	47,825	28,836	16,701	12,135
	1 " " '07	72,813	41,015	31,798	17,912	13,885
	11 " " '08	808,653	492,327	316,326	202,368	113,959
	11 " " '07	772,993	392,099	380,893	195,639	185,254
E. ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Nov. '08	170,739	88,121	82,618	.....	.....
	1 " " '07	187,955	97,864	90,091	.....	.....
	11 " " '08	1,837,239	960,163	877,075	.....	.....
	11 " " '07	1,976,867	1,031,593	945,274	.....	.....
EL PASO, TEX. El Paso Cos.	1m., Oct. '08	44,913	33,544	11,369	7,107	4,262
	1 " " '07	46,474	30,766	15,708	5,993	9,714
	12 " " '08	528,654	377,808	150,846	83,930	66,916
	12 " " '07	486,719	360,609	126,110	66,057	60,053
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Oct. '08	37,267	12,636	24,631	1,927	22,704
	1 " " '07	34,504	15,119	19,385	1,797	17,588
	10 " " '08	346,409	120,598	225,811	12,439	213,372
	10 " " '07	322,152	128,734	193,418	9,855	183 563
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Oct. '08	113,391	59,931	53,459	.....	.....
	1 " " '07	114,883	63,872	51,011	.....	.....
	10 " " '08	1,092,090	613,400	478,690	.....	.....
	10 " " '07	1,052,505	620,834	431,621	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Oct. '08	119,298	56,103	63,195	15,187	48,008
	1 " " '07	114,460	58,164	56,295	13,886	42,409
	12 " " '08	1,057,761	614,110	443,651	185,862	257,788
	12 " " '07	1,039,275	587,657	451,619	155,113	296,506
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Oct. '08	94,348	52,842	41,506	20,192	21,314
	1 " " '07	89,940	53,521	36,419	19,671	16,748
	12 " " '08	1,064,411	619,700	444,711	241,761	202,950
	12 " " '07	1,037,765	606,363	431,402	221,424	209,978
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Oct. '08	21,654	10,941	10,712	5,380	5,333
	1 " " '07	20,652	12,765	7,887	4,823	3.064
	12 " " '08	258,708	146,599	112,110	57,598	54,512
	12 " " '07	248,881	145,818	103,063	56,409	46,653
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Oct. '08	38,509	21,144	17,365	8,145	9,220
	1 " " '07	33,697	20,332	13,365	7,149	6,216
	12 " " '08	419,405	250,706	168,699	97,884	70,815
	12 " " '07	393,330	227,631	165,699	70,925	94,774
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Oct. '08	575,281	313,041	262,240	156,822	105,418
	1 " " '07	559,822	271,191	288,632	153,575	135,057
	5 " " '08	2,689,125	1,525,178	1,163,947	777,352	386,594
	5 " " '07	2,647,648	1,344,188	1,303,460	773,466	529,994
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m., Nov. '08	47,968	*22,859	25,110	11,483	13,626
	1 " " '07	50,713	*25,692	25,021	11,420	13,601
	11 " " '08	522,149	*269,104	253,045	126,469	126,576
	11 " " '07	549,745	*298,507	251,239	117,572	133,666
LEXINGTON, KY. Lexington & Interurban Rys. Co.	1m., Oct. '08	53,731	36,804	16,927	.....	.....
	1 " " '07	52,538	31,459	21,079	.....	.....
	10 " " '08	520,320	334,067	186,253	.....	.....
	10 " " '07	473,321	297,766	175,555	.....	.....
LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Nov. '08	59,091	*27,956	31,135	10,255	20,880
	1 " " '07	57,754	*28,977	28,777	8,653	20,124
	11 " " '08	610,195	*310,908	299,287	111,322	187,965
	11 " " '07	581,543	*299,912	281,631	92,977	188,654
MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Nov. '08	136,376	*87,560	48,816	35,312	13,504
	1 " " '07	125,979	*85,324	40,655	34,435	6,219
	11 " " '08	1,484,286	*939,189	545,098	385,634	159,464
	11 " " '07	1,471,071	*916,425	554,646	370,376	184,270
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Nov. '08	341,604	160,909	180,693	101,056	79,638
	1 " " '07	335,026	169,585	165,441	100,435	65,005
	11 " " '08	3,589,995	1,813,479	1,776,515	1,095,286	681,230
	11 " " '07	3,563,912	1,798,565	1,765,347	1,082,445	682,902
Milwaukee Lt., Ht. & Tr. Co.	1m., Nov. '08	108,378	29,629	78,750	59,057	19,693
	1 " " '07	109,009	29,585	79,423	57,598	21,825
	11 " " '08	1,289,118	340,647	948,471	656,210	292,261
	11 " " '07	1,037,268	328,942	708,326	504,686	203,640
MINNEAPOLIS, MINN. Twin City R. T. Co.	1m., Nov. '08	526,574	259,780	266,794	143,667	123,127
	1 " " '07	497,429	264,410	233,018	131,142	101,877
	11 " " '08	5,846,542	2,897,698	2,948,844	1,427,456	1,521,388
	11 " " '07	5,552,879	2,700,434	2,852,445	1,300,525	1,551,920
MONTREAL, CAN. Montreal St. Ry.	1m., Nov. '08	301,578	183,382	118,196	26,962	91,234
	1 " " '07	296,184	182,638	113,547	27,051	86,496
	2 " " '08	630,186	351,506	278,680	54,442	224,238
	2 " " '07	608,083	347,213	260,870	54,919	205,951
NORFOLK, VA. Norfolk & Portsmouth Tr. Co.	1m., Oct. '08	156,790	88,317	68,479	.....	.....
	1 " " '07	257,515	158,954	98,561	.....	.....
	10 " " '08	1,552,029	923,587	628,442	.....	.....
	10 " " '07	2,234,812	1,359,622	875,190	.....	.....
OAKLAND, CAL. Oakland Trac. Co.	1m., Oct. '08	242,506	111,290	131,216	45,943	85,273
	1 " " '07	251,958	120,982	130,976	46,757	84,219
	10 " " '08	2,324,994	1,099,957	1,225,035	459,090	765,945
	10 " " '07	2,310,498	1,164,247	1,146,251	440,492	705,759
San Francisco, Oakland & San Jose Cons.	1m., Oct. '08	74,400	36,503	37,897	22,727	15,170
	1 " " '07	72,411	37,897	34,514	20,390	14 124
	10 " " '08	747,784	373,063	374,721	214,144	160,577
	10 " " '07	667,450	351,814	315,636	203,897	111,739
PHILADELPHIA, PA. American Rys. Co.	1m., Nov. '08	219,503	....	.....	.....	.....
	1 " " '07	231,317	.....	.....	.....	.....
	5 " " '08	1,235,723	.....	.....	.....	.....
	5 " " '07	1,339,925	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Oct. '08	9,767	6,216	3,551	2,151	1,400
	1 " " '07	9,057	6,716	2,341	2,250	91
	12 " " '08	121,4..	89,503	31,923	27,003	4,921
	12 " " '07	118,071	78,313	39,757	26,951	12,806
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Nov. '08	370,378	165,331	205,047	.....	.....
	1 " " '07	347,598	178,534	169,064	.....	.....
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Nov. '08	75,963	36,777	39,186	.....	.....
	1 " " '07	72,498	38,236	34,262	.....	.....
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Nov. '08	872,339	*536,636	335,703	233,694	102,009
	1 " " '07	871,075	*579,509	291,566	231,314	60,252
	11 " " '08	9,682,878	*6,182,030	3,500,848	2,564,872	935,976
	11 " " '07	9,958,735	*6,485,975	3,472,760	2,546,529	926,231
SAVANNAH, GA. Savannah Elec. Co.	1m., Oct. '08	51,071	30,304	20,767	15,911	4,856
	1 " " '07	51,313	35,564	15,749	14,855	894
	12 " " '08	591,556	391,942	199,614	186,979	12,634
	12 " " '07	591,417	373,702	217,716	169,957	47,758
SEATTLE, WASH. Seattle Elec. Co.	1m., Oct. '08	401,935	233,624	168,310	97,084	71,226
	1 " " '07	374,379	208,598	165,781	84,072	81,709
	12 " " '08	4,453,076	2,632,132	1,820,944	1,067,190	753,754
	12 " " '07	3,994,084	2,326,446	1,667,638	875,466	792,172
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Oct. '08	147,152	95,977	51,174	44,257	6,917
	1 " " '07	141,985	92,056	49,929	40,297	9,632
	12 " " '08	1,683,239	1,077,798	605,441	514,915	90,527
	12 " " '07	1,609,039	1,007,305	601,734	434,555	167,179
TAMPA, FLA. Tampa Elec. Co.	1m., Oct. '08	47,354	30,170	17,184	4,380	12,804
	1 " " '07	45,572	34,958	10,614	759	9,854
	12 " " '08	544,966	360,826	184,140	32,151	151,989
	12 " " '07	519,503	74,095	145,407	20,018	125,389

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JANUARY 9, 1909 No. 2

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.
ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum
Single copies.....10 cents
Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum
CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.
ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.
Single copies.....20 cents
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The Prevention of Accidents

The prevention and treatment of accidents and the various problems incident thereto is a subject which was never of greater importance than at the present time. This issue contains the first of a series of articles by F. W. Johnson, of the Philadelphia Rapid Transit Company, who expresses the belief that many of the efforts which have been made to solve these troublesome problems have failed to effect improvement at one fundamental source of the difficulty. It apparently increases the work of the claim department if a more determined and systematic attempt than has been the custom in the past is made primarily to teach new trainmen all that they should know to help them to avoid accidents; but this method, if followed conscientiously, is a precaution that would not involve an excessive outlay of money and may result in the reduction of casualties. The exercise of constant vigilance on the part of the trainmen would decrease the seriousness of preventable accidents, and cause a reduction in the large number of claims for which there is little or no justification. To teach trainmen by impressive lessons to keep their minds alert to protect life is a humane course of action and one which a company is justified in following, even at apparent great expense. The problem would be easier of solution if trainmen in large cities would remain in the employ of the companies for a longer time than is the usual custom, but the fact that this condition makes necessary a practically continuous effort is an obstacle that needs to be recognized, if it is to be surmounted.

An Extra Charge for a Transfer

The effect of the establishment of a charge of 1 cent each for transfers by the Newton (Mass.) Street Railway, as reported in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1909, page 34, affords a significant illustration of the extent to which the unwarranted use of transfers may go.

The Newton company, as was shown in the series of articles on the Massachusetts fare situation published in this paper, imposed the charge for transfers, with the approval of the Board of Railroad Commissioners, because its revenues were inadequate. The change was made effective on Sept. 1, 1908. The results may be given greater emphasis by partial repetition of the figures published in our issue of last week. During the three months ended Nov. 30, 1907, the number of transfers issued amounted to 13.97 per cent of the total cash passengers carried. In the corresponding three months of 1908 the proportion was 10.50 per cent. In this period there was a decrease of 0.11 per cent in the number of cash passengers carried, which is so insignificant that it has no substantial bearing on the decrease of nearly 25 per cent in the total transfers issued.

The reduction in the aggregate number of transfers issued by the company in the three months indicates a decline of 3.1 per cent in the number of passengers that it was necessary to carry. When the total number of transfers issued in the three months of 1908 is shown to have been 178,810, being a reduction of 59,365 in the net number of transfers issued, it will be clear that there must have been some waste in the use of the privilege by the public.

The real effect of the action of the company in establishing a charge of 1 cent each for transfers was to make the unit of fare for about one-eighth of its passengers 6 cents if they desired to continue to exercise the transfer privilege. A charge of 1 cent also meant that all the passengers who had been in the habit of taking transfers for which they had no real use would abandon the practice, and that some very short trips by individual passengers whose destination was within reasonable walking distance of the line on which they paid their fare would be discontinued. To what extent the reduced issue of transfers would be due to dissatisfaction at the extra charge is, of course, a matter of speculation. The Newton Street Railway, it will be understood, is one of a group of companies controlled by the Boston Suburban Electric Companies, several of whose properties increased their unit of fare from 5 to 6 cents. The experience of these lines warranted the statement, however, by Matthew C. Brush, vice-president and general manager, that the antagonism displayed by the public when the increased fare was placed in effect passed away very largely.

Outside of the increase in revenue, which is a material advantage, the action of the company in setting up a charge will be important because it gives a value to that which has been regarded altogether too lightly if its effect on earnings is to be given due weight by the public as well as by street railway managers themselves.

Short Cuts in Railway Engineering

While much of a deprecatory nature has been said and written regarding "rule of thumb" engineering methods, yet almost every engineer makes use of a number of "short-cut" formulas which tend greatly to facilitate preliminary calculations, at least. Many of these short formulas seem to be purely empirical; they have become so familiar through long-continued use that their theoretical deduction is all but forgotten. However, for nearly every one of these short cuts, if it be a reliable one, "there is a reason." For instance, a short cut to the determination of power-station generating capacity is to allow 1 kw for every 2 hp of rated motor capacity in car equipments. This is based on an average transmission efficiency of about 75 per cent, which makes 1 kw output at the generator equal 1 hp input to the motor, and the additional fact that the continuous capacity of a railway motor is about one-half its rated capacity.

This rule, however, is modified for substations, which usually operate in parallel with adjoining stations, to 1 kw in rated substation capacity for each 2 hp in car equipments taking more than one-half their total current from that substation, plus 1 kw per hp for those cars taking less than one-half current. The reason for the modification is, of course, obvious.

The engineer's note-book, written or mental, is full of these perfectly legitimate short cuts. That the (long) tons of steel rail per mile of single track are equal to the pounds per yard multiplied by 11 and divided by 7 is not only easy to remember, but is much easier to apply than to multiply by twice 1760 and divide by 2240, even with the assistance of the slide rule, and it is just as exact. Another rule, in this case however a close approximation, is that the speed in miles per hour equals the rail lengths of 30 ft. traversed in 20 seconds. Another is that the number of pounds per yard of rail-weight is double the number of kilograms per meter. Another is to allow 1 sq. in. in cross-section for each 10 lb. per yard in steel rails and for the ordinary composition of track rails each 10 lb. per yard may be assumed as the equivalent of 100,000 circ. mils of copper in conductivity, allowing for the usual conditions of joints and bonding. The volts drop per mile per hundred amperes in third-rail having eight times the resistance of an equal cross-section of copper is equal to 365 (a constant quite easily remembered) divided by the number of pounds per yard of rail. For single track—two track rails, instead of one third-rail—the constant is two-thirds of the above, or the volts drop per mile of single track, per 100 amp, is 243 divided by the number of pounds per yard of single rail. That the resistance of a mile of single 70-lb. track rail is 0.07 ohm is almost as easy to call to mind as is the fact that No. 10 B. & S. gage copper wire has a resistance of almost exactly 1 ohm per thousand feet.

The B. & S. gage copper wire table, owing to the method of its deduction, is particularly susceptible to these short-cut rules. A wire which is three sizes larger than another wire has half its resistance, twice its area in cross-section and twice its weight. A wire which is 10 sizes larger than another has one-tenth its resistance, 10 times its cross-sectional area and 10 times its weight. No. 10 wire has a diameter closely approximating 01 in, its area is approximately 10,000 circ. mils, its resistance is approximately 1 ohm per thousand feet and it weighs close to 32 lb. per thousand feet. No. 5 wire weighs 100 lb. per thousand feet. The relative values of resistance (decreasing) and of area and weight (increasing) for consecutive increasing sizes are in the ratio 1.00:1.25:1.60:2.00, etc., and this same ratio holds good for the diameters of alternate sizes.

By memorizing the few constants named the B. & S. wire table (approximately) is always ready for use, even when, as is sometimes the case, we are revolving some problem in our mind in the interval between lights out and dreamland. Other short cuts in copper wire and cable data are: Number of feet per ohm resistance equals one-tenth the number of circular mils; weight per thousand feet equals one ten-thousandth the circular mils times 32; cost of copper wire per mile (at 15 cents per pound) equals the weight per thousand feet of the next smaller size.

Among the short cuts given above and the thousands of others in more or less common use some give perfectly exact results and others but approximations. A third class are based on certain assumptions which make them applicable to but certain conditions. In their adoption and use great care should be taken in their classification, and especial care should be exercised in the use of those last-named as applicable to certain conditions only, as otherwise they are quite capable of leading us far astray. Without such care the use of these short cuts makes good the disparagement of those who decry the "rule of thumb" methods; with proper care in their use many of the so-called rules of thumb become scientific formulas.

The Future of the American Street & Interurban Railway Association

The ELECTRIC RAILWAY JOURNAL is fortunate in being able to present in this issue a summary by President Shaw of the plans for the coming year of the American Street & Interurban Railway Association and its affiliated associations. The history of the American Association since the reorganization meeting at Philadelphia in 1905 has been one of rapid growth, not only in members but in efficiency and usefulness, and the program for the coming year, as outlined by Mr. Shaw, covers important work in practically every department of electric railway endeavor. As pointed out by him, however, the increase in number of members, while large, has not kept pace with the efficiency and usefulness of the organization. The field being covered is very broad and, while the work is being done thoroughly, even better results could be secured if all of those who could be benefited by the association would take advantage of the opportunity which membership in it affords. To assist in a better understanding of this situation on the part of those who are eligible as active or associate members, two committees on membership have been appointed, one to secure active and one associate members. The membership of these committees is drawn from all parts of the country, so that each section can enter into friendly rivalry with the others to see which will have the largest representation in the association.

We also notice that President Shaw states that probably the next convention will be held somewhere in the Middle West. We are heartily in favor of this plan, and believe that such a selection will not only be desirable for the reasons mentioned by Mr. Shaw, but will be of great educational value to the Eastern companies, especially those whose officials have not recently seen the latest railroads constructed in that section of the country. The article by Mr. Shaw is one which is in every way well worth careful perusal.

The Consolidated Gas Decision

The decision of the United States Supreme Court this week in the Consolidated Gas case is interesting on account of what it contains and what it does not contain in regard to what constitutes a reasonable return upon the value of public utility properties in large cities, where the receipts are large and reasonably certain to increase. The full report has not yet been filed, but according to the press reports, one of the rulings of the court was briefly this: That since the New York State Legislature had established a rate for gas which permitted, under existing rates of consumption, a return of from 5½ per cent to 6 per cent upon the present value of the company's property, and that since a possible increased consumption of gas would probably increase the net earnings of the company, a court of equity should not interfere before a bona fide test had been made of supplying gas at the rates mentioned in the statute. The court, however, expressly denied any intention of fixing the reasonable rate of return which any corporation should be permitted to obtain without legislative interference. The proper rate of return, it says, depends upon circumstances and locality, but in this particular case "the complainant is entitled to a return, if possible, of 6 per cent upon the fair value of its property actually used in this business of supplying gas." In regard to the franchises, the court ruled that their value should be taken as $7,781,000 in determining the value of the entire property for rate-fixing purposes. This was the figure at which the franchises were capitalized and valued in 1899-1900 at the time of the consolidation, which was effected pursuant to a State statute, and the court considers that the State should not now question this amount. The court held, however, that the general question of the method of valuing franchises for rate-fixing purposes was not before it and would not then be decided. No allowance should be made for good-will in this case. The digest of the decision so far made public indicates that the full decision will make most instructive reading. It is equally apparent that the court in passing upon other cases of like nature would give due consideration to all circumstances and conditions which differentiated them from those of the Consolidated Gas Company.

Reducing Wastes in Car House Lighting

We took occasion last week to discuss methods of lighting car houses and shops, but there is another point which should be emphasized in connection with that subject, namely, waste. The cost of lighting a car house of average size is not a serious matter from the point of view of current consumed, but here is often one of the little loose ends of service which in the long run is well worth attention. In many car houses there are no adequate methods of knowing whether lights are being burned needlessly or not, without making a personal trip through all the house. With the more careful planning of car house and shop designs now noticeable in electric railway practice, there is a general tendency toward the installation of centrally controlled circuits, bunching the auxiliary electrical equipment switches for different sections in one convenient location, and on a suitable fireproof switchboard panel. For this service there is a field for the use of pilot lamps in the switching compartment, with red bulbs to show when the outlying incandescents are in use.

It is often the case that a great many more lamps are burned around a car house than are needed. Aside from the power and consumption, this means a waste of lamps and fixtures which in turn calls for extra maintenance. The maintenance of pit lights is usually a matter of considerable cost, relatively speaking. Much of this cost may be caused through absence of pockets for permanent lamps and carelessness in the use of portable lamps. The cord and lamp of a portable outfit may be left in the pit or across the rail, so that when the car is pulled out of the pit track and run to another part of the house the cord is likely to be destroyed. This means stopping at busy times to fix the pit lamp cords, or else doing work by an inferior light while waiting for the repair force to go the rounds. Where it is the practice to supply lamps to the car house, without a proper record at the storekeeper's window, careless use and breakage often result. No item is too small to be of importance in the administration of a railway property, and lamp breakage can easily amount to quite a large sum if attention is not directed to it.

THE FUTURE OF THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION

BY JAMES F. SHAW, PRESIDENT OF THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION

It is a departure for the president of the American Street & Interurban Railway Association to prepare a formal address to the members and others interested in the industry at any other time than at the annual meeting. The work before the members of the association, however, is so important this year and the necessity of securing the co-operation of all interested in street railway affairs is so great that the writer has decided to disregard precedent in this particular. In consequence he has taken advantage of the offer of the publishers of the Electric Railway Journal to discuss in its columns some of the important topics which now confront the association and which are of interest to non-members as well as members of it.

MEMBERSHIP

One of the most important matters to be undertaken by the association during the coming year is an addition to both classes of its membership. There has been a gratifying increase in the number of both active and associate members since the submission of the report of the secretary-treasurer at the Atlantic City convention. On Sept. 30, 1908, the record stood: Active members in good standing, 262; associate members in good standing, 249. Since Sept. 30, 1908, 44 companies have applied for active membership, and there have been 97 applications for associate membership, making a total on Jan. 2, 1909, of active members, 306, and of associate members, 346, provided these applications are accepted at the next meeting of the executive committee.

While this increase in three months of 17 per cent in active membership and 39 per cent in associate membership is very gratifying, the total is far short of what should be the number of members in the association if we look upon the statement from the standpoint of (1) the benefits conferred by membership, or (2) the magnitude of the interests represented by the association, or (3) the members in similar organizations.

The electric railways constitute one of the large industries of the country with their capitalization of over $4,000,000,000, exclusive of floating debt, upon which they were paying more than $2,000,000 in interest in 1902. Not including the electrified steam lines, they are estimated to have an annual income of $350,000,000. I refer to these facts here only to indicate the importance of the industry and work to be done and the necessity for including in the association all those interested in its work. Realizing this condition, the writer has appointed two committees on membership whose members are so distributed geographically that inquiries in regard to active or associate membership in the association can be taken up easily by any one interested. The committees consist of the following:

COMMITTEE ON ACTIVE MEMBERSHIP

C. S. Sergeant, Boston, Ch'm.
E. A. Newman, Portland, Me.
H. C. Page, Springfield, Mass.
R. S. Goff, Fall River, Mass.
W. Caryl Ely, Buffalo, N. Y.
C. Loomis Allen, Utica, N. Y.
W. G. Ross, Montreal, Que.
C. L. S. Tingley, Philadelphia.
W. E. Harrington, Pottsville.
J. N. Shannahan, Baltimore.
A. H. Ford, Birmingham, Ala.
W. H. Glenn, Atlanta, Ga.
R. I. Todd, Indianapolis.
Jas. H. McGraw, New York.
P. P. Crafts, Clinton, Ia.
C. B. Fairchild, Chicago.
A. W. Warnock, Minneapolis.
A. H. Classen, Okla. City.
John A. Beeler, Denver.
E. E. Potter, Seattle, Wash.
C. N. Black, San Francisco.
Harro Harrsen, Mexico City.
D. A. Hegarty, Little Rock.
C. C. Smith, Milwaukee.

COMMITTEE ON ASSOCIATE MEMBERSHIP

C. L. Allen, Utica, Chairman.
Howard F. Grant, Seattle.
C. H. Hile, Boston.
W. W. Sargent, Fitchburg.
M. C. Brush, Newtonville.
J. S. Doyle, New York, N. Y.
H. H. Adams, New York.
W. O. Wood, Long Island City.
P. N. Jones, Pittsburg, Pa.
C. E. Flagg, Spokane, Wash.
L. D. Mathes, Dubuque, Ia.
D. A. Hegarty, Little Rock.
R. E. Danforth, Newark.
W. H. Staub, Baltimore.
H. S. Cooper, Galveston.
J. B. McAfee, Lexington.
T. W. Passalaigue, Charleston, S. C.
A. W. Warnock, Minneapolis.
R. E. Hunt, Salt Lake City.
C. F. Hewitt, East St. Louis.
W. S. Dimmock, Tacoma.
J. A. Beeler, Denver, Colo.
W. T. Bivins, San Francisco.

The appointment of these committees, however, is not intended to relieve any active or associate member of the association or any member of the Manufacturers' Association from co-operating in the work. It is to be hoped that all of those who showed such enthusiasm at Atlantic City in regard to the association itself and the work accomplished by it will be able to impart some of this interest to others who are not members, and that each will informally constitute himself a member of the membership committee. The work of the association ought to attract the support of all companies, because no company is too large to be outside the association, and none is too small not to be interested in and helped by it.

THE FUTURE WORK OF THE ASSOCIATION

In each of the affiliated branches of the association, as well as in the main body, questions are pressing for settlement which are more important now than perhaps ever before in the history of the organization. For the main body of the American Street & Interurban Railway Association one of the most important topics is that of State and federal legislation. A new condition, so far as the electric railway companies are concerned, has arisen during the past two or three years which will require the application of the best thought on the part of the railway managers, governmental authorities and all versed in political and economic questions. The policy of governmental ownership of steam railways and of municipal ownership of urban railways never aroused very much enthusiasm in this country. It was of European origin and essentially adapted to conditions other than those which prevailed in the United States, and the foreign exotic never flourished here or showed any indication of material growth or suitability to the conditions here existing.

The history of government control or regulation of public utilities is entirely different. Commencing as it did in federal matters, as illustrated by the Interstate Commerce Commission and legislation similar to that of the Hepburn act, it has been taken up by different States, some of which have gone farther than others. I am far from believing that strict supervision of the securities issued by street railway companies, the condition of a company's physical property and the regulation of its operation, if intelligently and impartially directed, will be detrimental to the interests either of the companies themselves or of the public. But whether it is a menace, as some believe, or is not, as held by others, it has undoubtedly come to stay in one form or another. Some of the laws passed by different States on this subject are drastic, some have much to commend them, some seem to be ill-advised. The whole subject is one which demands most careful consideration and hearty co-operation on the part of both railway companies and authorities, if a satisfactory solution is to be reached.

The question of commission regulation of public service utilities implies, or should imply, co-operation in securing betterments in the transportation service and a greater

security for invested capital in these important industries. There have been three serious obstacles in the past with which railway managements have had to contend. One has been the lack of sympathy, or, perhaps quite as often, unwarranted prejudice against the railway companies on the part of the public, owing to misunderstanding of the high cost of the equipment required, the expense of providing transportation and the taxes which the railway companies pay for the use of the streets. Part of this may have been due to absence of full publicity in many States of annual and operating reports, but whatever the cause the companies have been the chief sufferers. The second obstacle has been the absence of a responsible and intelligent single body with sufficient power to review matters both of construction and operation, grant franchises upon reasonable terms when they were for the interests of the public and ameliorate the conditions of the latter, even to granting permission for an increase of fare when the conditions warrant, as has been done in Massachusetts. The third condition which has handicapped the railway companies in the proper development of their properties has been the anomalous condition in some States of awarding franchises, by which the status of the company's investment in the public streets upon the termination of its franchise is at least uncertain. Under these conditions it has often been difficult to raise capital except under arduous terms. Through its committees on public relations and municipal ownership the association is studying this problem and through its main office is collecting statistics which will be of value in determining the best solution for many of the questions involved.

Another committee appointed at the last meeting was that on the revision of dues. The purpose of the appointment of this committee is to go carefully over the subject of annual dues paid to the association with the idea of possibly making them more equitable.

Other committees of the American Association which have been appointed to carry on special investigations in each of the departments indicated by its title are: Compensation for carrying United States mail, insurance, education, welfare of employees and the committee to consider the suggestions contained in ex-President Goodrich's address.

THE LOCATION OF THE 1909 CONVENTION

The place of meeting in 1909 will be determined at the meeting of the executive committee to be held in New York the latter part of January. Every effort will be made to have the attendance the largest in the history of the association. It is probable that the convention will be held somewhere in the Middle West. This plan will not only be a convenience to the member companies in that section which have sent representatives East for the two last successive years, but will give an opportunity to the many new companies which have been organized in that rapidly developing part of the country and have not yet joined the association to become acquainted with its scope.

WORK OF THE AFFILIATED ASSOCIATIONS

It is difficult to designate which of the technical associations affiliated with the American Association is of most importance to the welfare of a railway company. Each is undertaking work in its respective field which is of vital interest to the operating department.

ACCOUNTANTS

It might be invidious to refer to the establishment of a standard classification of accounts as the most important service rendered by the Accountants' Association through its honorable career, but this work has been of the greatest practical value, revised and amended as it has been by the association as the occasion demanded and as the needs of the railways grew. The promulgation of a new classification of accounts by the Interstate Commerce Commission, in the preparation of which it had the assistance of the Accountants' Association, will create a need for still greater services from this association, but the past history of the organization indicates that this work will be properly done. It must not be expected that a classification of the form recently promulgated by the Interstate Commission, and adopted in whole or in part by many of the State commissions, can be put into immediate force by the companies easily. Even if practice does not disclose any changes which will be required in the classification itself, the plan will involve changes in many blanks and forms used by the companies, as well as in the organization of their accounting departments. In devising methods of simplifying this work alone the Accountants' Association can render the street railway industry a tremendous benefit during the next few years, until the companies which adopt the new classification become accustomed to the new forms. This work will also result in saving money for every company that becomes entitled by membership in the American Association to participate in its benefits. It belongs with great propriety within the province of the Accountants' Association, which in the past has given as much attention to the methods of conducting the accounts of railway companies as to questions of classification. The development of interurban railways is also bringing changing needs in the systems and policies of accounting, while the application of electricity to heavy forms of traction is opening still other problems which can best be solved by the broad plan of co-operation which the Accountants' Association represents. Notable is the appointment this year of a committee on interline accounting to shape a class of questions entirely new to the industry.

ENGINEERS

To the Engineering Association have been assigned all of the questions relating to engineering topics which occupied the attention of the main association up to a year ago, such as car house construction, car wiring and standardization, as well as the subjects on which this association had previously been engaged and in which it had secured results which are of benefit to every member company. Of these the one of greatest economic importance is perhaps that of standardization, on which two reports have already been rendered. Up to this time the effort in standardization has been confined to rolling stock, but during the coming year a change has been made in the organization of the committee on standardization by which the committee will include among its members the chairmen of those other committees of the Engineering Association which have charge of the branches particularly affected by the establishment of standards, thus increasing the effectiveness of the work. While the topic of maintenance and repair does not lend itself in the same way as that of construction to standard forms, it is equally, or almost equally, susceptible of improvement in the direction of standardization of methods, dimensions and parts. This was clearly demonstrated by the report of the committee of the Engineering Association last fall on subjects of maintenance and inspection and on economical maintenance, in both of which the practice of the companies investigated throughout the country in repair methods was

tabulated and considered. Similar beneficial work has been initiated in car house design and the best methods of protecting car houses and the cars stored in them from fire by the committee on car houses and that on insurance. The subjects of overhead construction and transmission lines possess equal interest and value for investigation, and are cared for by separate committees, while power generation, a fruitful topic for investigation, demands and is receiving careful thought. The plan to include the purchasing agents in the Engineering Association is a wise move, as it will lead to closer associations of these two important branches of the industry.

CLAIM AGENTS

The meetings of the claim agents have proved, if any proof was necessary, the advantages of association work. Railway companies, and especially street railway companies, have long been considered a fair field for accident fakirs and shyster lawyers. An accident fakir rarely repeats his doings in the same city, but until the organization of the Claim Agents' Association there was little to prevent him from victimizing the companies in one city after another, except by a tedious and expensive process of correspondence between individual companies. Through the Claim Agents' Association, however, a general bureau of information has been established, by which prompt reports of suspicious cases and characters are transmitted to the headquarters of the association and the opportunity for the successful prosecution of fraudulent claims is greatly reduced. This service would alone justify the work of the claim agents, but it is by no means their only claim for support. The annual meetings are devoted to discussions not only of methods of caring for accident claims after they have been commenced, but of reducing the number of accidents, and one of the most important plans for the coming year is the establishment of a joint committee of the Claim Agents' Association and Engineering Association, by which the experience of the former on the causes of accidents will direct the efforts of the latter to changes in the equipment by which it is hoped the causes will be removed.

TRANSPORTATION & TRAFFIC

To the lately organized Transportation & Traffic Association have been assigned the questions to which the attention of the general manager and general superintendent of a company are especially directed. This includes the formulation of standard rules for city and for interurban service, which has been assigned to standing committees of the association. In previous reports rules have been formulated for each of these branches of electric railway service, and experience has shown that these must be revised and extended each year to meet the changing conditions of electric railway service and embody the lessons acquired through experience.

At the last meeting of the association a series of papers was presented on the subject of publicity in its relation to the promotion of traffic, and it is proposed during the coming year to investigate this subject still further and determine the economic relations between the expenditures for advertising street railway parks and other means of stimulating traffic and the net income thereby induced. The most important work of the Transportation & Traffic Association during the coming year will be that of the committee on training of employees, and the preparation of papers upon this subject to be read and discussed at the next convention. There is no greater or more appreciated public service than the intelligent effort of the trained and efficient employee to please the patrons of the road.

STATISTICAL BUREAU AT ASSOCIATION HEADQUARTERS

One object of establishing permanent headquarters for the association was to permit the engagement of a statistical force to secure and disseminate information which would be of value to the member companies. The bulletins which have already been prepared and issued through the secretary's office have proved so helpful that it has been decided to increase this department and thus insure a continuation and extension of this work. The office of the association in New York is being more generally recognized than ever before as the natural headquarters for the railway managers who are visiting the city, and it is hoped that those who have not used the office for this purpose will do so. It is the purpose to make the office the source of any information which a railway company requires in the operation of its service, and if there is an inquiry for data which is not on file in the office an effort will be made to secure it.

The present organization is no longer an untried experiment. In 1905, when the plan was first suggested, there may have been many who doubted its wisdom. But the association has demonstrated its value to the industry. The tendency of the times is overpoweringly toward co-operative and concentrated effort, and the need for this effort can be supplied only through an active association. This object the American Street & Interurban Railway Association fulfils and expects to perform more efficiently each year. Whether the problems to be solved relate to engineering, accounting, legal or transportation matters, the association is prepared to undertake them. The field for the association exists and is fallow, but it remains with each company and each individual connected with the industry to decide to what extent he or it will participate in the work.

CONTRACTS FOR NEW HIGH-TENSION SINGLE-PHASE RAILWAYS IN SWITZERLAND AND ITALY

The Allgemeine Elektricitäts-Gesellschaft, of Berlin, has secured a contract for the Lötschberg line of the Berner Alpenbahn-Gesellschaft for the supply of one electric locomotive, which will be equipped with two 15-cycle single-phase motors of the Winter-Eichberg type, each having a one-hour rating of 800 hp. The line pressure will be 15,000 volts. The maximum speed will be 75 km (46.5 miles) per hour, the normal one about 40 km (24.8 miles) per hour. The maximum tractive effort will be 13,500 kg (29,754 lb.). The locomotive is to consist of two parts, each of which will have two driving axles and one trailing axle, so that the whole locomotive will possess six axles, four of which will be used for driving. The motors are to be mounted directly on the axles, the wheels of which will have connecting rods. The overhead equipment contractor has not yet been announced.

The same company has equipped the Padua-Fusina, which has a length of about 35 km (27.7 miles). It is a single-track line for standard gage. The line pressure is 6600 volts, but 600 volts will be used where the line enters Padua. The overhead construction is of the catenary type. The rolling stock comprises 10 motor cars and six trailers. Each motor car is equipped with two 25-cycle single-phase motors of the Winter-Eichberg type, each having a one-hour rating of 65 hp. The running speed on the level is about 40 km (24.8 miles) per hour.

HIGH-TENSION CURRENT COLLECTION—SOME RESULTS OF THE SWEDISH ELECTRIC RAILWAY TESTS

BY OTIS ALLEN KENYON

A great deal of attention has been given to the subject of the collection of high-tension currents from an overhead wire at high speeds on the Continent of Europe. As the readers of this paper know, many of the electric railways in Europe have long used the sliding bow instead of the trolley wheel. Hence, when the single-phase system became a commercial possibility it was natural that the sliding contact should be given special consideration by the German contractors who were familiar with the use of the system for tramway purposes. During the recent tests on single-phase railway operation, conducted by Robert Dahlander under the auspices of the Swedish Government, special attention was given to the subject of the best design of overhead conductors and collectors for high-speed single-phase railway operation. The results of these tests are now available through the publication of a voluminous report by the engineers in charge of the work. This report is available now in printed form only in Swedish, but the early publication of an edition in German is announced, and it is quite possible that it will be translated into English. The following notes on recent European practice in overhead construction and current collection are based largely upon this report, but are amplified by data on the same subject from other sources.

Types of overhead construction can be divided into two classes according to the method of suspending the contact wire, thus:

1. Direct suspension by span wires, brackets or bridges.
2. Suspension from messenger wire or wires by hangers placed at short intervals.

Various types of both these classes were thoroughly tested by the Swedish Electric Railway Test Commission, and a new type of the first class, or direct suspension, was developed which, according to the report, is considered best adapted to the needs of the Swedish railways. The three most important points to be considered in overhead construction are: insulation, operating performance and cost.

INSULATION

So far as insulation is concerned, the second class of overhead suspension mentioned above, the catenary, has fewer points of support than the ordinary span, bracket or bridge construction, and therefore requires fewer insulators. Other things being equal, the chances of breakdown due to defects in insulators are directly proportional to the number of insulators.

In the tests of the Swedish commission, the voltage on the contact wire varied from 5000 to 20,000, and the average working voltage was from 12,000 to 13,000. The results indicate that either class of overhead system can be satisfactorily insulated for these voltages. The weakest point in both systems seems to be the insulation of the collector. It was here that breakdowns invariably occurred when the highest voltages were tried in the Swedish tests. The commission recommended 15,000 volts as a conservative choice for the Swedish railways.

As regards the insulators themselves the commission found that, all things considered, brown-colored porcelain was the best material. Among other patent insulators, ambroin was tried out and, although it was mechanically stronger than porcelain, it was found that both its dielectric strength and insulation resistance decreased with exposure to the weather. It also costs from 50 to 100 per cent more than porcelain.

A great many shapes of insulators were tried, the most successful being those shown in Fig. 1. The form shown at the left in the diagram is intended for use where fixtures are to be clamped around the top of the insulator. The petticoats are designed to prevent the clogging of the space between them with soot and dirt.

Experiments were also tried with the Oerlikon system of overhead construction, but the report states that it is not very satisfactory on a high-speed road where there are many crossings, bridges, tunnels, etc. In the open where the collector can run along on top of the contact wire the system has the advantage of being cheap to install and easy to repair. With the Oerlikon construction, also, it is easy to have two independent contact wires, one on each side of the track. The troubles experienced with this system are all due to the necessity of bringing the wire from alongside to a position over the middle of the track. The transition must be smooth and requires that supports of special design be placed at short intervals, thus increasing the cost and reducing the reliability. Then again, the effect of high speed is to extend the zones on each side of the crossing where this complicated construction is required, since the change in position of the collector must not be made too suddenly. The Swedish report also states that the Oerlikon overhead line is difficult to insulate properly. Though the

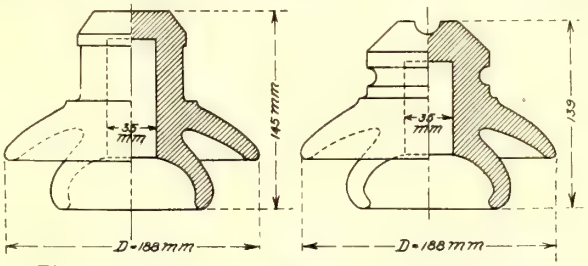


Fig. 1.—Insulators Used for Trolley Suspension

section used in the Swedish tests was built for 15,000 volts, it could not be operated satisfactorily above 6000 volts.

OPERATION

Both classes of overhead construction operated satisfactorily at low speeds, but the first class, that is, the span construction, ceases to operate well when the speed exceeds 70 km per hour (approximately 45 m.p.h.). As the speed increases the spans must be shortened until a point is reached where it is better to use the catenary form of construction. The shortest span which it is practicable to use on straight track seems to be 30 m (or approximately 100 ft.).

Tension in the contact wire must be kept within a certain range or trouble will result. In cold weather the wire is liable to break and in warm weather it may become so slack as to render the operation of the collector impossible. Experiment showed that unless some automatic device for maintaining a constant tension was installed, the tension had to be adjusted once or twice a year. The proper operation of the collector required that the tension in the contact wire exceed 4 kg per square millimeter (or 5700 lb. per square inch).

Fig. 2 shows the type of construction recommended by the commission for operation at 15,000 volts and average speeds of about 40 m.p.h. There are two lines of poles, one on each side of the track, and each line of poles carries a separate single-phase feeder. Except on curves the trolley spans are 30 m (about 100 ft.) in length, thus making the feeder spans 60 m. The brackets which carry the con-

tact wire are movable about their point of attachment to the pole and the ends of the contact wire are loaded with weights which thus maintain a constant tension in the wire. In case an insulator breaks, the bracket can be swung around out of the way and repaired and the wire will automatically pull up so that trains can pass at reduced speed. In station yards where it is desirable to reduce the number of poles to a minimum, the type of construction shown in Fig. 3 is used. Here the poles are staggered at intervals of 60 m and a guy wire run from the center of the span to the top of each pole.

COST

The catenary or second class of overhead construction, while more expensive to build, is more substantial than the span wire construction and, having fewer supports to be insulated, should be more reliable and cheaper to maintain. For speeds above 50 m.p.h. the catenary type of construction must be used regardless of the cost of installation if smooth operation of the collectors is to be obtained.

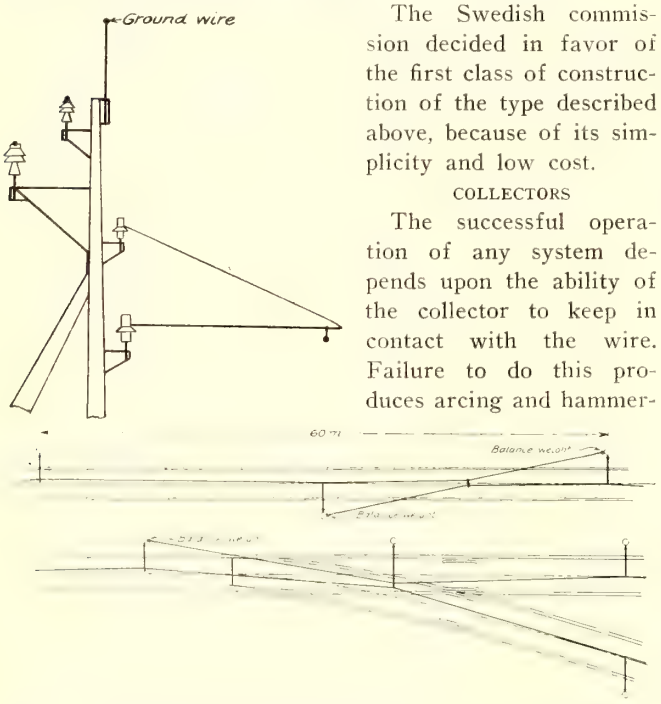


Fig. 2.—Overhead Line Construction with Double Line of Poles for Feeders

The Swedish commission decided in favor of the first class of construction of the type described above, because of its simplicity and low cost.

COLLECTORS

The successful operation of any system depends upon the ability of the collector to keep in contact with the wire. Failure to do this produces arcing and hammering. The arcing destroys both the collector shoe and the wire, while the hammering accelerates the wear, kinks the wire and breaks the fastenings. The difficulty of keeping the collector in contact with the wire increases very rapidly with the speed, and the minimizing of this difficulty is one of the important problems in high-speed operation.

The variations in the position of the wire over the track, and the swaying of the car require the collecting device to be so construed as to adapt itself to all such variations, thus forming a flexible connection between the wire and the car. At low speeds it is comparatively easy to design such a device, since all variations in position take place so slowly that the inertia of the collector does not prevent it from following the wire. However, at high speeds the effect of every little variation is exaggerated and tends to produce vibration. Large variations in position, such as are caused by passing under bridges, etc., when made gradually, have little or no effect on vibration. The three principal causes of vibration are:

(1) Unevenness of the contact wire, due either to imperfect suspension or non-uniform wear.

(2) Vibration and swaying of the car or locomotive.

(3) Inertia of the contact device.

Unevenness of the contact wire due to the sagging between the supports, as explained, can be reduced to a minimum by use of the catenary type of suspension. The non-uniformity of the wear is more an effect than a cause. It is produced by the action of non-homogeneous material, arcing and non-uniform pressure on the contact wire.

The vibration and swaying of the car can be reduced to a minimum by careful ballasting of the track. Furthermore, in cases where very high speeds are reached, the cars themselves may be balanced. In the Berlin-Zossen tests, where the cars attained speeds of 130 m.p.h., it was found absolutely necessary to balance the cars in order to keep them on the track. At high speeds, however, vibration and swaying of the cars cannot be entirely avoided, and no matter how well the wire is suspended, it cannot be made absolutely parallel to the plane of the track. The collecting device must follow these variations of car and wire if it is to remain in contact, otherwise there will be arcing which will destroy the contact surface, and hammering of the wire which will produce non-uniform wear of the wire. Both of these causes still further exaggerates the trouble. If the collector is to operate with perfect satisfaction, the natural period of vibration of the part that carries the contact shoe must be greater than the highest vibration which it will be called upon to make.

The experience of the New York, New Haven & Hartford Railroad, as given by W. S. Murray in his last paper before the American Institute of Electrical Engineers, illustrates this point and shows the disastrous effect of attempting to collect current at high speed by a heavy contact device with low natural period of vibration. The method followed by the New Haven road to reduce the trouble consisted in rigidly suspending by clamps an auxiliary steel wire from the old copper conductor. That this expedient has not been a perfect remedy is shown by the statement in Mr. Murray's paper that probably even better results could be obtained by suspending the auxiliary wire by loops instead of rigidly from the copper conductor.

In appearance, the New Haven auxiliary wire construction is very similar to the type of construction installed some years ago by the Siemens-Schuckert Company on the Hamburg-Blankenese road, and described in the Street Railway Journal for April 6, 1907. However, it is quite different in principle. On account of its rigid construction the practical benefit of the introduction of the steel wire on the New Haven road is limited to that which results from substituting for copper a metal that can stand the treatment administered to the contact wire by the collector, there being no gain in the flexibility in the construction other than that due to the character of the metal itself.

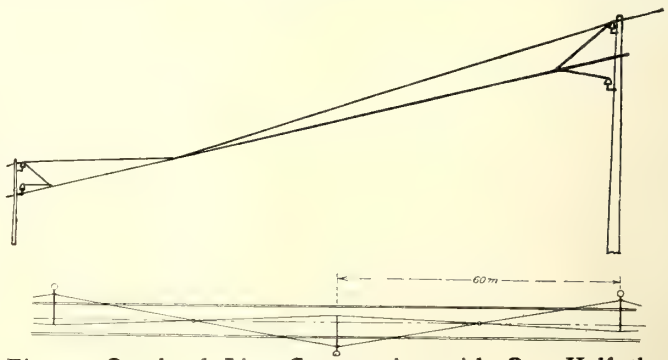


Fig. 3.—Overhead Line Construction with One Half the Usual Number of Poles

The Siemens-Schuckert system does not employ a steel wire but one of hard copper, the purpose of the auxiliary wire being solely to reduce vibration. The whole secret of the improvement lies in the use of a special clamp, which allows a longitudinal and vertical movement of the contact wire of the kind recommended by Mr. Murray as advisable. The tension in the contact wire is adjustable and is automatically maintained constant by balance weights.

The principal types of sliding contact collectors used in Europe are shown schematically in Figs. 4 to 9.

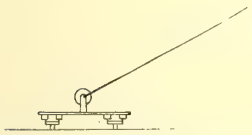


Fig. 4.—Plain Bow Collector

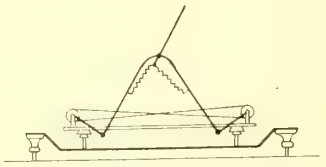


Fig. 5.—Siemens-Schuckert Collector for Swedish Tests

Fig. 4 shows the plain bow trolley employed on the direct-current street railway systems. It can be used for high tension when mounted on porcelain insulators. The arm is balanced by springs so disposed as to exert a uniform pressure of about 5 kg (11 lb.) against the wire, independent of the angular position. The arm is long and therefore the natural vibration period of this system is low. In the Swedish tests it was found entirely unsuited to speeds above 25 km per hour (15 m.p.h.).

The Siemens-Schuckert Company designed the type shown in Fig. 5, which was tried out during the railway tests in Sweden. This device consists of two parts: the main body, which is hinged to the stand in such a way as to take care of the large variations in height of the wire, and the upper piece, which carries the shoe and is hinged to the lower part. The upper part is about 80 cm (32 in.) long, and although the construction is very light, the length is such as to give it a natural period of vibration which limits the speed at which it will work satisfactorily. The report of the Swedish tests, however, does not specify the exact limitations of this type except that the bearing friction was found to be great and the balancing springs complicated as compared with other types tested. The same company built a similar device shown in Fig. 6, which is in use on the Hamburg-Blankenese road.

Fig. 7 shows a type which is a modification of the design of Brown, Boveri & Company used on the

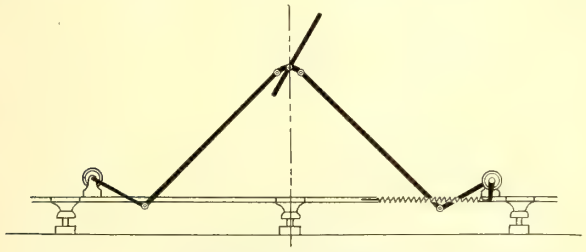


Fig. 6—Siemens-Schuckert Collector for Hamburg-Blankenese Line

Simplon locomotive. This form was developed by the Allmänna Svenska Elektriska Actiebolaget in consultation with the engineers of the Swedish State Railways. The device consists of two long arms so interconnected as to balance the wind pressure and exert a uniform pressure against the wire, as are all the modern types. The upper part, which is supposed to follow the variations of small amplitude, is pivoted to the end of the long arm and is equipped with stops in such a way that the rear upper contact arm cannot be deflected backward more than 30 deg.; this guards against the possibility of the forward bow refusing to lower at points where the wire descends into tunnels, under bridges, etc. If the front top bow gets stuck in one position the rear bow, not being able to bend backward more than 30 deg., will depress the front bow through the cross connections. This requires a rather long upper bow (80 cm), and therefore, as far as inertia goes, it has the same limitations as the design shown in Fig. 5.

The pantograph bow as designed by the Allgemeine Elektricitäts Gesellschaft is shown in Fig. 8, and like practically all of the other collectors built by European manufacturers, consists of two parts, one being a trailing collector. The pantograph or lower part takes up all the great variations in height of the wire, while the upper arm, which is very light and only 30 cm high, takes up the slight variations. This upper arm has a comparatively high natural period and therefore works very satisfactorily. In the Swedish railway tests, a simple aluminum contact shoe gave perfect satisfaction with this type of collector.

The side rod contact system, developed by the Oerlikon Company, has been described at various times in the pages of this journal. It is a very radical departure from the usual form and, as explained, involves considerable difficulty in the line construction and the operation at cross-overs, tunnels and bridges where the contact wire must be

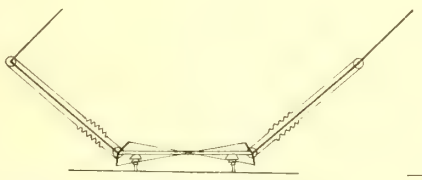


Fig. 7.—Collector Designed for Swedish Tests

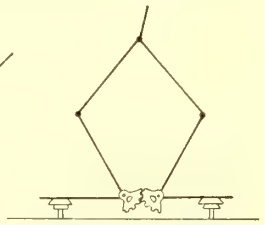


Fig. 8.—A. E. G. Pantograph Bow Collector

gradually brought up from a position alongside to a point over the car. This system was installed on one section of the test tracks in Sweden and tried at moderate speeds (45 m.p.h.) and with 6000 volts on the contact wire. The special overhead construction required, like all types of direct suspension, is not suitable for high-speed work, although on straight track in open country the collector seems to follow the wire with but slight sparking at the supports. The principal disadvantages pointed out in the report of the Swedish commission are: Short distance of the high-tension contact wires over the track in stations, due to the necessity of keeping the pivot of the collector rod inside the clearance limits; complication and cost of overhead construction under bridges, in station yards, at crossings, etc.; liability of the collector rod catching in the contact wire at crossovers and switches, and poor contact on curves taken at speed when the wire is on the inside, due to centrifugal force lifting the rod and causing it to vibrate against the wire, producing vicious sparking.

CONTACT SHOE

The wear of the contact shoe does not mean much unless the wear of the contact wire is also known. However, if aluminum or some soft alloy is used it is fair to assume the wear of the contact wire is negligible compared with that of the shoe. Siemens & Halske build a shoe that is U-shaped in section, the inside being filled with a hard grease. This reduces the wear and also the singing, which is sometimes objectionable.

Wear of the wire and shoe can be traced to two causes,

mechanical and electrical. The mechanical causes are due to pressure and cannot be entirely eliminated. Non-uniformity of pressure is the most serious trouble. The springs can be so designed as to make the pressure constant for any position of the collector. However, the speed at which the collector changes its position affects the pressure to an extent which can only be controlled by reducing the inertia of the mass to be moved. Throughout Europe the average pressure of the contact shoe against the wire is about 5 kg (11 lb.). An exception to this practice is the Oerlikon collector, which exerts only 0.7 kg (1.5 lb.). This low pressure is necessary on account of the great length and lightness of the rod. A greater pressure would necessitate a heavier rod and introduce greater inertia.

The electrical causes are secondary, being due to arcing, which is caused by insufficient contact surface. Arcing is especially destructive in that once started the surface is left more predisposed to arcing than before and conditions rapidly go from bad to worse. The cause is due to imperfect contact and vibration and the resulting wear is a function of the current rather than of the power. For a given power the lighter the voltage the less destructive is the arc. Soot deposited on the contact wire by steam locomotives increases the wear to an astounding extent. The Swedish commission found that the wear of the shoe on a soot-covered wire is about 10 times as rapid as on a clean one. In these tests the Oerlikon collector wore out at an extremely rapid rate. The rod was of brass 9 mm in diameter, and had to be removed after traveling between 200 and 400 km. The aluminum shoes on the other types of collectors ran about 2500 km (1500 miles on soot-covered wires. It is estimated in the report that on clean wires they would run at least 20,000 km (12,500 miles). The practice of the Swedish tramways indicates an average life of such shoes, when used in tramway service, of 20,000 km (12,500 miles) before renewal, but if left until worn out they will run as high as 100,000 km (62,000 miles).

CONCLUSIONS

The results of experiments made thus far seem to point to a type of collector which should consist of two parts, namely, a main part to take up the large variations in the height of the wire and an auxiliary part to take up the vibrations. The main part may be comparatively large and heavy and should be balanced for wind pressure and provided with springs arranged to exert a constant pressure irrespective of the position of the shoe. The auxiliary part, which should trail, must be light and designed to have a high natural period of vibration which will enable it to follow the most rapid vibrations of the car to which it will be subjected.

About 25 per cent of the total railway mileage in Italy is operated by electricity. There are 1792 motor cars and 952 trailers in service. Nearly one-third of the lines are operated by Belgian companies.

Fifty-three of the street railway companies in Germany, representing a capital of $81,840,000, earned net profits of $7,087,500 in the year 1907-8, or 9 per cent on the capital. Five of these companies, however, showed a loss of $3,375,000. The total average amount distributed in dividends was 6.5 per cent. Twenty companies paid dividends ranging from 2 per cent to 5 per cent; 23 paid dividends of between 5 per cent and 10 per cent, and three companies dividends over 10 per cent. Seven companies paid no dividends at all.

THE PROBLEM OF REDUCING ACCIDENT DAMAGES—I.

BY FREDERICK W. JOHNSON, ASSISTANT GENERAL CLAIM AGENT, PHILADELPHIA RAPID TRANSIT COMPANY

The subject of accident damages is to-day, always has been and doubtless always will be, more or less of a thorn in the side of the management of the average street railway property.

That such should be the case is, of course, to be expected. As a business proposition, it is a self-evident fact that this constant drain upon the resources of a company must in time become a menace of no little magnitude to the success and development of the enterprise. In many instances the situation has been still further complicated by the fact that, despite every effort of the past, no permanent material progress has been made in the direction of effecting a reduction in the demands upon the treasury of the company from this direction, leaving the outlook for the future anything but promising.

With many companies the management of its claim department in past years has proved to be a rather refractory proposition. In practically all of its other departments the company has been able to estimate and to gage the probable expenditures of the future in the light of those of the past. But with respect to its claim department conditions have been different.

It will hardly be necessary to enter into an extended discussion of the causes which contribute to, or which are largely responsible for, so unsatisfactory a condition of affairs. It is sufficient to say that the very nature of claim and of accident work is such as to render any forecast of the future extremely hazardous. We can figure with reasonable accuracy upon the probable cost of construction, maintenance or operation of this, that or the other department of the street railroad. But how are we to arrive at a conclusion regarding the possible cost of accidents which have not yet happened; of the extent and severity of injuries which have not yet been inflicted, or of the probable action of juries which have not yet been drawn?

That accident damages have been increasing in recent years in amounts that are out of all proportion to the normal increase in the business is a fact that is viewed with considerable apprehension in more than one section. That active measures will have to be adopted at no distant date to offset this tendency may be regarded as one of the certainties of the future. Just how this end is to be accomplished by each individual company will remain more or less of a problem until such time as its management awakens fully to the real seriousness of the situation.

The problem is one which will require the best thought and earnest endeavor not only of the officials of a company, but also of the rank and file, before satisfactory progress can be made in the direction of solution. It is, of course, possible for the management of a railway company to effect an arbitrary reduction in the expenditure or cost of operation of practically all of its various departments, save only the claim department, by the mere issuance of orders. But the situation in the claim department is so vastly different that a totally different course of action must necessarily be pursued in order to accomplish a reduction in expenditures.

Reviewing the past briefly for the purpose of ascertaining just what has been accomplished in the way of perfecting the organization and management of the average street railway claim department, one can but feel that in recent years encouraging progress has been made in this direction. Greater attention has been given to the work-

ings of this expensive and, for that reason if for no other, important department, with a decided increase in efficiency as a natural and logical result. Fortunately, the day seems to have passed when the claim department could be considered a harbor of refuge for the misfits and incompetents of all of the other departments. At the head of the average department of to-day one finds men of admitted business ability, capable, efficient and competent, who take the deepest possible interest in the business welfare of their employers and realize the importance of surrounding themselves with clean-cut, intelligent, energetic assistants. One finds further that the methods followed in conducting the affairs of the department are along intelligent, progressive, businesslike lines. The physicians employed by the department to aid in determining the extent and severity of injuries sustained by claimants are usually prominent in their profession, while the attorneys retained to assist in the preparation and trial of cases in court rank invariably among the ablest in their respective communities.

The formation of an association wherein men engaged in this branch of electric railroads might meet in annual convention, where views, opinions, experience and helpful suggestions may be freely interchanged for the purpose of bringing to the surface for mutual advantage the latest ideas in all phases of the work, unquestionably marked another step in advance. These and many other developments too numerous to mention clearly indicate a decided improvement over conditions which prevailed ten, or even five, years ago.

OPPORTUNITIES FOR FURTHER ADVANCEMENT

And yet, have the immediate opportunities for still further advancement really been exhausted? It will be admitted, we believe, that as far as the average claim department of to-day has been developed, its condition compares very favorably with that of other departments of the company. But is it not rather a fact that many of our claim departments have unconsciously stopped a trifle short of the actual possibilities for development in the claim and accident field? Either this is the condition or else it is necessary to admit that the accident damage question in its present proportions is a little beyond our control. We are strongly inclined to favor the former explanation for the reason that the average department has been devoting its efforts in recent years almost exclusively in the direction of perfecting its organization from the moment of the occurrence of an accident forward, so to speak. That it lay within the power of the department to deliver some mighty powerful strokes before the actual occurrence of the accident itself is a truth that seems to have been overlooked, or else underrated, in some quarters.

HOW CLAIM DEPARTMENTS CAN PREVENT ACCIDENTS

In order that we may make this point quite clear, let us attempt to express it a little differently. The tendency of the past with some companies has been for the head of the department to start the machinery at his command into active operation immediately upon receipt of notification of the occurrence of an accident. In some cases he has even gone to the extent of putting his department upon an emergency basis in order that instantaneous service might be given at any hour of the day or night. From the moment of the accident his organization has been as complete and as efficient as it has been within his power to make it. His outside force of investigators, inspectors and adjusters comprises men of experience and of ability. The surgeons and attorneys who assist him in their respective lines are men of excellent capabilities. The blanks and forms and methods in use by the department are of the most approved order. In short, the organization of his department, as stated, is as nearly complete as it is possible for him to make it.

And yet, suppose that the conductor or motorman of the car concerned in an accident should neglect to turn in a report of the occurrence to the company, as has happened times without number in years past! Suppose that the crew turns in a report, but fails to obtain witnesses to the occurrence because of a lack of appreciation of the vast importance of this feature! Well, little defects of this nature are sufficient in themselves to cripple and humble a department effectually, however thorough and complete its organization and management may be. There is nothing new or novel in this. It is merely a restatement of old conditions, advanced for the purpose of pointing out to railway companies the fact that they must of necessity go deeper than has been the practice in the past if a reduction in accident damages is really desired. The task of perfecting the organization of the claim department is of vast importance, but this, of itself alone, while it unquestionably will assist in checking the growth of the evil, never will accomplish much of value in the direction of effecting an actual bona fide reduction.

By way of illustrating this phase of the situation let us go briefly through the records of the average claim department for a period of three years, picking out a few cases at random, and noting whether there is any foundation in fact for this statement.

"In 1905 we note that a verdict of $1,000 was rendered against the company. What were the facts?"

"A passenger alighted from a moving car. The company was not responsible for the injuries which he sustained, yet he secured a verdict against us for the amount named."

"Why?"

"Because we were able to produce but one witness out of a carload of passengers. If we had only had three or four more of those passengers the verdict would have been in favor of the defendant."

"Why were you able to produce but one witness?"

"Because a careless conductor thought it unnecessary to obtain more."

"Well, now, you mentioned a case back in 1906 where you felt that the company had been mulcted of $3,000. How about that?"

"That was the case of the driver of a team. His horses got beyond his control and crashed into the side of one of our cars. The accident was unavoidable under the circumstances, our car being at a standstill at the moment."

"But why was the verdict of $3,000 given?"

"Because the trainmen were comparatively new men and did not appreciate the importance of obtaining witnesses, though there were plenty available at the time. It was the word of the teamster against that of the crew, and we lost."

"What was the nature of that $2,500 case in October, 1907?"

"That was the case of a passenger who was injured while attempting to board a moving car. The men failed to make out a report of the occurrence, as they felt at the time that the matter was of little importance."

"You have had other cases similar in character to these during the last three or four years?"

"Yes, we've had a good many of them, off and on. Somehow or other, our men don't seem to be able to get

the necessary witnesses to enable us to defend successfully our cases in the courts. And then, again, we have a number of unreported accidents each month; more than we should have."

"You have, then, long recognized the fact that this condition was seriously impairing the work of your department? In other words, you've known for the last three years that you were losing many of your cases in the courts because your men were not reporting all of their accidents, and also that in many cases the men were neglecting to obtain the necessary witnesses?"

"Yes."

"What, then, in view of this fact, have you been doing, or are you actually doing to-day, to remedy this defect? What measures have you adopted to prevent recurrences of these conditions in the years to come? If accidents of this kind have been costing your company $10,000 or $20,000 or $50,000 a year in the past, what efforts are you making to effect a saving in this direction?"

DISREGARD OF NEEDED WORK

Right here, it seems to us, is the crux of the accident damage problem of to-day. The question is a pertinent one, and can probably be considered to advantage by the great majority of street railway companies throughout the country, both large and small. To be perfectly frank, the fact of the matter is many of us have been plowing along for years with a studied disregard of the very field which offered the greatest possible opportunities for missionary work. We have been engaged busily in training everybody in the various branches of accident work, except the men upon the firing line, viz., the conductors and motormen upon the cars.

This is one of those unpleasant things that we do not like to admit; no, not even to ourselves. Yet the facts speak for themselves. Many times in the past, trial attorneys representing defendant companies have complained: "If we only had had two or three witnesses to that accident, the plaintiff's case would have been futile." It is not to be expected that unjust causes of action can be met successfully by defendant attorneys unless they have evidence with which to refute the fictitious facts advanced by claimants. Nor is it to be expected that they will have this evidence unless the foundation for it is laid by the men on the cars, who have the opportunities to obtain the names and addresses of eye witnesses. And, lastly, it is not to be expected that the men on the cars will give uniformly satisfactory service in this respect unless they have been instructed properly and thoroughly in this highly important part of their duties.

The practice has been followed generally of requiring the new employee to spend a certain number of days on the cars as a student, for the purpose of learning the runs, routes, operation of his car, the collection of fares, mysteries of the day-card, and so forth. Then he has been turned in as competent to handle his end of the car, and has been sent to headquarters for a final rehearsal, at which time he has received his instructions covering accident work. The superintendent proved generally to be a busy man, with but little time to devote to instruction work of this sort, and the recruit has been given a few perfunctory words of advice, usually terminating with this very suggestive admonition: "Now, be careful and don't have any accidents. We can't afford to have careless men upon the cars, you know. If you do have an accident, make out a report. Here's a rule book that will tell you all about it. Now, be careful not to have any accidents."

With this parting word ringing in his ears, the more or less bewildered recruit, who has had more advice and instruction shot into his system within the week than he could hope to assimilate in a month, goes forth to protect the interests of his employers against—he knows not what. Without chart or compass, he is set afloat upon the sea of accidents, to learn by bitter experience and at the expense of his employers that of which he should have been forewarned. If the conditions were other than those of a serious character, such extensive preparation would border closely upon the humorous. Probably the most unfortunate feature lies in the fact that his instruction course in accident work is now complete, for no provision is made for following this first effort up from time to time in order that he may be kept up to concert pitch.

But let us go back to those instructions for a moment. The superintendent who thus gave to the new employee the only instruction that he has received, or will receive, on this subject honestly believed that he had practically covered the essential features. And yet, as a cold-blooded matter of fact, he had in reality done more toward "padding" the "unreported accident" column of his employers than any other 10 men upon the system; for the principal thought that the new employee carried away in his head was this: "The superintendent said not to have any accidents; that means that if I do have one I'm done for here." And the result when the new employee meets with his first accident is about what might have been expected. If he gets away successfully with that first one, it encourages him to try the same tactics again. Meanwhile his employers get neither accident reports nor witnesses upon his mishaps. Furthermore, it may safely be taken for granted that he is not the only man upon the system who is following the same course in his accident work.

Some time ago an official of one of the larger systems of the Middle West was asked the question: "What do you do to keep down your unreported accidents?" The answer was: "Why, we lay men off, and frequently discharge them, when we find accidents unreported." This custom is representative of the course followed by many other companies in their fruitless endeavors to check growing abuses in this direction. Such a practice savors strongly of the old adage of "locking the barn door after the horse has been stolen," and of itself alone can accomplish but little good toward the end desired. At best, it is but a secondary measure of doubtful preventive value.

THE INCREASING TOLL FOR DAMAGES

Is it to be wondered that the annual toll for accident damages continues to increase steadily in volume? Is it overstating the facts to say that much of this annual waste is traceable directly to the languid, apathetic manner in which many of our electric railway companies have viewed the subject for years past? If a reduction in accident damages is actually desired, it can be brought about only through the adoption of active measures, planned intelligently, applied systematically and carried through energetically to ultimate success. No haphazard, hit-or-miss, narrow-gage policy will insure results of a permanent and satisfactory nature.

That a material reduction in the number of preventable accidents, as well as in the matter of accident damages, is entirely feasible stands to-day as an established fact, as demonstrated by companies which have taken the matter up seriously. Furthermore, that the real possibilities of work of this character are practically unlimited, and that the results obtained are but the merest fractional part of

what should follow in the natural course of events must also be accepted as established facts.

It should be understood clearly, however, in considering a subject of this character that distinction must be made between claims which are just and those which are unjust; between those which are founded upon fact and those which are not; between demands growing out of just claims which are fair and reasonable and those which arise out of just causes of action, but are clearly unreasonable or exorbitant.

The thought, therefore, should be in the direction of accomplishing a reduction in expenditures by operating against false, fraudulent, unjust and exorbitant claims, rather than as an arbitrary movement against all classes of claims, irrespective of their individual merits.

In the papers which follow there will be given, as comprehensively as limited space will permit, a resumé of the results of five years' experimental and research work in the field of instructing street railway employees in the various branches of accident work. Progress has not been as rapid as might have been desired, due primarily to the fact that the trail has had to be blazed much of the way as the possibilities of the work unfolded, and also to the fact that nine-tenths of the work has been carried on independently of and in addition to regular departmental duties.

In considering the subject it may be well to bear the following facts in mind:

That 10 critics of the work will be encountered to one supporter. It is urgently recommended, however, that choice front seats be reserved for these critics, as experience in the past has demonstrated the fact that they will be among the first to come tearing breathlessly into camp as soon as encouraging results begin to show above the surface.

That no claim is made that identically the same methods will produce identically the same results in each individual locality. The underlying principles of the work, however, are pretty much the same the country over. The application of these principles must be governed to a certain extent by the local conditions existing in each particular community.

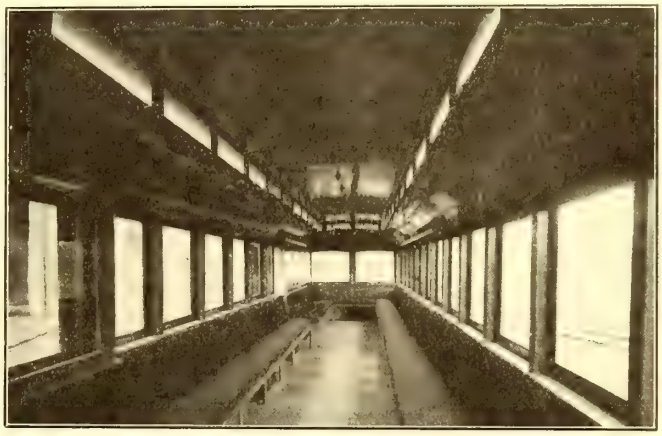
That if the material is prepared properly, and the plan of campaign drawn properly, it will be found that the men on the cars will be as anxious to receive the instruction as the company is to impart it.

Finally, that it will require unlimited time, patience and energy to produce the desired results. Adverse conditions which have been in force in a community for many years cannot be overcome satisfactorily by the work of a few months. In some instances it will require many, many months' work before the encouraging results will begin to appear all along the line.

(To be continued)

A UNIQUE CONVERTIBLE CAR

The accompanying halftones and elevation show a solution of the convertible car problem as worked out on the



Interior of Broad Ripple Car in Winter

Broad Ripple line of the Indiana Union Traction Company. The following details, as well as the illustrations, were furnished through the courtesy of R. C. Taylor, superintendent of motive power.

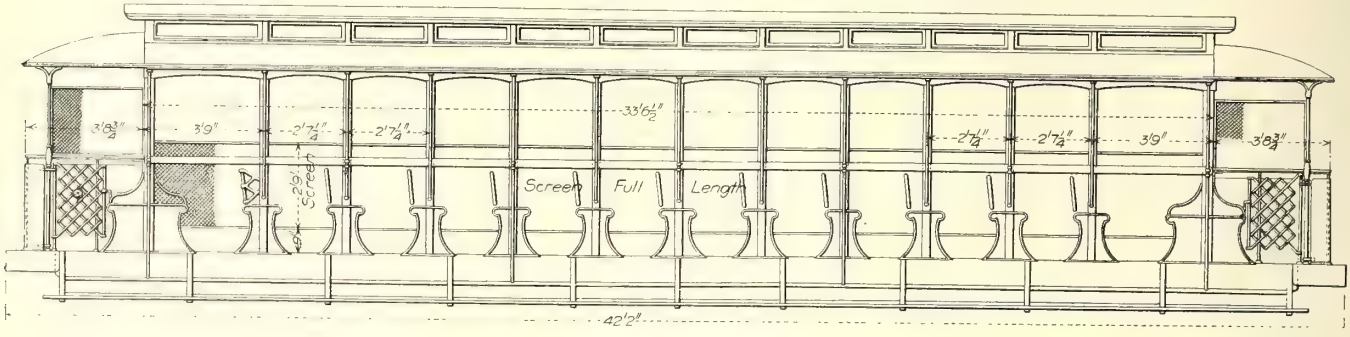
Before alteration the car was an open cross-seat car of the 15-bench type made by the Cincinnati Car Company. The alteration consisted in making the closed sides and sash removable and installing longitudinal seats, but leaving the end benches in as before. The car body proper was not changed in any particular, so that the sides and seats may be readily removed and the ordinary open car



Broad Ripple Car in Winter Service, Showing the Application of Side Doors without Disturbing the Bulkheads

seats replaced. In winter the car is heated by electric heaters, which are attached to the winter seats and removed with them.

The arrangement of side doors shown is unique, and was decided on to save cutting the end bulkheads. The end side door is operated by air from the front vestibule.

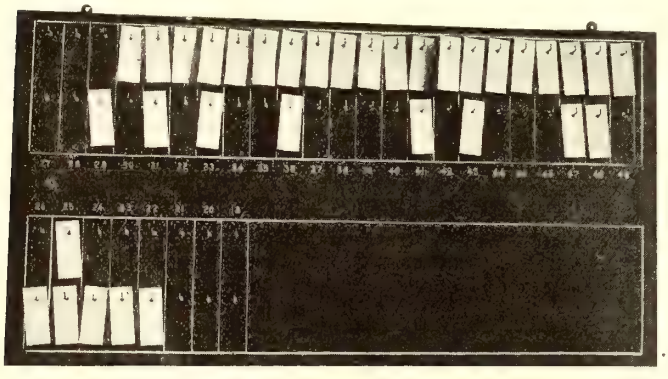


Broad Ripple Car—Side Elevation, Showing Car as Used for Summer Service

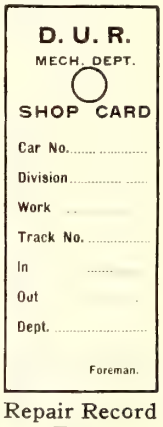
The rear platform has been left open and the front vestibule has been closed with drop sash, and is intended to be left on for both summer and winter operation. The car is equipped with Brill trucks, Westinghouse No. 93 A motors and Westinghouse automatic air brakes. It is 42 ft. 2 in. long over all and 33 ft. 6½ in. long between bulkheads.

CAR REPAIR RECORDS OF THE DETROIT UNITED RAILWAY

Sylvester Potter, master mechanic of the Detroit United Railway, has adopted a simple system for keeping car repair records at the main shops of that company. When a car comes into the shops it is accompanied by a conductor's tag, indicating the defects to be repaired. In the office of the master mechanic is kept a card index of every car on the system, using cards 12 in. x 9½ in. in size. The ruling of one of these cards is reproduced in an accompanying illustration. As the cars come to the shop the dates on the conductor's tags are entered in the left-hand column of the record card bearing the same number as the car number, together with the station or car barn from which the car was sent to the shops. The foreman of each department of the shops turns into the master mechanic's office at the end of each day a report made out on a blank, 8¼ in. x 10½ in., ruled with spaces, showing the numbers of all cars leaving his department on that day, and the nature of the repairs made to each car. From these daily reports a clerk enters the repairs made to each car on the proper card in the record index. When a car leaves the shop and is returned to service the date is entered in the third column of its card. Both sides of the index cards are ruled alike, so that a large number of entries can be made on a single card. In this way a complete and condensed history of each car on the system is kept in one small case in the office.

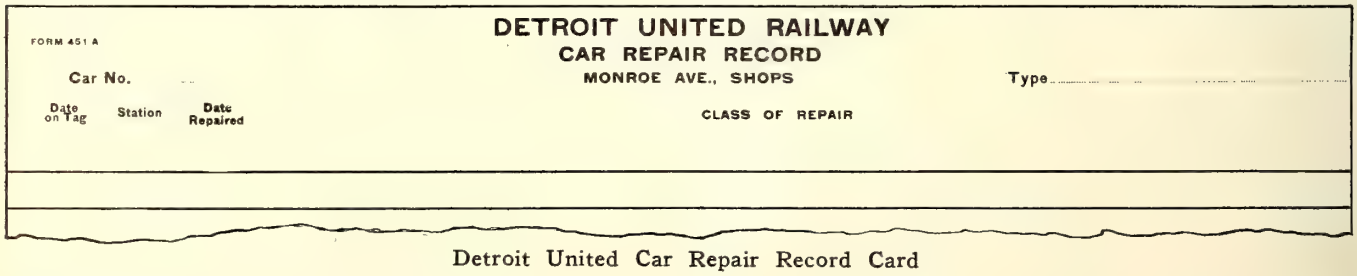


Detroit United Car Repair Record Board



Repair Record Tag

Another simple and convenient feature of the system of shop records used by this company is a board mounted on the wall of the master mechanic's office, which shows at a glance the location of every car in the shops. This board is 36 in. long and 18 in. high, and is ruled into 31 rectangles, representing the 31 repair tracks of the Monroe Avenue shops. These tracks accommodate two cars each, and in each space on the board are two hooks on which small record tags are hung. These tags, one of which is reproduced, are 1¼ in. x 3 in., and are printed as shown. When a car is brought to the shop for overhauling several of these cards bearing the number of the car and the division from which it was sent are made out, and one is given to the foreman of each shop department through which the car will pass. As each department finishes its work on the car the foreman signs the record tag and turns it in at the master mechanic's office, where it is hung in the space corresponding to the track on which the car is standing. When a car is moved from one track to another the tags on the hook are shifted. A master tag, bearing the car number and a brief summary of all repair work to be done, is made out in the office and hung on the hook with the shop tags. It serves to check the progress of the work in all departments.



Detroit United Car Repair Record Card

SECOND CONDENSATION OF OPERATING EXPENSE ACCOUNTS FOR NEW YORK ROADS

The second condensed scheme of accounts for street railroad corporations prescribed by the New York Public Service Commission, Second District, and comprising the system for corporations with gross operating revenues amounting to less than $100,000 a year, has been issued. As has been stated in previous articles relating to this system of accounts, the condensations apply only to the operating accounts. The balance sheet accounts and traffic accounts remain the same for corporations of all classes.

The titles of the primary accounts in the complete system, with the operating expense accounts for lines with annual operating revenues of $500,000 or more, were published in the ELECTRIC RAILWAY JOURNAL of Nov. 14, 1908, page 1373.

The titles of the condensed primary operating expense accounts, for corporations with annual revenues of $100,000 or more, but less than $500,000, were published in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1908, page 1567.

Following are the operating expense accounts for roads with gross operating revenues of less than $100,000 a year:

I. MAINTENANCE OF WAY AND STRUCTURES.
- Superintendence of way and structures.
- Roadway and track repairs.
- Cleaning and sanding track and removing snow.
- Other repairs of way.
- Repairs of electric power line.
- Repairs of buildings and structures.
- Other operations—Dr.
- Joint way and structures—Dr.
- Other operations—Cr.
- Joint way and structures—Cr.
- Depreciation of way and structures.

II. MAINTENANCE OF EQUIPMENT.
- Superintendence of equipment.
- Repairs of power plant equipment.
- Repairs of substation equipment.
- Repairs of cars and locomotives.
- Repairs of car and locomotive electric equipment.
- Miscellaneous equipment expenses.
- Other operations—Dr.
- Maintaining joint equipment—Dr.
- Other operations—Cr.
- Maintaining joint equipment—Cr.
- Depreciation of equipment.

III. TRAFFIC.
- Traffic expenses.

IV. CONDUCTING TRANSPORTATION.
- Superintendence of transportation.

GROUP I. POWER.
- Power plant labor.
  - a. Power plant superintendence and care.
  - b. Boiler room labor.
  - c. Producer labor.
  - d. Engine labor.
  - e. Electrical labor.
  - f. Cable power plant labor.
- Substation labor.
- Fuel for power.
- Other power supplies and expenses.
- Power purchased.
- Jointly produced power—Dr.
- Power exchanged—balance.
- Other operations—Dr.
- Other operations—Cr.
- Jointly produced power—Cr.

GROUP II. OPERATION OF CARS.
- Conductors, motormen and other trainmen.
- Miscellaneous transportation expenses.
- Joint operation of cars—Dr.
- Joint operation of cars—Cr.

V. GENERAL AND MISCELLANEOUS.
- General administration.
- Insurance.
- Relief department and pensions.
- General amortization.
- Other operations—Dr.
- Joint general expense—Dr.
- Other operations—Cr.
- Joint general expense—Cr.
- Injuries to persons and property.
- General stationery and printing.
- Store and stable expenses.
- Undistributed adjustments—balance.

ACCOUNTS FOR ROADS UNDER JURISDICTION OF FIRST DISTRICT COMMISSION

The First District Commission of New York has promulgated its classification of accounts for street and electric railways. Companies under the jurisdiction of the First District Commission are divided into the same classes respecting the treatment of operating expenses as those in the Second District.

The Commission of the First District has made public a report from Commissioner Milo R. Maltbie, who was appointed a committee to take charge of the preparation of uniform systems of accounts. An abstract of this report follows:

The systems of accounts will undoubtedly need revision from time to time. Certain new features have been incorporated which have not been sufficiently tested to determine their real merit. The corporations themselves were not a unit upon all points, some desiring one method and some another. Your committee has accepted the suggestions made by a majority of the corporations affected except where they involved the indorsement of an incorrect principle.

In the preparation of the three systems of accounts herewith transmitted, your committee has considered that the fundamental purposes of the law were:

(1) To establish uniformity between all corporations of the same class, such as street railways, electric railroads, gas undertakings and electricity supply undertakings. Street railways are operated mostly by electricity, and it was found practicable to include all, whether operated by animal power or electricity, in one group, and also to cover by the same classification all railroads running over a private right of way principally and operated by electric current.

(2) To establish systems of accounts which will show clearly and accurately the specific source of all income and the purpose of every expenditure. The facts must be had in order to determine whether it is reasonable for the consumer to demand improved service at existing rates, or whether an increased charge will be necessary. It has been urged by some that the public—the consumer, the taxpayer, the citizen and the public official—is not entitled to prescribe accounting systems for corporations or to know about its financial affairs. This theory has been exploded, and it is sufficient to recall the facts that public service corporations have been granted certain very valuable and special rights by the State and local authorities which individuals and corporations generally do not possess, that these corporations are using the streets and public places—the property of the public—that the public is therefore in a sense a partner in the enterprise, and as such is clearly entitled to know what the firm is doing, that many corporations have a virtual monopoly and that having tried a policy of non-interference experience has shown that the welfare of the individual, of the city and of the State is not adequately protected without regulation and control. An important reason for the general approval of highly differentiated forms of accounts is that they serve to protect and profit the thrifty and honest corporations. It is not the purpose of public regulation by reducing rates to take from a corporation all of the proceeds of enterprise and thrift that it may earn beyond a reasonable dividend. If a thrifty and intelligent corporation can, at a smaller expense to itself, supply a public service than a careless and incompetent corporation, the former should not be compelled to charge the public less than the latter. To do so is to discourage progress and economy. The systems of accounts reported will show what corporations exercise care, economy and ingenuity in operation and good judgment in the selection of employees. Present obscure and varying methods of keeping accounts furnish no basis of comparison, and a tendency is to put the thrifty and unthrifty in the same class and seek to deprive the stockholders of the thrifty corporation of their fair rewards. Where there is no prescribed system of accounting and no reasonable degree of publicity, there is a likelihood that the corporation will fall into the hands of the speculator. It goes without saying that the present bond and stock holders, having put their money into the enterprise, are entitled to know the results of operation and the actual status of the company, in all its details.

(3) To state the fundamental principles according to which accounts shall be kept, so as to prevent the charging of items to wrong accounts. The danger upon the one hand is that a sufficient amount will not be expended or set aside to keep the property of the company up to the proper standard. Sometimes rates are too low, but more often the straining for big dividends leads to the setting up of a large

book profit by neglecting repairs, renewals or provisions for depreciation. The virtual effect of such a policy is to hand each stockholder year by year a small portion of the plant in dividends. Even the common method of including the cost of repairs and upkeep of the productive plant in operating expenses for the year in which the money was actually spent is objectionable, for it allows the managers of the enterprise to put either more or less money into maintenance and thus overstate or understate true costs at will. Under conscientious management, operating costs would vary from year to year according to the amount of reconstruction necessary. If the machinery and plant required a minimum of expenditure in the way of replacement, the net income would appear large, and stockholders would demand its distribution through dividends, despite the fact that the neglect to include in operating expenses an allowance for fixed capital consumed had resulted in a false statement of profits and in the payment of dividends out of capital rather than earnings. The history of public service corporations has shown numerous instances of this kind, where large dividends have been paid for a series of years because no provision has been made in the costs of operation for the consumption of capital, other than the most obvious wear and tear. On the basis of attractive dividends, securities have been marketed, and in due time the buyers have found themselves loaded with worn-out property and no reserves for reconstruction.

The other danger, with which we have had less experience so far, is that an undue amount will be taken out of earnings and spent upon the plant, usually in the form of extensions. In this case, provided the capital receives a fair return, it is the user who suffers, for he has been taxed without his leave to provide capital for the undertaking and without receiving in return stock or bonds. To guard against this possible overstatement of the operating costs, it is necessary to provide that extensions and improvements of the property shall be charged to capital and not to operating expenses.

DEPRECIATION

The primary purpose of the three systems of accounts is to ensure the integrity of "capital" and the correctness of the charges to "cost of operation." The corporations are required to ascertain the life or term of service of their fixed capital, and to include in each year's operating costs a sufficient allowance to cover that part of the life of the productive plant which has expired within the year. The deterioration that has taken place during the year may at times be no greater than the expenditures for repairs (and included in operating expenses); in which event, the operating expenses afford a true statement of the real cost of the service rendered. The consumption of capital invested in a machine that gives 10 years' service is just as much a part of the expense of operation as is the cost of materials consumed in a single day, and it would be just as false accounting to reckon profits before paying for materials consumed as to do so before meeting the cost of expired outlay on machinery and other productive plant. A true statement of expenses will, therefore, include an allowance for the replacement of tangible and intangible capital, based on the most intelligent estimate that can be made of the probable life of such capital.

In order that "capital" may not be impaired, a corporation must provide not only for repairs and eventual replacement but also for depreciation due to obsolescence and inadequacy. Cities are expanding and conditions are changing, so that occasionally certain portions of the physical property have to be reconstructed because the original plans have been outgrown or rendered useless thereby. Street railway tracks, for example, sometimes have to be moved to new streets because the direction of traffic has changed. Central stations or works are removed to new locations because urban growth has made their first locations undesirable or uneconomical. These changes often come very gradually and sometimes infrequently, but all expenditures for such purposes should be paid out of earnings and not out of capital.

The corollary of the principle that capital accounts shall be charged only with actual money cost is that discounts and commissions upon securities and other commercial paper issued in payment for capital shall not be charged to capital, but shall be charged to a suspense account called "unamortized debt discount and expense." Another important requirement, which carries out statutory provisions, is that the account "franchises" shall be charged only with the amount actually paid to the State or to a political subdivision in return for the granting of franchises or rights, exclusive of taxes or other annual charges.

TREATMENT OF APPRECIATION

In conclusion, it should be noted that the systems of accounts do not recognize appreciation in the value of property as an offset for depreciation. The policy adopted by many public service corporations of depending upon the increase in the value of their assets consequent upon community growth or changes in market values is not recognized as proper. Of course, ultimately the accounts will reflect these facts. If a piece of real estate is purchased for $100,000, if that amount is charged to capital, if it increases in value to $200,000 and it is found wise to sell it for that sum and purchase another piece of land equally suitable for $150,000, the ultimate result may be that "land" will be represented in capital at an amount of $150,000 instead of $100,000; and that the surplus account will be increased by $100,000, which may be used as a reserve or distributed in dividends. The fundamental principle of the accounts, however, is that any appreciation shall not appear in the accounts until it is an actuality and until the amount of such appreciation has been determined by an actual sale of the property or the substitution of more expensive property. What shall be done when such a case arises is naturally a matter to come before the commission. It is not necessary in the systems of accounts to lay down a hard and fast rule.

SPECIAL WORK SPECIFICATIONS OF THE INTERSTATE RAILWAYS

The Interstate Railways Company is a Philadelphia corporation, which now controls 16 electric railways scattered through Pennsylvania, New Jersey and Delaware, as given in the accompanying list of the properties:

RAILWAYS CONTROLLED BY THE INTERSTATE RAILWAYS COMPANY OF PHILADELPHIA

Wilkes-Barre & Wyoming Valley Traction Company, Wilkes-Barre, Pa.
Wilkes-Barre, Dallas & Harvey's Lake Railway Company, Wilkes-Barre, Pa.
Lebanon Valley Street Railway Company, Lebanon, Pa.
*United Traction Company, Reading, Pa.
Schuylkill Valley Traction Company, Norristown, Pa.
Roxborough, Chestnut Hill & Norristown Railway Company, Roxborough, Pa.
Holmesburg, Tacony & Frankford Electric Railway Company, Tacony, Pa.
Delaware County & Philadelphia Electric Railway Company, Clifton Heights, Pa.
Southwestern Street Railway Company, Chester, Pa.
Chester & Philadelphia Railway Company, Chester, Pa.
Chester Traction Company, Chester, Pa.
Wilmington City Railway Company, Wilmington, Del.
Trenton Street Railway Company, Trenton, N. J.
Philadelphia, Bristol & Trenton Street Railway Company, Bristol, Pa.

Uniform engineering standards have been applied to all of these railways, especially in the adoption of special work specifications prepared in simple blueprint form by Thomas K. Bell, chief engineer of the Interstate Railways Company. These specifications cover all new 9-in. rail installations and replacements. The specifications follow:

SPECIAL WORK SPECIFICATIONS

Lengths of switchpieces to be the same as given on pages 161-162, catalog No. 10, of Wm. Wharton, Jr., & Company, plus 2 ft. at the heel end. Frogs as per page 163.

*Note.—The United Traction Company includes the Oley Valley Street Railway and the Boyertown & Pottstown Railway.

Spirals to be the Wharton standard, as given on pages 167-174, inclusive.

Tongue switches and mates to be Bell's patent heelless type, as shown on pages 6 and 7 in supplement No. 2 to Catalog No. 10.

Wheel flange data to be obtained from pages 178-179 and the accompanying wheel outline, Fig. 1.

For curb and car clearances, that of the Oley Valley car, 51 ft. over all, will be used in accordance with the diagram, Fig. 2, and the accompanying table of car sweep for circular curves.

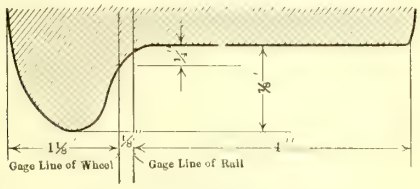
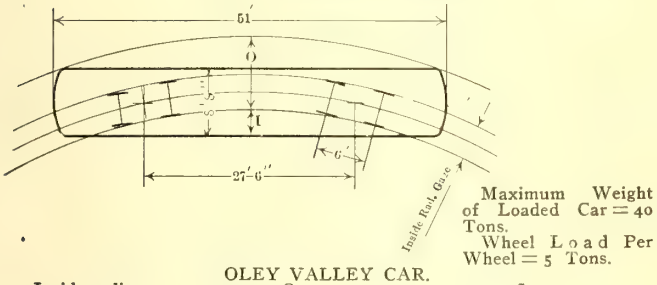


Fig. 1.—Wheel Flange



OLEY VALLEY CAR.

Inside radius. Ft.	In.	O. Ft.	In.	I. Ft.	In.
33	0	12	1	4	5⅞
35	0	11	10½	4	4
37	6	11	7 11-16	4	1 15-16
40	0	11	5⅛	4	0⅛
42	6	11	2¾	3	10½
45	0	11	0 9-16	3	9⅛
48	0	10	10⅞	3	7⅝
50	0	10	8 11-16	3	6 11-16
57	0	10	4⅛	3	4 1-16
60	0	10	2 7-16	3	3 1-16
65	0	9	11 15-16	3	1 11-16
70	0	9	9 11-16	3	0½

Fig. 2.—Car Sweep Data for Circular Curves

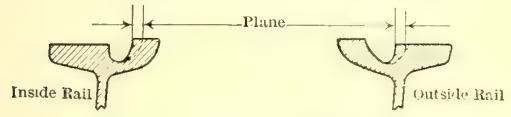


Fig. 3.—Method of Planing Rails

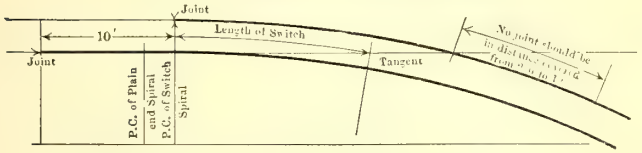
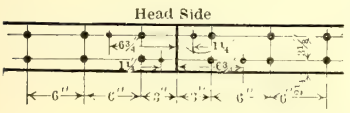


Fig. 4.—Location of Joints on Curves



Bolts 1 in. x 4 in. for L. S. Co., 119-341.
Bolts 1 in. x 4½ in. for L. S. Co., 141-395.
Joint Holes 1¼ in. in diameter.
Bond holes 13/16 in. in diameter.
Joint Plates 36 in. long.

Fig. 5.—Joint Bolt Spacing

Grooves to be as prescribed below for the following conditions: 7 ft. 6 in. wheel base, No. 3 flange, 3 in. tread.

Radius 33 ft. 0 in. up to 36 ft. 0 in., inside rail, 1¾-in. groove for T and girder rail.

Radius 36 ft. 0 in. up to 42 ft. 6 in., inside rail, 1 11/16-in. groove for T and girder rail.

Radius 42 ft. 6 in. and over, inside rail, 1 9/16-in. groove for girder rail only.

The minimum width of groove is to be 1⅜ in. Grooves for frogs, crossings, curved grooves of mates and both grooves of open point switches to be ⅞ in. deep, and to have an easy rise. All other grooves are to be at least 1⅛ in. deep, except at intersecting steam grooves, where the depth of such grooves is to be governed by the steam railroad in question.

(Note: On T-rail construction for 42 ft. 6 in. to 149 ft. radius, 1 9/16-in. groove; for 150 ft. radius and over 1⅜-in. groove.)

The minimum radius tried for as a standard is 42 ft. 6 in. No work with a lesser radius will be accepted unless special permission in writing has been obtained from the chief engineer.

The rails are to be planed to obtain 1 11/16-in. or 1¾-in. groove; plane them as shown in Fig. 3.

On spiraled plain ends of all layouts the rails should end as shown in Fig. 4.

(Note: If the spirals were ended as indicated by the Wharton Company, namely, stopping the outer rail at the P.C. (point of curve) of the spiral and extending the inner rail for 5 ft. beyond the P.C., then if the railway should desire later to run a straight track through a spiraled end of a plain curve, it would find that the joint on the outer rail, being stopped at the P.C., would leave a trackage space of 4 ft. plus or minus. Consequently, in setting the switch and mate, the guard rails might extend over the existing joint of the straight track on the switch side, but the straight track on the mate side would fall short, as previously stated. The spirals, therefore, have been laid out to have the inner rail extend 10 ft. beyond the P.C. of the switch end and to have the outer rail end on the P.C. of a switch end spiral. The switch mate, guard rail, switch head and frog can be dropped in place without loss of time and trackage. It will be further noted from Fig. 4 that no joint is permitted within the space 2 ft. 6 in. to 12 ft. beyond the intersection of the tangent and outside rail. This is done to avoid complications when putting in a switch mate and frog by having short pieces of rail occurring near the frog.)

Guard rail for all curves to be Lorain Steel Company, section No. 119-341. The same company's section No. 141-395 to be used through the straight of all special work. Bevel guards ½ in. below head. Angle of bevel to be 1 in 6. All flares are to be groove plus 1¼ in. except at steam crossings and where governed by the rail joint and bond drilling. (See Fig. 5 for joint plate hole spacing.)

Tie rods spaced every 7 ft. 6 in. and to have 1-in. round ends with four nuts. Body of rods to be 2¼ in. x 13/32 in. Tie spacing to be 2 ft. center to center. Spikes to be 5½ in. x 9/16 in.

All work to be thoroughly painted and proper assembly marks indicated in white.

The manufacturer will be held responsible for engineering data and alignment of work.

All plans are to be submitted to the chief engineer of the Interstate Railways Company for his approval.

The Interstate Railways Company will not countenance any delays in the delivery of work by the manufacturer unless said manufacturer has been duly notified by letter to hold up the work.

When work is shipped the manufacturer will notify the chief engineer of the Interstate Railways Company, enclosing to him the bill of lading, with two blueprints on heavy paper, one blueprint on linen cloth and one Van Dyke print. (Note: The two paper prints are for field work, the linen print for the office and the Van Dyke serves for a tracing.)

ANNUAL REPORT OF THE MASSACHUSETTS RAILROAD COMMISSION

The annual report of the Massachusetts Railroad Commission for the year ended Sept. 30, 1908, was submitted to the State Legislature which assembled on Jan. 6. The report is of a preliminary character, embodying various recommendations and comments by the commission, and the principal statistics relating to steam and electric railway operation for the year. An abstract of some of the features of the report follows:

In the report for 1908 the board recommends a change in the law as to the time of filing annual returns of street railway companies. The present fiscal year ends on Sept. 30, and it is recommended that June 30 be made the termination of the electric railway year to correspond with the recommendations and statistics of the Interstate Commerce Commission. All returns are desired by Sept. 30 under this arrangement.

STREET RAILWAY FARES

During the year several street railway companies have established increased rates of fare upon the whole or portions of their lines. In more than one instance the traveling public, recognizing the justice of this course, has acquiesced in it without requesting the board to review the action of the company.

In other cases petitions have been addressed to the board praying for its adjudication of the reasonableness of the increases. Some of these petitions have been decided in favor of the petitioners, others in favor of the companies.

The tendency to increase the unit of fare on street railway lines in this Commonwealth, while due in part to business depression existent the past year, is founded primarily upon the decreased purchasing power of the nickel for labor and material. The sustained costs of equipment, maintenance and operation have been out of proportion to the increased riding by the traveling public. The anticipated return to normal business conditions, now in part happily realized, seems to give promise that the companies under wise and sound management may, in many instances, realize a reasonable return upon investment without an advance in rates of fare.

While it is true that the majority of street railway companies in Massachusetts are non-dividend payers at prevailing rates, it by no means follows that an increase of fares will put these companies on a dividend-paying basis; in other words, sound and intelligent study may convince those in control of the properties that a 5-cent fare, while not affording the maximum of reasonable return, may, upon the whole, be a sound charge against the time when increase of population and induced travel may place the companies upon a dividend-paying basis.

The General Court of 1908 passed an act "relative to the transportation by street and elevated railway companies of the pupils of the public day and public evening schools and private schools" (chapter 530). The constitutionality of the act with respect to its provision for half fare for pupils of the public evening schools has been put in issue by the Boston & Northern Street Railway and the board has, upon advices from the company that it would therefore refuse to transport public evening pupils at one-half the regular fare, informed the attorney-general of the Commonwealth and the matter is now in his hands for appropriate action.

FREE TRANSFERS

Intimately associated with the question of street railway fares is the use of free transfers. Coincident with their use has come their misuse. The valid use of free transfers is not only a distinct convenience to the traveling public, but is of service to the companies themselves in permitting a routing of cars and a consequent decrease of car-mileage which makes for economy in operation. But with a free transfer privilege there is an attendant abuse from which the companies and, in the ultimate analysis, the whole traveling public suffer. To reason that free transfers should be withdrawn because improperly used is unsound; and yet their continued and increased misuse must finally present a situation where the companies may rightfully demand some restriction in their number or functions.

We recommend an alert and constant oversight of these conditions by companies to the end that the law, now sufficiently ample in its provisions and penalties, may be invoked in those cases where designing and evil-minded persons are depriving the public of its just rights, and all good citizens should co-operate with the managements of the companies who are endeavoring by recourse to the courts to minimize this growing evil.

BOSTON ELEVATED RAILWAY

The completion and opening for use of the Washington Street Tunnel, the building of the extension to Forest Hills, the projected tunnel, elevated and subway extension to Cambridge and the Malden and Medford extensions will with the consequent rearrangement and adjustment of traffic, both consummated and in contemplation, afford greatly increased facilities to the traveling public of Boston and its suburbs, not only in speed of transit, but in greater freedom in distribution of traffic.

In regard to fenders and wheelguards the board states that while the companies have in good faith endeavored to ascertain the merits of the various devices which have been put in use, the instances where persons have come in contact with the devices have been so few in number that little information of value has been secured for determining the superiority of any one device. The board recommends that companies continue the experimental use of fenders and wheel guards, keeping a record of their results, as in 1908, in order to assist in the determination as to the further use and efficiency of such devices.

COMPANIES AND MILEAGE

Annual returns for the year have been received from 81 street railways and a return to the date of its consolidation was received from one other company. The Amherst & Sunderland, Hampshire and Woronoco companies were dropped from the board's list through consolidation during the year, and the name of the Cottage City & Edgartown Traction Company was changed to the Oak Bluffs Street Railway Company. The Waltham Street Railway was consolidated with the Newton Street Railway. Of the 81 companies 62 operated their railways, 16 were operated under leases or contracts by other companies and 3 had organized and paid in a portion of their capital stock, but had not begun construction.

The net increase in the mileage is .724 mile of street railway line and 13.418 miles of second track, making 14.142 miles of additional main track. There was also an increase of 9.570 miles of side track, making a total single-track increase of 23.712 miles.

The companies now own 2233.845 miles of street railway line, 441.042 miles of second main track and 166.700 miles of side track, a total single-track length of 2841.587 miles, exclusive of 3.2 miles of track of the Rhode Island Company located in Massachusetts, and for which no return was received. All the track owned is surface track, with the exception of 8.660 miles of elevated line and 8.484 miles of elevated second track and 3.688 miles of elevated track sidings located in Boston.

The main track (including trackage rights) operated aggregated 2740.998 miles, a decrease of 4.268 miles from the previous year. The Old Colony leases and operates the Newport & Fall River, having a main and second-track mileage of 20.353 miles located in Rhode Island; and the Boston & Northern leases and operates the Nashua, having a mileage of 14.899 miles located in New Hampshire. Hence 35.252 miles of main and second track are operated outside the State.

COST PER MILE, EARNINGS AND TRAFFIC

The average cost of the street railways of the State per

mile of main track (including the cost but not the length of side track) was $31,004.80 for construction; $11,103.01 for equipment and $15,568.81 for lands, buildings, including power plants and other permanent property, making a total average cost of $57,676.62 per mile of main track.

The total income of the companies from all sources was $32,462,332.53 and the total expenditures, including dividends declared, were $32,318,320.82, making a net surplus of $144,011.71.

The total number of passengers carried computed on the basis of 5-cent fares collected was 602,400,874, an increase of 1,705,058 over the previous year. The total number of car-miles run was 116,982,089, a decrease of 737,114 car-miles from 1907.

The operating expenses amounted to 66.73 per cent of gross earnings, as compared with 67.71 per cent in the preceding year and 67.49 per cent in the year ended Sept. 30, 1908.

The gross earnings per car-mile were 26.31 cents and the operating expenses were 17.56 cents, leaving net earnings of 8.75 cents.

The average gross revenue per passenger was 5.11 cents and the operating expense 3.41 cents, leaving net earnings of 1.70 cents.

The employees decreased in 1908 to 17,267, compared with 18,181 in 1907. The cars owned in 1908 were 7618, compared with 7539 in 1907 and the motors owned were 16,649 in 1908 and 15,626 in 1907.

There were 6193 persons injured, of whom 121 received fatal injuries. The number of passengers injured was 4385, of whom 28 were fatally hurt. The number of employees injured was 299 and 13 of these sustained fatal injuries. The number of injuries to travelers and others on the street was 1509 and 80 of these were fatal.

DRAFTS IN STEAM BOILER PRACTICE

A preliminary bulletin on "The Significance of Drafts in Steam-Boiler Practice," by Walter T. Ray and Henry Kreisinger, is soon to be issued by the Technologic Branch of the United States Geological Survey. The work is in accordance with the general plan for the conservation of the fuel resources of the country. An abstract of the bulletin follows:

The experiments so far made seem to indicate that it is possible to double or treble the capacity of a plant without making any radical changes in the furnaces and boilers. These increases require about double and treble the quantities of air to be put through the fuel beds and boilers. It also seems probable that rebaffling the boilers will often permit the capacity to be doubled or trebled, while still getting more steam than formerly per pound of coal for uses outside the boiler room.

Measured weights of air were passed through two beds of lead shot in series. One bed remained always the same, and represented a boiler; the other was varied as to size of shot and depth of bed, and represented a fuel bed. Careful observations were made on the relative amounts of power required to force air through fuel beds of various thicknesses, composed of various sizes of coal, and through boilers of various lengths and areas of gas passages.

An important part of the discussion relates to an increase in the capacity of boilers by increasing the amounts of power which must be applied to pressure and exhaust fans in order to force several times as much air through the fuel beds and boilers. It must be borne in mind, however, that an attempt must not be made to put more air through existing boilers by running the fans a great deal faster, because the power consumed will increase far faster than the above calculations estimate. New fans and engines must usually be installed of sufficiently larger size to supply the larger quantities of air at as high an efficiency, if not higher.

One way of reducing the work required from the fan is to increase the grate surface, so as to avoid a high increase of pressure drop through the fuel bed. A low pressure drop through the fuel bed would also insure better combustion of the fine particles of coal, which would be carried out of the stack unburned if high gas velocities through the fuel bed were employed, the high velocities being obtained by high pressure drops. This last method is being successfully used by the Interborough Rapid Transit Company, New York City, and was described in a paper read in December, 1907, before the A. I. E. E. In this case the amount of steam produced was nearly doubled, the combined efficiency of the boiler and furnace dropping only about 3 per cent. In this case the pressure drop through the fuel bed was the same as with the single stoker, or perhaps decreased slightly, while the pressure drop through the boiler proper increased considerably. That is, the two fuel beds were in parallel, and with the same potential drop twice the current (weight of gases) was obtained. The same result could have been secured by thickening somewhat the fuel bed on the single stoker and increasing the pressure drop through it, or putting the two fuel beds in series and then, by increasing the drop of potential, twice the weight of gases would be obtained. The method of increasing the grate area is a promising one, because it requires less work from the fans; it is especially to be preferred in those cases where there is a high percentage of slack in the coal, as already explained.

The figures and principles derived from the experiments and tests presented in this bulletin may not be applicable directly to special problems; they suggest methods by which each problem can be studied and its successful solution brought about. The Geological Survey contemplates the making of further experiments with laboratory apparatus as well as with hot fuel beds in the near future.

IMPORTANT NEW RAILWAY IN KANSAS

Active work is now well under way for the construction of a single-phase electric railway between Iola and Kansas City, Kan. This road will be known as the Kansas City, Olathe, Ottawa & Iola Railway, serving the cities included in its name and also passing through Baldwin, De Soto, Mt. Ida and Harris, Kan. The main line will be 108 miles long, and there will be a 10-mile branch to Olathe. While arrangements have not yet been perfected for an entrance into Kansas City, it is expected that the terminal will include a 2-mile elevated structure within the limits of Kansas City, Kan.

The new line is well located for handling freight. The territory served includes not only a farming and stock-raising district, but also cement manufacturing and quarrying industries. One cement plant alone at Iola has a capacity of 5500 bbl. a day. The populations of the larger cities other than Kansas City are: Baldwin, 2500; Iola, 20,000; Ottawa, 10,000, and Olathe, 4500. The preliminary arrangements for the organization of this road are in charge of Hugh A. Holmes, 105 New England Building, Kansas City, Mo. The Standard Engineering Company, of Cleveland, Ohio, will have entire charge, including the supervision and inspection of all engineering work. This company is now represented on the route by George L. Wells, with temporary headquarters at Iola. Later, the principal construction office will be at Ottawa, Kan.

The Kansas City, Olathe, Ottawa & Iola Railway will be laid out as a double-track road, but only the east track will be built through at the start. Survey parties now in the field have a permanent location chosen for about 65 miles of track from Iola north. A low grade with few curves is possible over the entire route. In the first 45-mile section from Iola north there will be but four curves,

and these of 1 deg. This section also will include one 20-mile and one 9-mile tangent. All curves will be spiraled and the grades will be compensated for curvature. The railway company later will establish crushing plants for making ballast, there being excellent limestone at many points along the route.

The entire length of this line will be operated by 6600-volt single-phase current. There will be two lines of creosoted poles, one located on the edge of the right-of-way, comprising 30-ft. poles, carrying the telephone and signal wires only, and the other comprising 40-ft. or 45-ft. poles located for double bracket suspension, and also carrying the transmission wires at the tops. The No. 0000 trolley will be supported at 15-ft. intervals by hangers carried from a ½-in. extra-strength stranded messenger, which, in turn, will be supported by poles and brackets spaced 150 ft. apart. The trolley wire will be divided into six or eight sections, and each pair of sections will be fed from a fireproof static transformer station. Current will be carried between the power station and each transformer section on an independent single-phase feeder. The transmission pressure will be 66,000 volts. Each transmission wire will probably be No. 2 stranded copper, and the sectionalization and the use of independent feeders will be justified because, on account of freight traffic, it will be necessary to have current on the line the full 24 hours of each day. Also, to provide for continuity of service, the four transformer substations will all be equipped with duplicate oil-cooled transformer sets, and all parts of the transmission and distribution system will be insulated for double normal operating voltage.

It is expected that a plant will be installed for treating the poles and all the woodwork of the transmission system. If this is done, the tank will be of such capacity that a pole may be entirely submerged in oil of coal tar heated by steam coils. Also, the cross-arms and all wooden parts and fittings of the transmission system will be saturated with oil.

The power station will be located at or near Iola and in the vicinity of the Neosha River, from which circulating water will be obtained. Probably a settling basin and a filtration plant will be built. The principal equipment of the power station will comprise three 3000-hp gas engines, and provision will be made for an extension. Inasmuch as the power station will be near the center of a natural gas field, fuel for the gas engines will be easily obtainable. It is stated that the price for natural gas is less than 5 cents per 1000 cubic feet. The gas-engine units will be built with especially heavy working parts, and each will drive a three-phase generator furnishing current at 6600 volts for distribution to the trolley or for stepping up and feeding to the transformer stations along the line. It has not been decided whether a frequency of 25 or 15 cycles will be used, but the latter now is favored. One winding only of the three-phase generators will be used for operating the cars. Exciting current will be furnished by one generator driven by a gas engine and one driven by a motor. Each feeder section will be kept independent in the power house, as on the transmission line, and for each outgoing feeder there will be an independent bank of transformers and separate regulating devices, so that trouble at the power station may not hinder the operation of more than one section of the line. It is stated that it may be necessary to equalize the railway load with a battery, although the engineering data on this subject have not yet been completed. Should it be found desirable, such a storage battery in connection with a rotary converter will be installed later to improve the load factor of the power station.

The first installation of rolling stock will probably include eight passenger cars, each with four 125-volt a.c. motors and train control; also, three 800-kw electric locomotives, each with a capacity for handling an 800-ton train 30 m.p.h. on the level. The locomotives will have a maximum speed of 45 m.p.h. with no load, and will be built with pony trucks and equipped with both pantograph and trolley contacts. The Hudson Counties Company, of New York, has the construction contract.

AN APPLICATION FOR EMPLOYMENT

In view of the attention given to the requirements for employees, an application for the position of trainman to a prominent company in the Southwest will be of interest. The applicant forwards 25 to 30 testimonials from acquaintances as to his moral character and good standing as a citizen, but also indicates his technical qualification by putting himself through a long examination on various topics connected with electric railway work, such as "Points about motors which should be examined after." "What causes electricity to heat?" "The term and difference between short-circuit and grounded." "How to locate trouble in a reverse switch and how to overcome it." "Car wiring and current tracing."

These documents are accompanied by the following letter:

Dear Sir I thought I would write you in Regard to my Electrical studies and the industry I have taken to qualify myself for the position to which I aspire with your Company yes I ask for the position of Conductor with your Company although I am taken a thorough study in Electricity I feel Competent Enough to take Charge of a car and Control it as a first Class motorman I think I Can discharge my duties in Evry way to save the Company many Dollars Expense during my Service with them are at least that is my intention if I Cant Be of the Very Best Service to the Company and give Entire Satisfaction in Evry way I am very willing to Step down and out of the way and give my position to another man, Evry Employee of the Company Should use Economy in dischargeing their duties with the Company to Save the Company Evry Dollar they possible Can, for instance if a motorman has the inclination to take advantage of all down grades on his Run he can Save his Company many Dollars in a months Service, Economical Running are a great saving for the Company, but they Should use Economy in all service if my application is accept I will go out to work, Resolved to live up to Evry order and Rule laid down by the Company I think I Can discharge my duties in Evry way So I Can face the Superintendent at any time without fear of having incurred his displeasure

I EnClose you herewith a few of my Electrical Studies which I wish you to Read So you Can see what an interest I take in the project

I Could give you numbers of other Details in Regard to my Electrical Studies, but for the want of time and Space I will not this time, if you Remember me you have my application on file together with letters of my Recommendation, you placed my application on file I Believe the date was august the 19th 1907,

please State Salary you pay to Such positions, as I ask for, also please state what Salary you pay your motormen

Excuse Such lengthy letter

Respectfully

Unfortunately, the company in acknowledging the receipt of this matter was compelled to say: "You have certainly shown enormous industry in your application, but this hardly equals actual practical experience, and we want to start only with experienced men."

RECORD STORAGE IN BROOKLYN

As noted in the second article on the Brooklyn Rapid Transit Company's track and line headquarters, published Dec. 19, all of the company's important records will be stored on the second floor of the stable building at this location. These headquarters are fireproof, well lighted and accessible, offering an ideal place for storing and referring to documents. It is estimated that over 200 tons of records will be transferred to this place, these embracing the history of 36 constituent companies of the Brooklyn Rapid Transit system for a period extending from 1835 to 1908. Arranged according to departments, the records include the following information:

Legal Department.—Accident reports; investigators' papers; court papers consisting of pleadings, minutes and miscellaneous other papers; copy books of accident reports; depot records of accidents; books and papers.

Accounting Department.—Ledgers; journals; auxiliary books; mileage books; traffic accounts; voucher records; statements; bills; time sheets; time books; vouchers; day cards; register cards; miscellaneous forms and reports; pay rolls.

Operating Department.—Miscellaneous forms of reports and correspondence.

Engineering Department.—Miscellaneous reports and correspondence; track and line department records and drawings; building department records.

Mechanical Department.—Miscellaneous forms of reports and shop records, covering all the different shops.

Employment Department.—Applications; deposit orders; badge orders; books of rules; badges; punches; also miscellaneous forms of reports.

Treasurer's Department.—Cash books and correspondence; check books; checks and reports of receivers.

Among the railroad companies the records of which are to be stored at Nostrand Avenue are the following:

American Railway Traffic Company
Grand Street & Newtown Railroad Company
Brooklyn & Crosstown Railroad Company
Transit Development Company
The Brooklyn Heights Railroad Company
Bushwick Railroad Company
The Atlantic Avenue Railroad Company
Brooklyn, Bath & West End Railroad Company
Brooklyn & Jamaica Railroad Company
Brooklyn, Crosstown & Jamaica Railroad Company
South Brooklyn & Central Railroad Company
The Nassau Electric Railroad Company
Brooklyn, Flatbush & Coney Island Railroad Company
Brooklyn & Brighton Beach Railroad Company
Brooklyn Elevated Railroad Company
Railroad Construction Company
Sea Side & Brooklyn Bridge Railroad Company
Union Elevated Railroad Company
Coney Island Elevated Railroad Company
Kings County Elevated Railroad Company
Sea View Railroad Company
Brooklyn Union Elevated Railroad Company
Brooklyn Rapid Transit Company
Coney Island & Gravesend Railway Company
Broadway Railroad Company
Broadway, Flatbush & Metropolitan Avenue Railroad
Broadway, Gates & Flatbush Railroad Company
Broadway, Bushwick & Queens County Railroad Company
Jamaica & Brooklyn Road Company
Jamaica & Brooklyn Plankroad Company
Brooklyn, Queens County & Suburban Railroad Company
Sea Beach Railway Company
South Brooklyn Railway Company
Brooklyn Rapid Transit Employees' Benefit Association
Canarsie Railroad Company
Bridge Operating Company

COMMUNICATIONS

BOW COLLECTOR VS. PANTOGRAPH

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
PITTSBURG, PA., Dec. 26, 1908.

To the Editor:

In your issue of Dec. 19 editorial reference is made to Mr. Murray's recent paper before the American Institute of Electrical Engineers, and the statement is made that the New Haven Railroad might have obtained more satisfactory results by the use of a bow trolley instead of a pantograph. It is further implied that bow trolleys are in successful operation in Europe under conditions comparable with those on the New Haven road.

It seems to the writer that your statement should not have been so positive in pointing apparent neglect of European development unless you knew of some road which was actually using bow trolleys under commercial conditions similar to those existing on the New Haven; that is, speeds of 60 m.p.h. with the overhead contact wire varying by 1 per cent gradients from 22 ft. above the rails to 15 ft. 6 in. under highway bridges. As a matter of fact, the representatives of the New Haven company's contractors (the Westinghouse Electric & Manufacturing Company) have followed with care every detail of European development along these lines and each one of the several designs you mention, as well as others, has been tried out under the New Haven conditions, and having been found wanting, has been discarded and superseded by the design at present in use on the New Haven.

Your editorial of Dec. 19 contrasts the pantograph trolley with the bow, intimating that the one is a radically different arrangement from the other. It is assumed, however, that your criticism refers particularly to the contact member, since pantograph frames with swinging bow contacts have been used in Europe. The New Haven trolley consists of a light pantograph frame with a flat contact shoe. The former arrangement, as referred to in the statements above, has been tried on the New Haven, and has failed.

It is, furthermore, a fact that the New Haven type of pantograph trolley has been selected by several European roads in preference to the designs you have mentioned. The writer's purpose in addressing you on this subject is to correct the impression you appear to have that the New Haven company, as well as its contractors, have rejected any obtainable data in trolley design without due consideration. No doubt you will be glad to correct any wrong impression you may have created through the columns of your paper. THEODORE VARNEY.

[The term "bow collector" is somewhat of a misnomer when used to distinguish the European type of collector from the pantograph. The distinctive points of difference between the two forms are in the shape, weight and direction of movement of the contact piece. The bow collector used on the European high-speed railways is composed of two parts. The lower consists of a short pantograph pole or frame, and takes up the main variations in height. The upper member is usually trailing and is always light, so that it has little inertia, and a high natural period of vibration, and can follow the minor variations of the trolley wire. The article elsewhere in this issue by Mr. Kenyon on European bow collectors, with particular reference to the tests of the Swedish Government, will prove of interest, as will also the accompanying letters

from W. S. Murray, electrical engineer of the New York, New Haven & Hartford Railroad. The first letter from Mr. Murray was an answer to one asking for data in regard to the New Haven collector and his opinion of the European bow collector. The second was an answer to a request to authorize the publication of the first in connection with Mr. Varney's letter, printed above.—Eds.]

New York, New Haven & Hartford Railroad,
New Haven, Conn., Jan. 4, 1909.

To the Editors:

I have your letter of Jan. 2 in regard to bow collectors. We have been experimenting with the auxiliary contactor, the idea being, as you have described it, to make the part that comes in direct contact with the trolley wire a light auxiliary attachment to the main pantograph.

When we first got under way with the New Haven electrification I began experimenting with a light spring-supported shoe, and secured a considerably higher mileage from the contact surface by supporting the shoe with spiral springs, and I intend to continue this line of investigation shortly. Other matters of more importance diverted my attention from this work, but I hope to get some results later which will be of interest, at which time I will be glad to let you have them.

W. S. Murray,
Electrical Engineer.

New York, New Haven & Hartford Railroad,
New Haven, Conn., Jan. 6, 1909.

To the Editors:

I have just received your letter of Jan. 5, and in answer to your request that you be permitted to publish my letter of Jan. 4 concerning the electric locomotive pantograph collector, with and without auxiliary attachment, I can see no objections to your doing so. At the same time I feel the letter would be incomplete, since you have let me read Mr. Varney's letter in advance of its publication, if I did not add that I can see and sympathize entirely with Mr. Varney's point of view in that both the New Haven road and the Westinghouse Electric & Manufacturing Company, our contractors, were exceedingly close to all European development of collector devices, but only lacked, as he has well pointed out, a comparable situation with our own. In mentioning the high speed and extremely difficult gradient conditions our collecting device had to meet, there should not be forgotten also the necessity of it handling large amperages on account of the heavy trailing loads in the New Haven service.

As my letter to you of Jan. 4 would indicate, I cannot quite agree with Mr. Varney's statement that the auxiliary device as tried on the New Haven has failed, in view of our having obtained a considerably higher shoe mileage by using it. I will also take this opportunity to say that while it was the endeavor to cover as much ground as possible in my recent paper prepared for the American Institute of Electrical Engineers, it was quite impossible to touch upon the multitudinous number of little, but interesting, details. Referring to that paper, you will note that under locomotive current collectors, it was stated: "An efficient pantograph shoe has proved itself a very difficult problem. The present cost is about 0.06 cent a locomotive mile. We have made various experiments with aluminum, phono, copper and steel, rigid and spring-supported pantograph shoes." The 0.06 cent a locomotive mile, of course, stands for the present pantograph, which does not possess the auxiliary attachment. Now, if we assume the maintenance and repairs on electric locomotives to be 3 cents a locomotive mile, even at this figure shoe repairs would represent only 2 per cent of the total cost. Considered in this light, even if it was necessary to continue operation indefinitely upon the basis of our present pantograph arrangement, it would not present, as stated in the paper, a serious aspect. Particularly is this true in connection with the consideration of the effect of the present collecting shoes on the overhead system, as it is to be noted that the present rigid form of pantograph shoe seems to have no tendency to kink the trolley wire.

Thus I hope it is clear why I have felt it necessary to add this statement to my letter of Jan. 4, as I can feelingly understand Mr. Varney's point of view in that he gained the impression from your criticism that you thought this feature of our electrification had not received the consideration due it. I might add that 10,000 shoe miles would be a minimum figure to represent the tests with the spring-supported or auxiliary type of shoe.

In conclusion, let me repeat that the shoe situation is one offering an interesting, but not serious, aspect, and in due time a standard for the New Haven conditions will be the substitute for those already giving very good results.

W. S. Murray,
Electrical Engineer.

PAY-WITHIN CARS IN PHILADELPHIA

The first pay-within cars to operate on Chestnut and Walnut Streets in Philadelphia were put in service on Jan. 3 as part of the route of the Nineteenth and Twentieth Street line. The schedule calls for 22 cars, which are the first of this type to be delivered by The J. G. Brill Company of the order placed some time ago by the Philadelphia Rapid Transit Company. With the 50 pay-within cars on the Twelfth and Sixteenth Street lines, and the 100 which are being remodeled in the company's shops, provisions have now been made for 450 pay-within cars in use or to be put in service on the Philadelphia system. Other cars will be converted soon. The press comments on these new cars have been very favorable ever since they were put in service.

A SAFETY COIN WRAPPER

In any business, especially on electric railways, where a great many small coins must be handled, it is desirable that the coins should be wrapped quickly and with such security that the sealed packages cannot be broken without detection. These two important features are said to be combined in the series of wrappers for different sized coins made by the Detroit Coin Wrapper Company, Detroit, Mich., and now used by a large number of transportation companies and others. Aside from the security of these wrappers, it has been found that the quickness with which coins can be packed in them results in considerable economy in time when handling large quantities of change. This is especially the case on street railways where the conductor must keep within the schedule, and wraps two or three bundles every trip. The common form of wrapper would require several minutes of his time, whereas the "Detroit" would enable him to pack the coins

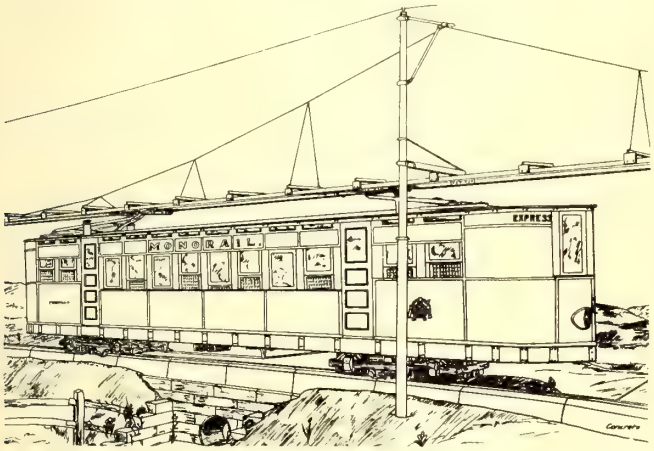


Safety Coin Wrapper

as fast as he could insert them. As the wrapper is made of heavy pressed paper, the conductor's name can be written or stamped on each one. Each packer is responsible for the amount and quality of the coins so done up, as when finished each roll is closed tightly with a self-sealing flap.

PROPOSED MONO-RAILROAD TO PELHAM BAY PARK AND CITY ISLAND, NEW YORK CITY

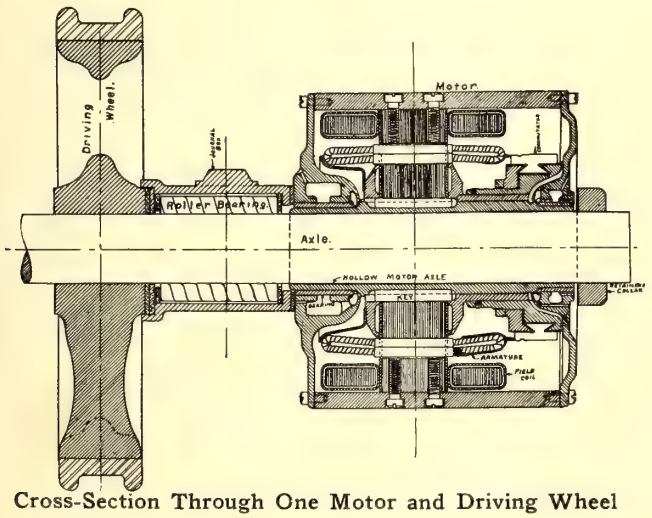
The Public Service Commission of the First District of New York has recently granted the Pelham Park & City Island Railroad the right to change over its present horse-car line to mono-rail electric operation. The route comprises 3 miles of single track running from the Bartow



Mono-Rail Car

station of the New York, New Haven & Hartford Railroad's Harlem River branch by way of Pelham Bay Park to Belden's Point, City Island. The present fare is 10 cents, but will be reduced to 5 cents for commuters after the electrification is completed.

It is said construction is to begin as soon as certain administrative permits are secured from the park commissioner. In spite of the short length of the line oppor-



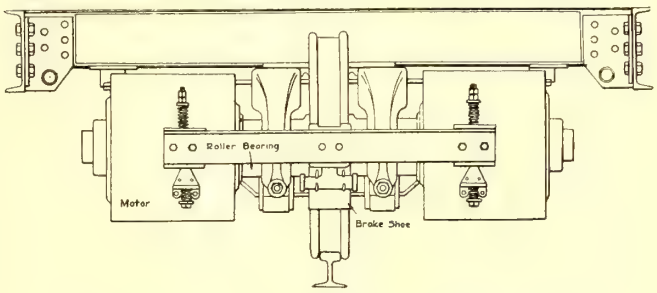
Cross-Section Through One Motor and Driving Wheel

tunities will be afforded for high-speed running, as about half the route is alongside a parkway with no road crossings. The mono-rail system to be used is the invention of H. H. Tunis, whose company installed a line at the Jamestown Exposition.

The single-running ground rail is to consist of a T-rail spiked to ties and set in concrete. The double flanges of the wheels will run in a groove on each side made with vitrified hump blocks laid against the rails.

The guide-rail on part of the line will be carried from brackets on steel poles spaced 75 ft. to 100 ft. To secure greater flexibility and safety, however, the superstructure will also be hung from a catenary cable carried over an upper auxiliary bracket of the poles. In Pelham Bay Park the guide-rail construction will be suspended from wooden bridges carried on steel bents set in concrete. To prevent the sag of the guide rails where the span is over 30 ft., a different type of catenary is to be used. At a point midway between each bent there will be an expansion joint to divide the track into a series of T's in which the upright will be the bent and the horizontal portion the guide-rail track. The guide-rails will be hung from cables passing over an A-frame in the center of the bent, thereby making the entire overhead structure a series of cantilevers.

In both classes of construction the combination guide and current rails for the wheels on the top of the car consist of light angles carried 30 in. apart, but connected with intermediate steel members to make an effective truss. The combination guide and current wheels on the car roof bear horizontally against these guide rails. As there are four wheels on each of the two trolley trucks, eight points of contact are afforded, thereby insuring a steady supply of current to the motors. The trolley trucks, which are of



End View of Truck Showing Double Motors

scissors type, will be made with or without springs, according to conditions.

Gearless shaft-mounted motors will be used to secure a low center of gravity. Each of the two axles of both trucks will carry a pair of 550-volt, 25 (nominal) hp, four-pole motors operated at 800 r.p.m., connected in series for starting and slow running, but in parallel for full speed. The motors are being built by the Sterling Electric Company, of Dayton, Ohio. The controller will be of General Electric type, with an auxiliary multiple unit contactor.

The motor armature is to be clamped on the hollow axle which slides over the car axle and it will be possible to remove the complete motor from the truck simply by taking off the retaining collar which holds the motor on the car axle. The journal is placed next to the wheel and the motor at the end of the axle, as shown in Figs. 2 and 3. This arrangement will make it possible to remove a motor without disturbing anything else, to install larger motors when necessary, and will permit reaching the brush-holders from alongside the car.

It is understood that the three mono-rail cars will be of steel, 50 ft. long, 6 ft. 6 in. wide, and will weigh 15 tons when carrying 50 seated passengers. The cars will be furnished with a pointed motorman's cab at each end.

A British syndicate has been formed to purchase the St. Petersburg, Russia, street railway system and has made an offer of 27,000,000 roubles to the Municipal Council.

ELECTRIC RAILWAY LEGAL DECISIONS

NEGLIGENCE

California.—Street Railroads—Collision of Car with Team —Contributory Negligence.

Whether one who, on the busiest street in the city, at the busiest time, is driving across a street car track, had the hind wheel of his buggy struck by a street car going up a slight grade, at a speed of four miles an hour, without warning and without attempt to stop it till it was within five or six feet of the buggy, was guilty of contributory negligence, is a question for the jury, though when he got into the buggy and started his horse the car, not seen by him, was standing at the crossing, with its front end 59 feet from where he must cross the track, and though, while he listened attentively without hearing anything, he did not look beyond the side curtains of his buggy so as to see the car till his horse was across the track.—(Scott et al. v. San Bernardino Valley Traction Co., 93 Pac. Rep., 677.)

Colorado.—Street Railways—Care Required by Operators—Negligence of Company—Same—Effect of Public's Right to Street.

It is the duty of persons operating a street car to exercise ordinary care and vigilance to avoid injuring the pedestrians, but what constitutes such care and vigilance must be ascertained from the circumstances of each case, for the question must be determined by what a man of ordinary prudence would have done under similar circumstances.

Where a car was something over half a block distant at the time it was signaled by plaintiff's intestate, and approaching on a slightly down grade at the rate of about eight miles an hour, and the gong was being sounded, when she stepped in front of it and was struck, defendant company was not negligent, nor liable for failure to avoid the injury, notwithstanding decedent's negligence, though it might have been had she not indicated her knowledge of the car's approach by signaling it.

Where decedent intruded herself in front of a street car while it was in motion and after she had signaled it to stop, the abstract question of the relative rights of pedestrians and street car companies to the use of the streets is not involved, for, both having rights upon streets, both are bound to exercise reasonable care in enjoying them, the one to avoid being injured, the other to avoid inflicting injuries, and the rights of the parties must be determined from the record by ascertaining whether they violated the law in respect to such duties.—(Liutz v. Denver City Tramway Co., 95 Pac. Rep., 600.)

Georgia.—Carriers—Street Cars—Negligence—Failure to Furnish Seat.

Whether a common carrier in not providing a seat for each and every passenger has fulfilled its legal duty of extraordinary diligence toward the passenger is a question of fact for the jury; and in a case where an injury results to a passenger, or is partly caused by failure to provide a seat, the fact that for a long period of time sufficient seats had not been provided, and the further fact that this was known to the defendant company, may be pleaded and proved as a circumstance of substantive negligence, as well as aggravation.—(Lyndon v. Georgia Ry. & Electric Co., 60 S. E. Rep., 278.)

Georgia.—Street Railroads—Injury to Pedestrian—Burden of Proof.

The verdict rendered in behalf of the plaintiff is not, for lack of any evidence to support it, contrary to law. When the plaintiff showed injury occasioned by the car of the defendant company, the burden of proof was shifted to the defendant, and it became incumbent upon it to show that the plaintiff consented to the injury or could have avoided it by the use of due care, or that the employees of the company exercised all ordinary and reasonable care and diligence, and the verdict of the jury that the defendant failed to carry successfully this burden is fully supported by the evidence.—(Augusta Ry. & Electric Co. v. Arthur, 60 S. E. Rep. 213.)

Indiana.—Carriers—Street Railways—Injury to Passenger —Contributory Negligence—Instructions—Instructions —Error Cured by Other Instructions.

In an action against a street railway for injuries to plaintiff through the negligent starting of a car which plaintiff was attempting to board, an instruction under which any act of plaintiff, whether negligent or not, would defeat his recovery, was erroneous.

In an action against a street railway for injuries to plaintiff through the negligent starting of a car which plaintiff was attempting to board, the error in an instruction, under which any act of plaintiff, whether negligent or not, would defeat his recovery, was not cured by a subsequent instruction that, if the evidence appeared to the jury to be evenly balanced on the question whether the injury was proximately caused by plaintiff's fault or that of defendant, the verdict should be for defendant, since plaintiff had the burden of proving that he was injured in the manner charged, and that the injury resulted proximately from the wrongful act or omission of defendant, this latter instruction still leaving the burden of proof as to plaintiff's contributory negligence in doubt.—(Abney v. Indiana Union Traction Co., 83 N. E. Rep. 387.)

Indiana.—Street Railways—Actions for Injuries at Crossings—Evidence—Sufficiency—Contributory Negligence Burden of Proof—Trial—Questions for Jury—Directing Verdict—Street Railroads—Questions for Jury—Contributory Negligence.

It is negligence to run a street car along streets of a city on a dark and stormy night at the rate of 15 miles an hour without a headlight, and without sounding a gong or whistle at street crossings.

Where the evidence shows that defendant street car company was negligent in running into plaintiff, the burden is upon defendant to show plaintiff's contributory negligence.

Where the undisputed evidence does not show a state of facts from which the one inference of contributory negligence may be reasonably drawn, it is error to give a peremptory instruction for defendant.

Whether plaintiff, who was struck by a street car, was negligent, held, under the evidence, for the jury.—(Nelson v. Chicago, L. S. & S. B. Ry. Co., 83 N. E. Rep. 1019.)

Iowa.—Carriers—Injuries to Passenger—Action—Nature and Form—Duty of Carrier—Question for Jury—Management of Conveyance—Sudden Jerks—Duty of Motorman—Duty of Conductor—Evidence—Sufficiency —Carriers—Injuries to Passengers—Action—Issues and Proof—Evidence—Declarations—Admissibility.

Whether an action for injuries to a passenger is in form for breach of contract, or for negligence, is immaterial; since there was no breach of contract unless there was fault constituting negligence.

A street car company owes a passenger very great care for his safety, and, if there is evidence of any negligence of its employees contributing to his injury, the case should go to the jury, unless there is conclusive evidence of his negligence.

Where a passenger, thrown from the platform step by the sudden starting of a street car, which had slowed down, had no intention of alighting there, and had not been misled into taking the position by any indication that the car was stopping to let him off, and the employees did not operate the car so as to injure a person in the aisle, and did not know his position on the step, the rule that it is negligence to suddenly, without warning, start a car which has slowed down or stopped, and from which the passenger is attempting to alight, does not apply.

The motorman of a street car is under no obligation to see that passengers do not put themselves in perilous positions.

The conductor of a street car, after signaling for a desired stop, has nothing further to do with the operation of passenger's perilous position in time to inform the motorman of the need of special care, and, while collecting fares, he may assume that the passenger will not put himself in a perilous position.

Evidence that a passenger was thrown from the step of a street car by a sudden starting after the car had slowed down, without evidence that he had been led to take the dangerous position by the employees operating the car, or that they knew his peril, or that the car was operated so as to injure a person in the aisle, is insufficient to show negligence.

In the absence of any claim that a street car was negligently operated because of the motorman's incompetency, evidence thereof is inadmissible.

In an action for injuries to a passenger, evidence of declarations by the agent of another corporation as to the motorman's incompetency is inadmissible.—(Heinze vs. Interurban Ry. Co., 114 N. W. Rep. 534.)

Kentucky.—Street Railroads—Injuries from Collision—Actions—Instructions—Care Required as to Persons Using Street—Damages—Excessive Damages—Personal Injuries.

In an action for personal injuries, caused by a collision between plaintiff's buggy and defendant's street car, instructions to find for plaintiff, unless the motorman, after he saw, or by the exercise of ordinary care could have seen, the danger of a collision, "used such means as were at his command" to avoid it, are erroneous, where it appeared that there were two ways of stopping the car—by reversing the current and by applying the brake—since the jury may have been misled to believe that he did not use both means

at his command, and that he was negligent in not doing so, while the law only requires that he use ordinary care in the exercise of the means at his command to avoid the danger, etc.

A street car company owes to those having a right to the common use of the streets with it only that degree of care that a person of ordinary prudence would exercise under like circumstances.

Plaintiff was thrown from a buggy in a collision with a street car. She was considerably bruised about the arm and hip, though no bones were broken. She suffered violent pains in the hip, leg, arm, back and head, and was confined to her bed for about two months, and at the time of the trial, a year or more after the injury, was still suffering severely as a result thereof. Held that $3,000 damages was excessive, in the absence of evidence that the injury was permanent.—(Lexington Ry. Co. v. Woodward, 106 S. W. Rep. 853.)

Maryland.—Carriers—Injury to Passenger—Setting Down Passengers—Instructions—Actions for Injuries—Instructions.

In an action by a passenger for injuries, an instruction that, if the jury found that the street car came to a full stop to allow passengers to alight, and thereupon plaintiff, using due care, attempted to get off the car, but while attempting so to do the car was started by a servant of the street car company, by reason of which the plaintiff was thrown to the ground and injured, the finding should be for the plaintiff, was properly given.

In an action against a street railroad for personal injuries to a passenger, an offered instruction that if plaintiff stepped to the footboard of the car while it was still in motion, and on that account was thrown to the street and injured, he could not recover, was properly modified by making it further necessary to his non-recovery that he failed to use ordinary care, since, as a matter of law, it is not always negligence to attempt to get off a car when it is in motion.—(United Rys. & Electric Co. of Baltimore v. Rosik, 68 Atl. Rep. 511.)

Maryland.—Street Railroads—Defective Track—Injuries to Travelers—Nature of Railroad's Liability—Res Ipsa Loquitur—Negligence—Knowledge of Condition.

Baltimore City Code 1906, section 24, requiring railroad companies to keep the streets covered by their tracks in thorough repair, etc., imposes on the railroad company that portion of the public duty which relates to keeping the parts of the streets mentioned in a safe condition, and the railway's liability for injuries caused by its failure to discharge that duty are the same as in like cases against the municipality.

That the wheels of the buggy in which plaintiff was riding when she was injured fell into the cable slot maintained in the street by defendant railway company was insufficient to raise a presumption of negligence on the part of the latter.

Where plaintiff was thrown from a buggy and injured by the wheels dropping into a cable slot maintained in the street by a street railway company, the latter was not liable for plaintiff's injuries in the absence of proof of notice of the defect, either actual or constructive, and negligent failure to repair the same.—(Miller v. United Rys. & Electric Co. of Baltimore, 69 Atl. Rep. 636.)

Missouri.—Carriers—Street Railroads—Injuries to Passengers — Evidence — Instructions — Appeal — Verdict — Conclusiveness—Credibility of Witnesses—Amount of Recovery—Approval of Trial Court.

The conductor in charge of a car called the name of a street. A passenger gave a signal for the car to stop. The car stopped before reaching its usual stopping place, but near to it, and the passenger attempted to alight, when the car suddenly started, causing injury to her. Held, that the passenger had the right to assume that the car had stopped for the purpose of letting her alight, and it was the duty of the conductor to learn whether any passengers were preparing to alight before starting the car.

An appellate court is not authorized to pass on the credibility of the witnesses.

Where the trial court did not think that the verdict in a personal injury action was excessive, and there was nothing to show that it abused its discretion, the court on appeal would not disturb the verdict.—(Hufford v. Metropolitan St. Ry. Co., 109 S. W. Rep., 1062.)

Missouri.—Street Railroads—Care Required at Crossings—Evidence—Weight—Testimony Opposing Facts and Laws—Street Railroads—Collision with Vehicle—Proximate Cause—Concurring Negligence of Another—Negligence—Contributory Negligence—Imputed Negligence—Negligence of Driver.

It is the duty of a motorman on approaching a crossing where he has reason to anticipate the presence of vehicles and pedestrians to keep a close lookout and give warning of the presence of the car.

Testimony entirely inconsistent with physical facts and laws within the knowledge of common experience will be disregarded and treated as though it had not been spoken; hence, where it appeared that a street car could not have been more than 100 feet away when a driver proceeded from a place of safety to the crossing where an accident occurred, his testimony that the rapid progress of the car raised such a cloud of dust as to obscure the headlight so that it could not be seen over a block away must be disregarded.

If a motorman was negligent in not ringing the bell or making an effort to reduce speed after a collision became imminent, negligence of the driver of the vehicle in which plaintiff was riding would not relieve the railway company from liability, on the ground that the negligent acts of its servant were the remote cause of plaintiff's injury.

Where plaintiff, a girl not over 16 years of age, was sitting in the rear of a vehicle, which her stepfather was driving, his negligence in driving into a dangerous position could not be imputed to plaintiff, her status being that of a mere passenger.—(Zalotuchin v. Metropolitan St. Ry. Co., 106 S. W. Rep., 548.)

New York.—Negligence—Contributory Negligence—Danger Incurred in Saving Life—Undue Risk—Instructions—Street Railroads—Personal Injuries—Danger Incurred in Saving Life—Contributory Negligence—Evidence.

In an action for the death of plaintiff's intestate, killed by one of defendant's trolley cars while endeavoring to cross its tracks and assist his brother across, an instruction that deceased was not necessarily guilty of contributory negligence in endangering his own life to save his brother was erroneous, as omitting the qualification that the action of deceased must have been compatible with a reasonable regard for his own safety.

Where deceased was killed by one of defendant's trolley cars while endeavoring to cross its tracks at a street crossing and to assist his brother across, if his own negligence contributed to placing himself and his brother in a dangerous situation, the fact that he then suddenly attempted to save his brother would not absolve him from contributory negligence.

In an action to recover for the death of plaintiff's intestate, who was killed by one of defendant's trolley cars while crossing its tracks at a street crossing and endeavoring to shove his brother across, evidence examined, and held not to justify a finding by the jury that deceased ran in front of the car to save his brother from danger.—(Miller v. Union R. Co. of New York City, 83 N. E. Rep., 583.)

Pennsylvania.—Carriers—Injury to Passenger—Evidence.

The electric controller of a summer car blew out, and, after the car had stopped, a passenger was found lying on the ground some 15 feet back from the rear end of the car. There was no evidence to show how she came there. Held, in an action by her to recover for injuries received, a nonsuit was properly entered.—(Green v. Pittsburg, M. & G. St. Ry. Co., 68 Atl. Rep., 675.)

Rhode Island.—Carriers—Street Cars—Duty of Carrier—Removal of Snow and Ice.—Injuries to Passengers—Negligence of Person Injured—Care Required by Passenger.

It would be unreasonable to require the immediate and continuous removal of all snow and ice from trains during passage, and a passenger cannot assume that the effects of a continuous storm of snow, sleet, or rain will be immediately and effectually removed from the exposed platform of a train between stations.

At the time plaintiff was injured a snowstorm had continued throughout the day, with some rain, and the temperature was below the freezing point. Before starting on the trip the conductor had removed the accumulated ice and snow from the street car steps; but during the trip a considerable mass of ice and snow was deposited on the step by incoming passengers, and plaintiff, in alighting from the car, slipped from the step and was injured. He testified that before stepping down he saw the ice and snow, and used due care in alighting. Held, that defendant was not negligent in permitting snow and ice to gather on the steps, as it would be unreasonable to require it to prevent the steps from becoming slippery by the ingress of passengers between stops.

The prevalence of storm and freezing weather imposes upon a passenger an extra degree of care to prevent injury in alighting from a car.—(Riley v. Rhode Island Co., 69 Atl. Rep., 338.)

CHARTERS, FRANCHISES AND ORDINANCES

Indiana.—Eminent Domain—Compensation—Persons Entitled.

Acts 1901, p. 463, c. 207, sec. 5, authorizes street railway companies to exercise the right of eminent domain, and provides that the company shall deposit with a designated officer a description of the rights and interests to be appropriated, and that such lands, rights and interests shall belong to the company, to use for the purpose specified by making or tendering payment. The section further provides that, if the parties cannot agree upon the compensation, notice shall be served by delivering a copy of the instrument of appropriation, or, if the owner be a nonresident of the county, that he may be served by publication, and that, upon the filing of the act of appropriation and delivery of such copy or publication, three appraisers shall be appointed on the application of either party, who shall return their assessment of damages. Held, that the filing of the instrument of appropriation with the designated officer was a seizure and appropriation of the land therein described, and constituted the final act of taking, upon which title passed, and all damages resulting from the taking thereupon vested in the then owner of the land as a personal claim.—(Ft. Wayne & S. W. Traction Co. v. Ft. Wayne & W. Ry. Co. et al., 83 N. E. Rep., 665.)

Maryland.—Street Railroads—Municipal Franchise Tax—Equivalent for Grant of Rights in Streets—Grant of Franchises—Power to Tax.

Acts 1882, p. 357, c. 229, provided that in lieu of the 12 per cent tax theretofore paid, certain street railway companies should pay the city of Baltimore for the use of the park fund a tax of 9 per cent on their gross receipts accruing from the passenger travel on the railways within the city limits. Acts 1888, p. 113, c. 98 (Annexation Act), provided that all streets, etc., in the annex, which shall have been legally condemned as streets under the provisions of the statutes relating to streets in Baltimore County, shall be held to be validly constituted streets of Baltimore city in all respects as if the same had been legally condemned as such by the Mayor and City Council of Baltimore. Act 1894, p. 837, c. 550, provided for an inspection of the books of the railway companies by the park commission, and that on default of any of the companies operating street railway lines within the present city limits in the payment of the park tax of 9 per cent of gross receipts for all street railway lines within the present city limits, a penalty of 30 per cent should be imposed. Held, that, the tax having been imposed as an equivalent for the grant of the privilege to use the streets for railway purposes, a street railway company was not liable to pay a tax on gross receipts derived from passenger traffic on lines within the city limits constructed on the company's private rights of way.

The street railway was liable for the tax on gross receipts derived from its lines on the public streets of the city, including those lines constructed under private grants on what became public streets of Baltimore County, and those constructed under grants from the Legislature and the county commissioners of Baltimore County before annexation.

A franchise to use a street or other highway for a street railway must emanate from the sovereign power of the State. It may be granted directly by the State, or by a municipal corporation, if authorized by the State, and may be by the State, without the consent of the municipal corporation, in the absence of some constitutional prohibition; and, if so granted, there is no objection to the municipality imposing a franchise tax, if authorized by its charter to do so, since the real consideration for such tax is the use of the streets, and not merely the right to use them, which may never be exercised.—(City of Baltimore v. United Railways & Electric Co. of Baltimore, 68 Atl. Rep., 557.)

New York.—Street Railroads—Rights in Streets—Consent of Local Authorities—Conditions—Statutes—Construction—Consent of Park Commissioners to Occupation of Park Approaches.

Railroad Law, Laws 1890, p. 1109, c. 565, sec. 93, provided that no consent of the local authorities in a city of 1,250,000 population to the occupation of a street for railroad purposes shall be valid, unless it provides for a sale of the franchise at public auction to the highest bidder. As amended by Laws 1901, p. 1229, c. 494, the section still provided in the first sentence thereof that the condition should be attached to the consent of the local authorities in cities of 1,250,000 inhabitants, but in the body of the amendment, one of the main features of which was the confirmation of consents and extension of consents theretofore given by local authorities to the construction of street railroads in cities of the first class, appeared the declaration that the provisions of the section as amended should apply to all cities of the first class. Held, that in view of the rule that effect should be given if possible to all provisions of a statute, and in view of the course of legislation, showing a legislative intent to constantly increase the limit of population of the cities which should be required to insist upon a public sale of street railway franchises as a condition of the consent of local authorities, the provision in the amended portion of the law that it should apply to all cities of the first class had reference only to the provision for confirmation of consents, etc., theretofore given by local authorities, and not to the entire law.

Buffalo City Charter Laws 1891, p. 205, c. 105, sec. 314, provides that the park commissioners shall have power to grant to a street railway company the right to construct and operate a railway, etc., through park approaches. Const. art. 3, sec. 18, provides that no law shall authorize the construction of a street railway, except upon condition that the consent of the local authorities having control of the streets be first obtained, etc. Railroad Law, Laws 1890, p. 1108, c. 565, sec. 91, as amended by Laws 1892, p. 1399, c. 675, provides that if in a city the exclusive control of a street, etc., to be used by a street railway is vested in authority other than the Common Council, the consent of such authority shall be obtained in addition to that of the Common Council. Held, that the validity of the consent of the park commissioners to the construction of a street railway through a park approach is not affected by the fact that it differs in its terms from the consent of the Common Council, especially where its terms are more rigorous.—(Kuhn v. Knight, Mayor of City of Buffalo et al., 83 N. E. Rep., 293.)

Oklahoma.—Mandamus—Performance of Public Service—Carriers—Control and Regulation—Preferences and Discriminations—Passes—Half-fare Tickets—Officers—Qualification—Oath—Carriers—Control and Regulation—Preferences and Regulations—Half-fare Tickets.

"When there is a grant and acceptance of a public franchise which involves the performance of a certain service, the person or corporation accepting such franchise can by mandamus be compelled to perform such service."

The provisions of section 13, article 9, of the Constitution, do not prohibit a municipal corporation operating a street railway from furnishing transportation free to its policemen and firemen and United States mail carriers, and half-rate tickets to school children, and free transportation to children under a certain age while traveling with a parent or guardian.

Municipalities are not prohibited by the provisions of section 13, article 9, of the Constitution, from granting franchises for street railways with conditions contained therein for the carrying of policemen, firemen, United States mail carriers and children under a certain age free, and for the furnishing of transportation to school children at a reduced fare, and when accepted by the grantee in the franchise, are valid.

Policemen, firemen and United States mail carriers are not officers contemplated or included by section 1, article 15, of the Constitution.

Street railways undertaking and contracting with municipalities by provisions contained in franchises granted by such municipalities, to carry policemen, firemen, United States mail carriers and children under a certain age free, and also to carry school children at half the regular rate, are not absolved therefrom by section 13, article 9, of the Constitution.—(Oklahoma City v. Oklahoma Ry. Co., 93 Pac. Rep., 48.)

Pennsylvania.—Estoppel—Acquiescence—Evidence of Consent.

Where a street railway company has been allowed to construct its lines without objection by abutting property owners, and expended large sums thereon, the operation of the line will not be enjoined by one who either gave his consent thereto or stood by and said nothing while the work was going on.—(Maust v. Pennsylvania & M. St. Ry. Co., 69 Atl. Rep., 80.)

Where an abutting landowner consented to the grading of a street railway and the laying of a track on a public highway, and made no objection to its construction, he could not thereafter maintain a bill to compel the line to be torn up and its operation enjoined.

In an action by an abutting landowner to compel a street railway line over a public highway to be torn up, evidence that complainant said to the general manager of defendant company, when laying out the route of the railroad, "I know where you want to go, and go ahead, and I will see you in a few days," is sufficient to justify a finding of consent.

News of Electric Railways

Cleveland Traction Situation

On Dec. 31, A. B. duPont, president of the Municipal Traction Company, and R. H. Bunning, chief engineer, severed their relations with the receivers of the company. Mr. duPont was retained several weeks at his original salary of $15,000 a year, but the salary was reduced recently to $6,000 a year and Mr. duPont was designated as superintendent of power houses and consulting engineer. Lawrence Crecilius will hereafter have charge of the power houses.

There has been considerable discussion recently of the probable disposition of the fare question, which will be based on the reports for November and December. The returns of December will afford data for the first full month of operation under the schedules fixed by the receivers. Tom L. Johnson was in the East last week in connection with the reorganization of the companies controlled by the estate of his brother, Albert Johnson, and could not discuss the question of fare with the receivers and Judge Tayler. The opinion prevails that Mr. Johnson, as Mayor, will oppose any change in the fare other than a charge of 1 cent for transfers. Mr. Johnson has said publicly that the service given now is in excess of traffic requirements, and it is expected that he will urge a reduction of the schedules to yield a return that will cover operation and fixed charges at the present fare. Every effort is being made to complete the December report by Jan. 10, as the receivers desire to prevent further deficits and secure data upon which to base the new rate of fare.

It is stated that attorneys for several of the creditors of the Municipal Traction Company will endeavor to have their claims classified under maintenance and operation, in order that they may be considered as preferred. Master Commissioner Belford began the hearing on these claims on Jan. 4, but on account of the contention of attorneys for the Cleveland Railway that they are not satisfied with the classification made by the expert accountants and that they will accept none of the claims until they have had an opportunity to examine them, Mr. Belford was compelled to adjourn the hearing until Jan. 8. Attorney John G. White, for the Cleveland Railway, claimed all the money now in the hands of the receivers and asked permission to examine all the claims. Attorney Harry J. Crawford and Henry J. Davies, secretary of the Cleveland Railway, will go over the list of claims together.

The order under which Master Commissioner Belford will work directs him to ascertain the assets and liabilities of the Municipal Traction Company; what portion of the assets were turned over by the Cleveland Railway; what debts were contracted prior to April 27, and whether contracted by any other company and assumed by the Municipal Traction Company; debts contracted since that date, with the amounts for maintenance and operation, the amounts for betterments, the amount expended in payment of mortgage indebtedness, the amount spent for permanent extensions. The commissioner will also account for the $293,050 guarantee fund and review the claims of the companies against each other. All claims must be filed with the master commissioner by Jan. 18.

The Municipal Traction Company has been granted an extension of time in which to file an answer to the receivership suit.

About 50 Brill fare boxes have been ordered for delivery to the Municipal Traction Company as soon as possible. One of the lines will be equipped with them and with pay-as-you-enter cars so that the receivers may satisfy themselves as to the saving that will be effected by them.

The Pay-As-You-Enter Car Corporation has brought suit through Kline, Tolles & Goff, against the receivers of the Municipal Traction Company in the United States Circuit Court, claiming that the company has infringed its patents in converting old cars into cars of the pay-as-you-enter type. The petition states that the receivers were notified on Nov. 12 that the cars infringed the patents owned by the Pay-As-You-Enter Car Corporation. The profits are asked on the operation of this class of cars from Nov. 12.

Public Service Commission Disapproves Purchase of River Tunnel by New York City

The Public Service Commission of the First District of New York at a special meeting on Jan. 5 rejected the offer made by the Interborough Rapid Transit Company to sell the Steinway tunnel under the East River between New York and Long Island City to the City of New York. The report of the committee of the whole, on which the commission based its resolution declining the offer, recites the action of the Legislature in passing, at the last session, the bill empowering the city to purchase the property, and calls attention to the fact that this was special legislation, inasmuch as it applied only to the Belmont tunnel and not to any other subway.

Following the offer of the Interborough Rapid Transit Company to sell the tunnel to the city a thorough examination of the property was made by Henry B. Seaman, the commission's chief engineer, who estimated that it would cost $310,000 to complete the line for operation. After giving the route and stating that the line is evidently intended for the operation of surface cars, the report continues:

"In many respects the Steinway tunnel is well located to constitute a valuable adjunct of a future comprehensive subway system. It occupies a level below the present subway in Forty-second Street, and could be extended at some future time across the city to the North River, and possibly south to the new Pennsylvania Railroad station, or to connect with the Hudson & Manhattan subway in Sixth Avenue. If a west side subway south of Forty-second Street were built many of the passengers from the north would proceed downtown by this route. The present east side subway in Fourth Avenue would then be freed from its present congested traffic, and could accommodate the passengers brought by the Steinway tunnel from Queens and the New York Central Railroad. It will pass under the proposed Lexington Avenue subway, and can be made to connect therewith. Practically all of the surface lines of the northwestern portion of Queens could be brought to Manhattan by this tunnel or made to connect therewith."

The legal status is then taken up and the history of the litigation given in detail, after which the terms proposed by the company are set forth. They are, in brief, that the company should transfer all its property rights in the tunnel and franchise, and that the city should pay therefor in city bonds at par "the actual cost to the Interborough" for construction, real estate, interest charges, etc., these approximating $7,239,476, the exact and final figure to be arrived at by an independent audit.

It was proposed that the city should enter into an operating contract with the New York & Queens County Railway for 25 years, the expenses of operation to be equally divided, a 5-cent fare to be charged to any point in Queens County and the city to receive as its share of the proceeds all "local" fares, which were to be estimated at twice the fares received at the two Long Island City stations. When these proceeds should have equaled the amount advanced for operating expenses by the city, interest on city bonds and all arrears, the surplus, if there was one, was to be divided equally.

Taking up this proposal, Mr. Weber, the commission's chief statistician, found at the outset that the company's books showed that nearly $8,600,000 had been expended, including a bonus for quick work by the contractor in an effort to complete the tunnel before the franchise expired, legal expenses, and similar items. Some of these items Mr. Weber questioned the advisability of including in the purchase price, notably "legal expenses for furthering legislation" and "payment for franchises to other than public authorities," but he took the two possible "costs," $7,240,000 and $8,600,000, and found that under the cost of $7,240,000 the annual expense to the city would be $427,500 and that under the cost of $8,600,000 the annual expense to the city would be $480,000, estimated as follows:

	On basis of $7,240,000 Cost	On basis of $8,600,000 Cost
A—Interest on bonds at 4 per cent	$289,600	$344,000
B—Interest on cost to complete tunnel ($310,000)	12,000	*
C—Interest on cost to rebuild station ($300,000)	12,000	12,000
D—Sinking fund of 1 per cent on the above amount	78,500	89,000
Total fixed charges	$392,500	$445,000
E—One-half operating cost, estimated at	35,000	35,000
Total annual expense to city	$427,500	$480,000

*This item is included in $8,600,000.

Mr. Weber concluded that the number of local fares would not be in excess of 1,500,000, or at most 2,000,000 in the first year. Taking 1,500,000 fares as the city's share of the proceeds of operation and the annual costs before mentioned, Mr. Weber gave the two possible deficits as $352,500 and $405,000, depending on what the actual cost of the property was.

Oklahoma Railway Increases Wages.—The Oklahoma Railway, Oklahoma City, Okla., has increased the wages of its motormen and conductors from 17, 18½ and 20 cents an hour to 18, 20 and 22 cents an hour, according as they have been in service one, two or three or more years.

Connection Completed Between Buffalo and Erie.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has completed the bridge over Chautauqua Creek at Westfield, thus making possible the operation of through cars between Buffalo and Erie. The bridge and approaches are 1436 ft. long and the span is 1100 ft. long.

Strike at Rome, Ga., Declared Off.—The strike of the employees of the Rome Railway & Light Company, Rome, Ga., which was begun in October, 1908, has been declared off. Former employees against whom there were no charges of misconduct have been reinstated by the company as far as vacancies would permit.

Conductor Killed by Breaking of Trolley Pole.—A peculiar accident occurred on one of the cars of the Northern Ohio Traction & Light Company at Cuyahoga Falls, Ohio, on Dec. 30, in which a conductor was killed. The pole of a car running at high speed left the wire and after bounding against several span wires broke, and one end was thrown through the vestibule window. It struck the conductor and fractured his skull and he died before reaching the hospital at Akron.

Rights of New York Railway to Sell Power.—The right of the Interborough Rapid Transit Company, New York, to deliver power to the New York City Interborough Railway without first obtaining permission from the Public Service Commission or the city authorities was upheld on Jan. 5 by the Court of Appeals of New York. The City of New York and the Public Service Commission sought to prevent such sale by injunction. The decision by the Court of Appeals confirms a ruling by the Appellate Division of the Supreme Court of New York State dated April 10, 1908.

Removal of Offices of Third Avenue Railroad.—The Third Avenue Railroad, New York, is renovating and extending its car house at 129th Street and Third Avenue, and will move its main offices to that point as soon as the changes are completed. The present car house at Sixty-fifth Street and Third Avenue will still be used for the storage of cars and as a repair shop and all of the main repairs of the company will be carried out there. J. S. McWhirter will retain offices at Sixty-fifth Street and Third Avenue, but F. W. Whitridge, receiver of the company, T. F. Mullaney, chief engineer of the company, and the officers of the accounting department will move to the 129th Street car house.

Chicago & Oak Park Elevated Railroad Ordinances.—After a discussion lasting several months it appears that the city authorities of Chicago and the Chicago & Oak Park Elevated Railroad may soon come to an agreement regarding track elevation and franchise limits. The city has asked Clarence A. Knight, president of the company, to sign a contract ordinance providing for the elevation of the road in Austin, in return for which the city will permit the company to build its proposed Humboldt Park extension and rearrange the stations along its right of way. The Mayor, however, does not agree to a 14-year extension of the franchise for the main line. President Knight is reported to have said that he will recommend to the directors that they agree to elevate the tracks through Austin at once.

Lynchburg Traction & Light Company's Employees' Benefit Association.—At the seventh annual meeting of the Lynchburg Traction & Light Company's Employees' Benefit Association, held recently, A. T. Powell, secretary and treasurer, reported that since the organization of the association seven years ago, $8,002.40 had been paid out in benefits and that during the past year 33 sick benefits had been paid, amounting to $642.14 exclusive of medical attendance. There are now 102 members and the assets are placed at $3,847.65. The following officers were elected at the meeting: R. D. Apperson, president; A. E. Anderson, vice-president; A. T. Powell, secretary-treasurer; Rev. J. L. Nichols, chaplain; Dr. J. W. Devine, physician; S. H. Cochran, D. C. Frost, R. L. Stabler, J. T. Thornhill, W. G. Loving and W. A. Paris, trustees.

Financial and Corporate

New York Stock and Money Markets

January 5, 1909.

The stock market to-day was weak and unsettled on account of the decision adverse to the Consolidated Gas Company, of New York, which was handed down yesterday by the United States Supreme Court. As soon as the decision was made known the stock broke almost 30 points and the net loss to-day amounted to 13. The feeling resulting in the decline in this stock has been reflected in all of the active issues, and losses have been the order of the day. The volume of sales has been well above the 1,000,000 mark for each of the two days. So far as other news is concerned, there is nothing to disturb the serenity of the trading. In fact, there are many encouraging features and the tone is generally buoyant. Recent monthly railroad reports have shown substantial gains over the corresponding months of the previous year, and this should have the effect of strengthening the entire list. Reports of improvement in conditions are arriving from managers of industrial corporations, although the improvement is more gradual than many had anticipated would be the case.

The bond market continues to be strong. The $30,000,000 issue of the St. Louis & San Francisco 5 per cent bonds, subscriptions for which were opened on Jan. 5, were so largely over-subscribed in advance that the subscription books were closed immediately after they were opened. These bonds were quoted on the curb, even before the subscription books were opened, at ¾ to 1 per cent advance on the subscription price. The report that the Pennsylvania Railroad is to put out an issue of $60,000,000 to $80,000,000 bonds has created wide interest.

The money market is practically where it has been for the last few weeks. The supply still seems plentiful, loans are only in normal demand and the rates remain cheap. Call money to-day was quoted at 2 to 2½ per cent, and 90-day paper at 3 to 3¼ per cent.

Other Markets

In the Boston market, the activity of Boston Elevated rights was the principal feature in tractions. Several thousand shares of these change hands daily at prices ranging from 3¼ to 3¾. There has also been some trading in Elevated stock, in Suburban, and in both issues of Massachusetts Electric.

Both Philadelphia Rapid Transit and Union Traction continue to be active in the Philadelphia trading. The former has been especially strong and active and has sold up in the neighborhood of 26. The rumors regarding a possible dividend on Brooklyn Rapid Transit stock and the excellent results recently attained in earnings by that company served greatly to strengthen Brooklyn Rapid Transit and caused considerable trading in the stock. Interborough-Metropolitan was also traded in to some extent in Philadelphia.

Little was done in traction issues in the Chicago market, even the various issues of the Chicago Railways being much duller than usual. A few shares of Subway stock changed hands at about 28.

In the Baltimore market, United Railway bonds continued to be sold. The 4s were quoted at 85½ to 85⅝ and the incomes at 52.

Quotations of various traction securities as compared with last week follow:

	Dec. 29.	Jan. 5.
American Railways Company, Philadelphia	45½	*45
Boston Elevated Railways	123½	126
Brooklyn Rapid Transit Company	67½	69⅛
Chicago City Railway	180	180
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a76	—
Consolidated Traction Company of New Jersey, 5 per cent bonds	a104½	—
Detroit United Railway	*53¾	*53¾
Interborough-Metropolitan Company	18⅝	18¼
Interborough-Metropolitan Company (preferred)	47¼	48¼
Manhattan Railway	153	151⅜
Massachusetts Electric Companies (common)	11¾	12
Massachusetts Electric Companies (preferred)	58	59
Metropolitan West Side Elevated Railway, Chicago (common)	11	16
Metropolitan West Side Elevated Railway, Chicago (preferred)	50	50
Metropolitan Street Railway	50	42
North American Company	74⅞	74
Philadelphia Company, Pittsburg (common)	44	43¼
Philadelphia Company, Pittsburg (preferred)	44⅛	44
Philadelphia Rapid Transit Company	23½	24⅞
Philadelphia Traction Company	90⅞	90½
Public Service Corporation, 5 per cent collateral notes	a99½	—
Public Service Corporation certificates	a75½	—
Twin City Rapid Transit Company, Minneapolis (common)	96¼	97⅝
Union Traction Company, Philadelphia	50⅜	51¼

a Asked.
*Last sale.

Annual Report of Boston Elevated Railway

The annual report of the Boston Elevated Railway for the year ended Sept. 30, 1908, presented at the meeting of shareholders on Jan. 4, contains a discussion by President W. A. Bancroft in relation to the great capital improvements which the company has been obliged to make. An abstract of the statement of President Bancroft is given herewith:

"The sum of $200,000 was charged out of earnings and credited to the depreciation fund, but, as the value of worn-out equipment which was disposed of during the year offsets that amount, no actual addition was made to the depreciation fund.

"The Washington Street tunnel, which was opened on Nov. 30, 1908, has proved admirably adapted to the purpose for which it was intended, has diminished congestion, and very much increased the facilities of the company for carrying its passengers.

"Besides this thoroughfare, which will cost, with its approaches and equipment, not less than $9,000,000, and which has been leased to the company for the term of 25 years at an annual rental of 4½ per cent upon its cost, the company is committed to the completion of the elevated extension to Forest Hills, to the building of the Cambridge subway, to the construction of an elevated connection between the Park Street tunnel and the Cambridge Main Street subway, to the lease of the Park Street tunnel, to the building of the East Cambridge elevated extension, to the building of an extension to Malden and Everett, and to a lease of the Riverbank subway. The completion of these various undertakings, together with the Washington Street tunnel and the normal additions to the surface lines, will, within the next five years, impose on this company charges at least as heavy as the company ought to meet.

"Having regard to the existing conditions, not only to the demands of our patrons, but also to the congested conditions of traffic, and to the needs of our system, we believe that none of the undertakings above recited could have been avoided, but we believe, also, that we can, for the present, go no further in assuming additional burdens. Our free transfer system has grown up to the detriment of our revenue, so that we ought to get some relief from its abuses. We may count upon some reduction in operating expense and a progressive increase in revenue. But the present rate of wages we should not wish to reduce any more than we should wish to impair the present high standard of service. We believe that the public will recognize that our present facilities are, for the present, suitable, and will not jeopardize what is admittedly our efficient service. Efficient service can be supplied only when it is joined to reasonable prosperity on the part of the company. This fact is pointed out because, in the zeal for new subways and other thoroughfares, the means necessary to supply them are frequently overlooked.

"Concerning the capitalization of the properties owned and leased by this company, your directors wish you to know that the capital stock of the West End Street Railway on Sept. 30, 1908, was as follows: Preferred, $6,400,000; common, $11,120,150; total, $17,520,150.

"Of this capitalization the preferred stock was the amount authorized by the Legislature for the purchase of the horse railroads which made up the West End system, and was considered only the value of these properties. Of the common stock $7,150,000 was paid in in cash at par, and the balance was sold under orders of the Railroad Commissioners for cash at prices ranging from 40 to 80 per cent in excess of the par value, realizing a premium to the amount of $2,117,049.

"Of the $13,300,000 par value of the stock of the Boston Elevated Railway the first $10,000,000 was paid in in cash at par, and the balance was sold under orders of the Railroad Commissioners for cash at a price 55 per cent in excess of the par value, realizing a premium of $1,815,000 above the par value. The present capitalization of the two companies, therefore, represents an actual payment in cash of $3,932,049.13 above par value of the outstanding stock. The amount of this cash premium has been invested in the properties now owned by the companies, so there is not only no capital inflation of these properties, but much more has been paid in than is represented by the par value of the stocks. The dividends paid on the stocks and the interest paid on the bonds of the two companies make an average return to the capital invested of something less than 5.12 per cent per annum. It is not true, therefore, of these properties that 'excessive dividends are paid on watered stock.'

"Besides its ordinary taxes the company's contribution to the public during the last fiscal year amounted to at least $405,089.76, made up as follows:

Compensation tax for the use of streets under the act of 1897	$117,188.52
Interest at 4 per cent on $4,200,971, cost of paving laid in streets by company	168,038.84
Cost of maintaining street paving by company	66,645.45
Amount of subway rental devoted to sinking fund	45,716.95
Moving snow removed from sidewalks and roofs (estimated) not less than	7,500.00
Total extraordinary payments to the public	$405,089.76
Add taxes assessed on real estate	298,326.80
Add taxes assessed on capital stock	569,803.58
Total	$1,273,220.14
To the above may be added the balance of the subway rental.	159,805.00
Also the rental of the East Boston tunnel	51,685.09
Grand total, which is about 10.5 per cent of the gross revenue of the company for the year	$1,484,710.23

"The company has continued its liberal policy toward its employees in respect to their wages, as well as in other matters. Compensation for learners during the year amounted to $16,203. There was paid during the year the sum of $59,625 as a guaranteed minimum wage for new or extra men. There was also paid as increased compensation to long service men the sum of $68,781. There was paid in pensions, under the provisions recited in former reports, the sum of $12,523. There was also paid in 'satisfactory service' money, in sums of $15 to each of the employees deemed worthy thereof, the sum of $53,430. The aggregate sum of increased payments to employees, under the provisions adopted five years ago, amounted during the year to $210,562. The provisions of last year raising the rate of wages increase this amount by $135,670, making a total of $346,231."

The following report of the business during the year was presented:

Gross earnings from operation		$14,074,697
Operating expenses		9,454,386
Net earnings from operation of owned and leased lines		$4,620,311
Subway rental	$223,316	
Less amount collected from the Boston & Northern St. Ry.	17,794	
	$205,522	
Interest on funded debt of West End St. Ry.	668,280	
Dividend on preferred stock of West End St. Ry., 8 per cent	512,000	
Dividend on common stock of West End St. Ry., 7 per cent	758,841	
Dividend on stock of Somerville Horse R. R., 6 per cent	9,180	
Taxes on West End St. Ry.	574,112	
Interest and taxes on leased property of the Old Colony St. Ry.	40,537	
Interest on leased property of the Boston & Northern St. Ry.	746	
Total payments on account of leased railways		2,769,219
		$1,851,092
Interest on funded debt	$521,353	
Less interest accrued this year charged to construction account	173,216	
	$348,137	
Taxes, Boston Elevated Ry.	294,018	
Compensation tax under Act of 1897	117,189	
East Boston tunnel rental	51,685	
Depreciation fund	200,000	
		1,011,029
Balance		$840,063
Dividend No. 14, paid Feb. 15, 1908, 3 per cent	$399,000	
Dividend No. 15, paid Aug. 15, 1908, 3 per cent	399,000	
		798,000
Surplus for the year		$42,063

The gross earnings from operation of $14,074,697 compare with similar results of $13,952,966 in the previous year, and $13,527,185 in the year ended Sept. 30, 1906.

The number of revenue passengers carried was 273,132,584, an increase of 2,047,769, or 0.75 per cent.

The operating expenses were divided as follows: General expenses, $947,967; maintenance of roadway and buildings, $782,847; maintenance of equipment, $1,144,750; transportation expenses, $6,578,822.

The statistics of traffic compare as follows:

Year ending Sept. 30.	1906.	1907.	1908.
Round trips	5,474,872	5,606,616	5,571,459
Revenue miles, surface	42,337,873	44,027,731	43,818,640
Revenue miles, elevated	7,718,735	7,802,457	7,806,503
United States mail cars	224,178	231,381	232,746
Revenue miles total	50,280,786	52,061,569	.....
Total revenue passengers carried	262,267,240	271,084,815	273,132,584
Average receipts per passenger	$0.04998	$0.04997	$0.04989

Boston (Mass.) Elevated Railway.—The directors of the West End Street Railway have sent to the stockholders of the company copies of the correspondence that has passed between W. A. Bancroft, president of the Boston Elevated Railway, and Joseph B. Russell, president of the West End Street Railway. The directors of the West End Street Railway say they have no intention of consolidating until the Legislature has acted upon the amendment now before

it, providing that the dividend on the second preferred stock to be issued for the West End Street Railway common stock shall be at the rate of 8 per cent per annum after June 10, 1922, when the lease expires, instead of 7 per cent. President Bancroft in his reply says: "I am authorized by the directors of the Boston Elevated Railway to say that up to the present time they have taken no steps to effect a consolidation of the companies and that they will take no such steps unless the West End Street Railway will actively co-operate toward that end."

Chicago (Ill.) Railways.—As there are $18,500 of the underlying bonds of the Union Traction Company, Chicago, still outstanding out of a total of $25,412,500, the Chicago Railways have authorized the Harris Trust & Savings Bank, Chicago, depositary, to accept deposits up to Feb. 1, 1909, so that the holders of the securities still outstanding may receive the benefits of the reorganization plan.

Chicago (Ill.) Consolidated Traction Company.—The bondholders' committee of the Chicago Consolidated Traction Company has extended from Dec. 31, 1908, to Feb. 1, 1909, the time for the deposit of the following underlying bonds of the north division of the Chicago Consolidated Traction Company: Chicago Electric Transit Company; North Chicago Electric Railway; North Side Electric Street Railway; Chicago North Shore Street Railway, and Evanston Electric Railway. The Harris Trust & Savings Bank, Chicago, is depositary.

Compania de Tramvias de Mexico, S. A., Mexico, Mex.—F. S. Pearson, president of the Compania de Tramvias de Mexico, is reported to be negotiating for the purchase of the Chihuahua & Pacific Railroad and the property of the Sierra Madre Land & Lumber Company in behalf of the Canadian syndicate which controls the Compania de Tramvias de Mexico.

Gainesville (Ga.) Electric Railway.—The sale of the property of the Gainesville Electric Railway has been ordered for Feb. 20 by Judge William T. Newman in the United States Circuit at Atlanta, under foreclosure of a mortgage for which the Knickerbocker Trust Company New York, is trustee.

Lake Superior Corporation, Sault Ste. Marie, Mich.—Horatio G. Lloyd has announced that Robert Fleming, London and New York, was the purchaser of the securities of the Lake Superior Corporation from Philadelphia institutions. It is understood that Mr. Fleming represents English and Canadian capitalists, who, with Edward J. Berwind and his associates, now control the Lake Superior Corporation. These capitalists are also understood to have acquired all the other holidings of the Canadian Improvement Company, which include a large amount of stocks and bonds of the Lake Superior Corporation and subsidiary companies. The Lake Superior Corporation will be refinanced and new members will be elected to the directorate of the company to represent the new interests. The company owns directly or through control of the Ontario Lake Superior Company, the capital stock of the Lake Superior Power Company, International Transit Company and the Trans-St. Mary's Traction Company, which operates the electric railway at Sault Ste. Marie, Mich.

Mattoon City (Ill.) Railway.—W. T. Avey has been discharged as receiver of the Mattoon City Railway by the Coles County Circuit Court and the company will resume possession of its property with Marshall E. Sampsell, Chicago, as president.

Philadelphia, Coatsville & Lancaster Passenger Railway, Parkesburg, Pa.—The property of the Philadelphia, Coatesville & Lancaster Passenger Railway has been sold at foreclosure to a committee of bondholders for $126,000. Of the $600,000 bonds authorized, $380,000 had been issued.

Utica & Mohawk Valley Railway, Utica, N. Y.—The Public Service Commission of the Second District of New York has granted the receivers of the Hudson River Electric Power Company permission to lease to the Utica & Mohawk Valley Railway the steam power plant and property located at Utica, the substations at Little Falls, Frankfort and Oriskany and the high-tension transmission line from Utica to Clark Mills. The lease has been approved by the United States Circuit Court for the Northern District of New York. A contract was entered into on March 20, 1905, between the Hudson River Electric Power Company and the Hudson River Water Power Company and the Utica & Mohawk Valley Railway, whereby the Hudson River companies agreed to furnish electricity generated at the Utica plant for a term of 20 years to the Utica & Mohawk Valley Railway. The receivers have found that under the contract electrical energy has been delivered at a loss and cannot be delivered at the contract price without loss and the lease has been determined upon in the public interest.

Traffic and Transportation

Rules Governing Employees and Operation Asked by New York Commission

The following order has been adopted by the Public Service Commission of the Second District of New York, and has been served on the electric railway companies within its jurisdiction:

"Whereas, The reports of investigations of accidents upon street surface railways made to this commission during the year 1908 indicate that a very large proportion of all the accidents so investigated upon such roads during the past year have resulted from one of the following causes, namely:

"1. Failure on the part of the company to adopt a set of rules for the government of employees;

"2. Failure on the part of companies to adopt a proper running schedule;

"3. Defects in rules;

"4. Violation of rules by employees.

"Whereas, The methods employed in securing efficient and capable employees; the methods employed in maintaining such efficiency and capability of employees; the character of rules and schedules adopted by such companies seriously affect the foregoing causes of accidents; and to the end that it may properly discharge the duties imposed upon it by Section 47 of the Public Service Commissions Law, it is important that the commission have all attainable information in regard to each of the above items in the operation of all such roads; therefore,

"Ordered, That each and every operating street surface railway under the supervision of this commission be and it is hereby required and directed, pursuant to the provisions of Section 45 and Section 46 of the Public Service Commissions Law, to furnish and report to this commission on or before Feb. 1, 1909, the following papers and information, to wit:

"1. Five copies of all printed rules governing employees in the operation of its road;

"2. Five copies of the running schedule in effect on this date;

"3. One complete set of blanks used in the employment of motormen and conductors;

"4. A statement showing what instructions, either on the road or in the shop, are given applicants for the positions of motorman and conductor, and how much time, if any, must be spent by him in each case;

"5. A statement showing the methods employed, in addition to the use of blanks, in ascertaining the qualifications of applicants for the positions of motorman and conductor;

"6. In cases where the system includes city and suburban lines, whether promotions are made from the city to the suburban lines; if so, what examinations are motormen and conductors applicants for promotion required to pass;

"7. Does the company maintain a school of instruction for applicants for motormen and conductors; if so, give full description of equipment in school and methods employed in conduct of same;

"8. A statement showing what methods are employed by operating officials to keep informed of the efficiency and capability of motormen and conductors;

"9. What records, if any, are kept of the violations of rules by motormen and conductors;

"10. Any other information on the subjects of maintaining discipline of employees, disclosing accident situations, and suggestions which may in the opinion of the chief operating officer be of use to the commission in investigating the causes of accidents so far as they relate to defective rules or running schedules and lack of discipline of the employees."

Twin City Rapid Transit Company to Publish Its History

The Twin City Rapid Transit Company, Minneapolis, Minn., began the publication in the daily papers of Minneapolis on Jan. 5 of a series of 27 full-page articles covering the history of the company from its beginning to the present time. The announcement of the proposed articles was made in a full-page advertisement in the papers of Minneapolis, signed by C. G. Goodrich, vice-president. This announcement was addressed to the people of Minneapolis, and was as follows:

"After 35 years of labor in organizing and building up the present business and system of the Minneapolis Street Railway, the management has decided to publish in the daily papers a series of articles covering the history of the company from its beginning to the present date.

"The company's history is so closely identified with that of Minneapolis and its citizens since 1873, that it will un-

doubtedly bring back to many of the older inhabitants recollections of the past, and refresh their memories as to the growth of the city since that date.

"To those who have, in more recent years, come to make Minneapolis their home, this history will be interesting and instructive and will give them a better idea of the foundation and growth of the city of their adoption, as well as new information regarding the character of the men who laid that foundation and made possible the phenomenal growth and expansion of Minneapolis and its street railway system.

"These articles are published for the purpose of giving the public a clearer conception of what the company has accomplished during the past 35 years, the large amount of work involved in bringing the property to its present state of high efficiency, and the revenue which must be received if the property is to be kept sound financially and the company enabled to anticipate the demands of the future for extensions of the system and improvements of the service.

"It is believed that this history will prove sufficiently interesting and instructive to warrant the reader in following each article in succession until the entire series is complete, and thus obtain a full appreciation of the growth and development of the street railway system of the city."

Central Electric Traffic Association

A. L. Neereamer, chairman of the Central Electric Traffic Association, Indianapolis, Ind., addressed the following communication to the electric railways in Indiana which are members of the association, under date of Jan. 2, 1909:

"Referring to Bulletin 18, of Dec. 29, calling a meeting of the Indiana lines which are members of the Central Electric Traffic Association at the office of the association, for the purpose of considering matters regarding the Indiana Retail Merchants' Association Convention on Jan. 19 and 20, the lines represented adopted the following resolutions which are herewith submitted for your information.

"*Resolved*, That as a general proposition, no reduced rates will be made by the interurban lines for the Retail Merchants' Association Convention, but that each line reserves the right to meet any local condition which may arise, incident to this convention.

"*Resolved*, That the Indiana lines, so far as possible, be represented officially in Indianapolis during the time of the Retail Merchants' Association Convention to advertise their properties and become acquainted with the various merchants located upon interurban lines, thereby establishing friendly relations which would result in increasing business for each line during the coming year."

Additional Limited Service Between Ft. Wayne and Indianapolis.—The Ft. Wayne & Wabash Valley Traction Company will probably establish an additional limited service between Ft. Wayne and Indianapolis via Bluffton in February. Schedules and rates of fare have not been decided upon. The present limited service between Ft. Wayne and Indianapolis will be continued.

Indiana Company Abolishes Indianapolis Freight Office.—The Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind., has abolished its Indianapolis office which has been in charge of J. W. Mettlin, general freight agent, and all traffic will hereafter be handled under the supervision of the Crawfordsville office.

More Pay-As-You-Enter Cars in New York.—The Third Avenue Railroad, New York, is drilling its employees in the operation of pay-as-you-enter cars, preparatory to installing 135 of these cars in regular service on Jan. 10. The new cars were described in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1908, p. 1411. The car bodies are 28 ft. long and the total weight of car and trucks fully equipped is 37,000 lb. The company expects within a few days to distribute to the employees a special book of instructions regarding the new cars. The patrons of the company have been appraised of the change in operation by the following notice posted in the cars on Jan. 1: "On Jan. 10, 1909, new pay-as-you-enter cars will be run on the Third Avenue line. Each car will have a fare box on the rear platform. Passengers are requested to have their nickels ready, but the conductors will furnish change, if necessary. Conductors will not be allowed to handle the fares. Each passenger will put the fare in the box, but will hand transfer tickets to the conductors. Passengers desiring transfers must ask for them at the time they put their nickels in the box. Conductors are not allowed to issue them afterward. Passengers are not allowed to enter the car from the front platform, but leave it from either the front or rear platform."

Personal Mention

Mr. L. J. Perry has resigned as vice-president of the Vallejo, Benicia & Napa Valley Railroad, Napa, Cal.

Mr. Robert W. Pomeroy has been elected a director of the International Railway, Buffalo, N. Y., to succeed Mr. Henry J. Pierce, resigned.

Mr. W. B. Parsons and Col. Millard Hunsicker have been elected directors of the London United Underground Railways Company, London, Eng.

Mr. John F. Dryden, president of the Prudential Insurance Company, Newark, N. J., has been elected a director of the Public Service Corporation of New Jersey, to succeed E. F. C. Young, deceased.

Mr. John Wheeler has been appointed superintendent of the Western New York & Pennsylvania Traction Company, Olean, N. Y., to succeed Mr. J. W. Barnes, resigned. Mr. Wheeler was formerly assistant superintendent of the company.

Mr. E. L. Kasemeier has been appointed auditor of receipts of the Ohio Electric Railway. The office of the auditor of receipts will be located at Springfield, Ohio. The auditor's office and the other general offices will remain in Cincinnati.

Mr. E. R. Lilienthal has been elected president of the Northern Electric Railway, Chico, Cal., to succeed Henry A. Butters, deceased. Mr. Lilienthal was formerly vice-president of the company. No successor has yet been chosen to succeed him in that office.

Mr. Frank I. Hardy has been appointed superintendent of the Fort Wayne & Wabash Valley Traction Company to succeed Mr. Robert T. Gunn, who resigned some time ago to become general manager of the Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.

Mr. George W. Lang has been appointed assistant superintendent of the Ottawa (Ont.) Electric Railway. Mr. Lang entered the employ of the company in 1892 as a conductor, and after four years of service was appointed inspector, in which capacity he served on various divisions of the road.

Mr. Theodore P. Shonts, who has been president of the Interborough-Metropolitan Company, New York, for the last two years, and chairman of the executive committee of the Interborough Rapid Transit Company, New York, for some time, has also been elected president of the Interborough Rapid Transit Company and the Rapid Transit Construction Company to succeed Mr. E. P. Bryan, who resigned last October.

Mr. C. L. Addison has been elected president of the New York & Long Island Traction Company and the Long Island Electric Railway, Hempstead, N. Y., vice Mr. F. L. Fuller, resigned; Mr. William O. Wood has been elected a director of both companies, vice Mr. F. L. Fuller, resigned, and vice-president, vice Mr. C. L. Addison, resigned, and Mr. Alfred A. Gardner has been appointed counsel of both companies, vice Mr. Van Vechten Veeder, resigned.

Mr. Remi Remont has resigned as secretary and treasurer of the Interstate Railways Company and the United Power & Transportation Company, Philadelphia, Pa., and Mr. T. W. Grookett has been elected treasurer of the companies. Mr. William A. Rosen has been elected assistant treasurer of both companies, and Mr. John W. Goodwin has been elected secretary of both companies. The office of vice-president of each company will not be filled until after the respective annual elections have been held.

Mr. F. A. Persons has been appointed superintendent of the Concord, Maynard & Hudson Street Railway, Maynard, Mass., to succeed Mr. John W. Ogden, resigned, who has been appointed an inspector of the Railroad Commission of Massachusetts. Mr. Persons has been engaged in electric railway work about six years. He was formerly with the Connecticut Valley Street Railway, Greenfield, Mass. He has been in the employ of the Concord, Maynard & Hudson Street Railway about four years, and has served in the mechanical, accounting and operating departments of the company in various capacities.

Mr. George F. Faber, general superintendent of the Western Ohio Railway, Lima, Ohio, has resigned from that company. Mr. Faber was formerly superintendent of the Elgin & Belvidere Electric Railway, Elgin, Ill., and at one time was superintendent of the Central Market Street Railway, Columbus, Ohio. The duties heretofore performed by Mr. Faber as general superintendent will be divided between Mr. Ernest Riddle, special agent, who will hereafter have the title of superintendent of operation, and Mr. Malcolm Baxter, master mechanic, who will hereafter have the title of superintendent of motive power.

Mr. Walter J. Jones, consulting engineer for the Interstate Railways Company, Philadelphia, who was associated for three years with Dr. F. A. C. Perrine, who died recently, will continue the consulting engineering practice of Dr. Perrine from New York. After serving four years in the pattern shop and 3½ years in the drafting room of the Dickson Manufacturing Company, Scranton, Pa., Mr. Jones engaged for five years in equipping street railways and in installing power plants in a number of States. Subsequently he was connected in turn with the Suburban Electric Light Company, Scranton, Pa., the Bergen County Gas & Electric Company, Hoboken, N. J., the Stanley Electric & Manufacturing Company and the American Construction Company, New Orleans.

Mr. A. T. Hoyle, acting superintendent of the Glens Falls division of the Hudson Valley Railway, Glens Falls, N. Y., has been formally appointed superintendent of that division of the company. Mr. Hoyle began his railroad career about 20 years ago in the train service of the Delaware & Hudson Company, serving on both the Pennsylvania and Susquehanna divisions of the company and finally becoming conductor and yardmaster. On March 1, 1901, he resigned from the Delaware & Hudson Company to become train dispatcher on the Hudson Valley Railway, and on May 1, 1902, was appointed chief dispatcher, which position he held until Aug. 1, 1908, when he was appointed acting superintendent of the Glens Falls division of the company.

Mr. Romie W. Wilson has been appointed superintendent of construction for the Manchester Traction Light & Power Company, Manchester, N. H., to succeed George N. Burpee, deceased. Mr. Wilson is a native of Champlain, Clinton County, New York, and was born in 1872. In 1895 he entered the employ of the Manchester Electric Light & Power Company as an arc light trimmer, on the commercial circuit, and was kept on this work for 19 months, after which he was on inside wiring for 2½ years. Subsequently he served about two years in outside construction, after which he was appointed general foreman of outside work. Mr. Wilson entered the service of the Manchester Traction, Light & Power Company when that company took over the Manchester Electric Light & Power Company.

Mr. H. D. Murdock, who has been mechanical and electrical engineer of the Indianapolis & Louisville Traction Company, Louisville, Ky., was recently appointed superintendent of the company. The office of mechanical and electrical engineer has been abolished. Mr. Murdock has been identified with electrical work since 1892, when he became connected with the construction department of the Westinghouse Electric & Manufacturing Company. After more than 13 years' experience with this company in constructing and equipping plants, he resigned to become superintendent of the Fifty-second Street shop of the Brooklyn Rapid Transit Company. He remained with the Brooklyn Rapid Transit Company about two years and then accepted the position of mechanical and electrical engineer of the Indianapolis & Louisville Traction Company, which operates its lines with 1200-volt direct current.

Mr. J. W. Mettlin has resigned as general freight agent of the Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind. Mr. Mettlin began his railroad career when a mere boy during the construction of the Lake Erie & Western Railway, and upon the completion of the road entered the train service of the company. Soon afterward he entered the train service and yard department of the Toledo, St. Louis & Western Railway and three years later became a clerk in the yard department of this company, rising finally to the position of traveling auditor. Subsequently, he served as traveling auditor for the Peoria, Decatur & Evansville Railway, the Louisville, Evansville & St. Louis Railroad and the Lake Erie & Western Railway. He was then appointed traveling auditor and special accountant for the Southern Indiana Railway. Leaving this company after two years' service he became traveling auditor of the Kansas City & Southern Railway. He has been associated with the Indianapolis, Crawfordsville & Western Traction Company as general freight agent for the last two years.

Mr. W. A. Gibbs, district manager of the central and eastern divisions of the Ohio Electric Railway, whose jurisdiction was recently extended over the Dayton and Richmond and Dayton and Union City lines, succeeding Mr. E. J. J. Sloat, resigned, is a New Englander by birth and is a graduate electrical engineer. He was appointed manager of the Zanesville Light & Power Company, Zanesville, Ohio, in 1905, and when Mr. J. R. Harrigan resigned as manager of the Columbus, Buckeye Lake & Newark Traction Company, soon after the property was acquired by the Schoepf interests in 1906, Mr. Gibbs was appointed to that position. When the properties of the Schoepf interests in Ohio were consolidated in 1907 as the Ohio Electric Railway, Mr. Gibbs was made district manager, with jurisdiction over the Buckeye Lake & Newark line, which became the eastern division, and the lines of the central division, which were formerly under the jurisdiction of Mr. J. L. Adams as general manager. Mr. Gibbs is preparing to move his headquarters to Springfield, where he will be nearer the center of the lines under his management.

Mr. Chas. G. Lohman has resigned as general traffic manager of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., and the duties which he has relinquished have been divided among the other officers of the company. Mr. Lohman, who was formerly general superintendent of the Chicago, South Bend & Northern Indiana Railway, was appointed general traffic manager of the company in October, 1908. Mr. Lohman has been identified with electric railroading for some 10 years. In 1899 he entered the employ of the Indianapolis (Ind.) Street Railway and served successively as inspector and division superintendent of that company, and subsequently as division superintendent of the Indianapolis Traction & Terminal Company, which succeeded the Indianapolis Street Railway. In 1905 he resigned from the Indianapolis Traction & Terminal Company to become superintendent of transportation of the Indiana Railway Company, at South Bend, Ind., and remained with this company until 1907, when he was appointed general superintendent of the Chicago, South Bend & Northern Indiana Railway. Mr. Lohman has not announced his plans for the future.

Mr. John G. Honecker, whose resignation as vice-president and general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., after serving for 26 years with the Johnson interests was announced in the Electric Railway Journal of Jan. 2, 1909, will continue to reside in Trenton, but will devote the balance of the winter to his interests at Reading, Pa., in the manufacture of gasoline engines for motor boats. Later, he will engage in construction work. Mr. Honecker entered the employ of Mr. Tom L. Johnson and the late Albert L. Johnson, when they were connected with the Brooklyn Street Railway, Cleveland, Ohio, in 1882. Mr. Honecker was then only 15 years old. In 1889 he resigned as paymaster and assistant secretary of the Brooklyn Street Railway to go to Denver, Col., to benefit his health, and while in Denver he worked on outside construction for the General Electric Company. Mr. Honecker went from Denver to Brooklyn as superintendent of the Marcy Avenue and Canarsie divisions of the Nassau Electric Railroad. When the Brooklyn Rapid Transit Company took over the Nassau Electric Railroad he was retained, but subsequently resigned to become connected with the Johnson interests in New York. In 1899 Mr. Honecker visited England and reported on the street railways in that country to the Johnsons. Upon his return from England, Mr. Honecker became connected with the Lehigh Valley Transit Company, Allentown, Pa., in which Mr. Tom L. Johnson and his brother were interested. In 1901 Mr. Honecker went to Trenton with the late Albert L. Johnson and helped to complete the Trenton, Lawrenceville & Princeton Railroad to Stony Brook. He returned to the Lehigh Valley Transit Company later and reconstructed the line between Philadelphia and Allentown so that the running time was reduced from four hours to three hours. In 1904 Mr. Honecker was elected vice-president and general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J.; he completed the Trenton, Newhope & Lambertville Street Railway, and reconstructed other lines, and the New Jersey & Pennsylvania Traction Company has recently built a large addition to its power house at Yardley, Pa., under his supervision. Mr. Honecker's popularity with the employees is attested by the recent presentation to him of a handsome diamond-studded watch charm, suitably engraved.

OBITUARY

Anson R. Flower, who was interested in a number of electric railway and lighting properties, died at his home in Watertown, N. Y., on Jan. 3, aged 66 years. Mr. Flower was born at Theresa, N. Y., on June 20, 1843, and was educated in the high school at Watertown. He came to New York in 1897 and engaged in the banking business with his brother, Mr. Roswell P. Flower, under the firm name of Flower & Company. After the death of Mr. Roswell P. Flower in 1899, Anson R. Flower became a special partner in the firm, devoting only part of his time to its interests. He was a director of the Brooklyn Rapid Transit Company; Nassau Electric Railroad, Brooklyn; Brooklyn Heights Railroad and the People's Gas, Light & Coke Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Phoenix, Tempe & Mesa Railway, Phoenix, Ariz.—Incorporated for the purpose of building and operating an electric railway between the cities named in the title. Board of directors: S. J. Tribolet, L. M. Hoghe, Ike Diamond, Andrew Nielson, Harry J. Bennett, M. L. Vieux and George Hageman. [E. R. J., Dec. 19, '08.]

***Victoria & Barclay Sound Railway, Victoria, B. C.**—Application will soon be made for a charter for this company for the construction of a line from Victoria by way of Otter Point and San Juan to a point on Barclay Sound, near Sarita River. W. H. Langley is solicitor for the company.

***Clinton, Danville & Peoria Railroad, Chicago, Ill.**—This company has been incorporated to construct a 20-mile line from Fithian to the State line east of Georgetown. Principal office, Chicago. Capital stock, $200,000. Incorporators: R. K. Hammond, J. K. Dering, W. S. Bogle, Henry Hafer, J. F. Hitt, Glenn W. Traer and Johnson E. Ford, all of Chicago.

***People's Railway, Woodstock, Ont.**—This company is applying for a charter to construct a road from Woodstock to Arthur by way of New Hamburgh, Berlin, Fergus and Elora. Bonding powers to the extent of $20,000 a mile are asked.

Mercer County Street Railway, Greenville, Pa.—Application has been made to the State Department for a charter for this company to build an electric railway from Greenville to Mercer and Sharon. The company will succeed the Mercer Construction Company which holds the present charter. Incorporators: James M. Campbell, Frank F. Filer, L. W. Orr, Mercer, and S. D. Downs, Greenville. [S. R. J., March 7, '08.]

***Regina (Sask.) Interurban Tramway.**—This company has been incorporated to construct an electric railway from Regina to Long Lake and from that point a circular line running round Regina. Surveys are now being made, and it is expected that work will commence in the spring. Capital stock, $350,000. Incorporators: J. L. R. Parsons, Regina; R. R. Barber, Georgetown, Ont.; C. J. Harris, Brantford, Ont.; W. M. Logan, J. F. Frame, Regina; J. H. Houser, Toronto, Ont.

Otter Creek Electric Railway, Wallingford, Vt.—This company has been chartered to build an electric railway from Rutland to Bennington, traversing the towns of Wallingford, Danby, Clarenden, Dorset, Manchester, Sunderland, Shaftsbury, Arlington and into Bennington, a distance of about 50 miles. Capital stock, $50,000. Incorporators: J. H. Senter, Montpelier; H. B. Barden, L. S. Whitney, S. C. Saunders and J. S. Jones, Wallingford. [E. R. J., Dec. 5, '08.]

FRANCHISES

Pensacola, Fla.—John E. Stillman, Henry M. Yonge and R. B. Simpson have applied to the City Council for a franchise to build an electric railway, beginning at the intersection of Sixteenth Avenue and Cervantes Street to the city limits. [E. R. J., Jan. 2, '09.]

Pittsfield, Mass.—The Board of Aldermen has granted to the Pittsfield Street Railway a franchise to double track its lines from Park Street to Pontoosuc Lake.

***Shangville, Mont.**—An ordinance has been passed by the Board of Aldermen granting W. A. Clark a 99-year franchise for the construction and operation of an electric railway in Shangville. The road will occupy the site now used by the Northern Pacific, as the main line, and along Hix Avenue and past the City Hall, Weston.

Brantford, Ont.—The City Council has passed a by-law allowing the Brantford Street Railway an extension of time in which to fulfil its former agreement with the city, its franchise, granted a year ago, to be sustained on condition that the agreements stated in the previous by-law and somewhat amended be carried out. The company is to give the city, within two months, a bond for $25,000 as a guarantee that the agreement will be adhered to.

***Welland, Ont.**—It is reported that C. H. Burgar, Welland, is endeavoring to secure a franchise for an electric railway to run from the Grand Trunk to the Michigan Central with branches from the Michigan Central to Air Line and from Air Line to Port Colbourne, Ont.

Philadelphia, Pa.—Mayor Reyburn, on Dec. 29, signed the Delaware Tunnel Railway Company's ordinance authorizing the construction of two passenger and freight railway tubes under the Delaware River. [E. R. J., Jan. 2, '09.]

St. Lambert, Que.—The Town Council of St. Lambert has passed the by-law granting a franchise to the Montreal & Southern Counties Railway through St. Lambert across the Victoria Bridge and into the city of Montreal, making its terminus at the foot of McGill Street. The by-law will be submitted to the citizens of the town, who will be asked to vote on it on Jan. 14. [E. R. J., Nov. 21, '08.]

Chehalis, Wash.—The Chehalis City Council has passed the ordinance granting an electric railway franchise to W. J. Patterson, Theodore Hoss and A. Welch for a 35-year period. The same parties have already secured a franchise at Centralia.

***Weston, W. Va.**—The County Court has granted a franchise to Dr. George I. Keener for a term of 50 years for the construction and operation of an electric railroad from Weston to Bendale. Work must commence within six months and the road must be completed within a year.

Edgerton, Wis.—An application has been made to the City Council by the Cincinnati Construction Company for a franchise to construct and operate an electric street railway upon certain streets of Edgerton. Work is to be started within 18 months and the line is to be in operation not later than three years from the date of passage of the ordinance.

TRACK AND ROADWAY

Little Rock & Hot Springs Electric Railway, Little Rock, Ark.—Louis Garrett, general manager of this company, is said to have announced that bids for the construction of the road will probably be advertised for within a few days. The length of the road will be 51 miles. Its terminals will be in Little Rock and Hot Springs, traffic arrangements with local traction lines having been made. There will be an hourly service between the two cities. The company will do both a passenger and freight business. The overhead trolley system will be installed on the entire line. [E. R. J., Nov. 14, '08.]

Warren-Bisbee Railway, Bisbee, Ariz.—It is officially stated that this company will construct about 3 miles of additional track during this year.

Redlands & Yucaipe Electric Railway, Redlands, Cal.—W. D. Larrabee writes that this company has completed about 1 mile of track, but work has been suspended for the winter months. Construction is to be resumed early in the spring. The line will connect Redlands, Yucaipe City and Oak Glen, and will be 22 miles in length. The motive power will be electricity. Capital stock, $1,000,000; issued, $400,000. Bonds, authorized, $400,000. Officers: J. M. Neeland, Los Angeles, president; C. S. Chestnut, Redlands, vice-president; C. D. Myers, Redlands, secretary; W. D. Larrabee, Redlands, general manager and chief engineer. [S. R. J., May 23, '08.]

Waterbury & Milldale Tramway, Waterbury, Conn.—The ELECTRIC RAILWAY JOURNAL is advised that this company contemplates beginning construction of its projected line between Waterbury and Milldale this spring. The road will be about 8 miles in length and will be operated by electricity, the overhead trolley being used. The company has already secured a contract for lighting the town of Wolcott, Conn. Office: 95 Bank Street, Waterbury. Officers: Charles H. Clark, Milldale, president; John H. Cassidy, Waterbury, secretary; Edwin S. Todd, Milldale, treasurer. [S. R. J., May 23, '08.]

Electric Power Company, Jacksonville, Fla.—D. G. Zeigler writes that arrangements are now being made for the awarding of contracts for the building of this electric railway. It is expected that work will be started about Feb. 1. The total system when completed will be 250 miles in length, and it will connect the following cities: Jacksonville, Fernandina, Waycross, Valdosta, Live Oak, Lake City, White Springs, Gainesville, Newberry, etc. It will be an electrically operated line, power being generated at a station which the company will build on the Suwanee River, about 3 miles from White Springs. The repair shops will also be located near the site of the power plant. About 120 cars will be purchased and placed in service upon the completion of the road. In addition, Mr. Zeigler states that the company contemplates furnishing power for lighting, heating and cold storage in the territory traversed by the road. Headquarters, Jacksonville. Capital stock authorized, $3,000,000; issued, $1,000,000. Arrangements are now being made for the disposal of $750,000 in bonds. Officers: W. B. Owen, president; J. L. Lynn, vice-president; J. H. Philips, secretary and treasurer; D. G. Zeigler, general manager, purchasing agent and chief engineer, all of Jacksonville. [E. R. J., Oct. 31, '08.]

Chicago & Southern Traction Company, Chicago, Ill.—The directors of this company have authorized the extension of the company's lines from Kankakee to Lafayette.

Illinois Inland Traction Company, Chicago, Ill.—This company has completed the survey and secured the franchises and rights-of-way for building its railway from Crete, Ill., to Momence, Ill., a distance of 20 miles. This line will pass through Goodenow, Beecher, Solitt, Grant Park and Momence. At Crete the line will connect with the Kankakee branch of the Chicago & Southern Traction Company's lines, and will serve as a feeder for this railway. Construction work will begin early in 1909, but it is not expected the line will be in operation before some time in 1910. W. H. Conrad, vice-president of the Chicago & Southern Traction Company, is one of the promoters of this new line. Headquarters, 731 First National Bank Building, Chicago.

Albia Interurban Railway, Albia, Ia.—This company has completed the construction of its line from Albia to Hiteman, which gives it, including the line built last year to Hocking, 10 miles of interurban road north and south of Albia. The Engineering, Construction & Securities Company, Chicago, had full charge of the engineering and construction work. It is also proposed to extend the line to Buxton early next spring, 9 miles due north from Albia.

Iowa Railroad, Eldora, Ia.—Andrew Stevenson writes that this company contemplates awarding all contracts between January and April, this year, for the construction and equipment of its proposed interurban railway. It is planned to begin work about May 1. The following cities will be connected by this road: Waterloo, Cedar Falls, Grundy Center, Eldora, Hubbard, Radcliffe, Story City, Ames, Des Moines, Boone, Berry, Conrad and Marshalltown. The system will have about 127 miles of standard gage single track. The motive power will be electricity. The power plant and repair shops will be located at Eldora, Ia. It is the intention of the company to furnish power for lighting to towns along the route of the projected road. Capital stock, authorized, $100,000. Headquarters: 153 La Salle Street, Chicago, Ill. Officers: Henry S. Osborne, 1402 Ashland Avenue, Chicago, Ill., president; Andrew Stevenson, Chicago, first vice-president, general manager and purchasing agent; James F. Hardin, Eldora, second vice-president and treasurer; L. W. Harris, Eldora, secretary; George W. Scott, 1301 Security Building, Chicago, electrical and chief engineer. [E. R. J., Oct. 10, '08.]

Manhattan City & Interurban Railway Company, Manhattan, Kan.—The Electric Railway Journal is advised that this company has completed its line for a distance of about 2 miles. It will be standard gage and will be operated by electricity, the overhead trolley being used. Power for the operation of the road will be received from the company's power station, which is now in course of erection. Headquarters: 109 North Fourth Street. Officers: W. R. West, Minneapolis, Minn., president; Joseph T. West, Manhattan, Kan., secretary, treasurer and general manager; F. C. Harris, Manhattan, chief engineer. [E. R. J., Oct. 3, '08.]

Kentucky & Ohio River Interurban Railroad, Paducah, Ky.—According to an official report, it is the intention of this company to begin the construction of its projected line between Paducah, Ky., and Cairo, Ill., this spring. It is to be a standard-gage electric road, 34 miles long, and it is planned to equip it with the overhead trolley. Eight cars will be operated upon the completion of the system. The power station and repair shops will be built at Paducah, Ky. Capital stock, authorized, $250,000; issued, $14,000. Bonds, authorized, $1,000,000. Office: 226½ Broadway, Paducah. Officers: L. B. Whitesides, Franklin, Ind., president; John J. Freundlich, Paducah, vice-president and general manager; C. H. Clark, Indianapolis, Ind., secretary; F. N. Whitesides, Franklin, Ind., treasurer; F. V. Whitesides, Paducah, electrical engineer; J. E. Jolliffe, Paducah, chief engineer. [E. R. J., Sept. 19, '08.]

Bangor Railway & Electric Company, Bangor, Maine.—It is stated that this company is making plans to replace the old track on the Hammond Street line with new next season. The 30-lb. rail will be replaced with the 70-lb. standard rail. The new work will be done from the junction of Hammond and Union Streets nearly to the end of the line, which is a distance of about a mile.

Western Massachusetts Street Railway, Westfield, Mass.—It is stated that this company has under consideration a plan to build a line from East Lee to Huntington over a new survey just completed, which goes south of the old line and nearer Otis Center; also the Great Barrington and Canaan road and a spur track from Great Barrington to Egremont.

Kansas City, St. Joseph & Excelsior Springs Railway, Kansas City, Mo.—Announcement is made that this company contemplates beginning the construction of its projected line early this spring. The road will connect Kansas City, St. Joseph, Excelsior Springs and Liberty, Mo., and will be 110 miles in length. It is the intention of the company to adopt the overhead trolley system. Office: 309 Keith & Perry Building, Kansas City, Mo. Officers: J. J. Heim, president; James F. Halpin, vice-president; Wm. J. Knapp, secretary and treasurer; J. G. Hedrich, chief engineer, all of Kansas City, Mo. [E. R. J., Dec. 12, '08.]

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company has completed and opened its line as far as Erie, Pa.

Canandaigua & Southern Electric Railroad, Canandaigua, N. Y.—George H. Switzer, president of this company, writes that it has not as yet been definitely determined when construction will be started on this new line. The road will have a total of 40 miles of standard gage track, connecting Canandaigua, Centerfield, South Bloomfield, Vincent, Bristol, Bristol Center, Bristol Springs, Naples, North Cohocton and Atlanta. It will be a single-phase line, and the company has decided to install the overhead trolley system. Power from Niagara Falls will be used for operating the proposed system. Capital stock, authorized and issued, $1,000,000. Bonds, $2,000,000. Officers: George H. Switzer, Bath, president, general manager and chief engineer; E. G. Hayes, Canandaigua, vice-president; H. C. Hatch, Atlanta, secretary; D. H. Maxfield, Naples, treasurer; E. D. Hamlin, 20 Court Street, Brooklyn, attorney. [S. R. J., Dec. 21, '07.]

Troy, Rensselaer & Pittsfield Railroad, Troy, N. Y.—This company, incorporated to build an electric road, 35 miles long, from Troy, has filed its report with the Public Service Commission for the year ending June 30. It shows that the company has surveyed 2½ miles of road and expended $48,147 for the year, making a total expenditure so far of $65,700, of which $51,942 went for track and road construction and $13,000 for organization. The company has a capital of $350,000, of which $35,000 has been issued.

Whitehall & Granville Railroad, Whitehall, N. Y.—The Vermont Senate has passed a bill amending the charter of this company and allowing it to construct a road into Vermont. The proposed road may be built through Poultney to Granville, or direct from Whitehall to Granville and terminating at West Pawlet, Vt.

Cleveland, Brooklyn & Elyria Railway, Cleveland, Ohio.—It is officially announced that this company is planning to begin construction on its proposed line this spring. The projected railway will connect the following cities: Cleveland, Elyria, Barberton, Orrville, Millersburg, Coshocton and Zanesville. The motive power will be electricity, and it has also decided to adopt the overhead trolley system. In addition to generating current for the operation of its road, the company also expects to furnish power for lighting to cities along the route. Capital stock, authorized, $100,000; issued, $90,000. Headquarters: 319 Citizens' Building, Cleveland, Ohio. Officers: J. J. Breitinger, Cleveland, president; W. E. Brooks, Elyria, vice-president; J. H. Knisely, Jr., Toledo, secretary; B. E. Ottman, Cleveland, treasurer. [E. R. J., July 11, '08.]

***Windsor, Ohio.**—S. Stoughton, Windsor, advises the Electric Railway Journal that the Painesville & Youngstown Railroad is only a project, which will be submitted to the public this month, when some of the promoters will hold a meeting at Painesville. A company will be formed and a charter applied for.

Brantford (Ont.) Street Railway.—It is reported that this company will remodel its entire system and will also build a line from Brantford to Dover within a few months.

Fort William, Ont.—The city is asking the Provincial Legislature to sanction a debenture by-law for $170,000 for the extension of the street railway system.

Toronto & York Radial Railway, Toronto, Ont.—This company has recently completed an extension to its system from Jackson's Point to Sutton, a distance of 1¼ miles.

Coos Bay Railway & Terminal Company, Marshfield, Ore.—It is announced that the work of building the electric railway on Coos Bay will begin this spring. All that is now desired by the company before starting on a $500,000 expenditure is a franchise to run cars through Marshfield. Franchises for North Bend and the intervening district have already been secured and some work at North Bend has been done. The road, according to the company's plans, is to extend from North Bend to Marshfield and then on to Millington, and from North Bend across Pony Inlet to Empire, and on down the coast to Sunset Bay, which is being made a summer resort. The company has advertised for bids for the construction of a tunnel 430 ft. long in North Bend to go under Montana Avenue. The power house for the line is located at Porter, half way between North Bend and Marshfield, and is large enough to supply light for both cities, as well as running the road. The plant

is now about completed, and is designed to meet the demands of a city of 30,000 people. Six boilers and a Westinghouse power plant have been installed in the new building. [E. R. J., Sept. 5, '08.]

Rogue River & Oregon Southern Railway, Grant's Pass, Ore.—G. A. Collins writes that the work of constructing this road, which is to link Grant's Pass and Kirby, Ore., has not yet commenced, but it is the intention of the company to begin work about April 1. The motive power will be electricity and the overhead trolley system will be installed. Capital stock, $1,000,000. Officers: H. B. Buddenborg, 511 Marion Street, Seattle, Wash., president; G. A. Collins, Grant's Pass, vice-president, general manager and chief engineer; O. S. Blanchard, Denver, Col., secretary. [E. R. J., Oct. 31, '08.]

United Railways, Portland, Ore.—It is announced that beginning Feb. 1, regular passenger and freight trains will be operated by this company over its new line between Portland and Holbrook, a distance of 16 miles. A portion of the equipment to be used in this service has been ordered and will arrive within a few weeks. The line between Portland and Linnton has been completed, grading and bridges between Linnton and Holbrook are completed, and the steel is being laid for that portion of the line. It is said that work will begin on freight terminals and sheds and the car shops of the new company at the North Portland terminals within a few days. The line is complete between Portland and Linnton, which includes 3 miles of standard gage track within the city limits, including the track on Front Street and on Fourth Street, and the 6 miles of track from the city limits to Linnton. On the section between Linnton and Holbrook the grading has been completed, the bridges and culverts are in and the company is laying steel. Beyond Holbrook the line is nearly completed to Summit, 2 miles farther west, where a 9000-ft. tunnel is being driven. The tunnel work is largely through rock. The roadbed is being ballasted with crushed rock; there is no grade over 1½ per cent and no curve over 4 per cent.

Waynesburg & Monongahela Electric Railway, Waynesburg, Pa.—W. J. Sheldon writes that contracts for the construction of the first section of this projected road, from Millsboro to South Brownsville via Millsboro, a distance of 20 miles, will be let this month. At the same time orders will also be placed for the necessary equipment for operating the first complete section of the system. Construction will begin immediately after the awarding of these contracts. The line when completed will be about 95 miles in length, and it will extend through the following cities: Waynesburg, Washington, Jefferson, Clarksville, Mariana, Millsboro, Frederickstown, Mount Morris, Carmichaels, Rice's Landing, Greensboro and South Brownsville. The track will be broad gage and the overhead trolley will be installed. The power plant will be built at Waynesburg, and the repair shops at East Waynesburg. A subsidiary company will be organized for furnishing power for lighting and heating. Headquarters, People's National Bank Building, Waynesburg. Capital stock authorized, $84,000, to be increased to $3,000,000; issued, $28,000. In conclusion, Mr. Sheldon states that this company expects to purchase and operate the Sabraton Railway, which operates a line between Morgantown and Sabraton, 3 miles; to take over and construct the Uniontown, Brownsville & West Side Railway, now being built from Bridgeport through Brownsville and Uniontown, and also the Brownsville, Masontown & Smithfield Street Railway, Masontown, Pa. W. J. Sheldon, 507 North Park Avenue, McKeesport, Pa.

Lakeview Traction Company, Memphis, Tenn.—This company on Dec. 24 began the construction of an interurban electric railway between Memphis and Lakeview, Miss. The entire 12 miles of the line between Memphis and Lakeview have been graded, with the exception of a few short stretches, which will be finished within a few days.

Nashville (Tenn.) Interurban Railway.—The last spike in this road, extending from Nashville to Franklin, Tenn., was driven on Dec. 24, just 75 days from the driving of the first spike at the Nashville end by Mayor Brown of Nashville. The road will be about 19 miles in length.

Fort Worth, Tex.—Stuart Harrison, who is at the head of the Fort Worth & Mineral Wells Interurban Railway, is reported to have said that C. B. Duffy, accompanied by Judge A. G. Mosely, St. Louis, and Luke Cates, Tennessee, will arrive in Fort Worth within a few days with a view to forming a company for the proposed line. [E. R. J., Sept. 19, '08.]

Northern Texas Traction Company, Fort Worth, Tex.—Work is being rapidly pushed on the extension of this company's lines to Washington and Fostepeco Heights and adjacent communities, which was begun this week. Both this and the construction of the bridge over Marine Creek are now under headway, and it is said that the cars will be running over the new tracks within a few weeks. The extension is 2 miles long, and will connect with the stock yards line at its present terminus, Main and Twenty-fifth Streets.

Ogden (Utah) Rapid Transit Company.—It is stated that during this year the Ogden Rapid Transit Company will make a number of improvements and extensions to its system. Among the most important will be the building of an extension through Ogden Canyon, and on to Huntsville and Eden Valley. Another is the extension of the line which has but recently been electrified to the Utah Hot Springs, 10 miles due north of the city—and on to Brigham City. Right of way and franchises have all been secured for this extension. Another city extension which is planned is the building of a line into the First Ward, extending it on Wall or Lincoln Avenues, from Twenty-fifth to Thirty-first Street, and connecting on the latter street by a loop with the Washington Avenue line. Another extension will be the building of a line down Seventeenth Street, on which work is already started.

Thunder Creek Transportation & Smelting Company, Tacoma, Wash.—H. J. Fuller writes that up to the present time no contracts have been awarded for the construction of this line. It is the intention of the company to award contracts soon, as it is planned to begin work early this spring. The line will be 22 miles in length and will connect a number of mines, smelters and townsites in Washington. It will be an electric road and will be equipped with the overhead trolley system. Power will be furnished along the route for mining purposes. Capital stock, authorized, $1,000,000. Headquarters: Bankers' Trust Building, Tacoma, Wash. Officers: A. M. Richards, president; G. Senior, vice-president; W. W. Shenk, secretary and treasurer; Fuller & Manley, chief engineers, all of Tacoma. [E. R. J., Sept. 26, '08.]

SHOPS AND BUILDINGS

Kansas City Railway & Light Company, Kansas City, Mo.—Plans are being completed for the erection of a new car house to include nine tracks, each 100 ft. long. It is expected that this structure will be erected in the spring.

Forty-second Street, Manhattanville & St. Nicholas Railway, New York, N. Y.—Plans have been filed for a new four-story car depot to be built by direction of Receiver Frederick W. Whitridge, on the site of the old car house of this company in Manhattan Street, east of Twelfth Avenue. It will have a frontage of 114 ft. and a depth of 181 ft. and will be of brick with stone trimmings. The new building will cost $58,000.

Portland (Ore.) Railway, Light & Power Company.—This company has recently opened a new freight station. The station and offices occupy a building 50 ft. x 216 ft., the eastern end containing the offices in a space 48 ft. x 50 ft. The new building is located on East Clay and Water Streets. With the adjacent yards and sidings the company owns about a mile of waterfront at this point. Wide spaces on the sides of the new station provide trackage for about 30 cars, and arrangements are made for unloading cars on one side and for loading on the other.

POWER HOUSES AND SUBSTATIONS

New Hampshire Electric Railways, Haverhill, Mass.—This company is said to have under consideration the erection of a new power plant. The place selected is stated as being located on Pelham Street, Methuen, Mass.

Cincinnati (Ohio) Traction Company.—This company is said to have completed plans for a new power station on the north side of Heck Street, between Foster and St. Andrews Streets. The structure will be of brick, steel and concrete, and it is estimated that when completed it will cost $33,000.

Puget Sound Electric Railway, Tacoma, Wash.—This company expects to place in operation within a few weeks a new substation in Puyallup. The station, now being erected near the Northern Pacific Railroad tracks in the eastern part of the city, when completed, will represent an outlay of from $35,000 to $40,000. The machinery cost about $25,000 and the brick building with the concrete foundations cost approximately $10,000. The station will have a capacity of about 700 hp.

Seattle (Wash.) Electric Company.—Announcement is made that during this year the Seattle Electric Company will erect a new power station, terminal and car shops on property at East Jefferson Street and Thirteenth Avenue, Seattle.

Manufactures & Supplies

ROLLING STOCK

Union Electric Company, Dubuque, Ia., will soon ask bids for two or more closed cars, for delivery in September.

British Columbia Electric Railway Company, Ltd., Vancouver, B. C., is reported to be in the market for six sets of trucks.

Mason City & Clear Lake Railway, Mason City, Ia., will soon send out specifications for two 60-ft. cars for interurban service.

Sioux City, Crystal Lake & Homer Electric Railway, Sioux City, Ia., will probably place an order shortly for two or three new cars.

San Francisco, Oakland & San José Consolidated Railway, Oakland, Cal., is having five new cars built in the shops of the Oakland Traction Company.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio, is preparing to ask bids on a 50-ft. double-truck combination passenger and baggage car.

Morgantown Interstate Railroad, Morgantown, W. Va., expects to order three or four interurban cars early this year. The cars will be double truck, length over all, 40 ft.

Edmonton (Alberta) Radial Railway.—The Preston Car & Coach Company, Preston, Ontario, has been awarded the contract to build the six new double-truck cars referred to in the Electric Railway Journal of Nov. 28, 1908. With the motors the cars will cost $5,400 each.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., is preparing specifications for two new cars, which will be operated between Rochester and Auburn. The Beebe Syndicate, which owns the Rochester, Syracuse & Eastern, will also purchase another private car. It will be used on the various lines the syndicate controls by the officials when making inspection trips.

Third Avenue Railroad, New York City, which has issued specifications for 200 convertible cars, with pay-as-you-enter features, as referred to in the Electric Railway Journal of Dec. 19, 1908, and Jan. 2, 1909, announces that the contract will be let Jan. 11. It is understood that the specifications were changed after they were first drawn and this has occasioned some delay. The contract for the motors was placed two weeks ago.

Illinois Traction System, Danville, Ill., is sending out specifications for 10 of the 25 box cars which it was announced in the Electric Railway Journal of Dec. 19, 1908, the company would purchase. These 10 cars are to have end doors, and are to be lined throughout. They are to be provided with metal body bolsters, metal truck bolsters and brake beams. The cars are to be equipped with Tower couplers, Westinghouse H. D. 812 air brakes with F-36 triple valves. The cars are to have outside metal roofs. The extreme height of the cars is not to exceed 15 ft. over brake staffs.

Kansas City, Olathe, Ottawa & Iola Railway, Kansas City, Mo., advises that its initial order for car equipment for its line will consist of eight passenger cars and three 800-kw electric locomotives. The passenger cars are to be equipped with 125-volt a.c. motors and train control. The locomotives are to have a tractive power sufficient for hauling 700-ton trains at 30 m.p.h. They are to be equipped with pony trucks and both pantograph and trolley wheel current collectors. The announcement that this company would soon be in the market for new cars was made in the Electric Railway Journal of Dec. 12, 1908.

Chicago & Alton and the **Toledo, St. Louis & Western Railroads,** after making thorough tests, have placed orders with the Strang Gas-Electric Car Company of New York, for four motor cars for passenger service. It is stated that the manufacturer of the Strang car also has received an order from the Interborough Rapid Transit Company, New York City, for a gas-electric car, which will be equipped with fire apparatus and so designed that it may be used for pulling subway trains to a place of safety in case of fire or other accident. There are being built for use throughout the country 27 gas-electric cars similar in general design to the special car "Irene," which has been described in the Electric Railway Journal.

TRADE NOTES

Walker Trolley Company, Cleveland, Ohio, has recently been incorporated with a capital stock of $30,000 by F. G. Walker, A. H. Fraunfelder, D. P. Thompson, Benjamin Parmley and Parmley W. Herrick.

Quincy-Manchester-Sargent Company, New York City, announces that beginning with Jan. 1, 1909, the company's department of track devices will be operated under the familiar name, "The Q & C Company."

Bates Machine Company, Joliet, Ill., has recently installed for the Keokuk Electric Railway & Power Company, Keokuk, Ia., a compound 18-in. x 30-in. x 36-in. Corliss engine, direct-connected to a Crocker-Wheeler 400-kw, 600-volt railway generator.

Stuart-Howland Company, Boston, Mass., reports that its business is much improved and that more new orders are coming in than for months past. Business in commutators is especially brisk. The company recently received an order for 850 bracket arms.

F. Bissell Company, Toledo, Ohio, dealer in wholesale electrical supplies and machinery, announces than on Jan. 1, Walter S. Bissell, who had been associated with the company for a number of years as traveling salesman, was elected treasurer. Mr. Bissell brings to the position a thorough knowledge of the electrical business and an extended acquaintance among the trade.

W. E. Davis, vice-president of the Cleveland Construction Company, Cleveland, Ohio, has begun an inspection of several important California projects. These proposed undertakings include water-power plants, transmission systems and electric railways. It is stated that if the inspection shows the properties to be feasible the Cleveland Construction Company will establish an office in San Francisco where it may be in close touch with the work.

Scherzer Rolling Lift Bridge Company, Chicago, Ill., has received cable advices from Rangoon, Burma, that the new Scherzer rolling lift bridge across the Ngawun River is completed and opened for railroad traffic. This, the largest bridge constructed in Burma, has a movable span 220 ft. long, the total length of bridge being 820 ft. The bridge is constructed on the main line of the Burma Railways extension connecting Rangoon with Kyngin. The government authorities required the large movable span to expedite the railroad traffic and the heavy traffic on the river. The bridge was designed by the Scherzer Rolling Lift Bridge Company and manufactured in England at the works of Spencer & Company, Melksham, Wilts.

Industrial Instrument Company, Foxboro, Mass., which has been formed under Connecticut laws has a capitalization of $2,000,000, and will act as a holding company for the securities of several instrument and steam gage manufacturers. The incorporators include B. B. Bristol, E. H. Bristol, and W. E. Goodyear, all of Waterbury, Conn. These men have been for many years connected with the Bristol Company. The new holding company has acquired the entire capital stock of the Standard Gauge Manufacturing Company, recently of Syracuse, N. Y., and of the Standard Electric Time Company, of Waterbury, Conn. It is the purpose of this company to manufacture gages for all kinds of steam machinery. A branch office will be established at 50 Church Street, New York City.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y.—The January number of the *General Electric Review* contains a paper on "Foreign Transportation Problems," by E. F. Colyer, and an article on "Electric Drive in Railroad Shops," by John Liston.

Corrugated Bar Company, St. Louis, Mo.—The December number of the house organ of this company, which is called "Design Methods for Reinforced Concrete Construction," discusses reservoirs. The next bulletin will treat of conduits and sewers.

Goldschmidt Thermit Company, 90 West Street, New York City.—The pamphlet of this company issued for the fourth quarter of 1908, called "Reactions," discusses a number of improvements in foundry practice. The varied uses of thermit are described.

Pathé Frères, New York City.—The weekly Bulletin of this company contains notices of a number of new films, the principal of which is entitled "Two Very Unlucky Thieves." The company offers a number of new subjects in every bulletin that it issues.

Ohio Brass Company, Mansfield, Ohio.—This company has issued its monthly bulletin for January which contains information concerning conical strain insulators, new adjustable cross-overs, rail-bond test bars, and some echoes from the Atlantic City convention.

National Electric Lamp Association, Cleveland, Ohio.—The engineering department of this association has issued Bulletin No. 8, which is devoted to miniature incandescent lamps with carbon filaments. It contains a list of the regular types of miniature and candelabra lamps.

Stone & Webster, Boston, Mass.—Stone & Webster issue a reprint from their "Public Service Journal" showing the capitalization and earning power of the Stone & Webster street railway companies. The article was prepared by A. S. Michener, who is comptroller for Stone & Webster.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JANUARY 16, 1909 No. 3

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

The Massachusetts Commission on Transfer Abuse

We hope that the studied opinion of the Board of Railroad Commissioners of Massachusetts on the subject of fares and transfers on street railways will be read with great care and thoughtfulness by all State commissions and other public regulating bodies which have jurisdiction over railways. The opinion of this board on all subjects is received with respect. The commission recognizes (see ELECTRIC RAILWAY JOURNAL of Jan. 9, 1909, page 70) that the continued increased misuse of transfers "must finally present a situation where the companies may rightfully demand some restriction in their number or functions." There has been too general inclination on the part of some companies to accept the increased misuse of transfers as an inevitable condition which no amount of vigilance or effort could overcome. It is a mistake for any management, settling down in this fixed opinion, to cease taking energetic steps to locate the source of the abuse and improper use of the transfer privilege. When a public regulating body of the high standing of the Massachusetts commission expresses its opinion of the necessity of invoking a law against designing and evil-minded persons who deprive the public of its just rights by the abuse and misuse of transfers, it is not becoming for a company to fail to follow the wisest course that is open to it in its community to correct this evil.

Graphic Methods of Studying Controller Circuits

One of the most difficult problems in the instruction of motormen and shop employees is the explanation in a satisfactory way of the circuits of car controlling devices, both of the hand and contactor type. The ability to read electrical diagrams in terms of the actual apparatus is not readily acquired by men untrained in the more complex phases of motor and control relations; thus there is often a serious gap between the explanation of car wiring by drawings and the following out of the various controller changes in the physical equipment. In one recent instance where the short-circuiting of the No. 2 motor on the transition point was in question before a gathering of car house men, a full-sized controller was mounted on the platform of the room, with a diagram of the motor and rheostat connections at one side, the size of the drawing being just sufficient to match each finger with a line of the diagram. Then as the handle of the controller was turned through different steps the course of the current through the controller could be followed, passing from the fingers to the diagram and thence through the various motor leads as drawn, back to the ground connection in the controller itself. The use of a diagram of practically the full height of the controller set up at the side of the case thus affords a most flexible means of emphasizing particular conditions. By a series of these large diagrams, made up for regular and emergency conditions, the detailed features of the apparatus can be made plain much more rapidly than through the ordinary method of following out small-scaled drawings entirely apart from any practical apparatus, and if colored lines are employed in addition, the explanations of circuit complexities will be reduced to such simple terms as to be readily within the comprehension of even the most untechnical.

Remuneration for the Service

The communication signed by "Engineer," published elsewhere in this issue, contains one reference which we do not approve in relation to the subject of increased fares on some of the Massachusetts railways. The communication refers to the "financial difficulties of the lines which need a charitable nickel in the contribution box." We feel that the question is distinctly not one of charity. The street railways, or, it might be more proper to say, the holders of the bonds and stocks representing the capital investment in the property, do not accept an increased rate of fare as a matter of charity. The subject of adequate fares is a simple business proposition. If the service is needed in a community every effort should be made by the public to support the railway with revenues large enough to enable it, with efficient management, to earn a proper return on the reasonable investment. If the price of lumber is raised the consumer who pays the increased price may object strenuously, but he recognizes the force of an argument respecting the increased cost of production. The same principle applies to an increase in price in other commodities; the people of this country have come to accept higher prices as inevitable. Precisely the same argument applies when the subject of increased costs for the service of transportation is under consideration. Average costs per unit may be reduced by better operation and increased density of traffic, but economies of this nature may not be of sufficient extent to offset the rapidity with which increased expenses absorb more and come of the gross revenues.

Street Railways and the Newspapers

A feature of street railway development during the last few years is the extent to which many of the railway companies have been advertising in the daily papers to reach the public. One step in this direction was the advertisements taken by the companies which installed pay-as-you-enter cars to acquaint the public with the proper method of paying their fares on these cars. It is a great advantage to any company which has close relations with the public to be able to tell its story directly to its customers, and this fact is being realized, even by Mr. Rockefeller. Thus the Twin City Rapid Transit Company has just commenced the publication of a series of popular articles on its system, which will occupy full pages for a month in the leading daily papers of the district. The Denver City Tramway Company utilized a full page in one of the Denver papers on the last day in 1908 to give in its operating report for the year, statistics of work done during 1908 and that which is intended during 1909, and to print in large type the story of what the company is doing for the city in different ways. The United Railways & Electric Company, of Baltimore, issued a series of 10 bulletins last year. The Boston Elevated Railway Company employs the newspapers for announcements of changes in routes and other information which it wishes to bring prominently to the attention of its clientele. Nor is this practice confined to the larger companies. Roanoke and Lynchburg, not to mention others, have also followed this plan on a large scale.

Of course, a railway company is in a particularly good position through the advertising cards which it carries on its cars to make brief announcements. But these reach only those who are riding on the cars and the space available is not sufficient to say very much or to tell a continued story. Many companies reserve, however, the most prominent spaces in their cars for their own cards, and with the daily papers for emergency service and with company publications a very satisfactory scheme of publicity can be worked out.

Rivalry Lessens Accidents

In Kansas City, Mo., a desirable form of rivalry has been instituted between the platform men reporting at various car houses as to reducing the number of accidents. As described in detail elsewhere in this issue, the management posts a record sheet each month, showing the number of accident reports turned in by the men assigned to each depot. The figures for the corresponding month of the previous year are also given, so that comparisons may be made between different car houses and between different years. The results are that the men bend every energy toward forestalling any possibility of accident. They are not only more watchful in handling their equipment, but freely criticise fellow workmen who may be lax, and thereby jeopardize a good record at the end of the month. There is, of course, the possibility that this plan of comparing the number of accidents reported will tend to bring about a hesitation on the part of the conductors and motormen to report trivial accidents. However, proper observance of this feature by the department of claims and a comparison of the number of unreported accidents for one year or one period against former records will show whether there is laxity among the men in this respect. The chief point to be observed in the execution of this scheme is that it calls the attention of every motorman and every conductor to the grand total of the accidents, and thus the men are impressed with the expense occasioned by any carelessness on their part.

Motor Locations in Repair Shops

In many electric railway repair shops where the machines are group-driven by one or more motors, comparatively little attention is often paid to the location of the equipment to secure the best mechanical results without sacrificing the convenience of tool operation. The electric drive is so easily applied to the shop that it is natural to consider the tool arrangement the only point of importance and to locate the motors on the floor or overhead as appears most convenient at the time of installation. With direct-driven machine tools the maximum of flexibility is secured without loss of valuable space, the essential requirements being the availability of power circuits at all the important working bays of the shop, protection of the wiring from mechanical injury and tool location with reference to the special requirements obtaining at different periods. The higher initial cost of direct-driven tools, however, tends in many cases to discourage their use, although in large shops turning out an extensive volume of repairs, where operations are repeated many times a day and where the organization of the working force approximates that of a manufacturing plant, the individual drive deserves a much more general application than it has yet received.

The two main points to be decided in group driving are whether the motors shall be located on the floor or overhead and whether provision shall be made for throwing the different lines of shafting together in each group by locating the motor in the middle of the shaft. In many cases the mechanical side of the group drive receives too little attention. With poor shaft alignment in the bearings and neglected lubrication the friction losses in the pulleys and shafts may readily amount to the power consumed in the tools, and as the tools are often run light to save the trouble of starting and stopping them frequently, the total kilowatt-hours required by the installation will be largely those due to friction, normal and excessive. On the other hand, if the shafting is well designed and maintained, and if the tools are operated only when they are needed, the power cost will not be greatly in excess of that for an equivalent direct drive, although the same convenience will not be possible. In this connection a better drive mechanically is generally obtained when the motor for each set of tools is located in the middle of the shaft.

The installation of a motor for group driving on a reserved space on the shop floor can doubtless be accomplished at considerably less first cost than an overhead location and the speed of erection is bound to be much greater. In many cases the shop building does not permit the attachment of a motor weighing 750 lb. or more to the ceiling structure, but in cases where overhead suspension or mounting on a timber platform or set of small channel irons is possible, the location of the motor off the floor enables work to be done with greater facility of movement to and from the tools, avoids the danger of fouling the motor leads and control wiring with chains of traveling hoists and work in process of handling, affords the motor cleaner operating conditions and enables inspection and adjustments to be made without interfering with the rest of the shop. It is not a very difficult problem to erect a motor of the moderate capacity used in the average repair shop on the ceiling, either by using a temporary wooden A-frame and working upward from the floor by means of differential blocks or by cutting a hole in the floor above, attaching a chain hoist to a suitable support on the upper floor and pulling the motor into position. When the motor is being placed it is advantageous to be able to adjust the mechanical support, throwing the machine forward or backward slightly as the case requires, in reference to the line shaft. If the motor suspension is rigid without being incapable of future adjustment occasional friction readings of the current and voltage required to run the shafting light at a given speed will show the general mechanical condition of the drive and enable defects to be promptly corrected.

Future Terminal Electrification in Boston

The prospect is not bright for the early electrification of the steam railroad terminals in Boston, judging from the somewhat pessimistic letters sent to the Massachusetts Board of Railroad Commissioners by the four railroads entering Boston, abstracted elsewhere in this issue. President Mellen, of the New Haven, expresses confidence in the ultimate success of the single-phase system as installed on the New York division of his road between Woodlawn and Stamford, but does not become enthusiastic over the plan to install a similar system in and around Boston. He asks for at least a year's time before coming to a definite conclusion. A. H. Smith, of the Boston & Albany, submits estimates regarding the electrification of the suburban lines of that road to show that it would require an annual expenditure of $715,000 in fixed charges and operating expenses to secure a gross revenue of only $420,000. President Tuttle, of the Boston & Maine, says that he has not yet been convinced that electric operation can be wisely or economically substituted for steam locomotives on any portion of that system. President Adams, of the Revere Beach, considers the case on his property closed on account of evidence already submitted to the board.

Mr. Smith's estimate of the expense of electrification for the Boston & Albany seems high, but in the absence of the data on which it is based, it cannot be controverted. The gross revenue quoted is that at present, but Mr. Smith points out that there has been no increase in traffic on the suburban lines for the past 16 years, and assumes that there would be no great development following the electrification. Upon this particular point it is interesting to compare Mr. Smith's assumption with the evidence from some of the electrified suburban lines in Great Britain, because in none of the conspicuous examples of electrically equipped steam railroads in this country have there been material changes in schedules from those previously in force with steam locomotives. It is true no other plan may have been possible, but the result has been that one of the principal advantages of the change has been lost up to the present time.

Fortunately, we have the British testimony on this subject through a recent paper read before the Liverpool Engineering Society. H. E. O'Brien, engineer of electric traction of the Lancashire & Yorkshire, says that the electrification for 20 to 30 miles of suburban lines of that company and of the North Eastern Railway has resulted in a steady increase in passengers carried of 1,000,000 per annum. The Mersey Railway shows about the same rate of yearly increase, or a total gain of 78 per cent in six years. The Lancashire & Yorkshire uses motor cars and direct-current third-rail, the same system considered by Mr. Smith. As a result of three years' experience, Mr. O'Brien sums up the advantages of electric operation over steam for a given schedule as follows: (1) More rapid and more frequent train service can be given; (2) increase of 50 per cent in terminal facilities without capital expenditure; (3) cost of rolling stock reduced 20 per cent; (4) repairs to rolling stock decreased by from 10 per cent to 50 per cent; (5) running costs decreased by 30 per cent to 50 per cent. The disadvantages are: (1) Increased equivalent coal consumption by about 30 per cent; (2) slightly increased cost of track maintenance.

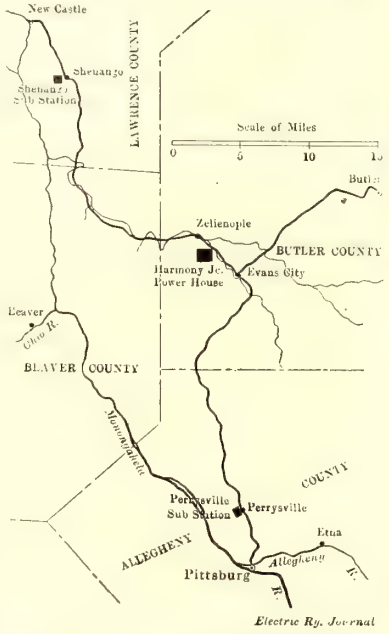
These figures afford some ground for believing that the estimate of 75 per cent operating ratio for the Boston & Albany is high.

The time may not yet be ripe for the electrification of the railroads entering Boston, but the letters to the board indicate an attempt to make out a case against electric operation, rather than in favor of it. Much depends on the point of view.

PITTSBURG, HARMONY, BUTLER & NEW CASTLE 1200-VOLT, D. C. RAILWAY

BY JOHN R. HEWETT

Although the Indianapolis & Louisville Railway was the first to be put into operation in this country with a potential of 1200 volts on the trolley, the Pittsburg, Harmony, Butler & New Castle Railway can claim the distinction of really being the pioneer road in this direction, as the plans and specifications for it were prepared at an earlier date. Both of these roads are under the same management and were built by the same engineer. James Bryan, of Pittsburg, is consulting engineer for both roads and was responsible for the choice of 1200-volt apparatus, and his faith in it has been well justified by the results attained. The personnel of this railway is as follows: President, R. H Boggs; vice-president, W. A. Goehring; superintendent, H. Etheridge; engineer of power house, C. A. Houghton. The map shows the districts served and the location of the power house and substations.



Map of Pittsburg, Harmony, Butler & New Castle Railway

The general scheme of electrification is as follows: Power is generated at Harmony Junction at 13,200 volts, 60 cycles, and fed to the Shenango and Perrysville substations by the transmission line at this potential. A substation in the power station takes care of the center portion of the system. The Butler section is fed by feeders. Synchronous motor generator sets in the substation transform the high potential alternating current to 1200 volts direct current, which is the working potential of the trolley.

The more important distances are New Castle to Shenango substation, 4.8 miles; Shenango substation to power house, 19 miles; power house to Perrysville substation, 21.75 miles; Perrysville substation to Pittsburg, 4.25 miles. The distance from the power house to Butler is 15 miles.

All of the system is operated on 1200 volts, with the exception of approximately 4 miles at the Pittsburg end, where the cars run over the city lines, which are operated at 600 volts.



Pittsburg 1200-Volt Line—Ellwood City Depot

POWER HOUSE

The power house is located at Harmony Junction, and its principal dimensions are as follows:

Engine room length, 120 ft.; width, 49 ft.; height to roof truss, 31 ft.; to apex, 47 ft.

Boiler room length, 120 ft.; width, 57 ft. 6 in.; height to roof truss, 31 ft.; to apex, 47 ft.

The more important items of electrical equipment are:

Two A. T. B. 8-pole, 1500-kw, 900 r.p.m, 13,200-volt, 60-cycle, vertical Curtis turbo-generator sets.

Two bipolar, 25-kw, 3600 r.p.m., 125-volt, horizontal Curtis turbine exciter sets.

The turbines are standard General Electric four-stage machines, with two rows of buckets per stage, and have mechanically operated valves and oil step bearings. They operate condensing, the usual vacuum attained being 28¼ in. or better. The exciter sets operate non-condensing.

Among the auxiliary apparatus may be mentioned two jet condensers, two horizontal feed pumps, two centrifugal



Pittsburg 1200-Volt Line—Buhl Bridge

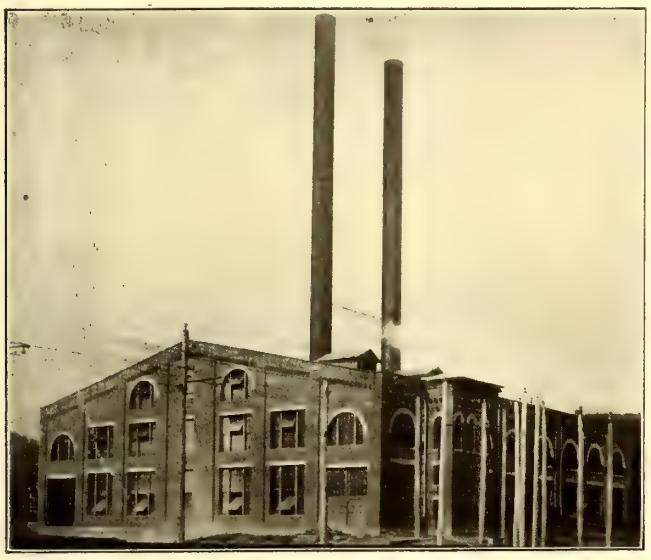


Pittsburg 1200-Volt Line—Grimm Bridge Spanning Connoquenessing River

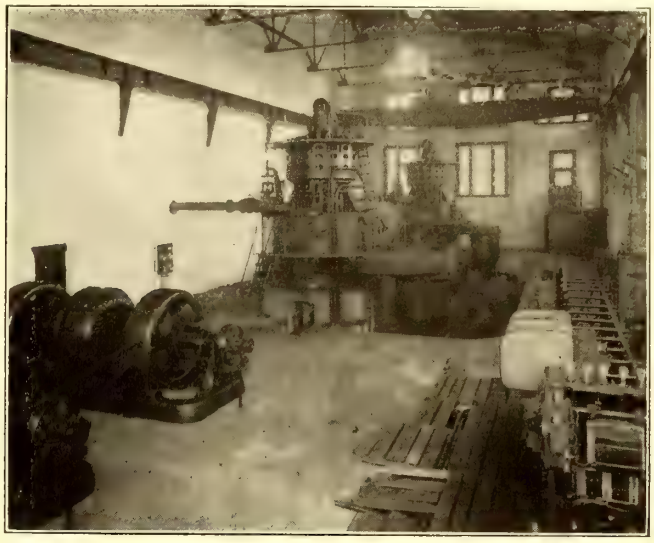
circulating pumps, two horizontal air pumps, two horizontal step bearing pumps.

All of these pumps are steam driven and were built by the Worthington Company.

A substation is located in the power house, but as the apparatus installed is similar to that in the other substations, it will be described later.



Pittsburg 1200-Volt Line—Exterior of Power House at Harmony Junction



Pittsburg 1200-Volt Line—Interior of Power House at Harmony Junction

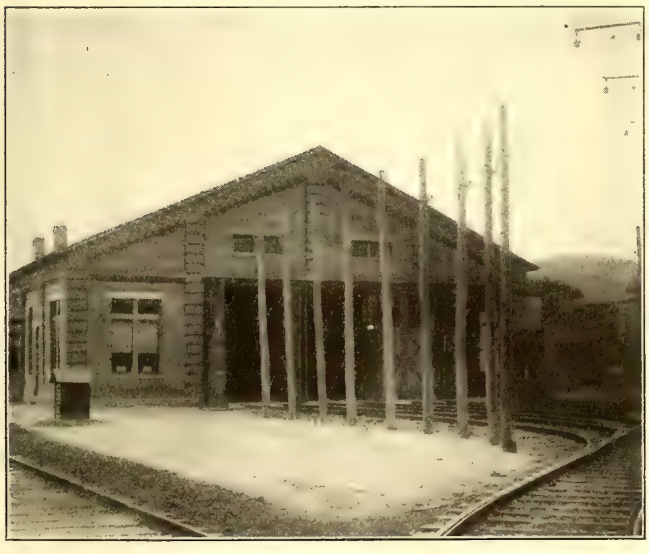
The present capacity of the power house is 3000 kw, but if conditions should warrant the installation of more apparatus, one of the end walls will be removed and additional turbines placed on the other side of the substation apparatus, leaving the present substation in the middle of the power house.

The present boiler equipment consists of four Babcock & Wilcox water-tube boilers, each of 480 hp, with a working pressure of 200 lb. per sq. in. These are arranged in two batteries and are hand fired.

The coal handling apparatus is simple, consisting of a pit running the length of the power house, with rails laid above, so that the coal can be dumped direct. A series of arches open from the pit to the boiler room floor. It may be of interest to note that the company has a coal mine immediately outside the power house, and coal is dumped directly into the coal bin.

SUBSTATIONS

There are three substations—one in the power house, one at Shenango and the third at Perrysville. The electrical equipment is the same in each, and includes three General Electric motor generator sets, each consisting of two 4-pole, 200-kw, 720-r.p.m., 600-volt, direct-current generators, direct driven by and mounted on the same base with one A.T.B. 10-pole, 425-kw, 13,200-volt synchronous motor. A 6-pole, 6-kw, 125-volt exciter for the synchronous motor field is mounted on the same shaft. Each motor generator has its own starting compensator.



Pittsburg 1200-Volt Line—Exterior of Car House at Harmony Junction



Pittsburg 1200-Volt Line—Span Construction Near New Castle

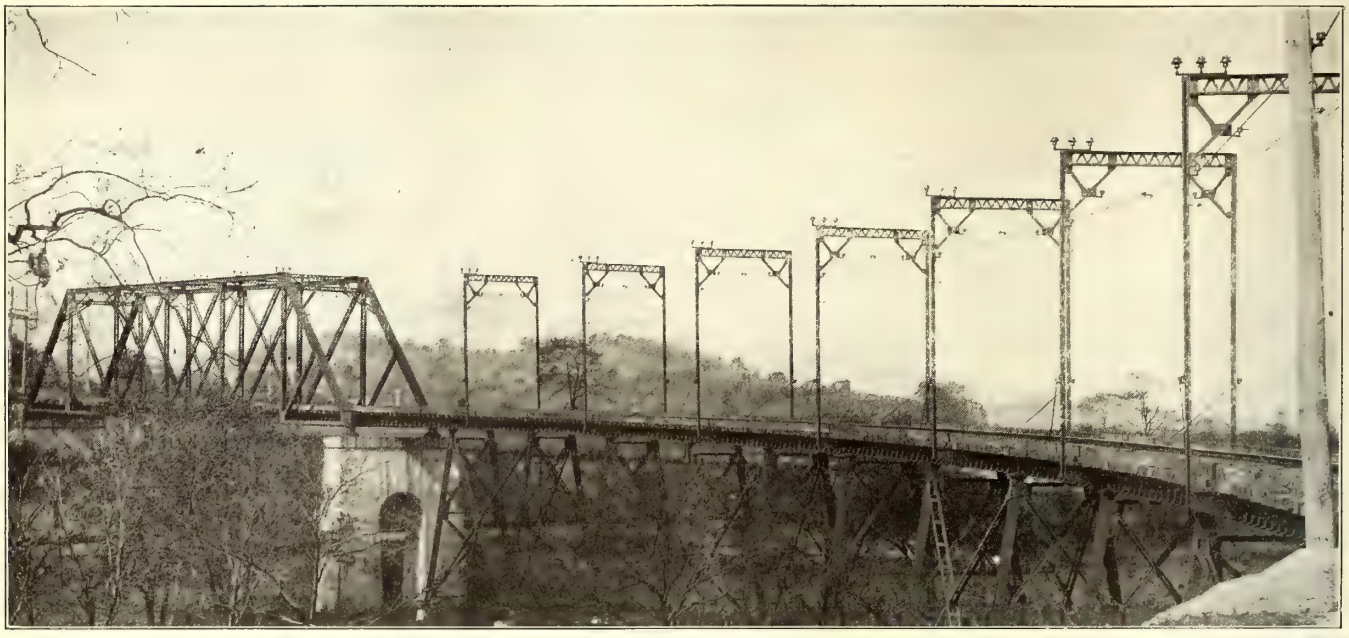
The switchboard in each substation comprises two 400-kw, 13,200-volt synchronous motor and exciter panels; two 400-kw, 1200-volt, d.c. generator panels; two 400-kw, 1200-volt, d.c. feeder panels, and two 1500-volt voltmeters and brackets.

The three-phase lightning arresters are of the multiple-

gap type. All of the oil switches in the substations are of form K-4.

The synchronous motors are started up on the a.c. side with the compensators in circuit. When full speed is attained the compensator is cut out and the motor direct connected to the 13,200-volt buses. The oil switches controlling these connections are interlocked to prevent the motors being thrown direct on the full voltage when starting up from rest.

The armatures of the d.c. generators are connected in series, with one terminal grounded, giving 1200 volts on the feeder bus to which the other terminal is connected. The generator fields are also connected in series through a single equalizer bus, to insure both machines taking a correct proportion of the load.



Pittsburg 1200-Volt Line—Luntz's Bridge

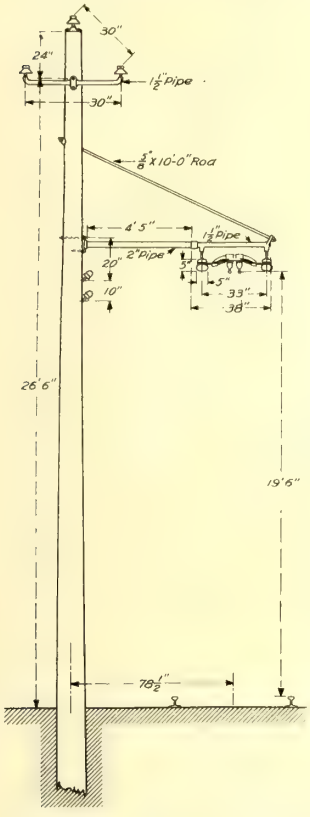


Pittsburg 1200-Volt Line—Ellwood City Y

TRANSMISSION LINE

The working potential of the three-phase transmission is 13,200 volts and the frequency 60 cycles per second.

The three wires are arranged in the form of an equilateral triangle, with sides 30 in. in length. An aluminum wire built up of seven strands and having a current carrying capacity equal to that of a No. 2 B & S copper wire is used.



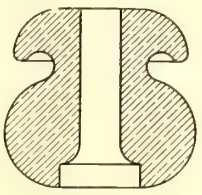
Pittsburg 1200-Volt Line—Standard Bracket Pole Construction

Each transmission line crossarm is a single malleable iron casting of a circular cross-section, with the ends turned up for the reception of the insulator pins. It is attached to the pole by one through bolt and one lag screw which pass through the double lug cast integral with the crossarms. The porcelain insulators were manufactured by R. Thomas & Son, and were tested to 30,000 volts. The insulator pins, which are of galvanized steel, are attached to the porcelain by cement, and in the case of the two lower insulators are screwed into the malleable iron casting. The top insulator pin is screwed into a circular malleable iron flange, which is in turn fastened to the top of the pole by three galvanized barge spikes. This flange also forms a weatherproof cap for the pole.

The total length of the transmission line is approximately 41 miles.

OVERHEAD CONSTRUCTION

The overhead construction shows some radical departures from standard practice. The material employed was manufactured according to the designs patented by James Bryan and H. Etheridge. A grooved No. 0000 copper trolley is used, and this is strung double the entire length of the road, the distance between the two wires being 5 in. and the height above the track is 19 ft. 6 in. Single bracket construction has been adopted throughout for single-track work, and there is very little special trolley work anywhere on the system. The poles are 35 ft. in length and are buried for a distance of 6 ft. in the ground. On tangent track the pole spacing is approximately 82 ft. On curves the spacing is considerably less, and although this involves the use of a large number of poles per mile, it eliminates all guys and anchors on curves. In all cases the pole spacing is arranged to bring the trolley wire immediately over the center of the track. On the double-track portion of the road a double bracket construction is used.

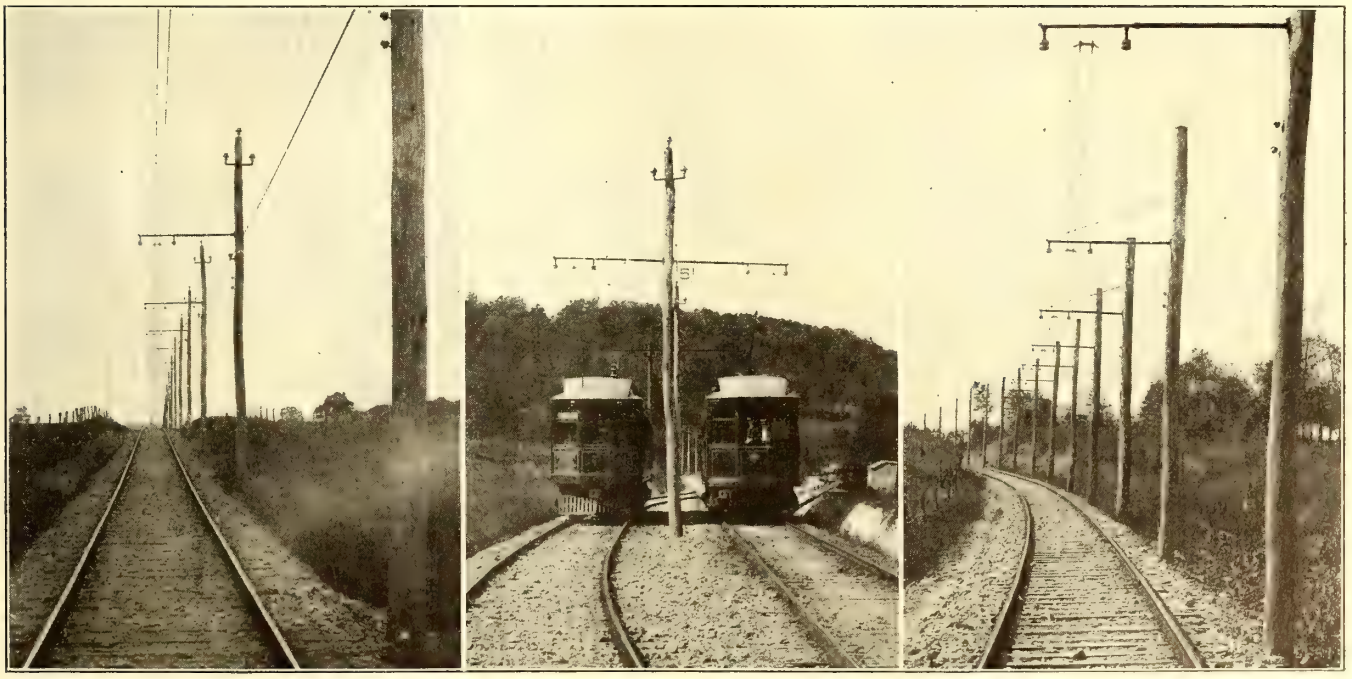


Porcelain Insulator

Referring to the details shown in the drawing, the bracket is built up of a malleable iron casting which has a circular cross-section and is screwed into a length of 2-in. iron pipe. This casting is 38 in. in length and is standard for all work, while the length of the pipe varies from 53 in. to 57 in. to suit the lean of the pole. A screwed flange is furnished at one end of the bracket for attachment to the pole. This is effected by a bolt at the top, which passes through the pole, and a lag screw at the bottom. The free end of the bracket is provided with a lug for the reception of a ⅝-in. stay rod.

A section of one of the insulators is also shown; they are of porcelain, and measure 5 in. in diameter and 5 in. in height. The insulator pins are in the form of a metal pipe, one end of which is screwed into the malleable iron casting and the other flared to a bell mouth to conform with the shape of the insulator. The insulators are attached to the pins by cement.

In the towns, where span construction is adopted, the trolley is doubly insulated by insulators like those on the brackets on the poles, and also by goose-egg insulators inserted in the span wires on both sides of the ears.



Pittsburg 1200-Volt Line—Typical Overhead Trolley Construction with Bracket Poles

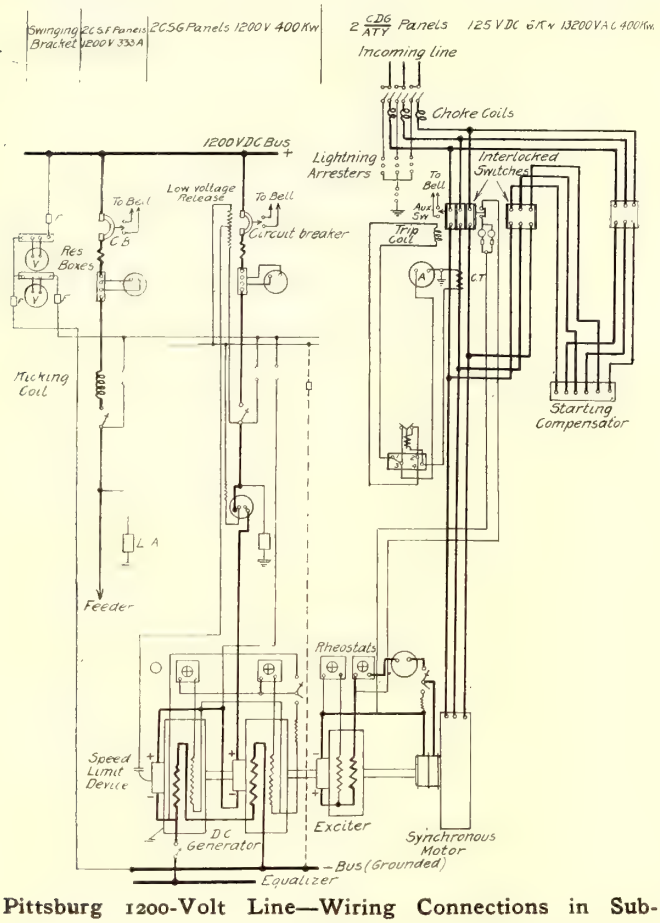
FEEDERS

The feeders for supplying the Butler section are of

stranded aluminum. For the first 7 miles the cable has a capacity of 500,000 circ. mil, and the second cable, which is strung parallel to the first, is 10 miles in length and has a capacity of 750,000 circ. mil. These cables are carried on the poles which support the trolley wire.

ELECTRICAL EQUIPMENT OF CARS

At present there are 14 four-motor passenger equipments in operation, and two additional cars for carrying freight



Pittsburg 1200-Volt Line—Wiring Connections in Substations

will be put into service in the near future. The electrical equipment, so far as motors and control are concerned, are similar on both passenger and freight cars.

The motors are GE-205, commutating pole, 600-1200-volt machines, with the commutating poles connected permanently in series with the armature. They are divided into two groups of two motors in series. These groups are arranged in series and parallel, respectively, for accelerating and free running. This grouping of the motors is the same for both 1200 and 600-volt operation, but the motors only run at half speed on 600 volts.

The control is, practically speaking, a standard automatic relay control for 600 volts, insulated for the higher potential on the motor circuit. Its important elements are the master controller, situated in the vestibule, and the reverser, contactors and dynamotor located under the car. The master controller is of the standard C-35-A form, with a single cylinder and direct-connected handle. Its action is automatic in cutting off the power and applying the air brakes, should the motorman release his grasp on the handle. The reversing is accomplished by a 600-volt electrically operated reverser, which controls the direction of current flow in the field. A commutating switch permits either pair of motors being cut out of circuit; it is provided with contacts in series with the control wiring to prevent the control system being operated beyond the series position if two motors have been cut out of service. The contactors are similar to those used for standard 600-volt operation, but are provided with additional insulation to suit the higher potential; that is to say, the parts subjected to 1200 volts are specially insulated from the operating coils and interlocks carrying 600-volt current. The contactors are supported in the box by insulated bolts, and the supporting plate is insulated from the box. All of the protective devices are similar to those used on 600-volt equipments, with the exception that an additional blow-out is provided for the motor fuse to make it more effective.

A dynamotor provides 600 volts for operating the control circuits when the car is on a 1200-volt trolley. Its provision enables operation on both 600 and 1200-volt trolleys without any change in the control circuit. It also supplies the current for the auxiliary circuits, such as air compressor and lighting, connections to which are controlled from a car panel located in the baggage compartment. The car wiring scheme is very similar to that of the Indianapolis & Louisville Railway, which was described in the Street Railway Journal of Jan. 4, 1908.

BRAKES

The air brakes are standard General Electric emergency straight-air brake equipments, with a differential type of governor for multiple-unit operation.

CAR BODIES

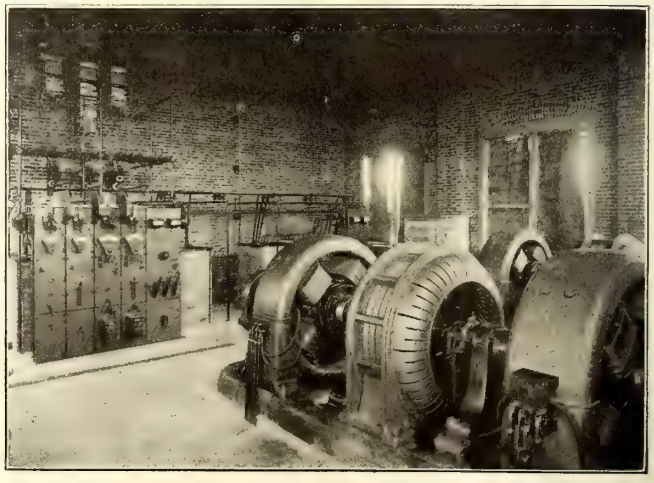
The car bodies were manufactured by the St. Louis Car Company. They are single ended and are arranged with passenger, smoking and baggage compartments. The trucks were manufactured by the Standard Motor Truck Company.

The more important dimensions are as follows:

Length of car over bumpers	46 ft. 0 in.
Extreme width	8 ft. 3 in.
Extreme height from top of track	13 ft. 2 in.
Truck centers	24 ft. 6 in.
Wheel base of trucks	6 ft. 6 in.
Diameter of wheels	36 in.
Weight of car bodies	38,000 lb.
Weight of car fully equipped	64,000 lb.
Seating capacity	50

TRACK

The track is well ballasted throughout with crushed rock, there being on an average 2500 cu. yd. per mile.



Pittsburg 1200-Volt Line—Interior of Shenango Substation

There are 65 miles of single track and at the Pittsburg end of the road there are 11½ miles of double track. The bridges, which are numerous, are all of a very substantial construction.

The 80-lb. T-rails are bonded under the fishplates with twin terminal welded bonds of No. 0000 capacity. The gage of the track is 5 ft. 2 1-2 in., which conforms with that of the Pittsburg city railways over which the cars operate. The maximum grade is 8 per cent. This occurs in the city of Butler, and there are other grades of 5 per cent on the interurban section, the country traversed being very hilly. The outer rails are super-elevated on all curves to permit high speeds. There are six turn-outs which constitute the crossing points between New Castle and Butler.

TELEPHONE SYSTEM

There is a complete telephone system installed, instruments are carried on each car, and jack boxes are provided at each crossover and at distances of about one-half a mile along the track. The telephone wires are supported on the same poles that carry the trolley wire.

The car house is situated at Harmony Junction and the same building houses the offices of the superintendent and operating force of the road. It is well provided with machinery for the installation and up-keep of the car equipments. Shelters are situated at nearly all of the scheduled stops; the depot at Ellwood City is illustrated.

CAR VENTILATION TESTS IN CHICAGO

The Health Department of the City of Chicago has announced the results of the experimental work which has been carried on with a view to ascertaining whether suitable car ventilation systems are available for recommending to the street railways. William H. Evans, health commissioner, has prepared a detailed report of the work carried on by his assistant, Dr. J. F. Biehn. This report, addressed to the Board of Supervising Engineers, argues that ventilation is of major importance in street railway work, and that it should be included in the rehabilitation of the traction lines.

In the ELECTRIC RAILWAY JOURNAL for Dec. 5, 1908, page 1520, the experimental heating and ventilating equipment known as the McGerry system, was described in detail. One car of the Chicago City Railway Company had been equipped with this forced ventilation apparatus, and since the publication of this description experiments have been made with it on the City Railway lines. On the Chicago Railways Company's cars tests have been made with three other systems, known as the Cooke, the Taylor and the Perry ventilation systems. Briefly, the construction of the various systems is as follows:

The McGerry system comprises duplicate sets of electric heaters and suction and blower fans operated by ½-hp electric motors. Fresh air is drawn in at the side of the car and two blowers under the longitudinal seats force it through electric heaters and distribute it by means of ducts extending along under the seats. Foul air is withdrawn from the level of the deck rail by a suction fan operated by the same motor that drives the intake fan and is discharged underneath the car. Independent and duplicate sets of motors and fans are installed on each side of the car so that heated air may be supplied, even though one equipment is inoperative.

The Cooke system includes one 1/3-hp motor with a 12-in. fan enclosed in a sheet-steel casing on the roof of one vestibule. This exhaust fan sucks air from openings in the deck sash, all connected with a sheet-iron duct extending around the outside of the monitor and supported on the roof. The exhausting of the air through the deck creates a partial vacuum within the car which serves to draw in fresh air through screens in the floor placed under the four longitudinal seats at the corners of the car body. Above these fresh-air intakes are electric heaters, so that the air thus sucked in is warmed before being discharged into the car body. After it rises and becomes vitiated the foul air is withdrawn through the openings in the deck sash into the ducts extending around the clear story and discharged through the exhaust fan on the vestibule roof.

The Taylor system depends largely on the movement of the car for the intake and discharge of air. Briefly, with this system there are fitted into the deck sash baffles extending over the roof of the car which, as the car moves, serve to force fresh air in and draw foul air out, the air currents being set up as the car moves on account of the difference in pressure on the two sides of the baffles.

The Perry system also is influenced to a certain extent by the direction and velocity of the wind and by the direction and the speed of the car, and is a so-called "automatic" system.

The following is quoted in abstract from the health commissioner's report and presents the results obtained from the tests of the ventilation systems on the cars of the Chicago City Railway and the Chicago Railways companies:

We require for perfect ventilation at least 28,000 cu. ft. of air an hour. Entering at the floor line, it is heated and is taken out at the monitor. We also require that this ventilation should go on at all times, whether the car be in motion or not, providing passengers are present.

The Cooke system—We made a test of a car equipped with this system Dec. 12 and found that the total cubic feet of air exhausted from the body of the car an hour was 47,524. Total cubic feet of air exhausted from the front vestibule 2984 and from the rear vestibule 3969. Total exhaust capacity, 54,577 cu. ft. Total cubic feet of air coming into the car at the various openings is approximately 25,000 an hour. The remaining air enters through the various openings or leaks in the car—around windows, door, etc. The ventilation in this car conforms to our requirements—that is, air is taken in at the floor line, passes over the heaters and the foul air is removed at or near the ceiling.

The Taylor system—The highest result we found on this car was on a test made Dec. 2. Total cubic feet of air entering the car an hour through the ventilators was 32,062. Total cubic feet of air leaving the car through the ventilators was 28,546. When I examined this car on its regular run on Van Buren Street I noticed that approximately half the ventilators were closed. In this system there is also an attempt made to take the air in at the floor line and exhaust it at the ceiling.

McGerry system—We have made a number of tests of this system: Dec. 21, regular trip, total cubic feet of air forced into the car was 22,237; exhausted from the car by the system 11,582 cu. ft. In this system there are only two exhaust points, but a number of intake points, the exhausts being at or near the ceiling, one on one side of the car at one end and the other on the other side at the other end.

Perry system—The test made Dec. 18, total cubic feet of intake per hour was 13,043; of exhaust 28,133 cu. ft.

The report of the health commissioner makes no recommendation regarding the adoption of any one of these systems, but the data are presented to the Board of Supervising Engineers so that it may have the results of the tests to aid it in any selection it may make.

A concession for the construction of an electric railway in Saltillo, Mexico, has been granted to Schondube & Neugebauer and Rodolfo M. Garza. According to the concession the plans must be approved and work begun within nine months.

THE PROBLEM OF REDUCING ACCIDENT DAMAGES—II.

BY FREDERICK W. JOHNSON, ASSISTANT GENERAL CLAIM AGENT, PHILADELPHIA RAPID TRANSIT COMPANY

It was during the winter months of 1903 that the writer first became interested in the subject of instructing car employees in the various branches of accident work. A chance remark on the part of one of the conductors of the company was really instrumental in directing attention to the matter. At that time the writer was associated with the claim department of the Connecticut Railway & Lighting Company, and had been engaged in the trial of a number of personal injury damage cases in local courts. A case had been reached in which the company was particularly interested, and which it was correspondingly desirous of winning. The claim had appeared to the company as being anything but meritorious. It was realized that a determined effort would be made to mislead concerning the facts and to exaggerate grossly the extent of the injuries, in the hope of recovering substantial damages.

It developed subsequently that the company's fears were, to a certain extent, well grounded. The company was not able to substantiate its contentions as forcefully as might have been desired, owing to the neglect of the crew in charge of the car to obtain a sufficient number of witnesses at the time of the occurrence. For this reason the defense broke down in a most vital respect, and a verdict was returned for the plaintiff.

Immediately upon completion of the trial the conductor concerned in the accident made the remark in conversation: "If I had only known that this thing would turn out so seriously, I could have secured the names and addresses of practically every person on that car."

In going over the details of the case, and especially the outcome of the trial, the conductor's remark struck the writer with peculiar significance. Here was a matter involving a considerable sum of money, the major portion of which need never have been expended on so unworthy a cause if the conductor of the car concerned in the accident had but known his business and attended to it properly. From this point it was but a step to the inquiry, "If he did not understand the importance of prompt, intelligent work in the handling of his accidents, who was responsible for the existence of such a condition of affairs?" Surely no one but the company itself. It did not expect untrained men to grasp instinctively the intricacies of its technical branches, nor of its medical or legal requirements. Why, then, should it expect that the conductors and motormen on its cars would be able to render satisfactory service in a field which was more or less of an unknown quantity to them?

This problem had been under careful consideration for some time when a second one arose to disturb our peace of mind. What if this same query should occur to some one else higher up, and he should begin to ask embarrassing questions? It was decided forthwith that the time for action of some sort had arrived. Just how the situation was to be met and whether anything of a practical value would result from our efforts were questions which, it was felt, only the future could determine. But that something should be done, and that quickly, was very clear.

First of all, some time was spent in examining records at headquarters for the purpose of determining just where the weakest points were; just what types of accidents were occurring with the greatest frequency; what localities on the lines of the company appeared to be the most productive of accidents, and particularly the sections from which the majority of the unreported accidents came; the divisions which were giving the least satisfaction in the work of obtaining witnesses to accidents, and so on indefinitely. With this data the company was better prepared for the question, or at least felt that it was.

CO-OPERATION OF OPERATING DEPARTMENT

The next step was to lay the entire matter before the officials of the company for the necessary authorization to proceed. This being granted, the subject next was broached to the superintendents of the various divisions. Almost without exception, we were gratified to find that they were in hearty sympathy with any movement which promised increased efficiency in the accident work of their men. We were fortunate indeed in this latter respect. The expediency of any campaign of this nature without assurance of the good-will and earnest support of all of the superintendents is seriously to be questioned. The superintendents come into immediate contact with the men on the cars, and their attitude toward a movement of this nature is observed closely by the men. The superintendents are in a position to assist very materially in insuring the success of the venture or of proving a serious, though not insurmountable, obstacle to ultimate success.

Having, then, been assured of the backing of the superintendents, the next step was to arrange the schedules so as to enable representatives of the claim department to meet the men of the various divisions in classes for the purpose of making them acquainted with the character of the work on which the company was embarking, and of giving first instructions. In this respect the company started in with fundamental principles: Nothing was taken for granted; the simplest principles of accident work were taken up first of all, regardless of the length of time which the men might have spent on the cars. The company's idea was to establish a firm, solid foundation for the work in the years to come.

As we look back upon those first classes we have a feeling that they must certainly have been well worth attendance, for it does not require stenographic notes of the proceedings to convince us that much of the material was delivered in an extremely crude condition. But that energy, determination and earnestness were present in fairly satisfactory measure must also have been true, for our recollections are very clear concerning the careful attention with which the conductors and motormen received their first instruction. There was no disorder, play or evidence of inattention. Apparently the trainmen were content to take the will for the deed.

The company was thoroughly in earnest, and as the work progressed it learned many things. Aside from our own people, many who gave the idea serious thought were apparently rather doubtful of its success. One firm of railway attorneys said: "We do not believe in placing written or printed instructions of any kind in the hands of our men. The danger that they will be used against us in court is altogether too great." Another wrote: "There is danger in teaching the men so much regarding accident work. They may make improper use of it after leaving the employ of the company." A letter of inquiry came from London, England. A gentleman who was connected with one of the tramways there wrote for particulars, and subsequently advised the company of his interest in the work and of his hearty approval of the idea.

About this time two bitterly contested strikes occurred, each of several months' duration, accompanied by unrest

and dissatisfaction on the part of company employees. This gave the work a serious setback at a most critical time, with a consequent loss of what little ground had been gained, necessitating a fresh start when conditions eventually became normal again.

From this point, however, the work progressed steadily and uninterruptedly. Methods of procedure became more and more systematized. We came to know our men better and better, and to gain a clearer insight into the obstacles which they encountered daily in their work on the cars. Gradually, and to a certain extent unconsciously, we began to strike responsive chords. We found many of the men of a happy-go-lucky disposition, a trifle careless at times, or thoughtless or neglectful, but withal good-hearted, well-meaning and fair-minded, and, once their interest was aroused, earnest and conscientious in their efforts to protect the interests of their employers. That the men had often been tried and found wanting previously in their accident work was due as much to the short-sightedness of their employers as to any deficiency on the part of the men.

With this powerful factor in the company's favor, coupled with the hearty co-operation of as efficient a corps of superintendents as ever represented a street railway company, it was inevitable that results should begin to appear here and there, first in one direction and then in another. To be sure, the results were not phenomenal, but they were none the less gratifying.

Before conditions intervened over which we had no control the company was able to complete approximately two and one-half years of uninterrupted work with its conductors and motormen on these lines. This consisted at first of oral instruction only; subsequently, printed instructions, including the installation and developing of the weekly accident bulletin, which will be described in detail in a later issue, were added. Both of these agents proved to be of material assistance to the company in its work, and each was responsible in part for the improvement in conditions which the company was able to effect eventually.

FREQUENCY OF LECTURES

For the first year or so the company depended solely on oral instruction. Classes were held frequently at first. In this respect, however, we soon realized that there was danger of dampening the interest of the men in the work by holding classes too frequently. Much of the instruction necessarily covered the same ground and was certain in time to become more or less monotonous. Accordingly, the interval between classes was lengthened, until it was found that the best results were obtained by giving but two series of lectures a year. One was given in the late spring, after most of the new men had been employed for the summer and before the heavy open-car travel set in, and the second series was held in the fall, after the closing of the parks and the inauguration of the regular winter schedule, and before the customary fall and winter types of accidents had commenced.

But this arrangement had its drawbacks, because the work sagged somewhat between the two series of classes. Many points arose in the interim which ought to have been brought to the attention of the men on the cars without delay. Under these circumstances, however, consideration of these features necessarily had to be postponed until the next regularly scheduled series of talks, possibly some months distant. For this reason the company felt that not only was it neglecting opportunities of pressing home its advantage still further, but actually was losing ground in some respects at the same time. Experience had shown that once the tension was reduced, the men slid backward with surprising rapidity.

So the problem arose as to how the company could keep in touch with the men in the long months which intervened between classes. In what way could it immediately direct the attention of practically every man on the system to some particular fact or line of instruction in connection with its accident work? It was in considering this question that the thought occurred that possibly some scheme might be devised whereby the company might be able to get into regular and frequent communication with its conductors and motormen through the medium of a weekly notice or bulletin.

The first venture in this direction met with a rather ignominious ending. It was a typewritten notice, dealing with a somewhat dangerous condition which existed on the lines of one of the divisions, and was designed to prevent the possible occurrence of accidents by calling the attention of the men of that particular line to the dangers of the situation. This notice, unfortunately, appeared to be open to criticism in that it unintentionally trespassed upon the authority of the operating department. The ensuing tangle was straightened out eventually and new plans were begun immediately to determine just how a scheme of this character might be evolved which, while avoiding carefully any future encroachments upon the authority of the operating department, would admit nevertheless of lessons to the men on the cars in the form of accident instruction.

For a time the abandonment of the scheme was threatened indefinitely, so far as our particular company was concerned. Eventually, however, word was given to go ahead, with the distinct understanding that notices from the claim department were to be worded carefully so as to avoid operating questions, or anything which might be construed as leaning in that direction; and, secondly, that each issue should be submitted first to the general manager for approval. These stipulations afterward gave entire satisfaction to all concerned, and in this respect proved to be well founded and of unquestionable assistance to the work, because they defined clearly the field of action available for printed instructions in connection with accident work.

These incidents in connection with the first efforts of the company to make use of weekly accident bulletins are cited for the express purpose of directing attention to the obstacles which will surely be encountered by those who may be sufficiently interested in the project to experiment on similar lines. The best results will be obtained by defining, first of all, the scope and character of work of this kind, thus eliminating the possibility of future misunderstandings between representatives of different departments.

TYPES OF EXPECTED ACCIDENTS

There are, of course, certain types of accidents which cost street railway companies vast sums of money annually. These accidents may be said to be of a standard type; that is, they happen over and over again, from the same old causes and in the same old way. It is possible to look into the future to a certain extent and to know as a positive fact that accidents of this class are absolutely certain to occur within the succeeding 12 months; and, furthermore, that coincident with their occurrence will come more or less heavy demands on the treasury of the company for expenditures incurred either in contesting claims arising out of these accidents, or in adjusting them.

During the summer months there are such regular acci-

dents as those resulting from head-on or rear-end collision of cars; those in which the passengers on the running-board of an open car are injured through the carelessness of the motorman in attempting to go past teams or other obstructions in close proximity to his track; that most expensive type of all, the premature starting of cars; injuring passengers who are in the act of boarding or of alighting; collisions with teams, and so on indefinitely. Another extremely serious problem is presented by the failure of employees to submit prompt reports on all their accidents, in consequence of which the company is forced not infrequently to go to trial on accidents of which it really has no knowledge whatsoever, and consequently little if any defense. Unfortunately, a considerable proportion of unreported accidents are mishaps for which the employees, and consequently the company, are responsible.

It was primarily against the more important problems of this character that the Connecticut Railway & Lighting Company directed its efforts from the first. It was felt, and this belief was justified subsequently, that many of the lesser evils would disappear in the natural course of events, as interest was aroused in the subject in connection with the discussion of more important questions.

The summer of 1906 was the second during which the company was able to carry the work through without serious interruption and under practically normal conditions. During May, June, July, August and September of that year the company transported something over 23,000,000 passengers. This is not a very large total when compared with the number handled in a like space of time by larger roads; but nevertheless it proved to be one of the busiest seasons that the company had experienced up to that time. Approximately 800 conductors and motormen were in the service, and 1295 accidents were reported during these five summer months, ranging in character from the accidental breaking of car windows to the overturning of a car, the result of spreading rails.

RESULTS OF THE WORK

Among some of the results of that summer's work were the following:

Of head-on collisions of cars (much of the system being of single-track construction) the company had none. The corresponding periods of previous years had failed to achieve similar results in this respect.

Of rear-end collisions of cars, the company had six, in which altogether 10 passengers and two employees were injured, none seriously, and all of which were amicably adjusted for a total expenditure of $177.

The company had four accidents to passengers injured through the premature starting of cars, all of which it was able to adjust satisfactorily for a total expenditure of $80.

Of passengers injured while riding on the running boards of open cars, through the carelessness of motormen in attempting to pass teams and obstructions, the company fortunately had none.

Nov. 1 of that year completed a straight-away run of 18 months without a single "unreported accident." Shortly after this the failure of a crew to report a comparatively trivial mishap broke the record temporarily. Prior to the inception of instruction work the average record had been from 10 to 12 unreported accidents per month.

The treacherous rail of the autumn months, due to the presence of falling leaves, had been productive in past years of many serious collisions of cars. For three years the company wrestled with this problem, gaining a little ground each year until the fall of 1906, when it experienced the satisfaction of passing through this period without causing injury to a single one of its passengers and without the payment of a dollar in accident damages. As opposed to this the record of the corresponding period in the second year preceding may be cited, when approximately 225 passengers were injured on a single division of the company.

The expenses incurred in carrying on the summer's work were nominal, amounting to $126, all of which was expended for printing.

The average number of witnesses obtained per accident for the system fluctuated between seven and eight during that year, as opposed to an average of three under former conditions. At this time there were about 60 lawsuits on the books of the company, among which there were no blind or unreported cases. The average number of interviewed witnesses per suit stood at 12.

The property changed ownership about this time, conditions became somewhat unsettled, and this, coupled with the disapproval of work of this character by the new management, brought about a discontinuance when the outlook for the future was most promising.

The foregoing facts are cited solely with a view to showing that encouraging results can be obtained from work of this character on a road of moderate size.

(To be continued)

BREAKAGES OF WELDED RAILS IN CHICAGO

At a dinner of the Electric Club on Dec. 30, Ralph H. Rice, assistant engineer of the Board of Supervising Engineers, Chicago Traction, described in a concise and interesting way the work of that board in supervising the rehabilitation of the Chicago City Railway, the Chicago Railways and the Calumet & South Chicago Railway properties.

In his discussion Mr. Rice, when questioned about the breakage of electrically welded rails in paved streets, stated that to the best of his knowledge the failure of welded joints was far below 2 per cent. It had happened that between Sixty-eighth and Seventy-third Streets on State Street a section of track had been welded late in the year, and this track was paved only between the rails, the street outside of the outside rails remaining open. On account of this open condition in which the track had been left, a number of breaks had occurred, and it was interesting to note that every break was in one of the outside rails. This instance seemed to verify the statement that rigidly welded track was kept from breaking by the protection of the pavement. Mr. Rice could not recall having heard of or having seen a break that had occurred at a weld. Most of the breaks were about 8 in. or 12 in. away from the end of the rail and at the edge of the heated zone. He stated that there must be enormous stresses in the long stretches of welded rails, but nevertheless the track is held accurately in place by its fastenings and the pavement. At one time, when it was necessary to cut a rail, it happened that this rail when sawed nearly in two broke and pulled apart about 1½ in. The special track work is not welded to the rails, and all of the track is built so that the rails, which weigh 129 lb. per yard, may be renewed without damage to the substructure.

The Hungarian Minister of Commerce is said to have recently stated that during the coming year the entire railway system of Budapest will be electrified.

SMALL OUTFIT FOR SUPPLYING ALTERNATING CURRENT FOR SHOP TESTING

In a large railway repair shop it is very desirable to have alternating current for testing purposes, but such current is seldom available on a d.c. road. On the Northwestern Elevated Railroad in Chicago the shops are supplied with direct current fed from the third-rail feeder circuits, and as no source of alternating current was at hand a simple and rugged converting set has been built by the shop employees under the charge of John E. Osmer, master mechanic. An accompanying illustration shows this converter and transforming outfit, which comprises a small motor-generator with a step-up transformer, starting and voltage-regulating boxes and a blowing fan. With this outfit alternating current is supplied for testing and the voltage of that current can be regulated between the limits of 350 volts and 3000 volts. The complete set for furnishing alternating current is mounted on the shop wall of the armature department and does not utilize any valuable floor space.

With the 550-volt current available and with the need for alternating current to be used in testing, the converting set was designed and built as follows:

The power supply is taken directly from the shop circuit, which is fed from the third-rail feeders. A large snap switch is used in connection with a 2-amp enclosed fuse and a small carbon-break circuit breaker which protects the converting apparatus. From the circuit breaker the current supply passes to a starting box which controls the small converter. This converter was made by adding two slip rings to a ½-hp, two-pole, 500-volt, shunt-wound motor. Two taps were brought out from the armature winding to the collector rings. The unit so arranged receives direct current at 550 volts and converts it to 375-volt, single-phase alternating current.

For the purpose of giving severe breakdown tests to motor and armature coils it was desired to have available a maximum voltage of 3000; therefore a transformer was built. Its primary coil is connected direct to the slip rings of the small converter and in one side of the primary circuit a control rheostat and box have been placed. The box has nine points to which are connected a series of resistance coils similar to those used in the control circuit of a type M multiple-unit equipment. With these resistance steps in series with the primary of the transformer, which has 750 turns in the primary and 7050 in the secondary, it is possible to obtain 10 different voltages from the secondary terminals of the transformer. When the d.c. line voltage fed to the small converter is 500 volts the a.c. voltage obtained from the machine is 350 volts and for each point on the box controlling the resistance in the primary circuit the following a.c. voltages are obtained at the secondary terminals of the transformer:

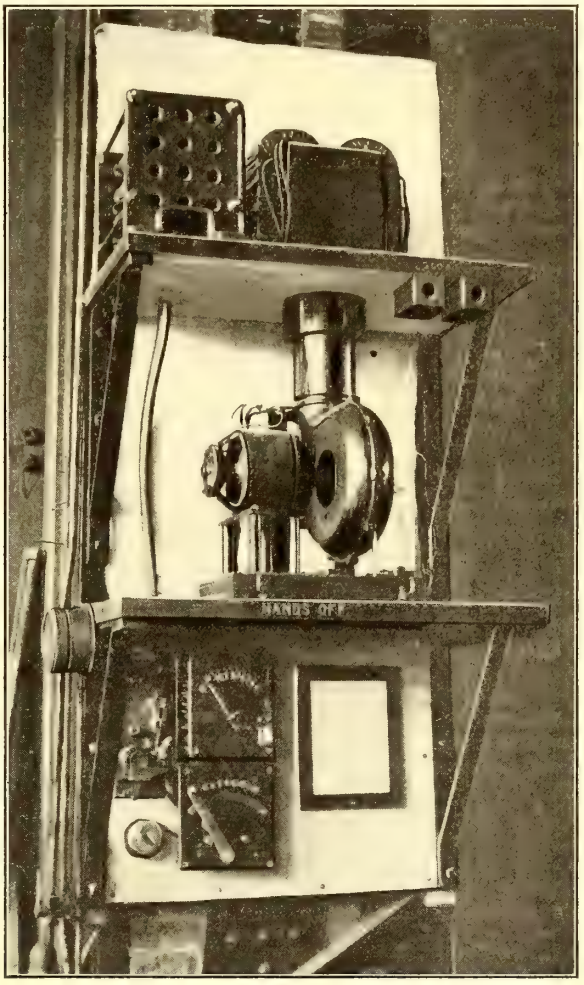
Point 1.....	630 volts	Point 6.....	2030 volts
Point 2.....	910 volts	Point 7.....	2310 volts
Point 3.....	1190 volts	Point 8.....	2590 volts
Point 4.....	1470 volts	Point 9.....	2870 volts
Point 5.....	1750 volts		

When the line voltage is 550 the a.c. voltage obtained from the transformer on the last point of the resistance cut-out switch is 2905.

As shown in the illustration, this transformer is mounted on a shelf directly over the small converter. On the shaft of the converter is a blower fan which exhausts directly up through the coils of the transformer, a box being provided about the transformer so that the maximum cooling effect may be obtained from the air circulation. While this air cooling is not necessary for regular testing work as now carried on, it would be found very advisable to cool the transformer if current were to be passed through it for any long period of time.

The transformer core is made of laminations cut from No. 26 gage stove iron clamped together by a through bolt at each of the four corners. There are two windings made up of No. 12 wire in the primary, 750 turns, and No. 21 wire in the secondary, 7050 turns; in all 100 lb. of wire were used. The secondary leads of the transformer, which carry a maximum voltage of 3000 from side to side, terminate in spring brass connection boxes enclosed in wood similar to those used for the heating buses connecting the cars of an elevated train.

This simple home-made converting and transforming set is made use of in the every-day work of the winding shop.



Alternating-Current Testing Set

Alternating current at various voltages is used for testing air-compressor motors, small electrical devices and the fields and armatures of railway motors. All armatures that are repaired are given an insulation test with alternating current by connecting one lead to the shaft and the other to the commutator bars. In this testing work each piece under test is first subjected to a low voltage and if this is satisfactorily withstood the voltage is increased to a predetermined maximum by the simple method of regulating through the medium of resistance cut in and out of the primary circuit of the step-up transformer. Air-compressor coils are subjected to a test of 1470 volts as obtained when the control switch is on the fourth point. Contactor magnets that are rewound in the shop and field coils for railway

motors are tested up to the same voltage as that for air-compressor motors. The mica-insulated armatures are ordinarily tested to 3000 volts alternating current.

The value of this simple outfit for obtaining a.c. voltages has been demonstrated to the satisfaction of the railway company. The information from which this article was prepared was supplied by Mr. Osmer, to whom acknowledgment is due.

HISTORY OF TWIN CITY RAPID TRANSIT COMPANY

As announced last week, the Twin City Rapid Transit Company, of Minneapolis, Minn., began publishing on Jan. 5 a series of 27 full-page advertisements covering the history of the company from its beginning, 35 years ago, to date. Each installment of the history is signed by C. G. Goodrich, vice-president.

It is interesting to review briefly the history of the Twin City lines at the beginning, as outlined in the advertisements of the past week. The Minneapolis Street Railway Company was organized on July 1, 1873. On July 9, 1875, the City Council of Minneapolis granted the company a franchise and provided regulations for the operation of the road. The franchise ordinance provided for the building of two lines, with a total mileage of 2.1, the city limits then enclosing approximately 11 sq. miles of territory.

The City Council reserved the right to designate other lines to be built as demanded by public necessity. It was provided that no propelling power or machinery of any sort should be used after it had proved to be a public nuisance. The operation of cars began on Sept. 2, 1875. Two cars were operated, and the total receipts on the first day were $21.50.

The rate of fare was not to exceed 5 cents on any line within the city limits, and the city reserved the right to regulate the rates at the expiration of five years, provided that the city should not reduce the fare below 5 cents on any one continuous line, but the Council could not designate any such continuous line to be more than 3 miles in length.

The early track construction was extremely crude; it consisted of wooden stringers 5 in. x 5 in. x 16 ft. laid on cross ties 5 in. x 5 in. x 5 ft., on top of which stringers were laid bent iron plates, forming the rail, which weighed 23 lb. to the yard. The gage was 3 ft. 6 in., and the cost of the track was $6,000 per mile.

The horse cars of 1875, of which there were six, received from New York for the Minneapolis line, were 10 ft. long, mounted on four light wheels, weighed about 1000 lb. and were drawn by one horse. A fare box was placed in the front of each car, into which the passenger dropped his nickel. In winter heat was supplied by a small sheet-iron stove, and the floor of the car was covered with hay to a depth of about 1 ft. Under the ordinance, no car was permitted to run faster than 6 m.p.h. The driver not only drove his horse, but kept a lookout for possible passengers, attended to the depositing of fares by boarding passengers, and made change. He was on his car from 12 hours to 16 hours a day, with 20 minutes release for dinner, and during the first six or seven years of operation in Minneapolis the drivers were obliged to wash their own cars. For all these services the drivers were paid the sum of $35 per month.

In 1877, at which time 18 cars were being operated, the receipts had risen to about $90 a day. The payroll book shows that the employees at this time were advanced $5 to $10 at a time, and were often two or three months back in their pay. At such times the directors would get together and indorse a note, feeling highly satisfied if they raised $2,500 on their joint indorsement. In these early days the entire office force consisted of one man and the mechanical department consisted of one blacksmith.

The Minneapolis Street Railway experienced a steady growth during the first 10-year period, and new cars, from 12 ft. to 16 ft. in length, replaced the 10-ft. cars. The old track with the strap rail was replaced with heavier rails, weighing from 50 lb. to 60 lb. per yard, and of a height to permit of street paving. The newspaper advertisements published cuts showing the rude track construction and the horse-car turntables of these earlier days. They also included copies of motions passed by the directors instructing the president and two of the directors personally to take charge of track construction details. Emphasis is laid on the great benefit which the road has been in extending the city, and a list is presented of the extensions authorized up to 1899.

The horse car lines thus extended were scarcely completed when the work of electrifying began. This necessitated complete reconstruction and resulted in a practical loss of the original investment. In October, 1887, conductors were put on the line and larger cars were ordered. Prior to this time the wages of drivers had been increased from $35 to $54 per month; conductors were paid the same wages as drivers, thus making a labor cost of $108 per month for each car operated in 1888, compared with $35 per month in 1875, an increase in wages of over 200 per cent in 13 years.

SAMPLE OF T-RAIL TRACK AT ST. LOUIS

The traffic department of the United Railways Company of St. Louis has built as an exhibit a section of T-rail track which may be used to demonstrate to the city authorities the permanence of this type of track. This sample piece of track is complete in every particular, from subgrade to paving, and stands adjacent to the general offices of the company. The section is one rail-length long and has been built so that both the ends and the sides show clearly the arrangement of the concrete, the ties and the rails below the street surface. The rails used in this sample track are 7-in., 95-lb. T-rail, similar in section to those which have given satisfaction on the lines of The Milwaukee Electric Railway & Light Company. Six inches of rich concrete are used as a foundation below the wooden ties. This concrete is brought up between the ties to form a solid foundation for the pavement.

There are exhibited in this 30-ft. section of track several kinds of pavement, all of which are laid and finished as if for actual service. Beginning at one end is a section of pavement comprising wooden blocks with granite toothing; next is a section of granite blocks. Adjoining is a section of pavement comprising asphalt centers and sides with granite toothing blocks. Brick paving is exhibited with the bricks extending under the rails and granite paving also is shown with the blocks grooved for the rail flange. Outside of the rails the paving is made complete by the use of wood blocks on one side and brick on the other. Thus the United Railways Company has an exhibit of paving combinations differing widely in character and yet all laid as they would be for actual service. The company desired by means of this track exhibit to obtain permission to lay T-rails in the streets of St. Louis.

THE WISCONSIN PUBLIC UTILITIES LAW*

BY DR. B. H. MEYER, CHAIRMAN, RAILROAD COMMISSION OF WISCONSIN

The most important provisions of the Wisconsin public utilities law may be grouped about four leading heads, namely, valuation, accounting, rates and service.

VALUATION

Up to the present time by far the greater number of plants which have been valued were valued in connection with proceedings in which they were involved. Naturally, this order of valuation will soon have to be broken when the number of complaints involving rates will probably decrease, and the commission can then take a survey of the whole field and systematically complete the valuation of all the plants, as contemplated in the law.

The first, and perhaps most important, step in the valuation of these plants is the valuation of the physical property. Where the companies have made a careful inventory of their property, the engineers of the commission take this and check it up and test it in the field and in the office, item by item. It is a matter of satisfaction to be able to state that in several instances of the valuation of important plants the differences between the company's staff and the commission's staff were so slight that little time was devoted in formal proceedings before the commission to the inventory or physical valuation. In other cases, again, many apparently irreconcilable differences developed and much time of the commission had to be devoted to the taking of testimony with respect to the items in dispute.

Thus far only one valuation has been made for the purpose of acquisition of a private plant by the municipality under the indeterminate franchise provisions of the law. In connection with this work the engineering staff of the commission has collected and compiled elaborate data relating to prices and lives of all the constituent parts of the physical plants of all the different classes of utilities. These data constitute one of the most valuable resources within the reach of the commission upon all questions of physical value.

THE VALUATION OF FRANCHISES

In addition to the physical value, there naturally arise the questions of the value of the franchise, good will and going value. Thus far, practically no utility managements have claimed franchise value to be used by the commission in the establishment of rates. The element of good will has scarcely been mentioned as an element separate and apart from going value. Incidentally, it may be remarked that the statutes of Wisconsin treat all utilities, except telephones, as monopolies, as shown by the provisions of the utilities law relating to indeterminate franchises and the granting of a certificate of convenience and necessity. The telephone business is, however, still subject to the inroads of competition, and so far as the statutes are concerned, it is technically a competitive business. It is, therefore, not impossible that in the valuation of telephone plants, an element of good will, using this term technically, as something different from "going value," may have to be included, which will probably have to be excluded in the case of all other classes of utilities. In fact, several companies have explicitly stated in their testimony that they made no claim for franchise values and good will. Under the head of going value, representations have been made to the effect that all the way from 5 to 100 per cent of the physical value should be added in order to arrive at the true and lawful value to be used in the establishment of just and reasonable rates. The widest range of reasoning is embraced in this class of testimony now before the commission.

If any one tendency in this testimony may be characterized as typical as compared with other tendencies represented in the same testimony, it is the tendency to make a going value stand for expense which has been incurred for outlays and services in connection with the upbuilding of the business of the utilities, and in return for which no adequate remuneration has hitherto been made. In other instances, going value has been represented as something very real, existing in connection with every plant, entirely independent of expense, past losses or profits and capable of fairly definite quantitative determination. Since the Wisconsin commission has not yet formally declared an official opinion with respect to these intangible items of value, it will not be possible to discuss these topics in greater detail or at greater length at this time. The commission has not yet made up its mind.

ACCOUNTS

Soon after the enactment of the law, the various utilities submitted financial statements to the commission, which in a measure gave some indication of the extent and character of the accounts kept by them. Since that time a number of conferences have been held and a great deal of detailed work has been done under the direction of the commission, but the final accounts have not yet been officially promulgated. The titles of the leading accounts were sent out to the different companies some months ago in order that the respective managements might begin to shape their books with reference to the same, and it is hoped that in the not distant future the final forms may be submitted. The theory of this system of accounts is that the books shall be kept in such a way that after the physical value of a plant has once been ascertained the valuation will be kept up practically in a systematic way, so that the commission, or any other authority, may see from year to year exactly what the financial condition of any particular plant is. The system of uniform accounts applies both to private plants and to municipal plants. This feature of the law is especially noteworthy in that it at last makes it possible to establish a comparable basis for public and private plants. Investigations made thus far by the commission show that not only does great variety exist among the private plants, but also among the public or municipal plants, and that the accounts of the municipal plants are, in many instances, only partial accounts, not showing all the operations and expenses of such plants. While this is generally true, it can best be shown from the water-works investigations. In eight Wisconsin cities of over 5000 population, the municipal water-works accounts show that there is no credit given for public service, four of these showing a deficit for the year which in three cases would very likely disappear and show a surplus if the plant were credited with revenues which justly belonged to it.

Out of 56 municipal water plants in cities under 5000 population, 33 reported a deficit for the last fiscal year. Of this total number 25 cities did not credit the plant with any earnings for public service, and of these 25 city plants, 22 showed a deficit. Twenty-eight municipal water plants showed no general expense whatever, such service being furnished by other city employees. Under the proper separation of accounts and the adoption of a uniform system, an entirely different situation, just to the city and to the plant management, would be revealed.

RATES

The managements of the private companies and municipal plants establish rates in the first instance. Such rates are subject to revision by the commission, either on complaint or on the initiative of the commission. The commission has been endeavoring to elaborate the principles upon which just and reasonable rates should be based for all the different utilities, and in a considerable number of instances schedules have been prescribed in which these principles are discussed. Many more schedules are still under consideration, and the commission hopes that in the not distant future all the utilities operating within the State will make their rates in accordance with uniform principles representing the latest and best which scientific methods and scientific thought can contribute.

SERVICE

With respect to service, the commission has put into effect a series of rules regulating gas and electric service. Other rules and regulations applicable to the other utilities may be adopted in the future.

APPEAL TO COURTS

All orders of the commission are subject to appeal. Thus far, only three of the decisions under the railroad commission law have been taken into court, and no utilities deci-

*Abstract of address read before the annual meeting of the National Municipal League, Pittsburg, Pa., on Nov. 19, 1908.

sions. Such appeal is taken first to the circuit court and then to the supreme court. The law provides that the record before the commission shall be the record before the court, and if new testimony should be introduced before the court, through such introduction and determination of the fact that it is new testimony a case is thrown automatically back before the commission for revision of the original determination on the basis of the new testimony.

One of the three railroad cases above referred to was finally determined by the Supreme Court of Wisconsin in an epoch-making decision handed down in June, 1908. This decision discusses the order of the commission under review; it analyzes and interprets the salient provisions of the statute creating the commission; it meets in the broadest and most progressive manner the arguments relating to constitutional limitations and the allegations regarding the exercise of legislative power by the commission; it brings into clear perspective the rights of the companies as well as the rights of the public; and in substance it declares that even though on the given facts the court might decide a case differently from what the commission does, if no errors of law have been committed, and the question is one regarding which reasonable and competent men might differ, the court will not set aside the order of the commission. In other words, the court may feel that the commission should have rendered an opposite decision, yet, within the limits of the law and discretion of the commission, it will sustain that decision.

So far as I know, this decision stands practically alone in this country in the breadth of the views expressed with respect to the regulation of public utilities and the extent of the support it gives to the administrative authority charged with that regulation. There were two concurring and one dissenting opinion.

COMMISSION AS A CLEARING HOUSE

Generally speaking, the information collected by the commission and the service performed by it and its staff have tended to make the office of the commission a clearing house between the public and private plants and municipalities. While the law expressly retains to the municipalities power to control the various kinds and character of service rendered and to be rendered, the power to prescribe conditions under which streets are to be used, extensions made, etc., an appeal lies in all such cases to the commission whether a municipal or private plant is involved. It has been the endeavor of the commission to co-operate with the local authorities and the companies along all these lines. The law has been in effect only a little more than a year and a half, but even now there exists a steady increase in the lines of communication between the local managements of private and municipal plants and city and village authorities and the commission. The information which has been collected and compiled by the commission is placed at the disposition of all citizens of the State in the most convenient form. The use of this information by local authorities and citizens has, in a number of instances, obviated the necessity of making complaints. In other instances, it has led to changes in the plant equipment and service.

RESULTS OF OPERATION OF THE LAW

In addition to reasonable rates and reasonably adequate service, among the results which the operation of the law has already shown and which the future may be expected to bring into evidence still more, may be mentioned the following:

1. The Wisconsin legislation has taken the utilities, as well as the railroads, out of politics. I do not believe that many citizens can be found in the State of Wisconsin who would seriously claim that in either the primary campaign or in the campaign preceding the present November elections the utilities, as such, had entered into politics. All students of municipal affairs well know that in this elimination of politics from the management of the utilities we have removed one of the greatest and most persistent sources of corruption and bad government.

2. The utilities law tends to eliminate feuds between the citizens and the managements of public and private plants. The law assures to all communities good service at reasonable rates. This is placed within the reach of all impartially, whether the commission advances or lowers the rate. The basis of its findings is published in every instance. These published facts should suffice to convince, and I believe do convince the average citizen of the reasonableness and justice of the decision, if it is reasonable and just, and whether he likes it or not, he must abide by that decision. In this respect, cases affecting utilities are quite different from the most of the cases affecting railroads. In the case of utilities the controversy frequently degenerates into a bitter and partisan feud, affecting the entire population, which blinds both sides to a proper comprehension of the facts and to a sense of justice. Proceedings before the commission tend to clarify and educate public opinion.

3. The public utilities law raises the standard of morality through the eradication of the evil of discrimination and the protection of a reasonable rate. To those who are quite familiar with the past evils of discrimination in railway rates, the extent of the discriminations in the rates and service of utilities may be almost beyond comprehension. The whole State of Wisconsin was literally streaked and plastered with discrimination in the rates of utilities, and in all the rest of the country where the extent of such discriminations have not yet been determined, as they have been in Wisconsin, it is quite probable that discriminations similar in character and extent likewise exist. All rates, rules and regulations in effect in the State are on file with the commission, and these are the only rates and regulations which can be lawfully enforced and collected. Free and reduced rate service has been absolutely prohibited. Thousands of individuals had been receiving free and reduced rate service, and the eradication of all such rates cannot help but serve as a moral tonic and raise the level of public and private morality within the State.

4. The utilities law is working a revolution in business management. While some managements are doubtless models from a business point of view, they are not the general rule. Many of the utilities companies have not been operated on a business basis; in fact, it is probable that a good many of the managements did not have the remotest idea as to the exact standing from a business point of view of the plant they were operating. Uniform accounting rules governing the service and the regulation of rates compel the adoption of business and scientific methods, which is resulting in nothing short of a revolution in management.

5. All of the effects of the law, taken collectively, are bound to place investments in public utility enterprises on a more stable foundation. The law works both ways. On the one hand it protects the consumer against unjust and unreasonable rates and poor service, and on the other it protects the investor in his claim to a reasonable rate on the property which is devoted to public use. This legislation will probably remove public utility investments very greatly, if not entirely, from the field of speculation and place them in the class of conservative, certain and stable investments.

SHORT CUTS IN RAILWAY ENGINEERING

In the editorial on this subject published last week, dropped figures caused two typographical errors, which should be corrected. One was in the second paragraph, where, as the sense shows, the kilowatt capacity of substations required by cars taking one-half of their current from the substation was 1 kw per 4 hp, instead of 1 kw per hp as stated. The other was in the fourth paragraph, where the diameter of a No. 10 wire should have been stated as closely approximating 0.1 in. instead of 01 in., the decimal point between the figures being missing.

The electrification of the Italian State Railways has made such rapid strides that it has been decided to establish in Milan an office to deal exclusively with all matters relating to the electrification of the various lines. Resort will be had as much as possible to water power, as the Government is averse to the importation of foreign coal for the operation of steam power houses.

PUBLISHING ACCIDENT REPORT FIGURES

Since June, 1908, W. A. Satterlee, assistant general manager of the Metropolitan Street Railway, Kansas City, Mo., has had posted each month at all the car houses of the company a tabulation of the number of accidents reported each month. This tabulation also includes the percentage of increase or decrease in the number of accidents reported for each division. One of the reports, that comparing November, 1908 and 1907, is presented herewith and will serve to show how complete a statement is displayed before the car crews. It is interesting to note that the record shows a decrease of 27.5 per cent in the number of accidents reported in November, 1908, as against 1907, the total numbers for 1908 and 1907 being 880 and 638, respectively, a numerical decrease of 242.

During the past few months since these accident statements have been exhibited to the men there has been a decrease of 16.6 per cent in the average number of accidents reported. The company, of course, carefully observes the results of these accident bulletins and makes sure that the employees do not fail to report all accidents, no matter how trivial. The reports as shown are divided into operating divisions so the men at each car house can see how their results compare with those of other parts of the system. It is stated that some divisions have brought about a reduction for one month of 50 per cent in the number of accidents reported, and as shown on the accompanying report for November, but one of the 11 divisions shows an increase and that is small. When these accident records are distributed to the car houses Mr. Satterlee notes on the bottom of each suitable remarks which will serve to interest the men in maintaining a record as free from accidents as possible.

NOVEMBER, 1908 AND 1907.

	Accident Reports.	1908.		1907.	Per cent of decrease.	Per cent of increase.
1.	*Northeast Division* (P.A.Y.E.)	..	15	..	46	67.4
2.	*Holmes Street Division.*					
	Holmes Street	20	..	31	..	..
	Thirty-first Street	6	26	19	50	48
3.	*Southwest Boulevard Division.*					
	Southwest Boulevard	23	..	40	..	..
	Twenty-fourth Street	12	35	22	62	43½
4.	*Fifth Street Division.*					
	Fifth Street	45	..	79	..	..
	Tenth Street	13	58	16	95	39
5.	*Ninth and Washington Division.*					
	Twelfth Street	44	..	51	..	..
	Broadway	6	..	16	..	..
	Roanoke	7	57	26	93	38.7
6.	*Armourdale Division.*					
	Armourdale	43	..	64	..	..
	Kansas Avenue	0	43	1	65	33.8
7.	*Westport and Rockhill Division.*					
	Westport and Rockhill	57	..	79	..	..
	Troost (P.A.Y.E.)	40	..	45	..	..
	Race track	1	..	4	..	..
	Swope	0	..	2	..	..
	Dodson	0	98	0	130	24.6
8.	*L Road Division.*					
	L	49	..	62	..	..
	West Side	14	63	20	82	23
9.	*Fifteenth Street Division.*					
	Fifteenth Street	31	..	40	..	..
	Prospect	27	58	31	71	18⅓
10.	*K. C. and I. Division.*					
	Independence Avenue	21	..	33	..	..
	East Ninth Street	17	..	17	..	..
	K. C. and I.	34	..	29	..	..
	Jackson and Hardesty	5	..	6	..	..
	Independence City	1	78	2	87	10⅓
11.	*Eighteenth Street Division.*					
	Eighteenth Street	44	..	40	..	..
	Vine	24	..	30	..	..
	Brooklyn	26	..	21	..	..
	Twenty-seventh Street	0	94	1	92	..
	Shops and power houses	..	13	..	7	..
	Total	..	638	..	880	..

The lines of the Buenos Ayres-Lacroze Tramways Company, which were converted to electric traction in 1905, now consist of 38½ miles, of which 25½ miles are owned by the company, 4 miles owned jointly, and 9 miles are operated over the lines of several other companies.

PROGRESS IN CONSIDERATION OF ELECTRIFICATION OF BOSTON STEAM TERMINALS

An abstract of various sections of the fortieth annual report of the Massachusetts Board of Railroad Commissioners was published in the ELECTRIC RAILWAY JOURNAL of Jan. 9, 1909, page 70. The report contains also copies of letters addressed to the commission by steam railroad companies in response to an inquiry as to progress in the study of electrification, which was recommended by the board in its report of the previous year.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD

Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, said in his response:

Our company, as you are doubtless aware, has been operating its passenger trains partially by electricity for some time back, and wholly since July 1, 1908, between Stamford, Conn., and Grand Central Station, New York.

The work has been more or less of an experimental nature, as it is probably the largest venture in the way of electrical traction there is in the country; that is, in the magnitude of the business handled and for the distance.

We believe we are warranted in stating that our electrical installation is a success from the standpoint of handling the business in question efficiently, and with reasonable satisfaction, and we believe we have arrived at the point where we can truthfully say that the interruptions to our service are no greater nor more frequent at the present time than was the case when steam was in use.

But we are not prepared to state there is any economy in the substitution of electrical traction for steam, but, on the contrary, we believe the expense is very much greater.

You will appreciate that three or four months' successful operation of the trains of a standard railroad by electricity does not constitute in itself a sufficient test to warrant its extension or introduction elsewhere. The present service should stand the test not only of four summer months, but of a winter's operation as well. There may yet transpire many things that will need remedies to be applied, as there have thus far, to enable us to reach the present stage, and we should deplore any agitation looking to the further establishment of electrical traction upon other sections of our system until after we have had a full year's operation of our present installation.

We believe no mistake will be made by the public in waiting for a while longer for the installation of electric traction upon the railroads in the vicinity of Boston, for by such waiting the vexatious delays and embarrassments of experimentation will be avoided and the work and knowledge will have advanced to a stage that will result in a better installation in some respects and for a less outlay than has resulted from the pioneering in this system we have been obliged to indulge in on the west end of our lines.

For any technical detailed explanation of our system of electrical installation, the appliances used, the power house equipment and the motors, I shall be glad to refer you to our vice-president in charge, with instruction that he give you such information as you desire if you will advise me your wish for anything further.

BOSTON & ALBANY RAILROAD

An abstract of the letter of A. H. Smith, vice-president and general manager of the Boston & Albany road, follows:

This matter has been given considerable preliminary study during the present year, with a view of determining the cost of such installation and the operating results. The investigation has thus far been devoted principally to the (Newton and Brookline) circuit operation, which constitutes the major portion of the suburban service. In order that you may have full information of the physical and financial difficulties involved, I wish to submit some details which the investigation has thus far disclosed. The extent of the electrification considered * * * embraces two tracks from the Boston terminal over the main line to Riverside, and a return over the Newton circuit.

The existing train schedules for the circuit and the

South Framingham service, together with the power station load for the service, have been calculated. The data indicate that a power station having a capacity of 6000 kw, composed of three units of 2000 kw each, will be required.

In considering a radical change of this character and its consequent large investment, it is deemed wise to anticipate that there will be some expansion in business, requiring an installation somewhat in excess of present traffic, which might possibly to some extent justify the expediture, or which, on the other hand, might permit such expansion without a radical revision of the plant to meet such a contingency. This assumed increase in traffic consists substantially of trains at intervals of 10 minutes between the hours of 6:30 and 9:30 a. m. and 4:30 and 7:30 p. m., with trains substantially at 30 minutes for the remaining interval, except between 12:30 and 6:30 a. m., when 60 minutes' service is provided for. For this service a power station of 6000 kw would be adequate, with the addition of storage batteries to handle the peak load, which would probably be the more economical construction.

In considering the electrification of the circuit, it was thought desirable to consider that the power stations and substations were located at points which would permit of the ultimate electrification of the main line for a distance of several miles west of Boston, and the proper locations of power houses and substations and battery houses upon this assumption are submitted to the board.

The system considered is direct current and third-rail construction, similar to that adopted in the New York electric zone of the New York Central & Hudson River Railroad.

The equipment considered consists of steel cars about 60 ft. in length and of the usual construction for such purposes.

The estimated cost of the installation above outlined would be substantially as follows:

Power stations, substations, storage batteries, transmission and feeder system, third rails, track bonding, new signal system, rolling stock and contingencies, allowing credit for the value of steam engines and coaches	$4,200,000
Storage basin to prevent tidal interference	15,000
Equipping subway in South station, including elimination of grade crossing	400,000
Miscellaneous changes in station platforms, etc	18,000
Total	$4,633,000

The value of the present equipment is about $750,000, for which an allowance is made above. In other words, there is a net capital increase of about $4,600,000, and assuming 9 per cent interest, taxes and depreciation, the annual charges come to about $400,000.

Some slight economies would accrue in the transportation expenses under this operation, which would be substantially absorbed by the additional expenses to be incurred for the maintenance of the additional apparatus installed, and the net economies would be so small as to be inappreciable in the consideration.

The gross revenue received from the proposed installation is about $420,000, and the operating expenses, on a 75 per cent ratio, would be about $315,000, which, added to the carrying charge of about $400,000, requires an annual expenditure of about $715,000 to secure a gross revenue of about $420,000.

The number of passengers handled in the above territory per annum has not increased, on the whole, in the past 16 years, due, probably, somewhat to the fact that the circuit is occupied as a high-class residential district, not susceptible of rapid subdivision of property, and more particularly to the fact that suburban lines are being rapidly extended into all such outlying districts, and afford a more advantageous means of collecting and distributing local travel through the commercial and residential districts than could possibly be afforded by a railroad constructed and operated upon a private right of way and devoted largely to long-haul operations.

It would therefore seem wise, before adopting a policy requiring an expenditure which is not only unremunerative, but which would mean a large annual loss or radical increase in rates, that further investigations should be instituted, to see if some system might be devised to abate the nuisance complained of without jeopardy to the property, or without placing a large burden upon the public. The rapid evolutions which are being made almost annually in electric traction may soon afford a solution, and the prospect of developing the steam locomotive itself is even more promising for the particular service which steam railroads have to perform.

In a statement in another section of the report, discussing especially the Boston & Albany situation, the commission concludes:

While certain evils which existed a year ago have been remedied, the board reiterates the conclusions in its last annual report that "the Boston & Albany Railroad must eventually make large expenditures of money in the way of improved terminal facilities, abolition of smoke nuisance and electrification of its suburban lines."

BOSTON, REVERE BEACH & LYNN RAILROAD

President Melvin O. Adams calls attention to firing restrictions on portions of his company's suburban lines, and refers to the testimony of G. M. Tompson as an expert before the board in the Boston & Eastern case, to the effect that it would be impracticable to electrify the Boston, Revere Beach & Lynn road at the present time.

BOSTON & MAINE RAILROAD

President Lucius Tuttle states that so far as he is able to ascertain, neither the New York Central road nor the New Haven company has determined that the experiment of electric traction is permanently successful, and "neither of them appears to be ready to advise other railroads to adopt electricity for general use in passenger and freight service, except, it may be, under conditions similar to those with which they have been obliged to deal." President Tuttle says that the Boston & Maine road has endeavored to keep in touch with this development, but has not yet been convinced that electric motive power can be wisely or economically substituted for steam locomotives upon any portions of its lines. The company burns coke in a large portion of its local passenger service, and suffers few complaints because of the smoke nuisance.

HIGHER FARES IN MASSACHUSETTS

The Springfield (Mass.) *Republican,* one of the leading newspapers in New England, said editorially in a recent issue:

Two of the street railway companies up the river are about to raise their units of fares from 5 cents to 6 cents. This is in accord with a tendency which was becoming quite general among interurban street lines around Boston before the panic. The costs of material and labor had then advanced so far as to disturb business calculations greatly. The panic resulted in a reversal of price tendencies and a much easier labor market; and it was to have been expected that little more would be heard of increasing charges by public service corporations. Nevertheless, here are the steam railroads of the country advancing freight rates all along the line, and now we have this resumption of the pre-panic movement toward higher charges on the part of our street railways.

It must be admitted on behalf of these corporations that the costs of operation and maintenance have been little reduced as a result of the panic and following business reaction. Prices for a while tended downward, but the movement was soon arrested, and lately the advance seems to have been resumed. We have never had a great panic, with the possible exception of that of 1857, whose liquidating and reactionary price effects have been so slight as those thus far experienced from the panic of last year. The reasons need not now be considered, but the fact is to be recognized. Complaint of the high cost of living for families is about as acute as before the panic, and what is true of the individual or family must be true of the corporations.

RECOMMENDATIONS OF GOVERNORS TO THE LEGISLATURES

Many of the messages being presented to the Legislatures of the various States now convening contain recommendations regarding legislation affecting railroad interests, and several contain both references to, and recommendations regarding, the control of public utilities. Abstracts from the messages of the Governors of a number of States follow:

GOVERNOR HUGHES, OF NEW YORK

The policy which the State has adopted for regulating its railroad and certain other public service corporations has been abundantly vindicated by the test of experience. It is obvious that if the State is to make serious attempt at regulating its public service corporations it must provide adequate machinery under general legislative authority for fair investigation and suitable redress of grievances according to their respective merits. Such amendments of the law as experience shows to be advisable to facilitate administration or to improve its provisions and more fully to carry out the intent of the statute should be supplied. I also renew my recommendation that the Public Service Commissions law should be extended to telegraph and telephone companies and that they should be brought under appropriate regulation as to rates, service and other matters similar to that which has been provided for corporations at present subject to the law.

The cost of new subways, the probable interest charges in case moneys for their construction were raised upon private credit, the liability of privately owned properties and franchises to taxation, the returns naturally expected by those who would engage in such enterprises solely for purposes of profit, together with the tendency to discourage additional lines in the view that this course may be of advantage to lines already existing, make it unlikely that we should be able in any event to obtain a proper measure of relief through the construction of subways by private capital, assuming, of course, that the established rate of fare (5 cents) be maintained. There may be exceptions in the cases of routes which would be regarded as aids to existing transportation lines.

The policy of construction at public expense is justified because of the importance of securing a comprehensive transit development with proper regard to the needs of the city as a whole and under conditions which, though safe and advantageous for the city, might not be regarded as attractive by individuals considering an investment solely for purposes of profit. Suitable transit lines are absolutely necessary means of intercommunication, and are as essential to the city's life as streets and bridges.

There would seem to be no unwisdom or prompting to extravagance in securing the measure of relief available through the adoption of the constitutional amendment with regard to the debt limit, which was approved at the last session of the Legislature. This relates to the exclusion from the computation of the debt limit of such improvements as will yield to the city a net revenue in excess of maintenance, interest and amortization charges. It also provides that any indebtedness heretofore incurred by the city for rapid transit or dock investment may be so excluded proportionately to the extent to which the current net revenue received by the city therefrom shall meet the interest and amortization instalments thereof, the increase in borrowing capacity resulting from the exclusion of such debts to be available only for rapid transit or dock purposes. The situation urgently calls for action, and I recommend that this amendment be agreed to so that it may be submitted to the people for adoption.

GOVERNOR LILLEY, OF CONNECTICUT

No more important matter will be presented for your consideration than the report of the special commission named by the last General Assembly to prepare a public utilities act. The State, unable conveniently to furnish public utilities direct, has lent of its powers to ever-increasing classes of private agencies, that the people may benefit by the progress of invention and of utilization of natural resources. In regarding the highly beneficial results obtained and the splendid development of the corporate agencies employed, we must not forget that it is the power of the whole community, acting through these agencies, which has produced such results and that with the powers granted there is a corresponding obligation to render adequate service without discrimination and to require therefor a compensation which will be reasonable.

The problem of safeguarding the grant of extraordinary power has become immensely complex. To select an agency and, having selected it, to compel a strict observance of the terms of the trust, these are the essentials of the problem.

The General Assembly meeting biennially cannot supervise public service corporations. The work is administrative rather than legislative. The bill provides for a uniform system of incorporation; for control of capitalization; for definition of territory for operation; for regulation of right of eminent domain and the right to use the public highways; for the safeguarding of construction and operation; for examination of financial condition in so far as may be necessary to maintain the standard; for a similar examination of the physical plant and for the regulation of rates. An appeal to the court is provided.

The bill, if enacted, will substantially abolish all special legislation. It will substantially abolish the lobby, for it places the granting of franchises and of extraordinary powers, subject to reasonable regulations, in a permanent commission whose decisions must be in writing and must specify the reasons therefor, whose members are subject to removal by the courts for cause, and whose grants of power must be in accordance with uniform and general rules. The bill provides for honest capitalization; it requires securities to be issued for cash only or for property found by the commission to be of equivalent value; it requires the proceeds of all securities to be honestly invested in the plant; it requires franchise rights to be used or surrendered; it prohibits condemnation except after a fair hearing; it provides for reasonable rates; it provides an efficient means for making repairs and changes in equipment necessary to the safety of the public and of employees; it recodifies, simplifies and renders uniform existing legislation. The powers of the commission are supervisory, not managerial, and should assure a continuous consistent policy. The General Assembly will retain its legislative functions undiminished.

This bill will furnish the foundation for a measure which I earnestly hope will be passed without delay. My views upon this matter have been frequently expressed in public and are well known.

GOVERNOR STUART, OF PENNSYLVANIA

In accordance with the authority contained in the aforesaid Act of Assembly, I appointed the Honorable Nathaniel Ewing, Charles N. Mann and John Y. Boyd members of the Pennsylvania State Railroad Commission. So important a commission, new in the administration of the State Government, necessarily had much preliminary work. The history of 4298 companies, chartered by the Commonwealth, has been thoroughly searched, with the result that 1440 have been found to be in existence and exercising powers which bring them within the authority of the commission. These consist of railroad and street railway companies, with their subsidiary lines, and steamboat, telegraph, telephone, pipeline and canal companies. The commission receives from all public carriers daily reports of accidents and special telegraphic reports of all fatalities. A summary of these accidents provides a basis for the recommendation of preventive measures. The commission is co-operating with the Interstate Commerce Commission and the Railroad Commissions of other States for the purpose of framing a harmonious system of car-service rules, to be applicable to all interstate and intrastate business.

GOVERNOR HANLY, OF INDIANA

I do not urge the enactment of a public utilities law, but if such a law is enacted it should be done by amending the present railroad commission law, extending the jurisdiction of the present commission to include public utilities, its authority in that behalf being carefully defined and the machinery for its execution supplied.

GOVERNOR FERNALD, OF MAINE

The method in Maine long has been to tax railroads on

gross receipts; I have always believed in this method as scientific, practical and especially easy of application, since it is absolutely under the control of the Legislature. By means of it we show a greatly increased revenue from public service corporations in the past six years, and without the addition of extra machinery, we have it in our power to secure additional revenue. You will have before you a statement of the varying plans for the taxation of railroads and other public service corporations. I commend to you a study of the same.

GOVERNOR QUIMBY, OF NEW HAMPSHIRE

I especially commend to you that portion of the conclusions which suggests the levying of taxation upon public service corporations at the average rate of taxation existing throughout the State, computed exclusive of the taxes upon the capital of insurance companies and the deposits in savings banks; and I trust that a law embodying this principle will soon be presented to me.

The problem of the State's relation to its common carriers as then existing was met by the passage, in 1882, of the statute creating the present Board of Railroad Commissioners. Though but slightly amended in the meantime, this law proved upon examination to contain the essence, at least, of the necessary provisions of the widely-heralded legislation of recent years elsewhere. The spirit of the times, however, calls for the State's supervision over other public service agencies than the common carriers; and if such course is to be followed here I suggest that it be through a board created for that purpose or through adding to the present duties of the railroad commission the further function of exercising the power of regulation which the State possesses over all forms of public utilities.

GOVERNOR FORT, OF NEW JERSEY

The last session of the Legislature, through a disagreement between the two houses as to the terms of the act, failed to pass a public utilities bill such as public sentiment seemed to demand. On this subject I still adhere to the views expressed in detail in my inaugural address and in the special message sent to the Legislature on March 30, 1908. This commission can take the place of the present Railroad Commission appointed under the act approved May 15, 1907, and which act should then be repealed.

The point upon which the legislation failed at the last session seems to have been over the rate-making power. A bill without some control over rates, at least a correctional power as to them, would be of little, if any, more value than our present railroad commission act. The commission should have the power to revise and correct rates shown to be unreasonable, upon complaint and after hearing, subject to a review of any final order as to rates by the courts, with a provision for speedy hearing and determination on the appeal. The power which is now in the Court of Chancery to regulate grade crossings should also be transferred to this commission when appointed. Such a commission can work no harm to legitimate and properly managed public service corporations of any class. The people are entitled to the best service that such companies can give them, and the companies to the protection from unjust public criticism or unreasonable exactions.

An intelligent, conservative Board of Public Utilities Commissioners, with adequate powers, will strengthen public confidence in the securities of all such companies and prevent harm to any interests. There is absolutely no reason, not founded in cupidity, against a Public Utilities Commission.

City authorities in Baku, Russia, are inviting tenders for its electric railway concession with a 42-year term.

The only street car line owned and operated by the United States Government is at League Island Navy Yard, in Philadelphia. It boasts of one car and two motormen, and dispenses with the services of a conductor, as all travelers ride free. This car is run for the accommodation of the naval officers and their friends, and conveniently holds a score of passengers.

LETTERS INDICATE STRAINED RELATIONS BETWEEN RECEIVERS AND COMMISSION OVER SERVICE ORDER

Correspondence between the receivers of the Metropolitan Street Railway of New York and the New York Public Service Commission, First District, which has just been made public, followed the issue of an order by the commission requiring increased service. The letters relate to an order of the commission prescribing the operation of additional cars on the Eighth Street crosstown line to the East Tenth Street ferry and across the Williamsburg bridge to Brooklyn. The letters of the receivers discuss their inability to comply with the terms of the order. Sharp criticism appears in the two letters of the receivers as well as in the reply of the commission:

FIRST LETTER OF THE RECEIVERS

The first letter sent by the receivers to the commission was dated Jan. 6, and is as follows:

We have received a copy of Final Order No. 1015, relating to the operation of the Eighth Street cross-town line to Brooklyn.

At the recent hearing on the proposed Fifty-ninth Street joint rate matter the testimony established beyond any doubt that the properties in our care, under the present method of operation, are earning substantially no return whatever upon the assessed valuations nor any amount approximating such a return. No testimony was offered to the contrary. It was reasonably expected by us that the facts thus developed would receive fair consideration by you and would effect some change in the attitude you had theretofore maintained toward the Metropolitan Street Railway property; but statements which appeared in the public press on Dec. 30, 1908, purporting to come from your commission, show beyond question that you either fail to appreciate the actual situation or are bent upon making orders which you must know are practically confiscatory in their character.

You certainly must understand that these roads cannot continue to be operated in a satisfactory manner without the expenditure of large sums of money in excess of the revenue which they now yield. We know of no method of obtaining the necessary funds except by resorting to the financial markets of the country and availing of money seeking safe investment. Your policy of oppression, maintained and persisted in, notwithstanding the indisputable evidence submitted to you, constitute such a menace that any attempt on our part to procure the requisite cash to enable us to carry on operations successfully would be utterly futile. If you intend that orders of the character of those you have issued with reference to the Eighth Street line shall be complied with, you must point out to us some practical method of raising the necessary funds.

The fact that you are now making an appraisal of this property would seem to be a concession that the data at your command were insufficient to afford a basis for intelligent orders involving expenditure. Nevertheless, you are continuing to issue such orders requiring large capital expenditures and a great increase in operating expenses; and this you are doing notwithstanding the repeated protests of those acquainted with facts which you apparently refuse to admit, although unable to disprove.

Your orders with reference to the Brooklyn and East Tenth Street ferry branches of the Eighth Street cross-town line make necessary the addition of between 25 and 30 car units, representing an outlay of from $375,000 to $450,000, to say nothing of additional operating expenses, estimated to amount to over $100,000 a year.

In our letter to you of Dec. 14, 1908, we told you that we did not have sufficient cars to operate the schedule you suggested without robbing other lines of equipment. It is true that we expect to receive 127 new cars during the winter, but in ordinary course only a small part of the additional equipment thus at our disposal would be allotted to the Eighth Street cross-town line. Furthermore, the acquisition of this number of new cars does not necessarily mean a corresponding increase in our available equipment. They are needed to a great extent to replace old cars which it is no longer good business judgment to continue in operation and which must necessarily be soon retired from service. The transportation requirements, taken as a whole, will not justify the assignment to the Eighth Street cross-town line of so many additional cars as your orders require; on the contrary, it is our judgment, based

upon a study of the situation as a whole, that when an equitable distribution of equipment is made upon receipt of the new cars, the demands of the service on lines other than Eighth Street will require the assignment to them of all the extra cars available. We do not intend to place any additional orders for cars, and even had such been our plan, your course would have rendered it impossible of accomplishment.

The requirements of your Final Orders Nos. 1015 and 1016 unquestionably seem to make it unprofitable for the receivers to continue to operate the property of the Central Cross-town Railroad, which includes the Eighth Street crosstown line. We are at present operating this property under a temporary agreement, expiring April 30, 1909, which relieves us from the necessity of paying the sum of $22,500 quarterly as part of the stipulated rental under the terms of the lease.

The result of our former investigation, when orders pertaining to this line were issued by you last spring, and the decrease in travel on the line under consideration, due to the operation of the Hudson Tunnels, has led us to consider the advisability of asking the court which appointed us for instructions in the matter of continuing to operate the property of the Central Crosstown Railroad. The additional burden which compliance with your Final Orders Nos. 1015 and 1016 will involve increases the possibility that we shall be obliged to take this course. In the event of such cessation of operation by us, the abolition of the exchange of transfers between the various lines involved will be thereby entailed; but, of course, you will assume the responsibility for whatever line of action it is necessary for us to adopt as a logical sequence of your orders.

According to our interpretation of the provisions of Final Order No. 1015, it does not apply directly to the service across the Williamsburg bridge, but in the event of our ceasing to operate the Central crosstown lines, in all probability there will be a very great curtailment of the service to Brooklyn, and possibly such service will be discontinued altogether on the lines which we are now operating across the Williamsburg bridge.

We hope that in view of the facts above pointed out you may see fit to make some modification of your Final Orders Nos. 1015 and 1016. If, however, you insist upon putting them into effect without any modification, we shall be glad if you will indicate from what other lines the cars are to be withdrawn in order that we may comply with the orders regarding the Eighth Street cross-town line. It seems only fair that if you are bent upon demonstrating to the public the superiority of your judgment and the breadth of your knowledge of practical railroading, you should assume the responsibility for the results. Upon being advised of your wishes we will at once take steps to make the necessary changes, providing the feeder cables will carry the additional load. If we do not hear from you by Jan. 11 in this regard we will withdraw cars from other lines as may be most expedient in our judgment and put them on the Eighth Street line.

REPLY OF THE COMMISSION

The reply of the commission, signed by the chairman, William R. Willcox, and dated Jan. 11, is as follows:

On behalf of the commission, I beg to acknowledge your letter of Jan. 6, criticising the commission for issuing orders requiring you to provide adequate service upon lines under your control, and calling this a "policy of oppression maintained and persisted in." Permit me to call your attention to certain facts which apparently have not received the attention from you they deserve:

The law of this State requires every street railway corporation to provide adequate service. You are receivers acting under the directions of a judge of the United States Circuit Court. Nevertheless, the statutes of the State of New York are binding upon you and must be obeyed.

The statutes also provide that the Public Service Commission shall decide whether the service you give is adequate or inadequate, and that if the service is considered inadequate, the commission shall determine what service shall be rendered. This is a duty placed upon this commission by the Legislature, and this commission intends to continue to perform its duty. Your letter virtually suggests that we suspend the operation of the law, which we have no authority or desire to do.

The orders to which you object, about as strenuously as the public needs them, were issued in compliance of these provisions of law. The orders requiring better service upon the Eighth Street lines, which you specially oppose, were particularly needed. For example, the evidence taken at the hearings shows that the average number of passengers per car passing the point of observation upon the day of inspection, from 5:30 to 6:30 p. m., was 77, and that many cars carried a much greater number. The seating capacity of the cars was about 27. Consequently, upon an average, every car carried 50 persons standing, or nearly three times as many passengers as there were seats. Is it surprising that the Eighth Street lines are said to be the most congested lines in the city? That the cars are often crowded to the point of indecency, not to mention discomfort, can be conclusively shown to anyone who will inspect the cars. Yet you object to orders which require you to run from 20 to 30 more cars, and intimate that if you are required to do so, you will disrupt the system.

Permit me to call your attention to several other pertinent facts: This matter of service upon the Eighth Street lines was first taken up last April. Inspection showed that the many complaints received at this office were justified. On May 1, 1908, an order was issued for a hearing on May 14, and notice was duly served upon you. A day or two before this hearing was to have been held you wrote to the commission asking for an adjournment, to enable you to investigate the subject. On May 14 the hearing was adjourned until May 22, followed by other adjournments until June 3, at which time evidence was taken, showing great overcrowding, the need for additional service and the possibility of running more cars. In the meantime, you had sent to this commission, under date of May 27, a letter requesting that the proposed orders be not issued, and stating that improvements would be made. As a result the hearings were adjourned and final action postponed.

In November, our inspectors again examined and reported upon the service on the Eighth Street lines. This inspection showed that the overcrowding was practically as great as it had been seven months previous, and that the postponement you had urged had been productive of no appreciable relief to the patrons of the Eighth Street lines. It seemed to the commission time to order an improvement in the service which you had not provided voluntarily even after eight months' notice. Accordingly, orders for hearings were passed and notices sent you. The hearings were held, new evidence was taken, and orders were adopted Dec. 29.

Perhaps you may be interested to know that the records of the cases show that 12 hearings were held altogether, at none of which did you appear, or anyone representing you, to contradict the evidence taken, or intimate in any way that there was no need for improved service. They also show that at no time have you, either personally or by letter, indicated that the standard of adequacy adopted in these orders is improper, unjust or unfair. As a matter of fact, the commission held an informal conference with the operating officials of the various roads at which it invited their suggestions as to the proper standard of adequacy, and the present orders are in harmony with suggestions made by your own general manager as to the standard of adequacy. However, if all of the facts known to you were not placed before the commission at the hearings duly held, you alone are to blame for your failure to appear and take advantage of the opportunity afforded you.

You state in your letter that you have not cars enough to give adequate service. Yet you have known of the needs of the Eighth Street lines for eight months to our positive knowledge, and if your organization is efficient, you must have known of it for many months more. You certainly knew of it last August when you agreed to rent 40 cars to a separate and independent company. Yet the orders to become effective upon Jan. 18 would require only 20 or 30 cars more than have been operated.

You must be aware that the laws of this State require that every street railroad corporation shall have sufficient cars and motive power to meet all the requirements which may reasonably be anticipated, unless relieved therefrom by order of this commission. This is binding upon you, although you are Federal receivers. No application has ever been received from you asking to be relieved from the obligations imposed by statute. It is, therefore, incumbent upon you to provide sufficient equipment and property to render adequate service. This you have not done admittedly, and you say in your letter, "we do not intend to place any additional orders for cars." This statement appears to be a flat refusal to obey the laws of the State of New York.

The commission notes with astonishment the veiled threat in your letter that, if this commission insists upon compliance with the statute and with the orders of this commission, you will continue your policy of breaking up the street railroad system of Manhattan into small sections. Neither this statement nor any similar one will induce this commission to disregard the law or knowingly allow anyone else wilfully to do so. In carrying out the policy of disruption, you may be within your legal rights, provided the United States Court is willing to assume the responsibility for your acts, but you cannot shift the responsibility there-

for upon this commission. If you insist, as a reply to the orders of the commission requiring you to obey the law, that the public shall be still further inconvenienced and injured, this commission will exercise every power that it has to prevent this result. The law can be obeyed without the harmful results which you threaten to bring about, and if you adopt the policy you suggest, when there are other ways open to you, you alone are responsible. Ordinarily, when a company cannot obey the law, the suggestion is made that it withdraw, surrender its franchise, or allow others to manage its affairs.

Another ominous statement in your letter is that if this commission persists in its "policy of oppression," i. e., requiring adequate service, you will take cars from other lines and otherwise decrease the service you are rendering to sections of the city for which no orders of this commission have been issued. This commission wishes it definitely understood that this is not only inadvisable, but plainly in violation of the statute. Inspections will be made from time to time to determine whether you are carrying out this plan, and proceedings will be begun immediately to order the service needed upon all lines. If compliance is not had with these orders, proceedings will be begun in the courts to enforce penalties.

You refer to the appraisal being made by this commission of the property under your control as a reason why orders for adequate service should not be issued. The law recognizes no such excuse, and this commission has never entered into any understanding with you that the commission would suspend the law or stop the issuance of orders for improved service. You object to "interference" in your affairs by this commission and ask to be allowed to do as you please. Compliance with the requirements of the statutes would have made it unnecessary for this commission to issue the many orders it has found necessary to issue; continued non-compliance will force us to continue.

SECOND LETTER OF THE RECEIVERS

The receivers of the Metropolitan Street Railway addressed a second letter to the commission, in reply to the foregoing, dated Jan. 12. This letter follows:

The letter of your chairman, written on your behalf, dated on the 9th instant and received by us on the 11th, seems to require but a brief reply.

So far as we know, no one has disputed the proposition stated by you, to the effect that while we are receivers acting under the directions of a judge of the United States Circuit Court, the statutes of the State of New York are binding upon us and must be obeyed. If you will refer to our letter to you of Aug. 24, 1908, you will see that we then told you plainly that suggestions to the effect that because we were appointed by a Federal Court we considered ourselves not amenable to State control were wholly unwarranted.

You seem to overlook the fact, however, that the receivers have no personal or individual interest in the properties under their charge, but that they are only trustees for the owners, endeavoring to perform their duties efficiently and conscientiously and to the best of their ability under the directions of the circuit court of the United States.

Suggestions or insinuations on your part that we have either violated the law in the past or intend to do so in the future, are utterly without foundation. We are rendering the best service in our power, and neither the orders of your commission nor the statutes of the State of New York can require us to do anything more.

Your suggestion that when a company cannot obey a law, it should withdraw, surrender its franchise or allow others to manage its affairs, is singularly futile. The law does not confer upon your commission or upon anyone else the power to deprive the creditors of this company of their security or to compel them to sacrifice their investments because of some arbitrary views on your part with respect to what constitutes adequate service. Fortunately, there are tribunals which consider evidence, have regard for existing facts, and are guided by the settled rules of law. If you undertake to destroy the value of the property in our charge, we will, of course, resist you by every lawful means in our power.

As to the matter of non-appearance before your commission upon the hearings, you may possibly remember that at an early stage of the case we were directed by the court not to appear but to furnish you with any and all information which you might require. This we have done to the fullest extent.

With regard to your criticism respecting the leasing by us to the belt road of a few cars, we beg to say that our sole object in letting them have these cars was to obviate any inconvenience to the public which might arise from even a temporary cessation of the operation of the belt line. It was of no advantage to us to rent these cars and we were actuated entirely by a regard for the public. It seems to us that our action in this respect should receive your commendation in view of your expressed concern in regard to the public welfare.

Your reference to "threats" is without justification. We make no "threats," but simply tell you what is certain to come to pass if you persist in the policy which you have adopted. You have wholly failed to meet any material assertions or suggestions made by us in our letter to you, and we are therefore justified in assuming that you are unable to answer them.

We shall continue to do the best we can in spite of the difficulties which you insist upon interposing.

LETTER TO THE BELT LINE

The receivers of the Metropolitan Street Railway addressed a letter on the same date to the Central Park, North & East River Railroad. This letter is as follows:

In the agreement of Aug. 5, 1908, providing for the renting to you by us of not to exceed 40 electric passenger cars, and also an electric snow sweeper and an electric sand car, it is provided that the arrangement may be terminated upon two weeks' notice by either party.

Recent communications received by us from the Public Service Commission call for an increase of service this winter which may require us to ask for the return of the cars which we are now renting to you. The commission intimates that we should use these cars on our own lines instead of leasing them to an independent road.

As you know, our only object in permitting you to have these cars was to obviate the inconvenience which would have been occasioned to the public by even a temporary cessation of the operation of electric cars on your Fifty-ninth Street line. The Public Service Commission does not seem to appreciate this, and while its implied criticism is wholly without merit, the fact remains that a condition of affairs may arise when we shall need these cars for our own service, and we desire to give you this notice of the possibility that we may have to avail ourselves of the cancellation clause of the contract, so that you may be governed accordingly.

NEW TIMETABLE OF THE SOUTH SHORE ROUTE

The Chicago, Lake Shore & South Bend Railway, H. U. Wallace, general manager, Michigan City, Ind., has recently issued a new timetable for the general information of those who wish to travel between South Bend, Ind., and the business district of Chicago, or any intermediate points on the new electric route between these terminals. The Chicago, Lake Shore & South Bend line is now in operation from South Bend, Ind., to Hammond on the Illinois-Indiana State line, a distance of 69 miles. From Hammond to Kensington, a station on the Illinois Central Railroad, the roadbed for the electric line is practically completed. It is the plan to handle the traffic between Kensington and Randolph Street, in Chicago, over the suburban tracks of the Illinois Central Railroad. At present, however, the electric service between South Bend and Hammond makes connection at Hammond with the steam suburban service of the Lake Shore & Michigan Southern Railway. From the La Salle Street terminal of the Lake Shore Railroad 18 trains a day make close connections with the electric trains at Hammond and Gary. The running time over the steam suburban route to the connecting point with the electric line is about an hour, and the running time of the limited trains over the new electric line from Hammond to South Bend, 69 miles, is two hours. Thus the combination of services will carry the passenger between the business district of Chicago and South Bend, 91 miles, in three hours' running time. The new folder of the "South Shore" route contains not only the usual complete timetable, but also the time of connecting trains to and from the present terminus in Chicago. The rates of fare are about 2 cents per mile. The new folder contains a map of the territory served by the road and its connections into Chicago.

COMMUNICATIONS

ACCIDENT FAKING IN THE SOUTHWEST

OKLAHOMA RAILWAY COMPANY
OKLAHOMA CITY, OKLA., Jan. 7, 1909.

To the Editors:

Some time ago a party was apparently injured on one of our cars by reason of one of the incandescent lamps breaking and a piece of glass getting in his eye. Our claim agent settled with him, and we heard nothing more from him until recently, when he appeared at Guthrie, at which point I am interested in the street railway.

He was detected in the act of unscrewing one of the lamps, with the evident intention of having it fall and strike him. In fact, he did claim to have been injured on one of our cars, but on examination nothing could be found the matter with his eye. From his actions it is believed that he is making a habit of getting hurt on street cars. It might be well for other companies in this section to look out for this party. ANTON H. CLASSEN.

INCREASES OF FARES

MILFORD & UXBRIDGE STREET RAILWAY,
MILFORD, MASS., Dec. 26, 1908.

To the Editors:

In my opinion the larger part of the railways in Massachusetts are carrying passengers for too low a fare and something will have to be done to remedy it. I do not see how receipts can be increased to any extent, and employees are not being paid any more than they should receive. It seems to me that the only thing to do is to raise the fare, making the unit 6 cents instead of 5 cents.

W. L. ADAMS,
Superintendent.

NORFOLK & BRISTOL STREET RAILWAY,
FOXBORO, MASS., Dec. 22, 1908.

To the Editors:

Our fares have not been increased as yet and therefore we cannot give you any information of interest at this time concerning this matter. We believe, however, that the time has arrived when street railway companies must do something to get their receipts high enough to meet the increased cost of labor and material and leave a fair return for the money invested; and if there is no other way to do this the fares must be increased.

F. M. PERRY,
Superintendent.

BOSTON, MASS., Jan. 12, 1909.

To the Editors:

It is very gratifying to have an analysis of the conditions which have led, in the Commonwealth of Massachusetts, to increase of fares on some of the street railways. The writer is heartily in sympathy with your belief that such increase is in certain cases necessary and in accord with sound public policy. He therefore takes this opportunity of begging you to explain fully to the public the origin of the financial difficulties of the lines which need a charitable nickel in the contribution box. The public in this commonwealth is pretty apt to give the honest investor a square deal. Before it taxes itself, however, to pay dividends on a losing proposition it naturally wants to make sure that the investors were really unfortunate and not that the companies were overcapitalized.

It seems to be now quite certain that our American one-fare system inaugurated in the boom days of 20 or 25 years ago has simply reached its natural limitations. It was to a certain extent a huge bluff, based on the theory of general averages which worked well for a while, like the fraternal insurance of about the same period, but carried nevertheless the intrinsic certainty of ultimate failure. It is perfectly safe to say to the passenger: "Why certainly we'll carry you to about any place you want to go for a nickel," provided that on the average the prospective passenger doesn't want to go very far. Then if occasionally he should really want to take a long ride, the loss would be more than compensated by the score of chaps who ride only a few blocks. There are routes in the vicinity of Boston on which the end-to-end fare is less than *one mill* per mile. But as a city grows and the street-car system about it develops it is the almost inevitable result that the average ride will lengthen and the proportional cost per passenger will run up. Yet so great is the bulk of travel that most roads continue prosperous in spite of this fact, provided they get a reasonable amount of the short-distance traffic. The roads on the despair list are almost without exceptions those running in a territory that does not yield the short-distance ride to any material extent. In other words, they are roads which never had any right to assume the condition of averages which alone justifies a straight 5-cent fare.

Just how far the public is likely to go in taxing itself to save unwise promoters and investors from the consequences of their rashness remains to be seen—it will certainly be no great distance if demands for increased fare become common or are made by roads that are not absolutely clear from even the suspicion of overcapitalization. For such cases the best thing for the public is to let them go under the hammer to some one who buys low enough to bring the fixed charges within reason.

But there is certainly a class of roads which is in every way deserving of the helping hand. Such roads are commonly those which are fundamentally cross-country or inter-suburban roads, built in the reasonable hope that traffic would follow the trolley, a maxim that has proved true in a multitude of cases. Such a road, however, perhaps from no general error of judgment, but from a complication of causes, has played in hard luck and finds the receipts too small to pay its legitimate expenses. It borrows and borrows more, in hope of pulling through to more prosperous times, often skimps painfully and unwisely, as, for example, by cutting down a service already too infrequent for reasonable earnings, and finally bankruptcy stares it in the face. Now all this time it has been doing good to the community and trying to build it up, and it is safe to say has increased property values all along the line. It is better for the community to lend a hand and cheerfully concede an increased fare than to have the plant actually abandoned, and such help is very likely to be extended in any deserving case.

ENGINEER.

The municipality of Moscow, Russia, has been authorized to contract a loan of 9,000,000 rubles to be used in building electric railways.

The substitution of electric for steam traction on the Cherbourg railway lines has been approved by the French Government.

The Tramway Company of Constantinople, it is said, will electrify its lines shortly, and has placed its contracts in France.

News of Electric Railways

Annual Meetings of the Central Electric Railway and the Central Electric Traffic Associations

The third annual meeting and election of officers of the Central Electric Railway Association will be held at the Claypool Hotel, Indianapolis, Ind., on Jan. 28, 1909. Members and invited guests from Ohio, Kentucky, Indiana and Michigan have signified their intention to be present and, as the meeting is the last one of the year, the prospects are good for an unusually large attendance. All managers have been asked to request the heads of their departments to take part in the various discussions. The Supply Men's committee requests that each member of that department wear his button at the meeting. The office of the secretary, in the Traction Terminal Building, Indianapolis, will be open to members and their friends while in the city. The annual meeting of the Central Electric Traffic Association will be held at the Claypool Hotel on Jan. 27, the day preceding the meeting of the Central Electric Railway Association. The program of the meeting of the Central Electric Railway Association follows:

MORNING SESSION, JAN. 28, 1909

10:00 a. m.—Business session.

11:00 a. m.—"The Luminous Arc Headlight," by W. S. Culver, engineer, General Electric Company, Cincinnati, Ohio.

12 m.—Adjournment for lunch.

AFTERNOON SESSION

1:30 p. m.—"The Proper Inspection of Equipment," by W. E. Rolston, superintendent of power and shops, Cleveland, Southwestern & Columbus Railway, Elyria, Ohio.

2:30 p. m.—"The Practicability of Light and Power for Electric Railway Transmission Circuits," by G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind.

3:30 p. m.—Remarks by the president. Election of officers.

Judge Tayler Outlines Terms Necessary to Attract Capital in Cleveland

In a letter to the receivers of the Municipal Traction Company, Cleveland, on Jan. 13, Judge Tayler expressed the opinion that any franchise granted for street railway operation in Cleveland should provide for a fare that shall yield 6 per cent on the stock above operating and fixed charges and that the people should have the benefit of any surplus above this amount in reduced fare. He says that a franchise providing for a return of this kind should attract the capital necessary for extensions and improvements.

On Jan. 11 the receivers of the Municipal Traction Company, Cleveland, filed with the United States Circuit Court reports of the Municipal Traction Company for the first 12 days of November, when the properties were still under the management of the Municipal Traction Company, and for the remainder of the month after the court took charge. These reports follow:

NOV. 1 TO 12 INCLUSIVE

Gross earnings	$151,338
Operating expenses	117,238
Net earnings	34,100
Miscellaneous income	1,332
Gross income, less operating expenses	35,432
Taxes	8,813
Income, less operating expenses and taxes	26,619
Interest	16,110
Net income	10,509
Cleveland Railway rental	29,351
Deficit	$18,842

NOV. 13 TO 30 INCLUSIVE

Gross earnings	$227,035
Operating expenses	165,552
Net earnings	61,483
Miscellaneous income	1,120
Gross income less operating expenses	62,603
Taxes	13,221
Income, less operating expenses and taxes	49,382
Interest and other deductions	24,424
Net income	24,958
Cleveland Railway rental	44,027
Deficit	$19,069

The receivers state that Auditor Tanner, who prepared the report for the first 12 days, omitted certain items that should have been distributed in former reports or given as a total in the final report. When Mr. Tanner's attention was called to this, he stated that he had taken the matter up with the officers of the company and that the decision had been reached not to include them in the report. The items named are: Balance charged to loss on "Municipal day," when no fare was charged, $3,200; Cleveland Railway organization expenses, $5,333; uniforms for motormen and conductors, $18,487. In addition, the receivers believe that the following should be charged in the report: Cleveland, Painesville & Eastern Railway rental, $4,197; Northern Ohio Traction & Light Company rental, $157; petty cash to be accounted for by F. C. Alber, $3,500.

In a letter to Mayor Tom L. Johnson, made public on Jan. 9, in answer to arguments made recently by the Mayor in interviews with Warren Bicknell and F. A. Scott, receivers of the Municipal Traction Company, and Judge Tayler, the receivers state that the figures obtained through the operation of the company make it plain that an increase of fare is necessary at once if satisfactory service is to be maintained in Cleveland. Notwithstanding the contention of the Mayor that the present service is in excess of the traffic requirements, the receivers state that the public is entitled to a system of operation that will enable it to travel in reasonable comfort at all hours, and that such service cannot be operated at a fare of 3 cents. They also express themselves as being opposed to the zone system and say that the suburbs must have the same fare as the city. The receivers evidently feel that the Mayor can enable them to operate with a uniform rate that will result in returns sufficient to avoid further deficits, without compromising himself or his policies; but if he does not see the matter in that light, the only thing left them is to operate at the various rates provided in the original franchises—3 cents on the Forest City Railway without transfers, and 5 cents or 11 tickets for 50 cents on the Cleveland Electric Railway. The rate on the Woodland Avenue and West Side lines would probably have to be fixed by a legal decision, as authorities disagree as to the time the franchises of the Cleveland Electric Railway expire. The letter in part, dated Jan. 4, follows:

"Careful consideration has been given to the questions suggested by you at the conference between you and the undersigned receivers on Dec. 26, 1908, which questions are as follows:

"What is the (1)—Loss by interurban service for the year and for the month of January, 1909?

"(2)—Loss in East Cleveland, Lakewood (Detroit and boulevard), Corlett, South Brooklyn, Euclid Beach, Newburg and Kinsman and Woodland extension by reason of 3-cent fare, as against 5-cent fare or 11 tickets for a half-dollar, by the year and for the month of January, 1909?

"(3)—Loss on the lines whose receipts are less than a sum sufficient to pay operating expenses without rental—each line by the year and for the month of January, 1909?

"(4)—Loss on the lines whose receipts are less than a sum sufficient to pay operating expenses when rental is charged—each line by the year and for the month of January, 1909?

"In reply to the first question, a careful investigation has been made of the cost of interurban service, and the receivers find that while there is some loss, the amount is not so considerable as to affect materially a possible rate of fare. In any event, the interurban cars are being operated under a contract which was made years ago by the Cleveland Electric Railway and its predecessors, and which contract was honored and its terms lived up to by the Municipal Traction Company during its operation of the lines.

"Particular attention has been given to your questions two, three and four, dealing first with the possible loss in carrying passengers at a 3-cent fare to suburbs, such as Kinsman and Woodland extension, Newburg, South Brooklyn, Corlett, Detroit Avenue and Clifton Boulevard, Lakewood, East Cleveland and Euclid Beach, and second, with the loss on certain lines, the receipts of which may be less than a sum sufficient to pay operating expenses without rental; and third, with the loss on lines, the receipts of which may be less than a sum sufficient to pay operating expenses after rent is charged.

"The figures already obtained through the operation by the Municipal Traction Company and the receivers make it clear that a 3-cent rate of fare has not been sufficient to pay the cost of operation and charges.

"Further analyses of these results are now being pre-

pared, and will be made public when completed, but the present daily loss, and the consequent necessity for immediate consideration of the question as to rate of fare, create an emergency requiring immediate action.

"The questions suggested to you, numbered 2, 3 and 4, relate to the results of operation, but they go much farther than this, for they involve two primary questions:

"First—Whether the street railways of Cleveland are to be operated and dealt with as one system, on which a uniform rate of fare shall prevail; or whether the city shall be divided against itself by the operation of separate lines at different rates of fare? Second—Whether the service on the street car lines shall be such as is needed to reasonably accommodate the people, and the rate of fare such as will pay the necessary charges for providing the service; or whether the rate of fare shall be an arbitrary amount fixed in advance, and the service only so much as can be given without loss for such a rate of fare?

"The next and equally important point which your questions involve is, whether there shall be a uniform rate throughout the city, as it now exists, which of course must include such suburbs as Brooklyn, Corlett, Lakewood, Newburg, Kinsman and Woodland extension, South Brooklyn, Collinwood and East Cleveland, or whether the rate of fare shall be graduated by the distance traveled and so produce a zone system.

"On all of these propositions it is the judgment of the receivers that the people of this city desire:

"First—Good service on all the lines now in operation, at such reasonable rate of fare as will pay the reasonable charges for furnishing the service.

"Second—The operation of the street railways as one system, so that citizens who use the cars may receive the same treatment and be required to pay the same rate of fare on one line as on another, and so that those riding on Woodland Avenue S. E., Broadway or St. Clair Avenue N. E., or any other lines shall not be required to pay a higher rate of fare than those riding on Euclid and Cedar or some other line on which the cost of hauling passengers may prove to be a little lower.

"Third—That those citizens who have moved into the suburbs of Cleveland and have built homes there and who have so established themselves in the belief that the character of the car service and the rate of fare would be substantially as they have been during recent years, the vast majority of whom are employed or do business within the limits of the city proper, and all of whom are contributors to the welfare of this community, and within the next few years will become actual citizens by the extension of the limits of the city proper, shall receive the same consideration as those who are at the moment actually residing within the limits of Cleveland.

"Fourth—That nothing should be done tending to create a zone system, thus encouraging a congestion of population.

"It is, therefore, the judgment of the receivers that these various questions resolve themselves into a single one, namely, at what rate of fare can passengers be carried on the lines of the present system of street railways with such service as is necessary to meet the needs of the people?

"The reports of the Municipal Traction Company from April 27 to Nov. 12, and the report of the receivers, giving the results of their operation during the last 18 days of November, make it clear that a 3-cent rate of fare will not pay the cost of adequate service.

"Unless the service be cut down to such a degree that it will fall far short of accommodating the people, an immediate increase in the rate of fare must be made. If an increase be made under existing conditions, and without some action on the part of the City Council, there would appear to be no course open to the receivers other than to apply to the court for permission and authority to establish such rates of fare as are authorized by existing franchises on the several lines.

"The receivers would be forced into this position with the utmost reluctance, as it necessarily involves much confusion and inconvenience to the public."

Plans for Chicago Subway

John Ericson, city engineer and head of the subway bureau of Chicago, transmitted the preface to an elaborate report on subways for Chicago to the chairman of the transportation committee of the City Council on Jan. 6. The main report will be a volume of several hundred pages and its publication is announced for March. It is pointed out in the preface that a double-deck subway would be too expensive and would entail too many considerations in the way of disturbing present underground structures and building foundations to be practicable. A suggestion is made of a trial design of subway structure running through the loop district in Wabash Avenue, with four lines of track, two for the elevated railroads and two for the surface railways. The capacity is figured at 18,000 passengers an hour in each direction on the tracks used by the surface railways and 25,000 an hour in each direction on the tracks given over to the elevated railways. The total is 86,000 passengers an hour in both directions, which approximates the combined elevated traffic or the combined surface traffic in the loop district in its present congested state. In other words, the subway as outlined in this one street would add 50 per cent to the city's local transportation lines.

According to the report the movement of surface cars has practically reached its maximum at the times of congestion. Twenty-five double-track lines is the present limit to the south as the streets exist. Fifteen such double-track lines are in existence, with six elevated tracks leading to the south and southwest. All these outlets have not less than one-third the capacity of a double-track subway outlet. The demands of future transportation make it necessary to conserve all these street outlets for surface lines in addition to the subways. The cost of construction should not be so great as to prevent a reasonably available revenue each year, and for that reason the annual construction expenditures should be between $3,000,000 and $5,000,000. The report advises little change in the present Illinois tunnel. Some modifications will be needed, but no sweeping changes. The top of the present tunnel, except at the river crossings, is below the level contemplated for the subways.

Wisconsin Electric & Interurban Railway Association.—Clement C. Smith, president of the Wisconsin Electric & Interurban Railway Association, has called a meeting of the association for executive session to be held at Milwaukee on Wednesday morning, Jan. 20. The association will also hold a meeting at Oshkosh on Feb. 1, at which a number of papers on operating topics will be presented.

Northwestern Electric Association.—A meeting of the Northwestern Electrical Association will be held at Milwaukee on Jan. 21. In the morning the members of the association will visit the West Allis shops of the Allis-Chalmers Company. The afternoon will be devoted to a consideration of the work of the Railroad Commission of Wisconsin, and a paper on this subject will be presented by Prof. B. H. Meyer, chairman of the commission. In the evening there will be a beefsteak dinner at 6:30, to take the place of a formal banquet. Among the speakers expected will be Prof. Meyer, John I. Beggs and Hon. Neal Brown, Wausau.

Storage Battery Cars Proposed for New York—The newspapers of New York have had a good deal to say lately about the adoption of Edison storage batteries for street railway service in New York, notably on the Third Avenue Railroad. There has, in reality, been some discussion of such projects, but the statements in the daily press are decidedly anticipatory. Inquiry made of Thomas A. Edison at his laboratory in East Orange elicited this statement: "Mr. Edison does not care to have any statement made with regard to the battery. When he is fully satisfied himself that everything is all right, he will let the public know." Frederick Whitridge, receiver of the Third Avenue Railroad, recently expressed himself before the Public Service Commission of the First District of New York as favoring the operation of self-contained cars on the crosstown lines in New York.

New Members A. S. & I. R. A.—B. V. Swenson, secretary of the American Street & Interurban Railway Association, announces that the following new member companies and associate members have been enrolled in the association since Jan. 1, 1909. Member Companies: Sacramento (Cal.) Electric, Gas & Railway Company, Edmonton (Can.) Electric Railway, The St. John (N. B.) Railway, Galesburg (Ill.), Kewanee Electric Railway, San José (Cal.) Railway. Associate Members: Gen. Geo. H. Harries, Washington, D. C.; Wm. H. Staub, Baltimore, Md.; J. D. Brown, Nashville, Tenn.; E. W. Sharp, New York; E. J. Lenz, Greenville, Miss.; Le Grand Young, Jr., Salt Lake City, Utah; Albert C. Fairbanks, Watertown, Mass.; W. O. Stieff, Reading, Pa.; Le Roy G. Miller, Franklin, Pa.; Geo. A. Barnes, Franklin, Pa.; Geo. J. Smith, Chicago, Ill.; E. J. Beatty, Franklin, Pa.; R. C. Cunningham, Philadelphia, Pa.; W. H. Lee, Indianapolis, Ind.; James V. Smith, Franklin, Pa.; Chas. H. Thomas, Franklin, Pa.; L. J. Drake, Jr., Indianapolis, Ind.; C. E. Schauffler, Chicago, Ill.; J. E. Southwell, Boston, Mass.; W. A. McWhorter, Birmingham, Ala.; W. A. Trubbe, Bridgeport, Conn.; W. L. Conwell, New York City; J. J. Sinclair, New York City; J. S. McWhirter, New York City; Chas. H. Cross, Chicago, Ill.

Financial and Corporate

New York Stock and Money Markets

Jan. 12, 1909.

The effect of the decision adverse to the Consolidated Gas Company was felt in the stock market throughout the past week, and there has been an uncertainty in the trading which has resulted in net losses for most of the prominent stocks. The fact that a large portion of the recent dealings has been for professionals who have only speculative interest in the market accounts for this feeling. Many of these men were compelled to loosen their hold on other stocks to protect their interests in Gas stock, and such sales, of course, caused depression in the prices of the issues in which liquidation took place. As far as the moral effect of the decision goes, it cuts very little figure in the Street.

The traction stocks have shown a good deal of activity during the week, and, as a rule, have lost something in price. Brooklyn Rapid Transit and the Interborough-Metropolitan issues have been especially active. The rumors of a possible dividend on Brooklyn Rapid Transit stock may account for this, but it is not apparent why Interborough-Metropolitan should be a feature in the market at this time. No plans for the reorganization of the Metropolitan Street Railway have been made public yet. The activity which has been a feature of the trading recently, however, may indicate that a definite scheme of reorganization will be submitted soon to the security-holders concerned.

The good market for bonds continues and all new issues that are offered are taken rapidly. That the money market remains easy is shown by the rates prevailing at all centers. Rates on collateral loans are even lower than a week ago. Call money to-day was quoted at 1¾ to 2 per cent, and 90-day paper at 3¼ to 3½ per cent. It is, of course, only a question of time before the increased requirements for funds by mercantile borrowers will strengthen rates.

Other Markets

Although the Boston stock market was strong in tone and fairly active, not much has been done in traction issues except for the trading in Boston Elevated rights. These have been active, and prices for the options have advanced. They are quoted now at 4 to 4½ per cent. There has been no trading in traction bonds.

In the Philadelphia stock market both Rapid Transit and Union Traction stocks have been fairly active. Prices have been reasonably strong, although the fluctuations have been within narrow limits. Rapid Transit closed at 25¼ and Union Traction at 52. There was little trading in any other traction issues.

Very little interest has been shown during the week in traction issues on the Chicago Stock Exchange. Series 2 and 3 of the Chicago Railways Company were in the market to some extent, but prices were about stationary. A few lots of South Side Elevated railroad stock were sold at 55 to 56.

In Baltimore the bonds of the United Railways continued active. Fair-sized blocks have been traded in every day, but prices remain about the same. The 4s are selling for 85½ and the incomes for 52.

Quotations of various traction securities as compared with last week follow:

	Jan. 5.	Jan. 12.
American Railways Company, Philadelphia	*45	*45½
Boston Elevated Railways	126	128½
Brooklyn Rapid Transit Company	69⅛	69¾
Chicago City Railway	180	180
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	—	a73½
Consolidated Traction Company of New Jersey, 5 per cent bonds	—	a104½
Detroit United Railway	*53¾	*55½
Interborough-Metropolitan Company	18¼	15
Interborough-Metropolitan Company (preferred)	48¼	43
Manhattan Railway	151⅜	149
Massachusetts Electric Companies (common)	12	11¼
Massachusetts Electric Companies (preferred)	59	59
Metropolitan West Side Elevated Railway, Chicago (common)	16	16
Metropolitan West Side Elevated Railway, Chicago (preferred)	50	50
Metropolitan Street Railway	42	*42
North American Company	74	73
Philadelphia Company, Pittsburg (common)	43¼	43⅛
Philadelphia Company, Pittsburg (preferred)	44	43½
Philadelphia Rapid Transit Company	24⅞	25¾
Philadelphia Traction Company	90½	90½
Public Service Corporation, 5 per cent collateral notes	—	—
Public Service Corporation certificates	—	—
Twin City Rapid Transit Company, Minneapolis (common)	97⅝	100⅜
Union Traction Company, Philadelphia	51¼	52

a Asked.
*Last sale.

Cicero & Proviso Street Railway, Chicago, Ill.—The protective committee of bondholders of the Cicero & Proviso Street Railway has extended until Jan. 20 the time for depositing bonds with the Illinois Trust & Savings Bank, Chicago, depository. Of the outstanding issue of $1,948,000 more than $1,500,000 has been deposited.

Columbus Railway & Light Company, Columbus, Ohio.—At the annual meetings of the Columbus Railway Company, the Columbus Traction Company and the Columbus Light, Heat & Power Company, on Jan. 7, Butler Sheldon, Frank T. Stewart, George Hardy, Harford T. Stewart and William K. Lanman were elected directors of all three companies. Officers of the Columbus Railway Company and the Columbus Traction Company were chosen as follows: Butler Sheldon, president; Frank T. Stewart, first vice-president; George Hardy, second vice-president; Herbert M. Burrington, secretary and auditor. The officers of the Columbus Light, Heat & Power Company are: Butler Sheldon, president; Frank T. Stewart, vice-president and treasurer; Herbert M. Burrington, secretary and auditor.

Dayton & Xenia Transit Company, Dayton, Ohio.—The Old Colony Trust Company, Boston, Mass., representing the holders of the first mortgage 5 per cent bonds of the Dayton & Xenia Transit Company, which has defaulted in its interest payments, has filed an intervening petition asking that the road be sold to satisfy the claims of the bondholders.

Delaware & Hudson Company, Albany, N. Y.—An appeal by the Delaware & Hudson Company to the Public Service Commission of the Second District of New York for a rehearing on the application of the company for authority to issue bonds for the financing of its recent purchase of additional coal lands in Pennsylvania and the acquisition of the Hudson Valley Railway has been denied by the commission. The company has announced that it will appeal to the courts from the decision of the commission.

Kenosha (Wis.) Electric Railway—The Investment Registry Company, London, Eng., has purchased control of the Kenosha Electric Railway from A. C. Frost, Chicago, and assumed the management of the company on Jan. 4. The Investment Registry Company was a small bondholder of the Kenosha Electric Railway. The road connects Kenosha and South Kenosha, about 4 miles distant, and reaches Anderson Park. Power is rented by the company from the Chicago & Milwaukee Electric Railroad.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—The members of the committee finally agreed upon to take over the management of the New Jersey & Pennslyvania Traction Company and the Trenton, New Hope & Lambertville Traction Company are: James G. Cannon, vice-president of the Fourth National Bank, New York, chairman; F. H. Goff, president of the Cleveland Trust Company, Cleveland, and J. R. Nutt, secretary of the Citizens' Savings & Trust Company, Cleveland. The secretary of the committee is E. W. Davenport, Fourth National Bank, New York City. The creditors' agreement has been accepted by the 10 creditors that represent the $370,000 indebtedness. It merely provides for the extension of the indebtedness until Jan. 1, 1910, and places the property in the hands of the committee. The agreement does not provide for the actual deposit of the securities. The committee has organized the New Jersey & Pennsylvania Railroad Company as the successor of the New Jersey & Pennsylvania Traction Company and the Trenton, New Hope & Lambertville Traction Company. C. M. Bates will be the president of the new company and H. C. Lang will be vice-president.

Ogden (Utah) Rapid Transit Company—The Ogden Rapid Transit Company has decided to issue $500,000 of bonds of this issue, $200,000 will be applied to refunding an outstanding issue and the remainder will be used for improvements and extensions.

Tri-City Railway & Light Company, Davenport, Ia.—The Tri-City Railway, which is a subsidiary of the Tri-City Railway & Light Company, has voted to increase its capital stock from $2,500,000 to $3,000,000.

United Power & Transportation Company, Philadelphia, Pa.—Charles Henry Jones and John W. Ellard have been appointed receivers of the Southwestern Street Railway by Judge Howland, in the United States Circuit Court, Philadelphia. The United Power & Transportation Company owns 7995 shares of the 8000 shares of the Southwestern Street Railway.

West End Street Railway, Boston, Mass.—The committee of stockholders of the West End Street Railway which was appointed to investigate the proposed merger of the Boston Elevated Railway has received the indorsement of holders of 131,209 shares of stock.

Traffic and Transportation

Recommendations Regarding Service in Washington, D. C.

The District Electric Railway Commission of the District of Columbia, as the result of a report made to it on street railway conditions in the District of Columbia by H. C. Eddy, its executive officer and secretary, has made recommendations to the Interstate Commerce Commission relative to the service on the Georgetown & Tenallytown Railway.

A brief abstract of the report by Mr. Eddy to the District Electric Railway Commission, on which the recommendations were based, follows:

"As a result of correspondence with the municipal authorities of some 20 or more of the larger cities in various sections of the United States it has been found that no definite regulation regarding the number of passengers which shall be carried in any one car has been enacted and enforced in any of the cities heard from. The consensus of opinion appears to be that the problem of eliminating the overcrowding of street cars has not only not yet been solved, but that the solution is at best most difficult. Information received through the courtesy of the State Department from consuls abroad indicates that somewhat more progress toward the solution of this problem has been made in foreign countries, and in several cities, notably Paris, the number of passengers which may be carried by various types of cars is fixed by municipal or imperial regulation.

"On Nov. 16, 1908, four inspectors were employed for the purpose of securing data showing the condition of passenger traffic on the various electric railways in the District of Columbia, and these inspectors, assisted occasionally by my regular assistant and myself, devoted 12 days of eight hours each to this work during the latter part of November and the early part of December. Observations were made at at least one point on every electric line operated within the District of Columbia, except that of the Washington, Baltimore & Annapolis Railway and a total of about 100 observations were made. At two or more different points where the traffic is heaviest, and on several of the lines on which many of the cars are much overcrowded, several observations were made at the same location and time but on different days.

"The weather was almost invariably fair when observations were made. This was merely a coincidence, but it is believed that the records obtained give a fairly accurate idea of the average conditions for, while in rainy weather many people ride who would walk on a fair day, on the other hand fewer people leave their homes on rainy than on fair days. The traffic is undoubtedly somewhat heavier in rainy weather, however, and some allowance should be made for this fact.

"In order to indicate clearly the results of the observations made, about 50 charts have been prepared showing graphically the conditions of the various congested points on the more important lines and also on some of the minor lines. It is respectfully suggested that a perusal of these charts will prove interesting.

"The observations made show that on many of the lines during the 'rush hours' cars are frequently operated carrying an excess of 40 passengers over the seating capacity. The rear platforms are frequently, I may say usually, crowded during the 'rush hours,' and the front platforms are often used to accommodate passengers, the steps and running boards being also often occupied to their fullest capacity. It is not an uncommon sight to see several passengers standing on the rear bumper and fender of a car, and in one instance last summer I saw two men standing on the front bumper.

"It should be noted in this connection that nearly all the newer types of cars which have been placed in service in the District of Columbia are fitted with bumpers which are so designed that it is practically impossible for passengers to occupy that portion of the car. It has been observed that especially during the hours of heaviest traffic, inspectors keep the cars moving and assist generally in the work of caring for the comfort of the patrons of the road. If this system was more generally adopted it is believed that it would be a great advantage to the traveling public.

"It is quite impossible to count the exact number of passengers on board a crowded car during the usually short interval which the car stops at a given point. However, it is possible to count, with a reasonable degree of accuracy, the number of passengers standing in a crowded car and at the same time note if the seating capacity is taxed, and by adding the number of standing to the seating capacity a very close estimate of the number of passengers on the car can be obtained. This was the method generally followed by the inspectors when the cars were crowded, two men being usually stationed at one point. It is believed that on the whole the data secured are if anything less than the actual number of passengers carried on the more crowded cars.

"It would appear from the observations I have made that more cars are needed during the 'rush hours' on many of the lines in the District of Columbia, and I am convinced that such is the case. However, it has been observed that there is a tendency on the part of the public in general to crowd into the first car that comes along, be it ever so full, regardless of the fact that there may be, as there frequently is, another car in sight, often only a few hundred feet away. In consequence of this fact it has frequently been observed that a car very much overcrowded is closely followed by a car which is not half full. This condition of affairs is also due in part to the cars running at very irregular intervals, which was found to be the case on several lines.

"In conclusion I would state that, while in my opinion the conditions regarding the crowding of cars in the District of Columbia are, to say the least, very unsatisfactory and should be remedied, yet, as far as I have been able to learn and observe, they compare favorably with similar conditions in many other cities."

Hearing on Fares on Athol & Orange Street Railway

A hearing was held by the Massachusetts Railroad Commission on Jan. 8 on the petition of citizens of Athol for workingmen's tickets and additional service on the Athol & Orange Street Railway at morning, noon and night. The petitioners were represented by Col. Titus, Athol, who stated that the petition for extra service would be withdrawn. Wilson D. Smith, general manager of the Athol & Orange Street Railway, said that the petitioners really desired a fare of 3 cents, between the upper and lower villages of Athol. The present fare limits and arrangements are as follows: Between the west end of the railway in Orange and the Boston & Maine Railroad bridge in Athol, just east of the town line, 5 cents; between the east end of the railway at the Athol fair grounds and the Boston & Maine Railroad bridge in Orange, near the company's car house, 5 cents; from any point in Athol or Orange to Brookside Park, lying between the two railroad bridges named, 5 cents; from the end of the line in Athol to the opposite end in Orange, 10 cents. The latter tariff is reduced by the sale of 16 workingmen's tickets for $1, good only for workingmen between 5 a. m. and 7 a. m. and 5 p. m. and 7 p. m. These tickets have been sold by the company since the Athol & Orange Street Railway was opened to traffic and cover a continuous ride between Athol and Orange in either direction.

Mr. Smith stated that there never has been any ticket covering the ride between the upper and the lower villages of Athol, nor between the center of Orange and the center of Wheelersville, on the westerly portion of the Athol & Orange Street Railway. The fare is 5 cents in each case, and Mr. Smith stated that in his opinion the workingmen's tickets did not discriminate against others. Chairman Hall then informed Col. Titus that the statute did not permit the company to sell workingmen's tickets good at the noon hour, and asked the petitioners to cite any other case where a workingman's ticket had been issued in a 5-cent fare zone. Col. Titus was unable to do this. Mr. Smith pointed out that if a reduced ticket were issued for these local rides within the same town, it would be greatly abused. Chairman Hall said that the commission has never ordered any company to issue a workingmen's ticket in a 5-cent fare zone, although in some instances it has recommended a workingmen's ticket in a 10-cent fare territory. Mr. Smith then stated that the company's operating expenses had increased about one-third in the past three or four years, and that last year there was a deficit of $4,500. In 1907 there was a surplus of $123, and the receipts were about $400 less than in 1908. Since the beginning of the present fiscal year the company's earnings have fallen off at the rate of about $200 a month, compared with last year, making the estimated loss for the year about $2,500. At the last meeting of the directors of the company the question of passing the dividend was very seriously considered. While the deficit was in part due to litigation, the possibility always exists that there may be a repetition at any time of the extraordinary circumstances which entailed the large charge in this instance. Chairman Hall in closing the hearing said: "This is the first time that the board has been asked to order a railway to carry people for less than 5 cents. The board will consider the application carefully, but will go very slow in deciding that a company shall charge less than a 5-cent fare."

Suit to Annul Franchise of a New York Company

The Public Service Commission of the First District of New York has asked the Attorney-General of New York to bring suit to annul the franchise of the Fulton Street Railroad, New York, which some time ago was placed in the hands of a receiver and which has not been operated for about seven months. The original franchise for the property operated as the Fulton Street Railroad was granted in 1887 to the North & East River Railway, which was the successful bidder at a public auction of the franchise held by the Controller. The property of the company was foreclosed under a mortgage in 1895 and sold by the referee to John H. O'Rourke for $50,000, and by him was transferred to the Fulton Street Railroad. Milo R. Maltbie, of the Public Service Commission, who investigated the subject and on whose opinion the commission took action, said in his report:

"Within two weeks Mr. O'Rourke transferred what property he purchased to the Fulton Street Railroad, just incorporated, and received in return securities of a par value of $1,000,000. Of this amount $500,000 was in stock and $500,000 in 100-year 4 per cent first mortgage bonds. Early in 1896 all of the stock found its way into the hands of the Metropolitan Traction Company, and thence it went to the Metropolitan Street Railway, etc.

"Following this change in stock ownership the Metropolitan Street Railway entered into an agreement with the Fulton Street Railroad for the operation of this property. The Metropolitan Street Railway agreed, in consideration of the lease, which was to run 1000 years, to guarantee the payment of the principal and interest of the bonds due in 1905. At present $300,000 of the bonds are held by the Equitable Life Assurance Society, and the remaining $200,000 are in the hands of various persons."

The Fulton Street road carried during the year ending June 30, 1907, 530,668 revenue passengers and 230,256 transfer passengers. According to sworn reports, the Fulton Street Railroad owns 1.05 miles of single track horse car line, and previous reports to the State Railroad Commission at various times showed that it owned from seven to 13 cars and from 42 to 65 horses.

The Metropolitan Street Railway says that the cars and horses received from the Fulton Street Railroad have ceased to exist, and have been replaced by the Metropolitan Street Railway from time to time. The actual ownership of such property, it is claimed, is a question for the courts, although the receiver of the Fulton Street Railroad has taken no steps to have the question settled. The receiver of the Fulton Street Railroad told the Public Service Commission that he has no funds and that the bondholders have refused to raise funds to purchase cars and horses for operation.

Advertising Improved Service in Boston

Since the opening of the Washington Street Tunnel the Boston (Mass.) Elevated Railway has been studying the distribution of traffic in the business section of the city with the object of so operating the new system as to secure the maximum public convenience of transportation. During this adjustment period, patrons of the company have been slightly inconvenienced through congestion of traffic at the North Station and through the removal of the elevated service from Pleasant Street to the South Station via Harrison Avenue and Beach Street. In the following advertisement addressed to its patrons and inserted in the daily press of Boston, on Jan. 5, the company tells the public about its plans:

"The Washington Street tunnel has now been in service for more than a month, and has proved very successful. The congestion at Park Street and Scollay Square has been relieved. Through passengers are carried more quickly and comfortably. The route of the elevated trains is more convenient for a large majority of its patrons in respect to their business, their shopping and their places of entertainment. When the connection required by law between the subway and the tunnel at Haymarket Square has been completed by the Boston Transit Commission and used as a transfer station, the conditions at the North Station will be very much improved. When the East Cambridge elevated tracks are built the conditions will be still further improved.

"Knowing, however, that the withdrawal of the trains, as required by law, from the Tremont Street subway, would involve changes which would undoubtedly cause inconveniences, the officials of the company have watched the results carefully, to see how such inconveniences might best be remedied.

"The congestion of the surface cars at the North Station proved very serious. This has been largely relieved by a new switch, turning a considerable number of the cars on to Haverhill Street.

"The through car service in the subway has been increased, and will be still further increased, if necessary.

"The removal of the elevated service to the South Station via Pleasant Street has caused inconvenience. This situation will be met, first, by the extension of the Charles Street line to Dewey Square and second, by transfer at Boylston Street subway station, from and to cars entering and leaving the subway at the Public Garden, to and from surface cars, at the corner of Boylston and Tremont Street, reaching Dewey Square via Boylston, Washington and Summer Streets. Conductors will issue transfers, on payment of fare, on and after Jan. 13, 1909."

Passenger Traffic in St. Louis

The following comparative statement of passengers carried by the United Railways Company, St. Louis, Mo., for 1907 and 1908 has recently been issued:

	1907.	1908.
First quarter	49,861,361	49,071,394
Second quarter	55,958,641	51,657,522
Third quarter	56,720,700	51,185,813
Fourth quarter	54,238,936	52,674,281
Totals	216,779,638	204,589,010

Sanitary Precautions of the Interborough Rapid Transit Company

Twenty-five hundred employees of the subway, elevated and surface lines of the Interborough Rapid Transit Company, New York, attended the exhibit of the work of the committee on the prevention of tuberculosis of the Charity Organization Society of the City of New York at the American Museum of Natural History, New York, on the evening of Jan. 3, and, after studying its different features, attended a meeting which was addressed by several speakers, among them Frank H. Hedley, vice-president and general manager of the Interborough Rapid Transit Company, who presided over the meeting in the absence of Theodore P. Shonts, president of the company, who was unable to be present. In Mr. Hedley's opening remarks he told of the great care that is taken to keep the cars of the subway and elevated lines in a sanitary condition. He said that the thick matting on the floor of the cars which was a trap for disease germs of all kinds had been done away with and its place taken by hard maple strips three-quarters of an inch square and the same distance apart. Every night the floor of every one of the 2500 subway and elevated cars is sprinkled with a 5 per cent solution of carbolic acid, which is a disinfectant and a destroyer of germs. The floors are then swept clean, and after the dust has settled it is wiped up carefully with cheesecloth instead of being churned up with feather dusters. Every week, and oftener if necessary, the floors are scrubbed with a soft soap containing a very strong solution of alkali.

Every month the interiors of the subway cars are cleaned with an oil emulsion which gathers up all of the fine particles of dust, and at least once a year every car is painted, varnished and oiled so as to most effectively repel the collection of grime and germs. Every night the straps are cleaned with an acid solution which will kill germs. Cuspidors have been placed at all elevated and subway stations and, owing to the watchfulness of the gatemen and ticket choppers, there is now very little spitting on the floors of the stations.

Texas Negroes Indorse "Jim Crow" Law.—The Negro Teachers' Association of Texas, in session at Dallas, recently indorsed the law which provides for the separation of the races on the street railways, the interurban railways and the railroads of Texas.

Hearing Asked on 6-Cent Fare in Massachusetts.—At the request of the City Council, the Mayor and City Solicitor of Northampton, Mass., have asked the Massachusetts Railroad Commission to give a hearing on 6-cent fares charged by the Northampton Street Railway.

Hearing Desired on West Roxbury Service.—The Massachusetts Railroad Commission has been asked to give a hearing on the service on the Old Colony Street Railway's single-track line, between Washington Street, West Roxbury, and the Dedham town line. The petitioners ask that the service be operated by the Boston Elevated Railway.

Syracuse, Lake Shore & Northern Railroad Opens New Stations.—The Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., has been extended and new stations have been opened at Baldwinsville, Fulton, Phoenix and Syracuse. Local one-way and round-trip fares and commutation

ticket rates have been established between such stations and intermediate stops.

Massachusetts-Rhode Island Line Applies for Freight Rights.—The Milford, Attleboro & Woonsocket Street Railway, Milford, Mass., has applied to the Selectmen of Bellingham for a franchise for the transportation of freight through Bellingham. The company will also apply for similar rights in Franklin. Freight will be transported only between the hours of midnight and 6 a. m.

School Fares on Staten Island.—On Jan. 4 the Staten Island Rapid Transit Company, New York, N. Y., put into effect an order increasing the fare of school children from $2 to $6.25 a month, but later on the same day restored the old rate of fare. George J. Brown, general passenger agent of the company, in explanation of the action of the company, issued this statement: "Pending further investigation of the legal and other questions involved, the Staten Island Rapid Transit Company has decided to restore the old intrastate school rates for the month of January, 1909; the company, however, regards these rates as unreasonably low."

More Pay-As-You-Enter Cars in New York.—In accordance with its announcement to the public, the Third Avenue Railroad, New York, placed 135 pay-as-you-enter cars in service on the Third Avenue line on Jan. 10. Passengers are requested to have their nickels ready, but the conductors furnish change, if necessary. The passengers must, however, deposit their own fares in the fare box. Transfers are issued by the conductor only when the fare is paid, and when tendered by passengers in payment of fare are given to the conductor. Passengers are permitted to leave the car from either end, but are permitted to board only at the rear end.

Minneapolis Company Asks an Opinion on Commutation Rates.—The Twin City Rapid Transit Company, Minneapolis, Minn., has asked the Attorney-General of Minnesota for an opinion as to whether the commutation rates on its Minnetonka line are in violation of the anti-pass law. The company has notified the policemen and firemen of Minneapolis and St. Paul that they can no longer be transported free on account of the provisions of the new law. W. J. Hield, general manager of the company, has expressed himself as favoring an amendment that shall exclude all city employees in uniform from the provisions of the law.

Telegraph Service on the Inland Empire System.—An attractive 4-page folder announces that messages will be received at any telegraph station on the Inland Empire System, Spokane, for transmission by wireless telegraph to ships at sea in any part of the world. The Spokane & Inland Empire Railroad utilizes both telegraph and telephone in dispatching its trains and the Postal Telegraph & Cable Company leases the telegraph wires along the line and has arranged for receiving and transmitting messages from 25 stations on the Inland Empire System. The folder contains a map of North America, showing plainly the trunk lines of the Postal Telegraph & Cable Company.

Suppressing Spitting in Augusta.—James R. League, general manager of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., has issued the following order to conductors with reference to the recent ordinance passed by the Council of Augusta regarding spitting in public places: "Notices are being posted in your cars calling attention to an ordinance forbidding any person to spit on the floor of a car in Augusta. The ordinance provides for a fine of from $1 to $5 for a violation of this ordinance, and it further provides that you shall see that this ordinance is enforced. Should one of your passengers spit on the floor, or other part of your car, you will ascertain his name, together with the names of as many witnesses as possible, and report same to your superintendent at once. He will immediately see that the case is brought to the attention of the recorder."

Increase in New York Subway Service.—The Public Service Commission of the First District of New York, reports a substantial increase in the service of the Interborough Rapid Transit Company in the subway. At the Grand Central Station the maximum service in the morning rush hour, southbound, has been extended from 9 to 9:30 o'clock. At midday at the same point the company is operating 20 trains an hour instead of 18, and from noon to 2 p. m. eight car trains have been substituted for six car trains. The company is now beginning the increased northbound service at 4 p. m. instead of 5 p. m., thus lessening the overloads at the beginning of the evening rush. The service has also been increased between 7 p. m. and 8:30 p. m. The commission says that the service now given by the company is considerably in excess of the recommendations made to the company by the commission in November, 1908.

New York Commission Appeals Transfer Decision.—The Public Service Commission of the First District of New York has appealed from the decision of the Appellate Division of the Supreme Court the case decided against the commission regarding the order to compel the Metropolitan Street Railway and the Central Park, North & East River Railroad to make a joint rate of five cents and will carry the suit to the Court of Appeals. The joint rate of five cents was to apply to the zone between Thirty-fourth Street and 116th Street and the companies were to divide the fares received on the basis of 3¾ cents to the Metropolitan Street Railway and 1¼ cents to the Central Park, North & East River Railroad. Both companies secured a writ of certiorari. This the commission moved to have vacated before the Appellate Division, but its application was denied. It is from this decision that the commission now appeals.

Spokane & Inland Schedule Modified.—The Spokane & Inland Empire Railroad has recently revised the time on its Inland division. The most important change is the consolidation of the three separate daily trains to Colfax and Moscow and their operation as one as far as Spring Valley, where they are divided and run separately to the terminals. The through trains leave Spokane at 8 a. m., 12:25 p. m. and 4:25 o'clock p. m. The Moscow section reaches Moscow at 11:20 a. m. and at 3:40 p. m. and 7:40 p. m. The Colfax section arrives at Colfax at 10:50 a. m. and at 3:10 p. m. and 7:10 o'clock p. m. The returning trains leave Colfax at 8:10 a. m., 12:30 p. m. and 4:30 p. m., and leave Moscow daily at 7:40 a. m., 12:01 p. m. and 4:50 p. m. The combined trains arrive in Spokane at 10:58 a. m. and at 3:18 p. m. and 7:20 p. m. Local trains leave Spokane daily at 7:40 a. m., 10:00 a. m., 1:00 p. m., 3:10 p. m. and 5:30 p. m., and arrive in Spokane at 7:20 a. m., 9:40 p. m., 12:01 p. m., 2:50 p. m., 5:12 p. m. and 7:20 p. m. The only exception to the daily schedule is a Saturday night train leaving Freeman at 6:45 p. m. and arriving at Spokane at 7:40 p. m. It leaves Spokane on the return trip at 11:15 p. m. and arrives at Freeman at 12:30 a. m.

Service Over Lines of United Traction Company, Albany, N. Y.—The United Traction Company, Albany, N. Y., has filed its answer with the Public Service Commission of the Second District to the complaint of Green Island regarding service between Troy and Green Island. The company states that the first car leaves Albia for Cohoes via Green Island at 4:42 a. m. and that a car leaves every 10 minutes thereafter until 11:42 p. m. The night car leaves Albia for Cohoes at 12 o'clock midnight and every hour thereafter a car leaves until 4 a. m. From 5:54 p. m. to 6:24 p. m. going north to Green Island there is a car every 5 minutes; a car leaves Cohoes for Albia via Green Island at 5:37 a. m. and every 10 minutes thereafter a car leaves until 12:37 a. m. The night car leaves Cohoes for Albia at 1:10 a. m. and every hour thereafter a car leaves until 5:10 a. m. From 6:34 p. m. until 7.04 p. m. there is a five-minute service south from Cohoes, through Green Island to Albia. The company submitted to the Commission a record of passengers, made some time ago, which shows that the service furnished met all requirements at that time. When the complaint was filed with the Commission, another record was made which is also submitted with the company's answer, and as a result of this count the company contends that the service now furnished is adequate and reasonable.

Philadelphia Rapid Transit Company Replies to Employees.—The directors of the Philadelphia (Pa.) Rapid Transit Company have voted not to treat with a committee representing its employees regarding an advance in wages and the readjustment of the agreement existing between the company and the men, and has made public the following letter in explanation of its action: "At a meeting of the board of directors of this company, held on Jan. 11, the Mayor of the city, as a member of said board, presented the request of a committee of certain of the employees of the company and others not employed by the company and not connected with its business, that the company would hereafter meet from time to time a committee to be appointed by them for conference on alleged grievances. In former communications we have stated explicitly the reasons for the refusal of the officers of the company to meet with such committee. The company again reiterates that refusal. At the same time the board of directors again authorizes the statement to be made to all of its employees that in the future, as in the past, each or any of them may at any time personally present to the general manager any and all complaints or grievances that they may have to make. Each of such complaints or grievances will receive due and just consideration, and the decision of the general manager thereon will be communicated to each person so complaining. Under no circumstances, however, will committees be received or treated with."

Personal Mention

Mr. C. M. Bates has been elected vice-president and general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., to succeed Mr. J. D. Honecker, resigned.

Mr. L. H. Conklin has resigned as general superintendent of the West Penn Railways Company, Pittsburg, Pa., to become general manager of the Scranton (Pa.) Electric Company.

Mr. Thomas McCaffrey, master of transportation of the Pacific Electric Railway, Los Angeles, Cal., has been appointed general superintendent of the company, and will hereafter perform the duties of both officers.

Mr. Joseph W. Bailey, who has been assistant superintendent of the Ogden (Utah) Rapid Transit Company for several years has been appointed superintendent of the company to succeed N. C. Flygare, deceased.

Mr. W. G. Miller, mechanical and electrical engineer of the Illinois Traction System, Champaign, Ill., and Mr. W. H. Tarrant, civil engineer of the Illinois Traction System, have been appointed to the general office of the system in Champaign to assist Mr. H. E. Chubbuck, general manager. Mr. Miller and Mr. Tarrant will be given special assignments covering the entire system and will do special development work.

Mr. Harry Stephenson, auditor of the Western Ohio Railway, Lima, Ohio, has been appointed superintendent of the Toledo Urban & Interurban Railway with headquarters at Bowling Green, Ohio. The appointment becomes effective on Feb. 1, when Mr. William L. Smith, now superintendent of the company, assumes the office of general manager of the Dayton (Ohio) Street Railway, as announced elsewhere in this issue.

Mr. Henry C. Morris, for several years assistant general manager of the Bay City Traction & Electric Company and the Bay City Gas Company, Bay City, Mich., has resigned. The Bay City Traction & Electric Company and the Bay City Gas Company are controlled by Hodenpyl, Walbridge & Company, New York, and Mr. Morris has announced that he will become identified with them in the management of their gas interests in Texas.

Mr. William S. Smith has been appointed general superintendent of the Dayton (Ohio) Street Railway. Mr. Smith was formerly general superintendent of the Toledo Urban & Interurban Railway operating between Toledo and Dayton, in which capacity he served for seven years. Before becoming connected with the Toledo, Urban & Interurban Railway, Mr. Smith was general superintendent of the People's Railway, Dayton, for five years. Mr. Smith has also been connected with the Cincinnati (Ohio) Street Railway.

Mr. Benjamin E. Tilton, engineer of maintenance of way of the Rochester (N. Y.) Railway, has been appointed engineer of maintenance of way of the Municipal Traction Company, Cleveland, Ohio, by Mr. Warren Bicknell and Mr. F. A. Scott, receivers of the company, to succeed Mr. R. H. Bunning. Mr. Tilton was engineer of maintenance of way of the Cleveland Electric Railway before that property was taken over by the Municipal Traction Company, and before that was engineer in charge of grade-crossing work in Cleveland.

Mr. John T. Wheeler, who was recently appointed superintendent of the Western New York & Pennsylvania Traction Company, Olean, N. Y., to succeed Mr. J. W. Barnes, has been engaged in street railway work since 1893, in which year he entered the employ of the local street railway company at Olean as a conductor. Mr. Wheeler also served as a motorman at Olean, and in 1896 became connected with the Bradford Electric Railway, Bradford, Pa., with which company he acted at different times as chief lineman, construction foreman and master mechanic, finally being appointed assistant superintendent of the Western New York & Pennsylvania Traction Company, which succeeded the Bradford Electric Railway.

Mr. J. F. Strickland, president of the Texas Traction Company, Dallas, Tex., contributed a very interesting article to the *Dallas News* recently on interurban railway development. Mr. Strickland said that while electricity has been used as motive power for some time the interurban railway is of recent development and with Illinois as an example showed that the interurban mileage of that State had increased from 300 miles in 1903 to approximately 1500 miles in 1908. During 1908 the interurban mileage of Texas increased about 158 per cent according to Mr. Strickland, who predicts that the electric interurban railway would soon monopolize the local business of the more densely populated sections of Texas.

Mr. Matthew C. Brush, vice-president and general manager of the Newton (Mass.) Street Railway and other lines controlled by the Boston Suburban Electric Companies, was the guest of honor at a dinner given recently by the president and directors of the companies at the Algonquin Club, Boston, in appreciation of his services in the interest of the roads. Mr. James L. Richards, president of the company, was toastmaster, and brief addresses were made by Gen. W. A. Bancroft, Mr. T. E. Byrnes, Mr. Robert Winsor, Mr. Thomas P. Beal, Mr. L. S. Storrs and Mr. F. W. Freeman. A resolution passed by the directors complimenting Mr. Brush for the efficiency which he has shown as vice-president was read by Mr. Richards.

Mr. R. D. Sefton, assistant purchasing agent of the Geiser Manufacturing Company, Waynesboro, Pa., has been appointed general manager of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., to succeed Mr. Jos. E. Wayne, resigned. Mr. Sefton began his railroad career as a telegrapher and served in that capacity and as station master for several years with a number of railroads in Pennsylvania. He then became connected with the Baltimore & Ohio Railroad and acted as general agent for that company and several others at Martinsburg, W. Va., during 1903, 1904 and 1905. Resigning from the Baltimore & Ohio Railroad in 1906, he became connected with the Geiser Manufacturing Company.

Mr. L. H. Davis, who has been general superintendent of railway, light and ferry properties of the Norfolk & Portsmouth Traction Company, Norfolk, Va., has been appointed general superintendent of floating properties of the company including the Portsmouth, Norfolk and Berkley ferry systems, the ferry between Willoughby Spit and Old Point Comfort, the ferry between Newport News and Sewalls Point and the Pinners Point and West Norfolk ferry. Mr. H. Root Palmer has taken over the lighting department at Portsmouth as general superintendent of lighting, and Mr. J. L. Adams has taken over the railway department as general superintendent of railways. Because of Mr. Davis's residence in Portsmouth he has been appointed general agent, reporting to Mr. E. C. Hathaway, general manager, and through him to the president.

Mr. J. M. Hood, Jr., engineer of way of the United Railways & Electric Company, Baltimore, Md., has been appointed chief engineer of the company to succeed Mr. Charles O. Vandevanter, resigned. Mr. Hood received his engineering training at the Massachusetts Institute of Technology and Princeton University and was graduated from Princeton with the degree of civil engineer. After leaving college he was employed on the Philadelphia division of the Pennsylvania Railroad in maintenance of way work. Subsequently he became connected with the engineering corps of the Baltimore & Ohio Railroad west of Pittsburg in connection with the location of a new line for that company. Later he went to Mississippi in connection with the building of the link to connect the Queen & Crescent Railway with the Illinois Central Railway. After this extension was completed, Mr. Hood was appointed division engineer of the new line of the Missouri Pacific Railroad between Memphis and New Orleans. He resigned from the Missouri Pacific Railroad to become resident engineer of the Seaboard Air Line in Georgia. Later Mr. Hood and Mr. Charles Vandevanter, whom he succeeds as chief engineer of the United Railways & Electric Company, Baltimore, opened offices in Baltimore as consulting engineers. They dissolved partnership after the fire in 1904, and Mr. Hood accepted the position of principal assistant engineer of the United Railways & Electric Company. Mr. Hood supervised for the United Railways & Electric Company the construction of the North Point extension to Bayshore Park and the Roland Park-St. Paul's Street boulevard line and the reconstruction of the lines of the company after the fire. Mr. Hood is a son of the late General John M. Hood, who was president of the United Railways & Electric Company and president and general manager of the Western Maryland Railroad. He is an associate member of the American Society of Civil Engineers.



J. M. Hood, Jr.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The Legislature of Connecticut convened on Jan. 5. The most important action so far is the presentation of the report of the special committee on public service corporations appointed by the General Assembly of 1907. As mentioned in the ELECTRIC RAILWAY JOURNAL for Nov. 28, 1908, the committee recommends that a commission be appointed to consist of three members, to be named by the Governor and confirmed by the concurrent action of both branches of the General Assembly, to have supervision of all railroads, street railways, gas, electric, water, express, telephone and telegraph companies subject to State control. A number of street railway companies have already applied for extensions of their powers. The Bristol & Plainville Tramway desires an extension of time in which to complete lines in contemplation. The Waterbury & Milldale Tramway wants its charter amended so as to extend its rights until July 1, 1911. The Hartford & Springfield Street Railway seeks an amendment to its charter to provide for the election of several additional directors.

Massachusetts.—The Massachusetts Legislature convened for its session of 1909 on Jan. 6. Mr. Weeks, Everett, is chairman of the committee on street railways. Among the matters which will probably be considered by the Legislature are the so-called electric railway and steam railroad merger question, in connection with the purchase of the Bennington & North Adams Street Railway of Vermont by the Berkshire Street Railway; the consolidation of the Boston Elevated Railway and the West End Street Railway; the projected tunnel of the Boston & Eastern Electric Railroad under Boston Harbor; a proposed tunnel from Chelsea Square to Adams Square; the application of the Boston, Lowell & Lawrence Street Railway to build subways and elevated railways in Boston, Lowell, Lawrence and Somerville; the holding of stock of electric railways by Massachusetts steam railroads; and the granting of the right of eminent domain to municipalities and corporations in connection with the property of railroads and other public service corporations. The Railroad Commission will shortly issue a report which will embody its views on the proposed purchase of the Bennington & North Adams Street Railway by the Berkshire Street Railway, and will also discuss the relations which in the opinion of the commission should exist between steam railroads and electric railways. A measure may also be introduced to provide for the construction of a subway between the present Park Street terminus of the Tremont Street subway and the South Station, Boston. Counsel for the West End Street Railway, Boston, in conformity with the vote of the stockholders at a recent special meeting, has filed a bill to amend terms of the Boston Elevated Railway-West End Street Railway consolidation act, so that after 1922 the dividend on the second preferred stock of the Boston Elevated Railway will be at the rate of 8 per cent. The act as passed last year provided for 7 per cent dividends on this class of stock, which, in event of consolidation of the two roads, is to be exchanged for the common stock of the West End Street Railway.

New York.—Senator Wagner has introduced a bill which provides for a 5-cent fare over the street railways operating in Brooklyn to Coney Island. Last year, while in the Assembly, Mr. Wagner secured the passage of a bill which provided for reduced fare to Coney Island, but Governor Hughes vetoed the measure upon the ground that the question was one within the power of the Public Service Commission to decide. Senator Goldberg has introduced a bill to compel every surface railroad in New York to issue transfers at all points where its lines intersect. A bill has been introduced in the Assembly to amend the rapid transit act to permit the construction of subway lines in New York by private capital on a franchise of not longer than 25 years, at the expiration of which term the city is to have the right to buy the property at cost. The bill further provides for the lease by the City of New York for private operation for a period of not more than 35 years of any roads that may be built by it. The Legislature convened at noon on Jan. 13, after a week's recess. The first matter to come before it next week will be the general laws of the statutory consolidation committee.

Ohio.—The General Assembly of Ohio convened on Jan. 5. As yet the active work has not begun. A vacancy occurs this year in the Railroad Commission, and ex-Governor Andrew L. Harris, before he retired, appointed James C. Morris as a member of the commission. Mayor Johnson is expected in Columbus soon, but his coming is said not to have anything to do with street railway legislation. He is said to desire a change in the debt limit law so as to permit Cleveland to issue additional bonds for improvements which he has in contemplation.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Pasadena (Cal.) Rapid Transit Company.—This company has been incorporated with the object of connecting Los Angeles and Pasadena by a third-rail electric railway, over the shortest route between the two cities. The round trip will be made in 24 minutes. The title to the right-of-way of the old cycle way, which extends from Pasadena to Avenue Fifty-three, a distance of 6 miles, has been secured, and additional right-of-way in Los Angeles suitable for a terminal is to be purchased. Offices Chamber of Commerce Building, Pasadena. Capital stock, $3,000,000. Incorporators and directors: Horace M. Dobbins, George H. Hayes, W. H. Smith, Edward J. Sheehan, Don C. Porter. Ernest H. May, president of the Pasadena National Bank, has been elected treasurer of the company. [E. R. J., Nov. 14, '08.]

***Chicago, Joliet & Pacific Railway, Chicago, Ill.**—Chartered in Illinois to construct a line from Chicago southwesterly and westerly through the counties of Will, Grundy, La Salle, Bureau, Henry and Mercer to Keithsburg, Mercer County. Capital stock, $50,000. Headquarters, Chicago. Incorporators: George Fuller, Isaac B. Fuller, William H. Richardson and Charles F. Blue, all of Chicago.

***Tri-City & Northeastern Interurban Railway, Moline, Ill.**—Application for a charter has been made by this company which proposes to build and operate a line from Watertown to Albany along the river front. Capital stock, $10,000. Incorporators: George W. Turner, L. F. Baker, Hampton; William H. Adams, F. M. Mitchell, Rapids City; J. W. Simonson and William Ashdown, Port Byron; Edward Cool, George Bryan, Cordova; C. E. Peck, J. S. Byers, Albany; J. W. Crowley, Daniel E. Keeler, Gust M. Hodges, John E. Mahon and Herman Diehn, Davenport.

***Mexico & Jefferson City Electric Railway, Columbia, Mo.**—This company has been chartered for the purpose of building an electric railway from Mexico through Columbia and Ashland to Jefferson City. The line will be 60 miles long. Capital stock, $600,000. Incorporators: T. F. Whiteside, C. F. Spaerta, Turner S. Gordon, A. J. Estes, J. M. Estes, John Williams, E. F. McCallister and C. A. Marshall, Columbia, and W. C. Carroll, New York.

***South Flatbush Railroad, Brooklyn, N. Y.**—This company has been incorporated to construct an electric street railway 3 miles long from the Brighton Beach line of the Brooklyn Union Elevated Railroad, at Avenue Q to Avenue Q and Flatbush Avenue, Brooklyn. Capital stock, $30,000. Directors: John C. Langan, Brooklyn; J. J. Boughman, New Cumberland, Pa.

***Tooele Valley Railway, Tooele, Utah.**—This company has been incorporated to build an electric railway 25 miles long in Tooele County, from Black Rock into Pine canyon, through Tooele to a connection with the San Pedro, Los Angeles & Salt Lake Railway, west of Tooele. The general office will be opened in Salt Lake City. Among those interested are C. F. Kelly, Butte, Mont., and J. B. Risque, Salt Lake City.

FRANCHISES

***Los Angeles, Cal.**—H. F. Vollmer has applied to the City Council for an electric railway franchise on Fifty-fourth Street from Hoover to Dalton. This will be a continuation of the Fifty-fourth Street line and will make a complete crosstown line in the southern part of the city from San Pedro to Dalton.

Atlanta, Ga.—The Atlanta, Griffin & Macon Interurban Railway has received an extension of time in which to begin the construction of its line. The extension is for one year, with the provision that if work is not begun by April 1, a tax of 2 per cent on one-fifth of the company's receipts will be imposed. If work is begun by that time, the tax will be 2 per cent of the receipts based on the mileage of the company in Atlanta proportionate to the road's entire mileage, which is about 2 to 80. W. J. Kincaid, president. [E. R. J., Oct. 17, '08.]

Caseyville, Ill.—A franchise has been granted by St. Clair County to the East St. Louis & Caseyville Electric Railway for the construction of an electric railway through East Lansdowne Heights to Caseyville. The line is to be built over the right of way of a portion of an old turnpike extending from East St. Louis to Caseyville, giving the latter village a much shorter railway connection with East St. Louis. [E. R. J., Nov. 14, '08.]

Council Bluffs, Ia.—It is stated that the Independent Transportation Company expects to petition the City Council within a short time for a franchise for the construction and operation of a street railway system over the streets of Council Bluffs. A. T. Flickinger, vice-president. [E. R. J., Aug. 22, '08.]

Primghar, Ia.—As the result of a special election held in Primghar the Sioux City & Spirit Lake Railway was granted a franchise to construct and operate a street railway and interurban electric line across and over the streets and alleys of the town for a period of 25 years. A franchise was also granted the company which provides for the construction and operation of an electric lighting and power system for a period of 25 years. [E. R. J., Dec. 5, '08.]

Marquette, Mich.—The Marquette, Negaunee & Ishpeming Interurban Railway, which proposes to establish an electric railway between the three cities named in the title, has applied to the City Council for an extension of its franchise rights in Marquette. The old franchise expired on Jan. 3. The line will be 14 miles in length. J. W. Barber, secretary. [E. R. J., July 11, '08.]

Missoula, Mont.—The County Commissioners have granted to H. R. Wharton, Butte, representing the W. A. Clark interests, a 50-year franchise for a street railway over the new Higgins Avenue bridge and also the privilage of stringing light and power wires over the same structure. [E. R. J., Dec. 26, '08.]

Binghamton, N. Y.—The Binghamton Railway has been granted an extension of time to build its line between Union and Vestal. The franchise is extended for two years more, until Nov. 1, 1910. The company has received permission to cross the Union-Vestal bridge, provided it will strengthen the structure.

Mineola, N. Y.—The New York & North Shore Traction Company has applied to the Public Service Commission of the Second District for a certificate of public necessity and convenience to extend some of its Nassau County lines into Queens County. This is preliminary to asking the Board of Estimate and Apportionment for a franchise for the proposed lines.

Patchogue, N. Y.—The South Shore Traction Company has applied to the Public Service Commission of the Second District for a certificate of public necessity and convenience to extend some of its lines through Jamaica, Hoffman Boulevard and Thompson Avenue to the Queensboro Bridge plaza and thence across the bridge. The company has applied to the Board of Estimate and Apportionment for the necessary franchise. A hearing by the commission has been ordered on Jan. 19.

Rensselaer, N. Y.—The United Traction Company, Albany, N. Y., has presented a petition to the Common Council asking for an extension of one year in which to complete and operate the extensions to the Broadway and Third Street lines in Upper Rensselaer.

High Point, N. C.—The Board of Aldermen has decided to extend the franchise of the Interurban Railroad which is being promoted by W. T. VanBrunt and E. D. Steele. [E. R. J., Dec. 5, '08.]

Salem, Ore.—The City Council has granted the Portland Railway, Light & Power Company a new franchise to operate its cars upon numerous principal streets of Salem.

***Clarion, Pa.**—The Clarion & East Brady Electric Railway has been granted a franchise by the Clarion Borough Council to construct a line through the borough.

Spokane, Wash.—Application has been made to the City Council by the Spokane, Columbia & Western Railway for a franchise to construct a line into the city. The line takes a general northwest to southeast course, crossing Gonzaga College grounds and connecting with the Spokane & Inland Railroad on Olive Avenue at the company's car house. [E. R. J., Jan. 2, '09.]

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company is rebuilding its track between Ensley and Wylam. The work was commenced at the end of the line and one-half mile is already completed. Creosoted ties and new ballast have been put in. The track will be lowered about 3 ft.

Parkside Transit Company, San Francisco, Cal.—This company announces the completion of its entire double-track line from Ingleside to the beach, at the junction of Sloat Boulevard and the Great highway, over Thirty-fifth Avenue to T Street, T Street to Twentieth Avenue, over Twentieth Avenue to H Street; also the connecting line from Twentieth Avenue to T Street, over Twentieth Avenue to the Boulevard. A new service over the entire line was inaugurated Jan. 1.

Connecticut Company, Bridgeport, Conn.—It is stated that the plans for the year of this company include the extension of the Seaview Avenue line across to Steeplechase Island. Negotiations between George C. Tilyou, lessee of the Island, and the company are now under way and will be completed, it is expected, very shortly.

Connecticut Company, Hartford, Conn.—The work of laying the rails on the electric road which this company is constructing between Hartford and Middletown is now completed. A large part of the wiring has been done, but considerable ballasting over the private way through Rocky Hill remains to be finished. The road will be ready for inspection by the Railroad Commissioners in a few weeks.

Tampa Sulphur Springs Traction Company, Tampa, Fla.—Work has been begun by this company on the extension of its lines into West Tampa.

Atlanta, Norcross & Gainesville Electric Railway, Gainesville, Ga.—H. D. Jaquish writes that this company has completed the surveys, maps and profiles for the first section of this proposed electric railway between Atlanta and Norcross. From the latter city the road is to extend through Buford and Flowery Branch to Gainesville. H. D. Jaquish, Gainesville, general manager, and E. Philbrick, Baldwin, chief engineer. [S. R. J., Jan. 25, '08.]

Augusta Railway & Electric Company, Augusta, Ga.—This company is said to have placed contracts for material to be used in the construction of a new city line, extending from McKinne Street to the river wharf. James U. Jackson, president.

***Idaho Falls & Salmon City Electric Railway, Boise, Idaho.**—This company is reported to have been organized for the purpose of building an electric road out of Salmon City to Idaho Falls, a distance of 102 miles. It is stated that the residents and business men of Salmon have raised or subscribed $100,000 for the building of the new road. The business men of Idaho Falls have subscribed $102,000 for the road. The preliminary survey of the proposed route has been made down the branches of the Lemhi River and Birch Creek. It is the intention of the company to build power plants at both Idaho Falls and Salmon City of sufficient capacity to handle all of the traffic, both freight and passenger. R. W. McBride is the promoter of this road.

***Lewiston, Idaho.**—A proposition to construct and operate a street railway system by local capital was submitted to the City Council recently by M. A. Means. The plan provides for the construction of a railway system in conjunction with street paving to be commenced within the next few weeks. The company plans to construct an initial system of 3 miles and will ask for a franchise providing trackage rights at a nominal sum to any motor system that may seek entrance to the city. The organization of a company is to be commenced at once and it is expected that an application for a franchise setting forth details of the plans will be submitted to the council within the next 10 days.

Chicago, Kenosha & Milwaukee Electric Railway, Chicago, Ill.—This company, which owns a right-of-way between Kenosha and Waukegan, has applied to the Wisconsin State Railroad Commission for permission to build an electric railway from Kenosha to the State line. The company is stated to have secured the necessary capital and will issue $1,500,000 of bonds as soon as construction begins. The line will pass through Zion City and other north shore towns, and will be 3 miles shorter than the Chicago & Milwaukee Electric Railway between Kenosha and Waukegan. Officers: George G. Wilcox, president; Volney Foster, Jr., vice-president; Frank R. Grover, 79 Dearborn Street, Chicago, Ill., secretary and treasurer.

Illinois Traction System, Champaign, Ill.—It is announced that this company will immediately purchase materials for a 12-mile extension from Seneca to Morris toward Joliet, Ill. This new line will be operated by the company and will be known as the Chicago, Ottawa & Peoria Railway. The company is arranging to change 100 miles of its line from alternating to direct current and will build a 3-mile belt line at Decatur. A contract has been placed with the Strobel Steel Construction Company for the approaches of the new bridge to be built at St. Louis and with the Pennsylvania Steel Company for the main steel spans for the St. Louis bridge. The Missouri Valley Bridge Company has been awarded the erection contract for the bridge and the American Concrete Company will build the foundations for the approaches. The order has not yet been placed for creosoted timber.

Rock Island-Southern Railroad, Monmouth, Ill.—It is stated that this company has presented to W. D. Brereton, president of the Commercial Club, an amended proposition, compliance with the conditions of which will result in

the construction of a stub line to Alexis. The company's proposition is to build a line to Alexis if the sum of $200,000 is raised jointly by Monmouth and Alexis, the $126,300 already pledged in Monmouth to apply on the $200,000 fund.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—This company has been formed to build an electric railway from Waukegan to Rockford via Fox Lake, McHenry, Woodstock, Marengo and Belvidere. A line will also be built from Elgin to Antioch, meeting the main line at Fox Lake, and passing through Dundee, Carpentersville, Barrington, Lake Zurich, Wauconda, Fox Lake and other towns. R. D. Wynn, Waukegan, is promoting the line.

Indiana, Ohio, Illinois Railroad, Indianapolis, Ind.—The Electric Railway Journal is advised that this company expects to commence work on its projected railway in the near future. It will be an interurban line, about 200 miles in length, connecting Indianapolis and Chicago and intervening points. Electricity will be the motive power. Capital stock, authorized, $5,000,000; issued, $50,000. General office, 5526 University Avenue, Indianapolis. Thomas P. Kiser, Indianapolis, president and general manager; John E. Clark, Carmel, superintendent.

Brownstown Water, Light & Traction Company, Brownstown Ind.—W. B. Holton advises that this company contemplates the construction of an electric railway connecting Seymour, Brownstown, Vallonia, Salem, Paoli, West Baden and French Lick. The length of the road will be about 70 miles. Surveys have been made and the company expects to have cars operating on the first 15 miles this year. It is planned to begin construction March 1. The company already operates the water and light plant at Brownstown and expects to be supplying Vallonia with light soon. An additional power station and also the repair shops will be erected in Brownstown. Officers: W. B. Holton, Indianapolis, president and general manager; J. B. Thompson, Seymour, vice-president; H. Jackson, Seymour, secretary and general manager. [E. R. J., Dec. 19, '08.]

Vincennes, West Baden & Louisville Railway, Vincennes, Ind.—A meeting of citizens of Otwell was held on Jan. 5 with reference to the building of this road by way of Ireland, Otwell, Algiers, Petersburg and Monroe City. It is reported that the Chicago Trust Company offers to finance the road if the people along the right-of-way will subscribe $150,000 worth of stock. Under the old company a 1 per cent subsidy tax has been voted in several townships, totaling $80,000, so that it only will be necessary to subscribe $70,000. [E. R. J., Dec. 19, '08.]

Boone, Webster City & Interurban Railway, Boone, Ia.—John S. Crooks, secretary of this company, which contemplates the construction of an electric railway connecting Boone, Stratford and Webster City, writes that the surveys, profiles and maps have been made and the rights of way secured. The overhead trolley system will be adopted by the company. It has not yet been decided when construction will be started. Officers: E. E. Hughes, president; J. L. Goeppinger, vice-president; J. S. Crooks, secretary; J. H. Herman, treasurer, all of Boone. [S. R. J., Dec. 14, '07.]

Sioux City & Spirit Lake Railway, Sioux City, Ia.—Announcement is made that this company expects to begin work soon on its interurban line connecting Sioux City and Spirit Lake. The other towns through which the line will pass are Potosia, Ellendale, Le Mars, Germantown, Paullina, Primghar and Hartley. The road will consist of about 110 miles of standard gage single track. The motive power will be electricity and it has been decided to install catenary construction. Two power stations will be built, one at Le Mars and the other at Spirit Lake. In addition to generating current for its own use, the company will furnish power in four cities situated along the route. The line will reach three amusement resorts, Arnold's Park, Spirit Lake and one on Lake Okoboji. Westinghouse, Church, Kerr & Company, New York, have been awarded the contract to build the road. Headquarters, 209 American Block, Sioux City. Officers: Frank Patch, Hartley, president; Fred Davis, Sioux City, secretary; G. E. Knaack, Hartley, treasurer; J. D. Browning, Sioux City, general manager; L. F. Wakefield, Sioux City, chief engineer. [E. R. J., Dec. 5, '08.]

Kansas City & Kansas Southwestern Railroad, Topeka, Kan.—This company has been granted an amended charter by the State Charter Board increasing its capital stock from $10,000,000 to $12,000,000. The company proposes to construct an electric railway extending from Kansas City to Independence, Kan., and from Kansas City to Topeka. [S. R. J., March 28, '08.]

Kentucky & Ohio River Interurban Railroad, Paducah, Ky.—This company will shortly be in the market for about 3000 tons 60-lb. relaying rails.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—This company has resumed service on its line between Kansas City and Olathe. The road is about 22 miles in length and is now operated by electricity. Gasoline motor cars were formerly operated on the line.

Interstate Railway, St. Joseph, Mo.—Joseph Corby is reported to have announced that this company will build an electric railway between St. Joseph & Kansas City, Mo. He states that the company has completed its surveys, located its line of road, obtained a majority of its right-of-way, by deed and contract, and secured the money necessary to build a double track, rock ballast, standard gage electric railroad between the two cities. This road will be 48.5 miles in length, 14 miles shorter than present lines. Arrangements have been made with the terminal companies and street railway companies of both cities for the handling of both passenger and freight business.

Billings & Cooke City Railway, Billings, Mont.—George H. Savage writes that surveys are being made and the rights-of-way being secured for this proposed electric railway. It is the intention of the company to resume work in April. The road will be 110 miles in length and will extend from Billings to Cooke City passing through Laurel, Joliet, Dean, Nye. Catenary construction will be used. Power for the operation of the road will be rented from the Madison River Power Company. An amusement park will be established and operated by the company near Billings. Capital stock, authorized, $2,000,000; issued, $5,000. Headquarters, Billings. Officers: Edward Horskey, Helena, Mont., president; Edward Estep, Billings, vice-president; George H. Savage, Billings, secretary and general manager; Bert Shorey, Billings, treasurer; R. E. Leslie, Helena, chief engineer. [E. R. J., Dec. 12, '08].

Jamestown (N. D.) Traction Company.—J. J. Nierling writes that this company has not yet completed arrangements for beginning work on its proposed line which is to connect Jamestown, Fried, Spiritwood Lake and Courtney. Capital stock, authorized, $150,000. Officers: J. J. Nierling, president; Morris Beck, vice-president; L. B. Niemeyer, secretary; F. A. Lenz, treasurer.

New York, N. Y.—The Public Service Commission of the First District has granted the New York, Westchester & Boston Railway a certificate of public convenience and necessity to construct its lines through the Bronx. The commission has also granted to the company a certificate approving the franchise to build, granted to it by the Board of Estimate and Apportionment. The Public Service Commission of the Second District has also granted the company permission to construct its road.

Dayton & Troy Electric Railway, Dayton, Ohio.—It is stated that this company is planning to build 2 miles of second track this spring as a step in the program of having a double track line between Dayton and Piqua, Ohio. The company will also lay about one-half mile of track as an emergency crossing at grade with the Big Four Railroad.

Massillon, Wooster & Mansfield Traction Company, Cleveland, Ohio.—G. A. Bartholomew writes that considerable grading has been done by this company and it is expected that the work of constructing the line will be started this summer. Among the cities which will be connected by this road are the following: Mansfield, Mifflin, Ashland, Haysville, Jeromeville, Reedsburg, Plain, Wooster, sillon, Canal Fulton, Manchester and Akron. The motive power will be electricity. The line will reach Petersberg Lakes, Turkey Foot Lakes, two Chautauqua grounds and five county fair grounds. The company expects to furnish power for lighting. Capital stock, authorized, $1,000,000; issued, $100,000. General offices, Williamson Building, Cleveland: Officers: G. A. Bartholomew, Cleveland, president and chief engineer; J. W. Buchanan, Smithville, vice-president; Roy I. Guthman, Youngstown, secretary; H. G. Bye, Youngstown, treasurer. [E. R. J., Aug. 29, '08.]

Scioto Valley Traction Company, Columbus, Ohio.—It is stated that this company will build a spur from its third-rail line to Summerland on Buckeye Lake, a pleasure resort. It is possible that the line will be extended to Newark. Right-of-way for the extension has been secured.

North Midland Railway, London, Ont.—A. E. Welch writes that the surveys for this road have been completed and it is expected that construction will begin this spring. The line will connect Lucan, Granton, St. Marys, Stratford and London, and will be about 45 miles in length. The road will be bonded for $25,000 per mile. Capital stock, authorized, $1,000,000. Officers: W. Scarlett, 169 Dundas Street, London, Ont.; T. H. Lascombe, London, secretary;

A. E. Welch, London, general manager. [E. R. J., June 20, '08.]

Dunnville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—James A. Ross, president of this company, writes that plans have been made to begin construction this spring. The road will extend from Dunnville through Wellandport to Beamsville, a distance of 23 miles. A by-law has been recently passed by Dunnville granting a bonus of $15,000. Mr. Ross states it is possible that the board of directors will be reorganized shortly. Capital stock, $400,000. The road will be bonded at $20,000 per mile. Officers: James A. Ross, Wellandport, president; W. J. Aikens, Dunnville, secretary; R. T. Gough, Toronto, chief engineer. [E. R. J., Sept. 26, '08.]

Altoona, Hollidaysburg & Bedford Springs Railway, Altoona, Pa.—At a meeting of the stockholders of this company on Jan. 5 a complete organization was effected. According to the plans of the newly organized company, the line will start from Broad and Beale Avenues, Altoona, extend through Hollidaysburg, Duncansville, Newry, Roaring Spring, Martinsburg, take in all parts of Logan, Allegheny, Blair, Freedom, Taylor, Juniata, North Woodbury, Frankstown, Greenfield and Woodbury townships, and then go to Loysburg, Tatesville, Everett, Mt. Dallas, Bedford and Bedford Springs. Ordinances have been introduced into the borough councils of Martinsburg and Hollidaysburg to grant the company right-of-way through those towns. Frank G. Patterson, president and promoter of the company since its organization, was succeeded by John G. Burns, Pittsburg, who was elected to the presidency and who will begin the active work of building the road. Frederick W. Patterson, Pittsburg, was made chief engineer and George W. Burke was re-elected secretary-treasurer. Thomas Maxwell was chosen vice-president.

*__Clarion & East Brady Electric Railway, Clarion, Pa.__—This company is said to have been organized for the purpose of building an electric railway from Clarion to East Brady via Sligo and Rimersburg, a distance of 25 miles, and by connecting with a road projected between Butler and East Brady it will make a complete trolley route of 86 miles from Pittsburg to Clarion. G. E. Arnold, F. M. Arnold and T. S. Arnold of Clarion are the head of the enterprise. A franchise has been obtained for the use of the streets of Clarion, with the provision that work is to be started within two years.

*__Terminal Railroad, Philadelphia, Pa.__—This company is reported to have been formed to build a street railway to join Angota with the Union terminal at Sixty-ninth and Market Streets, Philadelphia. The projected line will traverse the new section known as Millborne. The incorporators will be John Wolfenden, Washington T. Shore, Frank B. Rhoades, Jos. H. Dohan and Bernard J. O'Connor. It is planned to begin the line at a point near the Union Station, which is a terminus of the Market Street elevated, the Philadelphia and West Chester lines and the Philadelphia and Western system. It will then go over the West Chester pike and then in a southerly direction, crossing Long Lane Marshall Road and Pembroke Avenue, to the Delaware County turnpike, and on to Baltimore Avenue, at Fernwood. It will return by the same route. A charter will be applied for by the company the latter part of next month.

Belton & Temple Traction Company, Temple, Tex.—It is stated that this company has under consideration a number of improvements to its system which will include the extensions of the line to Lake Polk and to Williamson Heights and other needed extensions in the city. The plans also contemplate a material shortening of the line between Temple and Belton in order that more frequent service may be maintained.

Cleburne, Tex.—It is stated that H. M. Hyatt, Kansas City, Mo., who secured a franchise from the city of Cleburne several months ago for rights to operate local street railway and interurban lines over the principal streets of the city, has notified several prominent citizens of Cleburne that he has formed a company which is ready to begin construction of the Dallas-Cleburne interurban railway as soon as $600,000 stock is subscribed by the citizens of the towns interested along the proposed route. He states that a tentative contract for the grading and track work has been let, subject to the action of the parties desiring the construction of the road. [E. R. J., Nov. 28, '08.]

Marshall (Texas) Traction Company.—The Electric Railway Journal is advised that this company expects to begin the construction of its local street railway early this year. A contract has already been let for the building of three-quarters of a mile of track. The line will be about 4 miles in length and will be operated by electricity, the overhead trolley being used. It is the intention of the company to apply for a charter this month. M. Turney, Marshall, manager. [E. R. J., Nov. 14, '08.]

Spokane & Inland Empire Railroad, Spokane, Wash.—Reports are current to the effect that this company is considering the proposition of extending its line from Colfax, the present terminus, south to Walla Walla, a distance of about 75 miles.

Walla Walla & Columbia Traction Company, Walla Walla, Wash.—Dr. N. G. Blalock writes that it is the intention of this company to begin work on its proposed line about Feb. 1. Surveys have been made, rights of way secured for a distance of about 60 miles. Mr. Blalock states that arrangements have been made with the old company which originally had planned to construct the road, and when $250,000 has been subscribed the franchises, rights of way, surveys, etc., will be transferred to the present company, taking stock in the same for cash actually expended. The road will connect the following cities: Dayton, Huntsville, Waitsburg, Prescott, Walla Walla, Milton, Freewater, Touchet and Wallua. The system will have about 80 miles of standard gage single track. Overhead trolley construction will be installed. A power station will be built on the Tucanon River. Connections for the transportation of freight will be made at Wallua with the Open River Transportation Company, which operate steamers on the Columbia River between several important cities. Capital stock, $1,000,000. Headquarters, Walla Walla. Officers: Dr. N. G. Blalock, Walla Walla, president and general manager; M. R. Hauger, Dayton, first vice-president; H. H. McLean, Walla Walla, second vice-president; L. C. Davison, Walla Walla, secretary; George Kellogh, Walla Walla, treasurer. [E. R. J., Dec. 26, '08.]

SHOPS AND BUILDINGS

Humboldt Transit Company, Eureka, Cal.—The Electric Railway Journal is advised that this company expects to erect a new car house in the near future.

Public Service Railway, Newark, N. J.—This company has awarded the general contract for the construction of a passenger terminal at the junction of Hudson Street and the present Lackawanna and McAdoo terminals in Hoboken to the Fagan Iron Works, Jersey City. The building, which is to be of brick, concrete and steel construction, will be three stories high. It will be arranged so as to handle traffic from the Lackawanna Railroad from the ferries and the Hudson & Manhattan Railroad, which operates the tunnel under the river between New York and New Jersey, in addition to that over the surface and elevated lines. The lower floor will be used for the tunnel traffic, the main floor for the surface lines, railroad and ferry passengers, and the upper deck for the elevated traffic. The estimated cost of construction has not been made public, but it is stated on good authority to be in the neighborhood of $300,000.

Lake Shore Electric Railway, Cleveland, Ohio.—It is stated that this company has decided to build its own city and interurban cars, and for that purpose a car house at Sandusky will be converted into shops during this year.

El Paso (Tex.) Electric Company.—This company is said to have purchased about 55,000 sq. ft. in the Cotton addition as a site for a new car house.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Champaign, Ill.—This company is arranging to change 100 miles of its line from alternating to direct current and will build eight substations.

Humboldt Traction Company, Eureka, Cal.—This company expects to install in its power plant during 1909 a 400-kw unit consisting of an engine, boiler and generator. The company is also constructing a 15,000-bbl. oil tank, increasing the total capacity to 25,000 bbls.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—It is stated that this company is making arrangements for the installation of another storage battery at a cost of $25,000 which will be located near the central station. It is said that when the road is extended to Pass Christian an additional one will be established at some point near the western end of the line.

Philadelphia (Pa.) Rapid Transit Company.—It is announced that this company has placed its coal order for 1909. A contract has been made with Madeira, Hill & Company, for 200,000 tons of buckwheat coal and 75,000 tons of bituminous. Another award went to the Lehigh Coal & Navigation Company for 150,000 tons of buckwheat.

Big Bend Traction Company, Spokane, Wash.—Announcement is made that this company will erect a power plant and dam about 2 miles from the point where the Spokane flows into the Columbia. Surveys have been made and plans drawn for the dam, which will be 65 ft. in height. The station will have a capacity of 10,000 hp.

Manufactures & Supplies

ROLLING STOCK

Southwestern Interurban Railway, Arkansas City, Ark., is making inquiry for three cars.

Syracuse (N. Y.) Rapid Transit Company, it is said, will soon be in the market for new interurban cars.

Kentucky & Ohio River Interurban Railroad, Paducah, Ky., now under construction, expects to be in the market for eight cars some time in the Spring.

Illinois Traction System, Champaign, Ill., will soon order a 65-ft. private and office car for H. E. Chubbuck, general manager. The company is building a private trail car.

Albia Interurban Railway, Albia, Ia., has purchased through the Wesco Supply Company, St. Louis, Mo., two 16-ft. closed motor cars, each equipped with two GE-52 motors.

Chicago, Wheaton & Western Railway, Wheaton, Ill., has increased its order with The J. G. Brill Company from three to five cars. The original order for three cars was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 28.

Rochester Railway Company, Rochester, N. Y., is ready to place an order for four interurban cars, with privilege of increasing the number to eight. It is reported that the company will also soon purchase 30 new city cars.

Rochester & Manitou Railroad, Charlotte, N. Y., has ordered from the G. C. Kuhlman Car Company the three semi-convertible cars, referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1908. The company is also in the market for trucks.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., is reported to have about completed financial arrangements for the purchase of the 50 city cars referred to in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1908. It is said that the order for the cars will be placed soon.

Rock Island Southern Railroad, Monmouth, Ill., is in the market for a steam locomotive, six flat cars and six box cars. These equipments are to be used for work-train purposes during the construction of the proposed extension of the line from Monmouth, Ill., to Rock Island, Ill.

Buffalo, Lockport & Rochester Railway, Buffalo, N. Y., will place an order this week for eight interurban cars, with the privilege of increasing the number to 15. Specifications for these cars were issued in December, 1908, and referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 12.

Denver City Tramway, Denver, Col., advises it has just placed an order with the Woeber Carriage Company, Denver, for 25 43-ft. 10-in., standard combination passenger cars. The orders for the trucks and motors for these cars have not yet been placed, but these equipments will probably be purchased at once.

Washington Railway & Electric Company, Washington, D. C., has just ordered from The J. G. Brill Company 50 28-ft. 3-in. closed cars with pay-as-you-enter platforms. This order constitutes an increase of 15 cars in the order for 35 new cars which was chronicled in the statistical data published in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1909.

Third Avenue Railroad, New York, N. Y., has placed its order for the 200 new cars, referred to in recent issues of the ELECTRIC RAILWAY JOURNAL, with The J. G. Brill Company. These cars will be built under license from the Pay-As-You-Enter Car Corporation. They will have steel underframe, will be mounted on Brill trucks and will be operated with Westinghouse two-motor equipments. The Pantasote Company will furnish Agosote headlinings and Pantasote curtains.

Capital Traction Company, Washington, D. C., has closed a contract with the Pay-Within Car Company, through the Electric Service Supplies Company, sales agent, covering "Pay-Within" equipments for 11 double-truck suburban cars, to be operated on the Chevy Chase Division. These cars, which are being built by the Cincinnati Car Company, will be equipped with four sets of sliding doors and disappearing steps, operated with compressed air apparatus of the same type as used on Philadelphia cars. The method of fare pre-payment will be the same as adopted in Philadelphia, the conductor standing immediately inside of the car, midway in the open bulkhead, from which point he controls the doors and steps by means of an air valve.

Hudson & Manhattan Railroad Company, New York City, has ordered from the Pressed Steel Car Company 40 new steel passenger cars to be used in the tunnels under the Hudson River. Two of the tunnels are now in operation and two more will be completed some time next summer. The cars will be identical with the 50 ordered last November and described in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1908. They will be 48 ft. long with seating capacity for 44 passengers and equipped with both center and end doors. Contracts for other equipment for the entire order of 90 cars as far as they have been let are: General Electric Company, 90 two-motor equipments, 150 hp with type "M" control; American Locomotive Company, standard M. C. B. trucks; Hale & Kilburn, seats; Gould Storage Battery Company, storage batteries.

TRADE NOTES

James Clark, Jr., Electric Company, Louisville, Ky., has just placed on the market a new electric-driven notching press for armature disks and an electric-driven winding machine for field coils.

Lackawanna Steel Company has moved its Buffalo, N. Y., office from the Ellicott Building to the Fidelity Building. The company's general sales office is located at 2 Rector Street, New York City.

Richard Wick, formerly associated with the Western Wire Sales Company, Chicago, Ill., has opened offices at No. 356 Dearborn Street, Chicago, and will hereafter engage in the sale of bare and insulated wires and cables.

G. S. Ackley, president of the National Brake Company, sailed on the *Cedric* on Jan. 9 for Naples. It is his intention to visit Italy, Switzerland, Austria-Hungary, Germany, France and the British Isles. A number of friends were on the dock to wish him "bon voyage."

Westinghouse Machine Company, Pittsburg, Pa., reports among its recent contracts the following: Compound engine for Black Hills Traction Company, Deadwood, S. D.; Metropolitan Street Railway, Kansas City, Mo., 1500-kw turbine unit; Capital Traction Company, Washington, D. C., 3000-kw turbine unit; Tampa (Fla.) Electric Company, 1500-kw turbine unit.

Warren Webster & Company, Camden, N. J., announce that beginning with Jan. 1, 1909, they will conduct the business heretofore carried on by the American Specialty Company, of Chicago. The latter company has had branches and agents in various cities throughout the Middle West and the new business arrangement does not contemplate any change in the personnel of these representatives.

Gulick-Henderson & Company, Pittsburg, Pa., inspecting engineers, foundry specialties, and chemists, have opened a Western office and laboratory in the Manhattan Building, Chicago, in charge of W. O. Collins, who is a new member of the firm. Mr. Collins was formerly a member of the firm of Collins & Stevens, making a specialty of inspection and general engineering work.

Western Wire Sales Company, Chicago, Ill., has recently been reorganized, Richard Wick, formerly one of the officers of the company, retiring. The officers now are C. T. Murdock, president; A. N. Allen, secretary, treasurer and manager. The company announces that it will carry the same line of bare and insulated wires and cables as heretofore, and will cater to the same trade as it did previous to the reorganization.

Mechanical Appliance Company, Milwaukee, Wis., will show for the first time at the Chicago electrical show to be held at the Coliseum, Chicago, Ill., Jan. 16 to 30, an electrically operated crossing gate. This gate is designed to be operated by a small d.c. motor driven by 500-volt current. The gate is so constructed that the arms can be raised and lowered by the opening and closing of a switch designed to be located in a signal tower at any point.

Metropolitan Electrical Supply Company, Chicago, Ill., is making a campaign among steam and electric railways for the sale of De Ronde's insulating paints and compounds for which the company is agent. These products are said to be proof against action by water, acid, alkali and heat and have high insulating properties. They are especially recommended for use in coating moldings for dynamos and motor frames, switchboards, cutouts and for all other purposes where liquid insulation is desired.

Dossert & Company, Inc., New York City, has received a large order from the Central Electric Company of Chicago for Dossert solderless connectors, including two-way and four-way cable taps for delivery to the Cananea, Yaqui River & Pacific Railway at Sonora, Mexico, and terminal lug connectors for the Gila Valley & Northern Railway Company, Globe, Ariz. They have also received orders for special Y connectors for extra flexible cable for the Metropolitan West Side Elevated Railway, Chicago, and 200 special two-way connectors for the American Car & Foundry Company, Berwick, Pa., for the electric lighting system of steel passenger cars.

Westinghouse Electric & Manufacturing Company.—George C. Smith, an executive officer and director in many auxiliary Westinghouse companies, has been appointed by

the new board of directors of the Westinghouse Electric & Manufacturing Company as its special representative in connection with its interests in a number of electric railway and power companies whose securities are held as investments. Among the companies are the Lackawanna & Wyoming Valley Rapid Transit Company and subsidiary companies, Niagara, Lockport & Ontario Power Company, Electric Power Securities Company, of Niagara Falls; Grand Rapids, Grand Haven & Muskegon Railway; Atlanta Water & Electric Power Company. Mr. Smith's headquarters will be in the City Investment Building, New York.

American Locomotive Company has purchased a plot of 130 acres of land at Gary, Ind., from the Gary Land Company, a subsidiary company of the United States Steel Corporation, and plans are being drawn for a new plant which, it is said, will be the most complete and best equipped locomotive works in the world. The land purchased is twice the extent of that occupied by the largest of its present plants, and when fully occupied will give employment to from 12,000 to 15,000 workmen. The land adjoins that of the new plant of the United States Steel Corporation. Both steam and electric locomotives will be built at the new plant and it is probable that eventually electric trucks and all other branches of the company's work will be done. This company now operates plants in Schenectady and Dunkirk, N. Y.; Pittsburg and Scranton, Pa.; Richmond, Va.; Paterson, N. J.; Manchester, N. H., and Montreal, Canada. At present there is no large locomotive plant west of Pittsburg, and the selection of a location in the Chicago district provides additional locomotive building capacity where it is most needed for prompt and direct delivery to a large number of railroads.

ADVERTISING LITERATURE

Western Electric Company, New York.—A new bulletin, No. 5110, issued by this company is devoted to electrical equipment for central stations.

Vulcan Steam Shovel Company, Ohio.—This company has issued a large calendar which is illustrated with engravings of Vulcan steam shovels in operation.

American Carbon Battery Company, East St. Louis, Ill.—An art calendar for 1909 which calls attention to its carbon brushes is being sent out by this company.

G. M. Gest, 277 Broadway, New York City.—A little booklet is being issued at this time by Mr. Gest, devoted to the distribution of electrical energy. It is illustrated.

American Wood Working Machinery Company, Rochester, N. Y.—This company has issued an illustrated calender picturing with half-tones the company's large line of wood working machinery.

Crouse-Hinds Company, Syracuse, N. Y.—Bulletin No. 100, issued by this company on Jan. 1, 1909, entitled "Condulets," is a voluminous catalog of practically all the various products of the company.

Pettingell-Andrews Company, Boston, Mass.—This company has just issued a new illustrated catalogue describing "opalux" reflectors for electric illumination. Prices and discounts are given.

Chain Belt Company, Milwaukee, Wis.—A recent publication of this company describes a chain-belt concrete mixer of a new and improved type which is being put upon the market.

Northern Engineering Works, Detroit, Mich.—This company has just sent out an announcement that it is in the market for the construction of cupola furnaces and all other kinds of foundry machinery. Descriptive catalogs and bulletins will be furnished to interested parties.

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa.—"Motor Talks" No. 2 for January discusses display window advertising. Some attention is also paid to the use of small electric motors to relieve household work.

Jeffrey Manufacturing Company, Columbus, Ohio.—This company is sending out catalog "67D," which is devoted to Jeffrey rubber belt conveying machinery. The illustrations show the application of the rubber belt to conveyors for various kinds of material.

Robbins Belt Conveyor Company, New York City.—This company is sending out a reprint of a paper by C. Kemble Baldwin, chief engineer of the company, read before the American Society of Mechanical Engineers, dealing with the advantages and applications of belt conveyors.

Green Fuel Economizer Company, Matteawan, N. Y.—A new type of hot blast heater coil or radiator for indirect heating systems is described in a 16-page pamphlet issued by this company. The several novel features of construction are described and illustrated in the booklet.

Fidelity & Casualty Company, New York City.—The Monthly Bulletin for January of this company contains an article on the accidents caused by the traction companies in New York City. It shows that the loss to the companies from accidents amounts to more than their fuel bill, and is over 9 per cent of the operating expenses.

W. K. Kenly Company, First National Bank Building, Chicago, Ill.—This company, which deals in rails and track materials, is sending out a small calendar to call attention to the fact that the company represents the Kalamazoo Railway Supply Company, American Metal Hose Company and the Latimer Switch Point Lock Company.

D'Olier Engineering Company, 119 South Eleventh Street, Philadelphia, Pa.—Recent bulletins which this company has sent out are devoted to horizontal centrifugal pumps and to steam turbines. Each of the publications is illustrated and contains necessary information for prospective purchasers.

H. W. Johns-Manville Company, 100 William Street, New York City.—Catalog No. 100 of this company is devoted to J-M pipe and boiler insulation. The catalog describes the principal types of pipe and boiler coverings which have been perfected during the 50 years in which the company has been manufacturing asbestos and magnesia products.

General Electric Company, Schenectady, N. Y.—A new folder from this company describes its transformers for use in connection with moving picture machine arc lamps. This transformer is known as the "G. E. Economy Arc." Bulletin No. A637 illustrates and describes the various styles and sizes of tungsten incandescent lamps for battery service.

Industrial Progress.—This is the name of a new monthly publication issued at 330 Clinton Street, Milwaukee, Wis. According to the announcement of the publishers the magazine will be devoted to the republication of various articles taken from the trade and technical press. It is intended to be a digest of matter worth preservation and to give such matter additional distribution. The publication is illustrated.

American Blower Company, Detroit, Mich.—This company has recently published the following new bulletins: Electric forge blower circular, No. 242; variable speed engine catalogue, No. 244; shop heating treatise, No. 246, and steam trap catalogue, No. 247. The treatise on shop heating has been prepared by the company's vice-president and chief engineer, F. R. Still, who is an authority on factory heating and ventilation.

Lombard-Replogle Engineering Company, Akron, Ohio, announces that John Sturgess, who is well known in the electrical fraternity through his former connection with the Sturgess Governor Engineering Compnay, has recently become associated with the company as general manager. Mr. Sturgess' wide experience with governor design and operation will be of value to this company, which is specializing in governor work. An improved type which is just to be put on the market is the result of the collaboration of Mr. Lombard, Mr. Replogle and Mr. Sturgess.

Sprague Electric Company, New York.—An illustrated leaflet is being sent out to the trade by this company, accompanied by a circular letter explaining the merits of the Sprague electric shovel. It is claimed that it is simpler than any other mechanical shovel. As a two or three-rope bucket, it can be operated and controlled entirely by one handle. This arrangement eliminates all clutches and foot brakes, greatly simplifies the design, and reduces the chance of breakdown by dispensing with a number of moving and wearing parts. The shovel can be used on monorails, bridge cranes or gantrys, on stiff-leg derricks, unloading towers, etc.

Albert B. Herrick, New York.—The special class of investigations for electric railway companies carried on by this well-known engineer has been aptly termed by him "Maintainance Engineering." To carry out his investigations of track, line and feeder conditions, Mr. Herrick has invented many ingenious instruments, particularly those of automatic recording types, for use on his test cars. Some of his work has been referred to in these columns from time to time but readers will be interested to learn that Mr. Herrick himself has just issued a pamphlet which summarizes his work and contains many interesting illustrations of his testing apparatus, sample records, etc. A map in this publication shows the location of American and Canadian lines over which the test cars have been operated. These lines embrace 182 properties and a total mileage of 11,071, covering respectively 29.3 per cent of the United States electric railway mileage and 41.6 per cent of the Canadian mileage.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JANUARY 23, 1909 No. 4

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.
ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum
Single copies.....10 cents
Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum
CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.
ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.
Single copies.....20 cents
Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Passenger Car Window Glass

One feature of a railway car upon which all passengers are qualified to pass judgment is the window design. This part of a car structure is worth a careful study when new equipments are being planned. The shape of the windows has a great deal to do with the impression a car creates upon those who see only the exterior, as well as those who ride within the car. Next in importance to the proper contour for a car window and the choosing of the sash fixtures so that accidents may be minimized, is the choice of the glass. The cost of window glass is made up not only of the installation cost, but of the charges for maintenance occasioned by breakage. On the score of appearance also, glass should present a smooth, flat surface devoid of bubbles and irregularity. In general the window sash of high-class cars are glazed with coach glass, polished plate, or so-called "cylinder" glass. The experience of the Kansas City Railway & Light Company has tended greatly to favor the latter named grade of glass, and is mentioned here as illustrating the good results to be derived from careful observation of replacement materials and their costs. The records of this company for one year show that there were in operation cars with 10,000 sash containing cylinder glass 5/32 in. and 3/16 in. thick, and 9000 sash with AA coach glass. All these cars were in city service. During the year the cost of replacements of the 10,000 cylinder glass windows was only about 55 per cent of the cost of replacing the AA glass. It is stated that the original cost of the cylinder glass is about three times that of the coach glass, but that a considerable economy is shown when the cost of glass and labor for renewals is considered. It is the careful observation of such maintenance details as these that serves to place a repair shop on a basis for maintaining equipments in the best condition at a low expenditure.

Submitting Samples of Car Painting

About this time of the year every large railway system begins overhauling its open summer cars, and the question arises of how much to spend on painting and varnishing. The cost of painting cars depends very largely on the methods employed. Some are much more expensive than others, and it is possible to spend as much as $50 per car or as little as $5. From a study of specifications alone, it is not easy for the executive officer who must decide on the expenditures to be made to determine what method will produce the best results for the least money. One large city system in the East solved this difficulty by taking four cars of the same type and same general conditions and repainting them with different methods. One car was scraped to the wood, all paint burned off and was completely repainted and varnished, giving it the appearance of a new car. This cost $40. Another car had the paint freshened up with a paint cleaning compound and the varnished parts coated with a special oil mixture of about the same composition as ordinary varnish, but not boiled. This cost only $5.50. The two other cars were partially repainted and varnished with different degrees of thoroughness. These four sample cars when completed were submitted to the general manager for a decision as to which method to adopt for the remaining cars. The

appearance of the car which cost only $5.50 to refinish was so favorable that the cheap method will be followed this year in overhauling the several hundred open cars operated by this company. Without a sample before him, the general manager would have found it hard to believe that a car could be put in good condition, so far as painting was concerned, for such a small expense, and in this particular case the manager believed from his experience that there was not enough difference in durability between the two methods to warrant the additional cost. The practice of another road to test the durability of two different makes of varnish is to varnish half of the main panel of a car with one kind and half with the other. In this way both are subject to the same conditions, and the wearing qualities are very evident.

Census Statistics of the Street Railway Industry

The electric railway industry is developing so rapidly that the Census Bureau did well to make quinquennial collection of the statistics, instead of waiting until ten years following the last report, or until 1912. The census, for which the preliminary figures are available this week, are for the year ended Dec. 31, 1907, and it is interesting to notice that they correspond closely to the unofficial figures published last August by this paper. The census figures for 1902 are also included in the table published this week. The most striking feature of the record is the large increase during the past five years in mileage, cars and earnings from operation. The latter, indeed, have grown 68.9 per cent in the five years, or practically 14 per cent per year, and during the year ended Dec. 31, 1907, reached the enormous total of $418,187,858. This amount, however, includes the earnings from lighting and power service of those electric railway companies which are also engaged in the commercial lighting and power business, but is exclusive of income from securities owned, returns from investment in real estate not used for operation purposes, etc. The receipts from lighting and power in the 1902 report were something over $7,000,000, and could probably be conservatively estimated during 1907 at about $20,000,000. Deducting this amount from the earnings from operation quoted above, the earnings from purely railway operation would be slightly less than $400,000,000. This is approximately one-fifth of the gross earnings from operation of the steam railroads of the country reporting to the Interstate Commerce Commission for the year ended June 30, 1906, and is equal approximately to four-fifths of the passenger revenue of these steam railroads.

It is interesting to note that during the past five years the operating expenses of the electric railway companies have increased practically 8 per cent more than the earnings from operation, or 76.6 per cent, instead of 68.9 per cent, and that taxes and fixed charges increased practically 10 per cent more than earnings from operation, so that the net income of the electric railway companies shows an increase of only 31.8 per cent, or less than half that of the gross, as compared with five years ago.

The capital stock outstanding has increased 59.5 per cent and the bonds outstanding 72.9 per cent during the five-year period, making the total outstanding capital liabilities $3,774,772,096. This represents an increase of 59.5 per cent in capital stock and of 68.9 per cent in outstanding bonds, or the ratio of net income to capital stock outstanding during 1907 was practically only 2 per cent and the ratio of the increased net income to increased capital stock since 1902 was only 1.2 per cent. The table of averages gives some interesting figures in this connection, as it shows increases in salaries and wages paid of 73.5 per cent and 71 per cent, respectively. The wage earners, however, have gained per individual by this change more than the salaried employees, as their wages have increased 8.2 per cent, while the remuneration of the average salaried employee has advanced only 5.6 per cent.

Turning now to the statistics on physical equipment, the combined effect of consolidations and the development of long distance power transmission engineering is clearly indicated in the small increase, only 2.7 per cent, in the number of power stations, while the development of high-powered station apparatus is clearly shown in an increase of only 8.5 per cent in the number of steam and gas engines, but an increase of 92.2 per cent in their kilowatt capacity and 110.4 per cent in the kilowatt-hour output. The table also testifies in a striking way to the development in the direction of longer cars by the disproportionately low increase in the number of cars and car-miles compared with that of passengers carried, and to the rapid extension of the use of transfers since 1902 in the ratio between increase of fare passengers and of transfer passengers.

Preventing Mechanical Failures of Motors

In the efforts of many master mechanics to avoid electrical defects in railway motors on the street it sometimes happens that the mechanical side of motor adjustment is overlooked. There are few more aggravating troubles than those which block the line for many minutes at a time, and the cost of a mechanical failure often runs far above the expense of the shop repairs. As a rule an electrical trouble in a railway motor operating in regular service does not mean the same danger to passengers that is liable to be present in a mechanical failure. It may be spectacular and the cause of annoying damage suits, but in the majority of cases, probably, the mechanical failures are to be more dreaded. A short circuit in an armature, a grounded field or commutator or a burned-out lead is rarely capable of injuring any one's person, whereas a serious derailment may follow such an accident as the dropping of a motor or lower shell from its suspension, to say nothing of the delay which ensues while the car is being put back on the line or otherwise placed in condition for removal.

Careful inspection in the car house will do much to forestall motor dropping. Too much care cannot be taken to make sure that all the bolts are tight and of the proper length before the car goes into service. In one recent case where the car-house force were certain that all the bolts were tight before the car went into service from the pit, it was found that there was just one bolt still in the motor after it dropped on the street, with the nut gone; the corresponding corner bolt was gone, and when the motor dropped it broke the hinge bolts. It is most important for motors to be provided with cotter pins and bolts of sufficient length are a necessity for reliable service. Simple

as these precautions are, their neglect opens the way to serious trouble for an operating company. Only less important from the standpoint of possible service interruptions are failures to keep the bearings suitably lubricated, hasty truck adjustments and the careless running of motor leads across sharp edges or against shifting metal surfaces.

Cab Signals and Automatic Stops

An appendix to the annual report of the Interstate Commerce Commission sent to Congress last week reviews the work of the Block Signal and Train Control Board during the first year of its existence. The duties of this board of four signal experts who were appointed in July, 1907, embrace an investigation of block signals, automatic stops and cab signals and other devices designed to promote the safety of railway operation. So far, the board has confined itself to an investigation of some 371 devices of which 248 relate to signals and automatic stops. Out of 184 inventions which have been finally passed on only 12 signal and train-stopping devices have been found to possess sufficient merit to warrant the board in recommending an actual service trial. These figures are quoted here as showing in a concrete way the general lack of knowledge of the requirements of apparatus of this character on the part of inventors who waste their time, money and energy on developing impractical devices. While the object of the investigations of the board has been primarily to discover suitable safety devices applicable to steam railway operation, the report contains much of interest to electric railway managers. The fundamentals of safe operation of railway cars or trains are the same whether the motive power be steam or electricity.

One of the subjects discussed by the report and of special interest to electric railway managers relates to automatic train stops worked in connection with fixed visual signals, a safety device whose use has been confined to date entirely to electric subway and elevated railways. The efficiency of these stops has been satisfactorily demonstrated in such protected locations where they are not subject to the effects of heavy snow and frost and possible tampering by trespassers and where a very high maintenance and inspection cost is warranted by the dense traffic. The board does not consider the experience gained under these conditions, however, to be conclusive as to their efficiency in unprotected locations. In the existing installations of automatic stops, the assumption has been that the motorman would properly control the movement of his train in accordance with the signal indications and the automatic stop is only intended to come into play when for any cause the motorman is incapacitated; in this respect it has precisely the same function as the "dead man" on the controller handle. Motormen do not ordinarily have a companion in the cab as does the engineman of a steam locomotive and for this reason there is perhaps a stronger argument for the introduction of such devices on electric railways than on steam railways.

The object of a cab signal is entirely different from that of an automatic stop, though the two devices have been combined in most of the plans submitted by inventors to the board, since it is a simple matter to actuate a stop mechanism with the same control used for the cab signal. Cab signals are intended primarily to give a prominent warning close at hand to the engineman or motorman of a dangerous condition of track ahead. If the warning is not heeded the stop comes into play. There are arguments for and against the use of cab signals. In bad weather when fixed visual signals alongside of the track may be obscured by snow or fog, an indication in the cab cannot be missed or mistaken. Under any conditions, the indications of a cab signal are more likely to be impressed on the mind of the motorman or engineman than those of an exterior fixed signal. They can be made to give both visible and audible warnings and are easily combined with an automatic stop mechanism. On the other hand, the place for the motorman to center his attention is on the track ahead. A cab signal is a temptation to close the windows and trust to the signal inside, which is not absolutely infallible. If the signal apparatus on a motor car or locomotive gets out of order and there are no fixed signals along the road the car or train must proceed under the protection of a flagman ahead. Cab-signal apparatus must be constructed on the same principles as any other signal mechanism, namely, that a failure of any part will result in a danger signal and not a false clear signal. One reason for rejecting many of the plans submitted to the board was that the inventors had violated this principle by using a normally open circuit. With an open circuit a failure of any part of the apparatus cannot be detected by a distinctive indication of the signal and may exist as a source of danger for a long time.

The use of "wireless" communication between the controlling circuit and the apparatus on the car is an interesting characteristic of an experimental installation of cab signals and automatic stops on the line of the Suburban Railroad Company in the outskirts of Chicago. A coherer is made part of a closed circuit on the car and this circuit is broken, giving a danger indication on the cab signal if the particles in the coherer cease to be held in contact by the effect of the Hertzian waves emanating from a continuous-line wire strung along the track.

In referring to the merits of automatic stops and cab signals the report of the board states that in Great Britain the cab signal is considered only as a convenience, while "in America, both cab signals and automatic stops have been proposed as safety devices purely and on the assumption that the vigilance of enginemen and motormen cannot be improved to the point of insuring a satisfactory degree of safety while using only the present visual signals."

Elsewhere in the report also, the authors refer to the evidently greater efficiency of British railway employees as compared with the men employed in similar positions by the railways of the United States.

The report concludes with a strong endorsement of telephone train dispatching as against telegraph dispatching with the Morse code. Several steam roads have adopted telephones for train dispatching during the past two years and their experience has been that telephones are as safe and convenient as the Morse-code telegraph. The contingent liability of indistinct or incorrect transmission of words and figures must be guarded against in both systems of communication by good training, discipline and by repeating back all messages.

THE POWER SYSTEM OF THE ROCHESTER RAILWAY & LIGHT COMPANY

The Genesee River has three falls and seven rapids within the corporate limits of Rochester, which is 7 miles south of Lake Ontario, into which the Genesee River flows. The water power thus available has long been utilized for manufacturing purposes and supplies a considerable part of the power required in the railway and lighting service of the Rochester Railway & Light Company. The company, however, is not dependent entirely on Genesee water power because it possesses several steam power stations and also receives about 4000 hp from Niagara Falls. The railways served by the power equipment of the company consist of the city system of Rochester with suburban branches to lake resorts on each side of the Genesee River and interurban lines to Sodus Point, 40 miles distant, and Canandaigua, 27 miles distant.

The water power furnished by the Genesee River at Rochester, while practically unlimited during a short season of the year, falls to so low a point during other portions of the year that it is only possible at times to get enough water from Brown's Race to run the condensers for the engines. Water storage on the Genesee River has been discussed from time to time; but thus far nothing has been done. The New York State Water Supply Commission in its report just issued has recommended the erection of a storage dam capable of holding 18,000,000,000 cu. ft. of water at Portageville, N. Y. This amount has been estimated to be sufficient to provide a yearly average flow of 800 cu. ft. of water per second for power purposes and will increase by nearly 20,000 the actual 24-hour horse-power now developed at Rochester. Inasmuch as the scheme of poundage at Portageville will cost in the neighborhood of $10,000,000, which would be apportioned among the benefited districts, there is little likelihood of the plant being carried through for at least some time to come. It is necessary therefore for the Rochester Railway & Light Company to keep some steam-driven stations in operation.

A list of the generating stations and substations at present operated by the Rochester Railway & Light Company follows:

Station	Location	Power	Generating or Substation
A	Mill & Commerce Sts.	Steam	Generating
B	Upper Falls	Steam and water	Generating
C	Brown's Race	Steam, water and battery	Generating
D	Upper Falls	Water	Generating
E	Lower Falls	Water	Generating
F	Johnson & Seymour Race	Water and battery	Generating
G	Middle Falls	Water	Generating
H	Carroll & Fitzhugh Race	Water	Generating
I	Brighton, N. Y.		Substation
J	Barge Canal, Greece, N. Y.		Substation
K	Portable station		Substation
L	Charlotte, N. Y.	Steam and battery	Gen. and sub.
M	Penfield, N. Y.	Steam	Gen. and sub.
N	Ontario, N. Y.		Substation
O	Sodus, N. Y.		Substation
P	Webster, N. Y.	Battery	Substation
Q	Williamson, N. Y.	Battery	Substation
R	Charlotte, N. Y.		Substation
S	Dispatch, N. Y.	Water	Gen. and sub.
T	Pittsford, N. Y.		Substation
U	Victor, N. Y.		Substation
V	Canandaigua, N. Y.	Steam	Gen. and sub.
W	Gates, N. Y.		Substation
X	Littleville, N. Y.	Water	Gen. and sub.

The Brown's Race station, known also as station No. 3, is the largest of the combination stations of the company and is the subject of this article. It is located at about the geographical center of the city.

GENERAL ARRANGEMENT

The station is built on the westerly bank of the Genesee River against the rocky cliff. The solid rock extending from the race on the west at an elevation of about 100 ft. above low water was channeled down to about a grade of 58 ft. for the main floor of the boiler room. Below this for a distance of 10 ft. is a basement for the ash hoppers and ash troughs, while toward the river there is another step cut in the rock 30 ft. below the boiler room basement for the engine room. The latter room has mezzanine floors on either side which support steam piping, condensers and other auxiliary apparatus. The engine room proper is approximately 76 ft. square inside of the columns supporting the galleries and is spanned by an electric traveling crane of 35 tons capacity. The engines are set in two lines running north and south with the shafts running east and west, leaving a 10-ft. aisle between the two rows of machines.

ROOF AND COAL BUNKERS

The roof of the boiler room is slightly higher than the street and between the building and the street runs Brown's Race, which comes within 10 ft. of the southerly end of the building. A bridge spans the race and over this all the coal and other fuel used in the station is passed. The boiler room is approximately 89 ft. x 69 ft. in the clear. Above the boilers is a coal pocket which is 21 ft. wide at the bottom with sides sloping at 45 deg. and 17½ ft. high to the bottom of the boiler house roof beams. The boiler fronts, stokers, concrete ash hoppers and part of the side walls of the boilers are supported by the main boiler room floor, but the boiler drums and tube sections are hung from pairs of 15-in. I-beams which frame into the horizontal coal-pocket girders. The roof over the boiler house is made sufficiently strong to support coal wagons which dump directly into the 1300-ton coal pocket through any one of 18 coal holes. The pocket is filled without trimming by hand by this means. The bridge forming a runway over the race has a 5 per cent grade so that teams have no difficulty in delivering the coal to the roof. One of the views shows the runway leading from the roof of the station and also illustrates the cable runway to a cable tower on the west side of the race. Over the latter runway many of the cables leaving the station are taken to underground conduits.

STACKS

The foundations for the stacks are also in the boiler house roof. The stacks themselves are 178 ft. above the base or foundation girders and are 10 ft. 3 in. in diameter. For 20 ft. above the base they are lined with firebrick. The stacks stand 41 ft. center to center, and their tops are approximately 185 ft. above the furnace grates. The up-takes from the boilers go directly upward into the bottom of the flue which extends the length of the boiler house on each side and discharges into the bottom of the stacks near the center of the station.

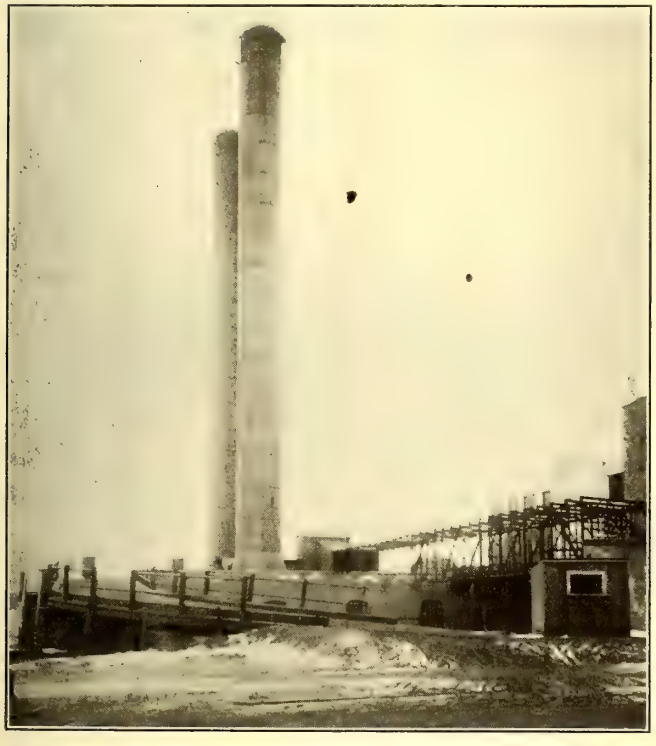
BOILERS

The boiler equipment comprises 10 Aultman & Taylor water-tube boilers, each of which is rated at 650 hp. The boilers are set in four batteries of two each occupying the four corners of the boiler house, with a single boiler set in the center of either side occupying the space immediately under the stacks. The boilers are set with no space behind them, cleaning doors being provided at the side instead of in the back. Two of the boilers are at present equipped for burning fuel oil and the others are fitted with Ross stokers made by the Harrisburg Foundry & Machine Works. Experiments made during the past year have caused the company to decide on a change in the boiler layout. The four boilers fitted with Ross stokers of the older type will have their furnaces changed. The

firebox will be lowered 7 ft. into the basement, leaving a combustion chamber above the grates of the stoker and the bottom tubes approximately 12 ft. high and 5 ft. deep, the setting otherwise remaining the same. The boiler front from the stoker to the lower tubes will be lined with firebrick and the bridge wall will, of course, be carried down to the bottom of the stoker pit. There is also an inclined firebrick arch over the coking grates which continues a suitable distance over the incandescent fuel. This serves as a sort of retort for coking the fuel, and the gases being completely burned in the combustion chamber, there is an absence of smoke. The effect of this deepened chamber is somewhat similar to that of a Dutch oven, and after trying the scheme out on one boiler the company is so pleased with the results that the change in the others will be made shortly.

OIL BURNING

Other experiments made with oil as fuel have caused the company to decide to equip four boilers for burning fuel, but the exact form of setting has not been decided



Rochester Power System—Stacks of Station No. 3, Showing Runway to Roof of Station

on as yet. Texas crude oil will be used. The oil is brought in cars and from the latter flows by gravity to a 750,000-gal. tank standing 90 ft. below the track level. An auxiliary tank 10 ft. below the track level feeds directly to the boilers, so that the oil will run from the cars to the storage tank and thence be pumped to the auxiliary tank. The oil can also be pumped from the storage tank. So far as cost is concerned experiments indicate that considering the cost of coal alone and the cost of oil alone, it is more expensive to use the oil. From the viewpoint of upkeep, however, including labor, it is estimated that the oil will show a small saving. The chief advantage of the scheme, however, is the absence of smoke, the ease of operation and above all the rapidity with which the boilers can be made to generate steam starting with the boilers cold. The two remaining boilers are fitted with the improved type of Ross stoker and these will not be changed.

BOILER OPERATION

A very interesting change will be made, however, in the flues and method of running the boilers. Considering one row of boilers and numbering these 1, 2, 3, 4 and 5, boilers No. 1 and No. 5 will have depressed furnaces, boilers No. 2 and No. 4 will be fitted for oil burning and boiler No. 3 will remain unchanged. The coal-burning boilers will carry the steady load and the gases will be constrained to pass from boilers No. 1 and No. 5 through boilers No. 2 and No. 4 and out through boiler No. 5 to the stack. If it is necessary to employ a fan to obtain the necessary draft in view of the circuitous route of the gases, a fan will be installed. Normally the oil-burning boilers will not be operating only on varying load and at peaks. The boilers will therefore act as sort of economizers and the arrangement will in all probability result in the generation of low-pressure steam at least. In cases of emergency the oil-burning boilers can be brought into use at once and steam generated in about 20 minutes.

The Ross stoker is designed for burning bituminous coal such as is used at Rochester and which costs about $2.50 per ton. After the fuel leaves the coking plate and grates it passes down the inclined grates, each alternate bar being arranged to rise at the lower end and move forward, breaking up and carrying the fuel downward toward the dump grate at the bottom, making a constant and positive feed at all times. Separate adjustments control the movements of the coal pusher, coking grates and inclined grates which are all independent. A series of small coking grates are hung from a rocking bar and arranged to move forward and backward in a horizontal direction. Their function is to carry the coal and coke from the dead plate to the main inclined grates. The latter are alternately movable and stationary. The movable grates are controlled by a regulator on the front of the stoker and move to a height of 4 in. upward and forward at the lower end and then backward level with the stationary grates. They are straight from the upper end to the dump grates and provided with overlapping and vertical flights on their sides so arranged that a suitable supply of air will pass between them. The dumping ash grate is balanced and reversible and is operated by levers in front.

ENGINE ROOM

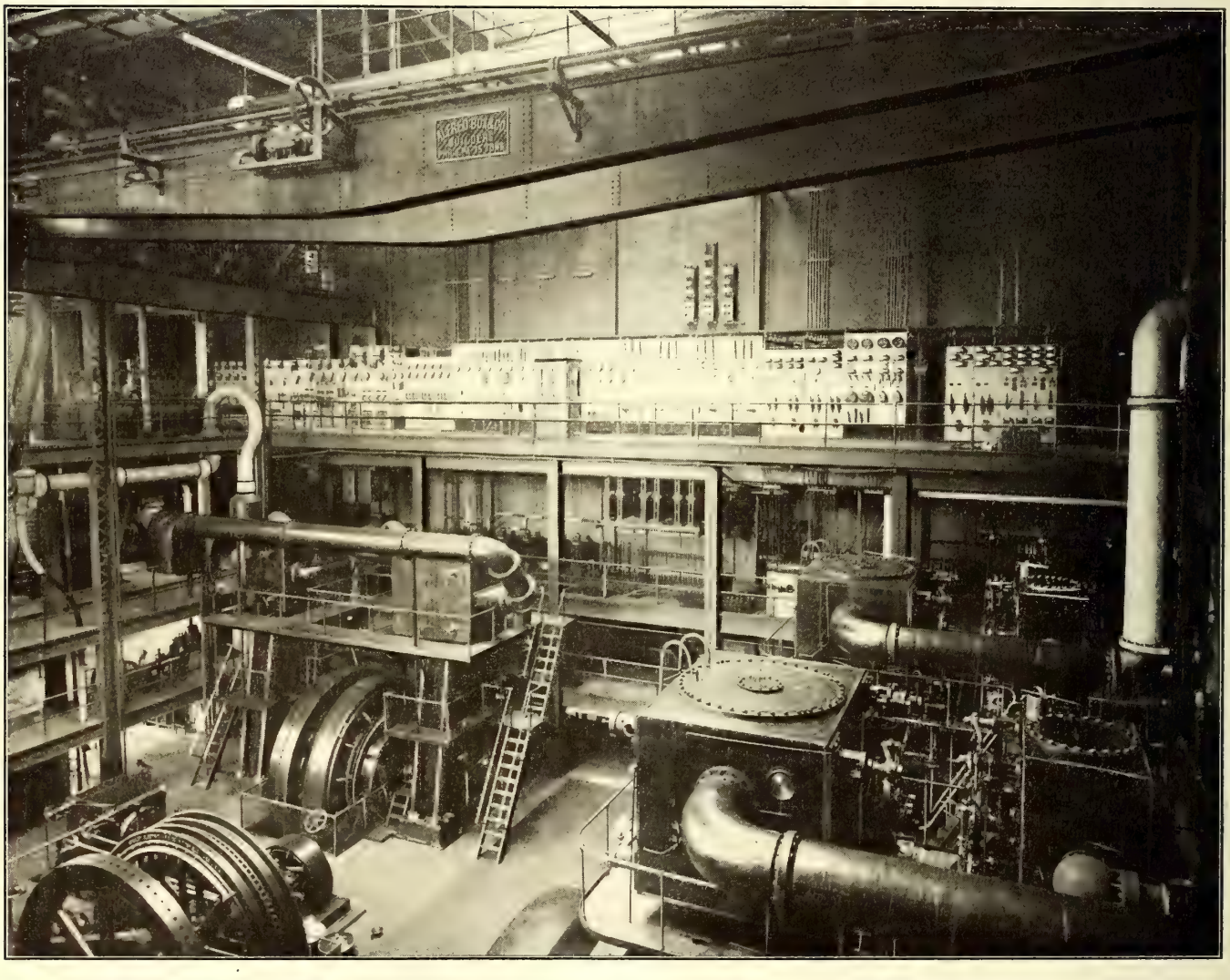
The engine room, a view of which is shown, is some distance above the river and has mezzanine floors on the east and west sides 6 ft. 10 in. wide. The first two mezzanine floors are on the same level with the engine platforms, the third mezzanine floor is on the same level as the main electrical control floor and carries the primary and secondary feed-water heaters, and the fourth mezzanine floor is 6 in. below the top of the crane girders.

Along the west side of the engine room are three vertical cross-compound engines built by the Southwark Foundry & Machine Company, of Philadelphia. Each engine is arranged to drive a 1360-kw, 4150-volt, 60-cycle alternator placed between the low-pressure side of the engine and an outer pedestal. The engines are designed to run at a normal speed of 90 r.p.m. with an initial steam pressure of 160 lb. and a vacuum of 26 in. Under these conditions each engine will develop 1800 hp at 30 per cent cut-off and a maximum of 3000 hp. When running with most economical load they require less than 13 lb. of dry steam per ihp per hour, including the steam used in the reheater, while the steam variation from no load to full load does not exceed 3 per cent from the normal. Under any change of load the speed variation is said not to exceed one-fourth

of one geometrical degree from the position of uniform rotation. The flywheel of each engine is 20 ft. in diameter and weighs with the armature sleeve close to 125,000 lb. The engines are fitted with Porter-type governors capable of electrical control from the switchboard for synchronizing purposes. A Bulkley condenser is provided with each of the three engines. The usual automatic free exhaust valve and connections are placed in each of the exhaust pipes and two Hoppes open heaters with 1750 ft. of scale-catching surface are connected to the engine exhaust pipe.

The feed-water is taken from the hot well, race, river or from the city water mains and is handled by three duplex outside-packed plunger pumps. These pumps are designed to work against 250 lb. water pressure and any one is sufficiently large to handle the entire installation. From the pumps the feed-water is taken through the Hoppes heaters and thence into the feed mains which run underneath the boilers immediately in front of the ash hoppers, where connections are made to vertical lines at the side of the boiler. The steam pipe connections for the three Southwark engines are illustrated. The door shown on the upper mezzanine floor leads into the boiler room, being a few feet above the boiler room floor. The main steam header supplying the engines is shown directly below this door and the two feeders from the boiler room are shown coming down at either side of the door.

Along the east side of the engine room there are two engines and a steam turbine, the Dickson engine shown in the foreground of the interior views having been removed and a turbine placed there instead. The engine near the switchboard galleries is an 1800-hp vertical cross-compound McIntosh & Seymour engine direct-connected to a 1000-kw railway generator. At the other end of the row is an 1800-hp Allis-Chalmers vertical, cross-compound engine direct-connected to two 550-kw, 250-volt generators. Between these engines is a 3000-kw Curtis turbine driving a 4150-volt, three-phase alternator. The latter unit is fitted with an Alberger condenser and the whole equipment requires less space than the old 500-kw set which has been placed in Station No. 1 for reserve use. The steam pipe arrangements on the east side of the station do not differ greatly from those on the other side.



Rochester Power System—General View of Engine Room of Station No. 3, Showing Switchboard Gallery

Normally when there is plenty of water in Brown's Race the condensing water is taken directly from the race without any pumping whatever, but during periods of slack water the condensing water is pumped from the river.

The station possesses many advantages because of its peculiar location. Although coal must be carted to it, after it is dumped into the pocket there is no rehandling, nor is there any moving machinery employed in its distribution. The coal is delivered by gravity through chutes to the hoppers of the stokers. The ashes are dumped into a concrete trough under the furnace pits in the basement whence they are washed into the river without further ado and the whole problem of ash removal easily solved. Boiler feed water must be pumped because the tops of the boilers are

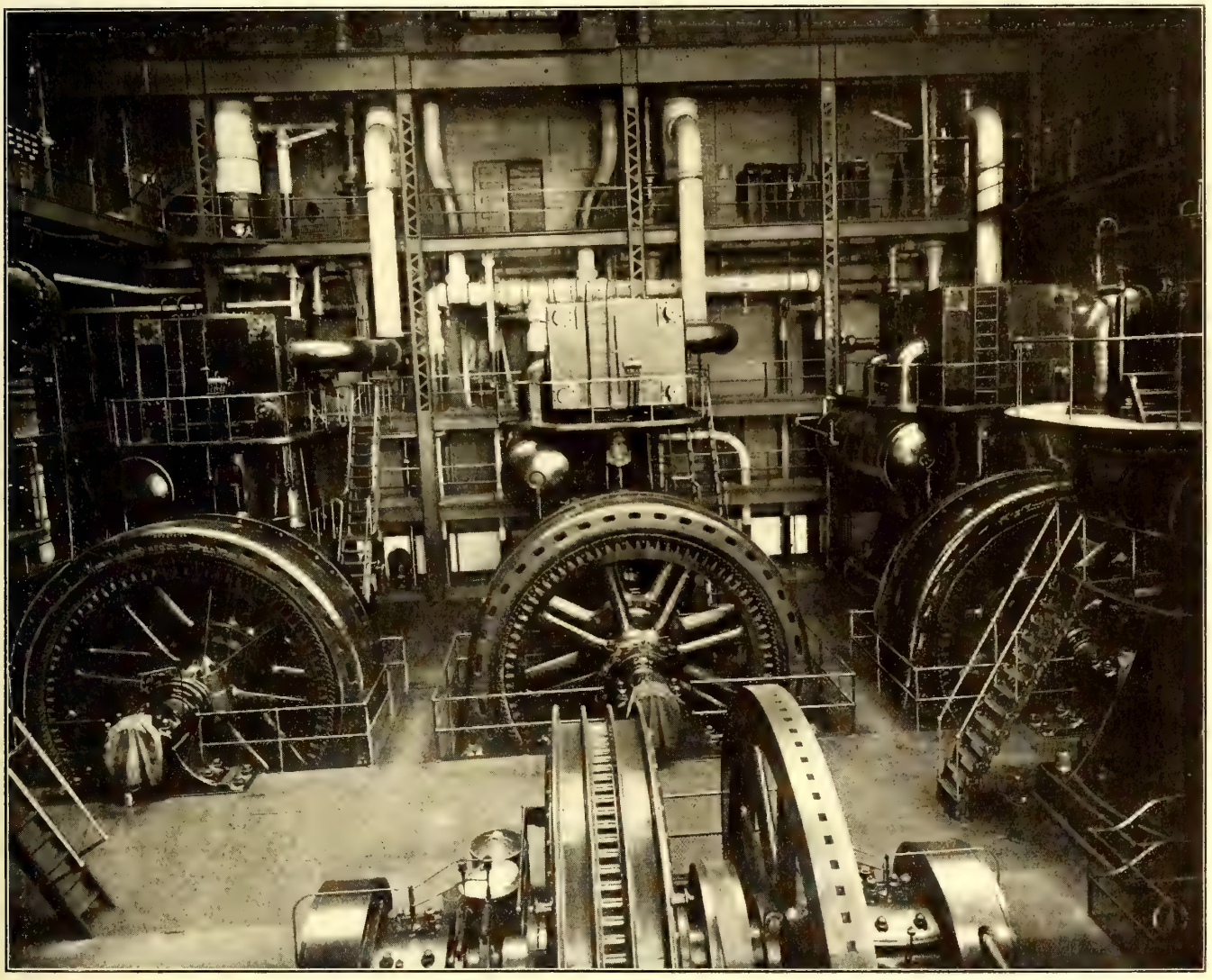
not much below the level of the race and at times water for condensing purposes must also be pumped. Ordinarily, however, there is enough water in the race so that the condensers may be fed by gravity from it, or, in other words, a spillway with intercepting condensers is provided at this point instead of farther down the river, where no advantage could be taken of it.

GENERATING APPARATUS

The generating apparatus in the station consists of three, 4150-volt, three-phase, 60-cycle alternators, one 3000-kw turbo-alternator, one 1000-kw, 550-volt generator and two 550-kw, 250-volt generators. The three engine-driven alternators are of Stanley type and all the other generating apparatus is of General Electric make. In addition there are two 250-kw, 550-volt Bullock motor-generator sets used to feed a 500-volt motor circuit, a 500-kw, 550-volt General Electric motor-generator set for street railway work, a 90-kw, 125-volt General Electric motor-generator set for excitation purposes, two 150-kw Edison machines direct coupled to a 250-volt Edison generator used as a motor, also for exciter purposes, a 1000-kw chloride battery for railway work, a 640-amp-hour battery floating on the exciter bus and capable of supplying the entire excitation energy required by the station for one hour, a 500-kw, 275-volt motor-generator set for feeding the Edison system at this point and a 125-hp motor direct connected to a generator. This last set is used in connection with the railway battery for booster purposes and is arranged with carbon regulator. There are also in use for excitation purposes a 75-kw steam-driven set and an induction-motor exciter set. The steam-driven set is used so as to make the excitation independent of any electrical disturbance which might affect the regular operation of the system, and also on account of the relatively high economy realized by utilizing the exhaust steam to heat the boiler feed-water, as the station has no other steam auxiliaries except the boiler feed pumps, stoker engines and condenser pumps.

WATER POWER AUXILIARY

Adjacent to the steam plant of Station No. 3 is an old water power plant taking water from Brown's Race through a 7-ft. penstock and having a head of about 90 ft. Heretofore the generators in this plant were driven from belts and ropes; but lately the plant has been reconstructed and direct-connected units have been installed. There are two 350-kw, 4150-volt alternators and one 300-kw, 550-volt, direct-current generator, which form the equipment of this plant.

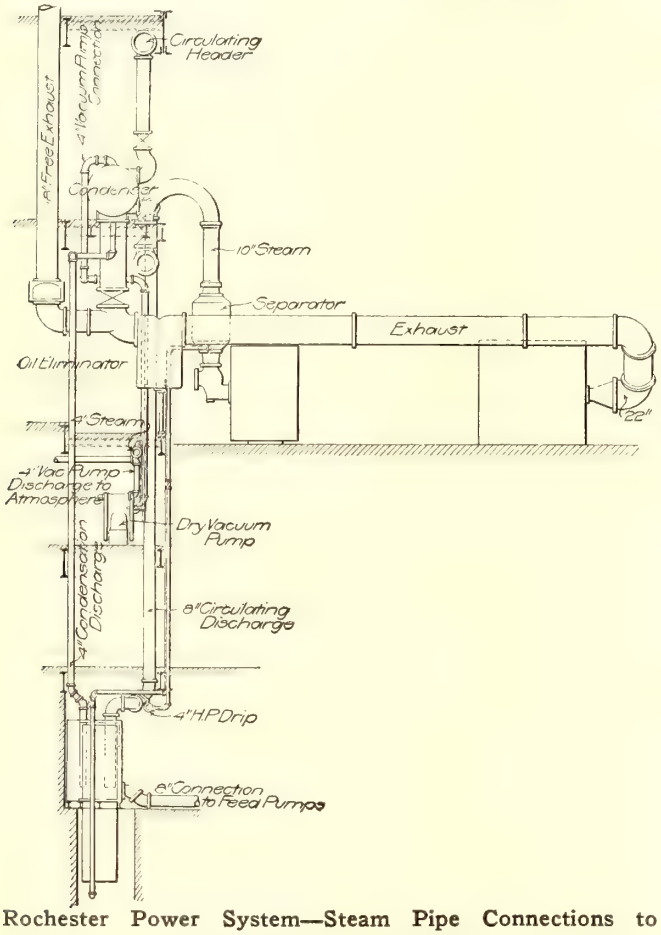


Rochester Power System—View of Engines Along West Wall of Station No. 3, Showing Steam Piping

SWITCHBOARD AND CONNECTIONS

At the south side of the engine room are three galleries set aside for electrical purposes. The two lower galleries are 12 ft. 6 in. wide and the one on which the switchboard is placed is about 16 ft. wide. An addition is built to the southeast corner of the engine room which extends the full height of the building, 18½ ft. x 43 ft. In this, switch-

board and transforming apparatus is installed. All the electrical connections of the generators, exciters, etc., are brought to the operating switchboard in the gallery. The board is somewhat different from that shown in the cut. Since the picture was taken the switchboard has been rebuilt to a large extent, although the general arrangement remains the same. There are now about 55 panels in the board comprising panels for the generators, motors, tie lines, battery, railway feeders, Edison system feeders, alternating-current feeders, etc. The railway circuits are controlled from the left end of the board. The panels are standard throughout, but the excellence of the wiring back of the panels is worthy of comment. The oil switches are located on the gallery below and the constant-current transformers for the series arc-lamp circuits fed from this station are placed in the gallery above and to the left. From this station there are several three-phase distributing feeders for lamp and motor circuits and on these circuits po-



Rochester Power System—Steam Pipe Connections to Large Engines in Station No. 3

tential regulators are arranged. These are placed back of the switchboard. The exciter circuits run directly from the machines to the bus in conduit. All wiring from the transformers to the switchboard is in conduit with outlet boxes at the bottom of the board for the relay connections and at the top for the instrument connections. Conduits are used for outlets and all the wiring being encased, the back of the board is singularly free from danger of contact. The motor-generator sets are located on the third gallery below the switchboard.

Station No. 3 being the main steam-generating station of the company, is electrically connected with many of the other stations through numerous tie lines. There are tie lines to Station No. 2 on the Upper Falls for both railway and Edison lighting circuits; alternating-current tie lines with Station No. 15 on the Middle Falls, with Station No. 5 on the Lower Falls, with Stations No. 4 and No. 6 on the Upper Falls and on Johnson & Seymour Race, respectively, and there is also a tie line for railway circuits with Station No. 5. Inasmuch as the other stations are tied together, it is possible to transfer the load from almost any station to Station No. 3 and vice versa. The advantage of having the various stations electrically connected was well shown during the recent drought. Stations No. 2 and No. 3 and Station No. 1, which is usually only run in cases of emergency, are the only steam stations of the company. In the absence of water the first two were run overloaded for 24 hours a day during the season of drought and the last was run for two hours a day on the peak load. The tie connections are run underground, some passing out underground directly from the station and others crossing the river to the opposite bank.

COMMITTEE OF RAILWAY COMMISSIONERS ON CONSTRUCTION AND OPERATING EXPENSE ACCOUNTS

Martin S. Decker, president of the National Association of Railway Commissioners, has issued a circular announcing the committees which will take up various subjects and report at the next annual convention, to be held at Washington, D. C., on Oct. 12, 1909. Among the committees appointed is one to take up the subject of "Construction and Operating Expenses of Electric Railways." This committee is composed of the following:

Milo R. Maltbie, of New York.
Francis M. Cockrell, of the Interstate Commerce Commission.
William Kilpatrick, of Illinois.
Halford Erickson, of Wisconsin.
Charles E. Mann, of Massachusetts.
Charles B. Riley, of Indiana.
C. N. Duffy, of American Street & Interurban Railway Accountants' Association.

In commenting on the work before this committee and the committees appointed to consider the subjects of "Railroad Statistics," "Grade Crossings and Trespassing Upon Railroads" and "Safety Appliances," Mr. Decker indicates "that in addition to the usual reports there should be strong effort made to secure uniformity in so far as may be practicable, and these committees might well also work in harmony with the committee on legislation in that respect."

Mr. Decker states that the committee which is to report on the "Powers, Duties and Work of State Railway Commissions" should make a report showing all the State laws pertaining to regulations. Mr. Decker recommends that another committee make a full inquiry into the history of delays affecting orders of State commissions, resulting from injunction proceedings in Federal courts. He thinks that such an inquiry "would be highly valuable as supporting recommendations for provision of a remedy."

Regarding the work of the committee on capitalization Mr. Decker says:

This is a new standing committee. In view of the regulation of capitalization in some of the States and the declarations which have been made for Federal regulation upon that subject, it has become important that such a committee should be provided. The effect of overcapitalization or wrongful capitalization upon railway rates, railway service and railway improvements justifies the fullest inquiry by this committee into all phases of the subject, both as related to State and interstate railroad transportation and rates and the character and degree of capitalization regulation which is practicable and under all conditions to be desired.

NEW YORK PUBLIC SERVICE COMMISSIONS REPORT TO LEGISLATURE

The Public Service Commissions of New York, First and Second Districts, have submitted reports to the State Legislature for the year ended Dec. 31, 1908. These reports relate to the work of the commissions and their decisions on various matters.

FIRST DISTRICT COMMISSION REPORT

The report of the commission of the First District shows that the surface, elevated and subway companies in New York City carry annually over 1,300,000,000 passengers, which is over 66 per cent more than the total number of passengers carried on the steam railroads of the entire country. These companies have a capitalization of over $533,000,000 and derive annually from their passengers over $62,000,000. The gas and electric companies have a capitalization of over $386,000,000 and the amount of gas sold annually is over 32,000,000 cu. ft., which is more than 20 per cent of the entire gas production in the United States. The income from the sale of electricity in New York is over $20,000,000.

The report, after mentioning the recommendation of Bion J. Arnold that two trains of the Interborough Rapid Transit Company be equipped with side doors, says:

Mr. Arnold has made other important recommendations as to improvements in the construction and operation of the subway, which are now being considered. The purpose of the commission has been to utilize every possible method known to engineers to increase the carrying capacity of the subway and relieve congestion.

Following the recommendations of Mr. Arnold, the Interborough company was requested to install a new type of signal system on the express tracks, which, by a method of speed control, would allow express trains to approach stations by shorter blocks than had formerly been the practice. By this means, when a train is at the station the next train is held just outside of the station instead of in the next block; less time is therefore lost in the arrival of trains at the stations during rush hours and a larger number of trains can be operated. This system has been put into use at the Ninety-sixth Street station and is working so satisfactorily that the company is about to install it at other stations.

In referring to the systems of accounts the commission says it found that little work as to electric railroad and gas and electric companies "had been done other than by certain technical associations whose systems were not compulsory, nor had they been generally accepted because of considerable differences of opinion within the associations themselves."

An abstract of the part of the report which refers to equipment, appliances and service follows:

The commission has ordered the complete and thorough overhauling of all of the surface cars operated in the boroughs of Manhattan and the Bronx. As a result the noise and strain incident to the running of rattling cars with flat wheels has been enormously decreased, car efficiency has been increased, the appearance has been improved, the cost of operation decreased and the safety of the public better protected.

Because of complaints and because of lack of proper efficiency in the service the commission has had careful investigation made of the equipment in use throughout the district, and has found it necessary to order practically all of the cars either to be completely overhauled or to be improved in certain specified particulars.

The enormous number of accidents reaching nearly 50,000 in a year, and including nearly 600 persons killed, called striking attention to the lack of safety devices, and the commission has conducted extensive and satisfactory tests of fenders and wheel guards, open to all manufacturers in this country and abroad, to determine what ought to be done to save life. This work was completed just before the end of the year.

The commission will now, following proper notices to the companies and after hearings, require the installation on the cars of fenders and wheel guards that have met the tests of the commission satisfactorily.

Another matter to be taken up immediately will be the proper types of brakes. Use of proper safety devices and brakes will, it is anticipated, decrease very largely the number of serious accidents. The next largest class of accidents arises from the fault of employees of the roads, such as overspeeding and apparent lack of proper instruction. This cause is perhaps more difficult to eliminate because of the human element involved, but its importance is unquestioned.

The commission found in its examination of equipment, particularly new equipment about to be purchased by the companies, that it was advisable, and ordered, that the companies should file specifications in advance of purchases. By this means it has been possible to point out important defects before equipment was completed, and at a time when their elimination was less expensive to the companies than after the cars were put in use. As a matter of legal authority the commission probably does not have the power to compel a company to make any change in its equipment until the equipment is put in public use. In European countries the possession of this power by the boards exercising State supervision over public services requires the approval of general plans of equipment before being purchased and has been very satisfactory.

The commission may require by order increases in service under the provisions of the act that companies shall furnish adequate service and shall have sufficient cars and motive power to meet any requirements of transportation that may be reasonably anticipated. The problem presented, however, of defining what will be regarded as adequate service is shown by the fact that in the year 1907, disregarding the number of transfers, there were carried on the roads of New York City 66,000,000 more fare passengers than in the year 1906. As an average, this means that there were 180,000 more passengers each day during the year than on the day before. It is not to be wondered at that, with the increase in the number of passengers incident to the growth of a great city, any increase in car service ordered by the commission is not readily apparent to the traveling public, yet a relatively greater amount of the time of the commissioners is taken up with consideration of increases in service than with any of their other important duties.

The commission has endeavored to increase the efficiency of service by requiring improvements in equipment. It has studied street congestion and attempted to have routes so changed as to avoid the limiting points of capacity. It has also insisted that the rush-hour service shall begin earlier and be continued later than has been customary.

The commission has decided that transportation companies should run as many cars as it is physically possible to operate during rush hours, that the number of seats should equal if not exceed the number of passengers in a short period of time, and that the only excuse for not providing such service shall be insuperable physical conditions or events which it is impossible to foresee.

SECOND DISTRICT COMMISSION REPORT

At the close of the year 854 corporations, municipalities and individuals were engaged in some public service that by operation of law placed them under the jurisdiction of the commission; of this number 141 were street railroad corporations, divided as follows: Operating, 80; not operating, either inchoate or dormant, 44; not operating, lessor, 17.

The number of persons in the employ of the commission at the end of the year was 88. The total number of complaints received during the year was 1399, of which 1147 were correspondence complaints, being made the subject of correspondence with the corporations against which the

complaint was made, while 252 were formal complaints to which answers were required.

CAPITALIZATION

The commission summarizes the chief decisions made on this subject, saying in part:

In three cases it was held that the use of capital to be secured by the issue of stock, bonds, or other evidence of indebtedness must be necessary for one or more of the four purposes specified in each of sections 55 and 69; that the amount authorized is reasonably required for one or more of said purposes. In other words, that an enumeration of purposes for which stock, bonds and other evidence of indebtedness may be issued is exclusive and not inclusive; that the stock and bonds may not be issued for purposes not enumerated in the statute, either with or without the authorization of the commission.

Pursuant to the principle thus enunciated, it was held in the case of the application of the Erie Railroad that a scrip dividend, and in the case of the application of the Babylon Electric Light Company, that a stock dividend is not one of such purposes; and in the case of the Lehigh & Hudson River Railway Company, that the reimbursing of a treasury for previous payments made for one of the purposes named in the statute is not one of such purposes. No capital whatever is secured to the company by the proposed issue of stock or scrip; and moneys secured by bond issues for the so-called reimbursement of the treasury could be expended for any lawful purpose, although not one of the purposes named in sections 55 and 69, whereas the statute plainly requires that they must be expended for one of those purposes only and must be reasonably required therefor.

In the application of the Newburgh Light, Heat & Power Company the commission denied the application for authorization of preferred stock to the amount of $250,000, entitled to a cumulative annual dividend of 8 per cent, holding that the condition of the money market taken in connection with the physical condition of the applicant corporation did not justify a fixed charge of this amount.

In the application of the Watertown Light & Power Company for authorization of an increase of its capital stock and bonded indebtedness, it was suggested to the commission by the corporation counsel of the city appearing in opposition to the application that the existing capitalization of the applicant was excessive and that for this reason the application should be denied as tending to increase an unwarranted capitalization. The commission adopted, unanimously, certain propositions as follows: (*a*) That it will not investigate or inquire into the correctness of the capitalization of the Watertown Light & Power Company authorized by the former Commission of Gas & Electricity; and therefore will not inquire in this proceeding into any alleged overcapitalization of the applicant existing at the time the application was made; (*b*) that the investigation upon this application for additional capitalization will be confined to the question whether such capitalization should be authorized by reason of the actual investment of the money to be secured thereby for the purposes of the corporation recognized by law as a subject of capitalization. The question was presented whether the commission might authorize the applicant to issue bonds to acquire money with which to make expenditures on property not presently necessary in the discharge of the public service functions of the corporation. It was held that public service corporations may be authorized to make expenditures incidentally for purposes other than public service, if such expenditures are on property to be used ultimately and properly for such public service.

An interesting question early presented itself to the commission as to what extent the investing public might be justified in relying upon the authorization given by the commission as an implied certificate that the bonds or stock to be issued were worth their face value or any other amount. It was obvious that the practice of the commission in carefully investigating the purposes for which bonds or stock were to be issued, and passing upon the necessity of the sum to be secured by such issue in carrying out said purposes, would create a feeling upon the part of some that such investigations could be relied upon as establishing the value of the securities. This identical question arose upon the application of the Hudson River Electric Power Company, decided Dec. 4, 1907, for leave to issue bonds to the amount of $3,232,000. Upon this point the commission said:

"In passing upon the application for leave to issue additional capital stock, the commission will consider:

"(5) Whether there is reasonable prospect of fair return upon the investment proposed, to the end that securities having apparent worth but actually little or no value may not be issued with our sanction.

"We think that to a reasonable extent the interests of the investing public should be considered by us in passing upon these applications.

"The commission should satisfy itself that, in a general way, the venture will be likely to prove commercially feasible, but it should not undertake to reach and announce a definite conclusion that the new construction or improvement actually constitutes a safe or attractive basis for investment. Commercial enterprises depend for their success upon so many conditions which cannot be foreseen or reckoned with in advance, that the duty of the commission is discharged as to applications of this character when it has satisfied itself that the contemplated purpose is a fair business proposition."

So in the case of the Watertown Light & Power Company the commission held that the purchasers of securities authorized by it are not exempt from the business risks involved in the possibility of the corporation issuing the securities being overcapitalized.

In a series of applications arising out of the desire of the Lockport Light, Heat & Power Company, a new corporation, to purchase the property and franchises of two existing and competing gas and electrical corporations, decided Oct. 31, 1907, it was held that a sale of the property and franchises of two gas or electrical corporations to a third is virtually a consolidation and is subject to the section of the law, providing that the capital stock of a corporation formed by the merger or consolidation of two or more other corporations shall not exceed the capital stock of the corporations so consolidated at the par value thereof, or such sum and any additional sum actually paid in cash. Various conditions were imposed upon the consummation of the desired purchase, which conditions were accepted by the applicants.

The application of the Elmira, Corning & Waverly Railway, decided July 23, 1908, was for an authorization to issue bonds of the applicant in exchange for the stocks of other railroad corporations. The question involved was whether authorization should be given to issue bonds for such purpose, but such question was not directly passed upon by the commission. The application was denied upon the ground that the fair value of the stocks proposed to be purchased was not equal to the par value of the bonds proposed to be issued, leaving the question unsolved whether the purchase of stocks of other railroad corporations was within the fair purview of the language "when necessary for the acquisition of property," as used in section 55.

The application of the Rochester-Corning-Elmira Traction Company, decided March 30, 1908, was the first case brought before the commission involving the capitalization to be authorized in the case of a new street railroad corporation. The following expresses the conclusions laid down by the commission in that case as the basis of its determination:

"Upon application for capitalization of a newly organized railroad company the proceeds of such capitalization to be used for constructing and putting in operation its railroad:

"5. Proof will be required showing in careful detail the probable cost of the physical construction and equipment of the road.

"6. In addition to estimates of the physical cost, proof should be given touching the following matters which enter into the expense of launching the enterprise: (*a*) expense of organization; (*b*) incorporation tax; (*c*) expense of obtaining certificate of public convenience and a necessity; (*d*) preliminary engineering expenses; (*e*) expense of proceedings to procure authorization of issue of stock and bonds; (*f*) expense of marketing securities; (*g*) dis-

count upon bonds, provided they cannot be sold at par; (*h*) interest upon the bond issue during the period of construction and prior to the beginning of revenue producing operations; (*i*) compensation of officers during the construction period; (*j*) incidental expenses during construction period; (*k*) expense of obtaining local franchise and consents.

"7. An allowance will be made for a proper amount of working capital to be determined by the extent of the proper operations.

"8. A fair allowance will be made for services in promoting the organization of the enterprise. Such allowance will be placed upon the basis of just payments for valuable and indispensable services.

"The division of the capitalization between stock and bonds will be determined in substantially the following manner whenever the same is practicable:

"9. An estimate will be made from consideration of the results of operation of existing roads of the probable gross earnings.

"10. An estimate will be made in like manner of the probable operating expenses, taxes and depreciation charges.

"11. The excess of earnings over the disbursements which must be made before fixed charges can be met represents the sum which is applicable to fixed charges.

"12. The maximum bond issue which will be allowed must be determined by the sum thus ascertained to be applicable to the payment of the interest charge.

"13. No bond issue should be permitted creating an interest charge beyond an amount which it is reasonably certain can be met from the net earnings.

"14. Stock representing a cash investment should be required to an amount sufficient to afford a moral guaranty that in the judgment of those investing the enterprise is likely to prove commercially successful.

"The order authorizing such stock and bond issues will contain appropriate provisions designed to secure the construction of the road in accordance with the plans and specifications upon which the authorization was made and not in excess of the actual requirements.

"If the allowance proves inadequate for the required purposes, an application for further capitalization may be made, upon which application the expenditure of the proceeds of stock and bonds already authorized must be shown in detail."

In the case of an authorization of stocks, bonds, notes or other evidence of indebtedness for the payment of interest obligations, the language of the statute is that the corporations under the authorization of the commission "may issue, stocks, bonds, notes or other evidence of indebtedness payable at periods of more than 12 months after the date thereof when necessary for the discharge or lawful refunding of its obligations." In the application of the Lehigh & Hudson River Railway, decided May 7, 1908, the commission held:

"Upon application for an order of authorization under these sections (55 and 69) the proposed use of the capital to be secured being the discharge or lawful refunding of obligations of the applicant, inquiry will be made as to the consideration of such obligations and the use to which such consideration was put, with a view to ascertaining whether such obligations are proper subjects of capitalization."

The commission in this case did not go into the subject extensively, but contented itself with calling attention in a general way to the point that the purpose for which the obligation was incurred could properly be considered upon an application to issue bonds in payment therefor.

In the application of the Delaware & Hudson Company for authorization to issue bonds, the point was again presented more directly. The company sought to issue bonds for the purpose of refunding outstanding obligations. The commission held that it may properly and lawfully deny an application for a bond issue, the proceeds of which are proposed to be devoted to the discharge or refunding of a conceded lawful indebtedness of a definite amount, as a matter of wise discretion. That one factor upon which such discretion may be based is the purpose for which the indebtedness was incurred. It was held that a bond issue which creates an annual charge upon railroad properties for purposes unconnected with those properties tends to limit the amount annually available from income for the proper management and betterment of such properties, and that a lien upon such properties for the principal sum limits by the amount of such principal sum the credit of the corporation in borrowing upon their security sums which may be necessary from time to time for their improvement and extension.

The foregoing review shows that the commission stands firmly upon two propositions: First, that it has no power to authorize the issue of stocks, bonds or other evidence of indebtedness except for one or more of the purposes enumerated in sections 55 and 69 of the Public Service Commission Law; second, that within the limits of those purposes it has a very wide discretion as to the purposes and all of the details of the proposed issue; that this discretion is to be controlled by sound general principles of universal application. While no formal decision has been rendered as to the extent the commission will undertake to control the discretion of boards of directors, its undeviating practice is not to interfere with that discretion unless its exercise is deemed to be clearly unwise and prejudicial to public interests by reason of its infringing upon some general principle essential to the public welfare. In other words, the denial of an application of this character imposes upon the commission the burden of pointing out clearly and conclusively wherein the granting of the same would be improper or unwise.

The practice of the commission is to require that stocks shall, in conformity to law, be issued for cash, at the par value thereof; or if they are issued for property or service, it requires satisfactory proof as to the value of such property or service, to the end that the stock shall not be issued for less than the true cash value of such property or service. Bonds are permitted to be issued with reference to actual market conditions and the value of money. Two forms of order are used: One in which, if the company desires to issue bonds at less than their par value, a contract for the sale of the same must be reported to the commission and approved; in the other, a minimum price is fixed below which the bonds cannot be sold, leaving the company at liberty to sell the same at that price or at such better price as it can obtain in the market.

Attention should be especially directed to the practice of the commission upon certain points of great importance, additional to that of discount allowed upon a sale of bonds. As shown above, it was determined in the Rochester-Corning-Elmira Traction Company case that an allowance will be made for a proper amount of working capital, to be determined by the extent of the proper operations of the corporation, and that a fair allowance will be made for services in promoting the organization of the enterprise. Such allowance will be placed upon the basis of just payments for valuable and indispensable services.

In these three matters of discount on bonds, working capital and allowance for promotion or services, the practice is understood to be different from that prevailing in Massachusetts. Since 1894 commissions in that State have had control of the amount of securities that public service corporations can issue for any and all purposes. The statutes under which they act are in many respects similar to the Public Service Commissions Law, in this particular: Railroads and street railroads must apply to the railroad commission; gas and electric light corporations, to the gas and electric light commission, and telephone and telegraph, aqueduct and water companies to the commissioner of corporations. Both the railroad and the gas and electric light commissions refuse to permit securities to be issued for discount on bonds. It is understood that the railroad commission apparently disapproves of an issue of stock or bonds to provide working capital, but that the gas and electric light commission permits this item to be included in a company's original capitalization.

The commission has not found occasion to doubt the correctness of its conclusions upon these points. It has endeavored, and will continue to endeavor, to make its rulings such as to encourage the investment of capital and the promotion of enterprise. The interests of the public imperatively demand these results, and the commission believes

that they are not in the slightest degree inconsistent with the protection of the public against those practices which have justly earned the condemnation of the public and led to the regulation of corporate capitalization by law.

UNIFORM SYSTEMS OF ACCOUNTS

The commission says that the form of accounts is intimately, and perhaps inseparably, connected with the subject of capitalization, and adds:

The law subjects these corporations to regulation and control as to capitalization, service and rates. No supervision over these matters can be efficient or just without full knowledge of the corporation's affairs. No complete understanding of such affairs can be attained without comparison with the like affairs of other corporations. Determinations as to rates and service necessarily involve considerations of cost. It is not practicable nor even possible to have intelligent investigation of the affairs of the large number of corporations subject to the provisions of the Public Service Commissions Law without uniformity in the accounts of the various classes of such corporations. In its work up to this time the commission has been considerably embarrassed by the fact that the statistics available for its use have, in many cases, been useless because not based upon uniform systems of accounts.

Attention is especially called to the fact that in the preparation of these systems of accounts the commission has kept in constant touch with the corporations themselves, has invited and profited by constant comment and criticism, and has endeavored in every way to make the bookkeeping it prescribes practical as well as thoretically correct.

The work of preparing these systems of accounts has been intrusted to William J. Meyers, statistician to the commission, and to him should be awarded the credit of their technical excellence and perfection of form.

Electrical corporations and street railroad corporations are in the present stage of the arts very closely related. Because of this close relationship, and because of the necessity for basing the accounts for all public service corporations upon the same fundamental principles, it was considered advisable not to crystallize the scheme for any one class of corporations in advance of a general settlement of the scheme for other classes.

Throughout the various schemes of accounts, uniformity has been sought for whenever it seemed to be practicable to obtain it. It has been recognized, however, that to attempt to secure uniformity of accounting where uniformity of fact does not exist, is to abandon the substance for the form, and there has been no attempt to push uniformity to such lengths as to secure merely specious results. Each scheme recognizes the division of capital into fixed capital and floating capital; that in fixed capital, wherever different classes of corporations have similar classes of fixed capital, similar accounts have been prescribed in respect thereof; that floating capital is subdivided into materials and supplies on the one hand and current assets on the other, and that like accounts for current assets have been prescribed; as have like accounts for investments, prepayments, suspense and other matters usually appearing on the debit side of the balance sheet; and for funded debt, unfunded debt, reserves and other matters usually appearing on the credit side of the balance sheet. With regard to the income accounts, it has not been practicable to push uniformity with regard to the operating accounts much beyond the principal divisions of revenues and expenses. With regard to non-operating revenues, non-operating revenue deductions, income deductions and appropriations, substantial uniformity has been practicable and has been provided for in the accounting orders.

The smaller corporations are less highly organized than the larger corporations, and the minuteness of classification of labor which is practicable in the larger is impracticable in the smaller. Furthermore, the managers of the smaller corporations are in more immediate contact with the detailed affairs of the corporation, and for that reason do not need the minuteness of accounting that is imperative in the larger concerns. This condensation has seemed practicable only in the various income accounts. The capital accounts are accounts that continue during the life of the corporation, and it is much more essential that the same scheme of accounts be continued throughout the corporation's entire history. The income accounts are closed annually, and a radical change in them produces little other inconvenience than to prevent comparisons with accounts of prior years. If the change is confined to a further subdivision of those of prior years, not even this inconvenience results. On the other hand, a change in capital accounts involves matters covering a very considerable period of time and the record of which is frequently too incomplete to permit re-classification. Growth is the normal course of affairs for a well-organized, well-managed public service corporation in a healthy and thriving community, and this fact, coupled with the well-founded conviction that there is necessarily a much more accurate accounting for capital than has prevailed in the past, has led to the provision of a single scheme of capital accounts for corporations of all grades in a particular class. The grading of corporations for purposes of accounting has been tentatively based on gross revenues from the several classes of operations: corporations whose gross annual revenues from any class of operations equal or exceed $500,000 being placed in grade A; the next dividing line is placed at $100,000, and the next at $25,000. It is probable that it will be found necessary to establish a still lower grade.

The scheme of accounts and the scheme of reports are very closely connected, and the annual reports cannot be brought to show the situation fully and clearly until the scheme of accounts on which they depend has been brought into satisfactory form. Despite this fact, the commission was of the opinion that it was unnecessary to wait for the installation of the new schemes of accounts before materially extending the scope of the annual reports. An annual report of a corporation ought to furnish such information as should be filed regularly, not only for the information of the commission intrusted with the administration of such a law as the Public Service Commissions Law, but also for that of the investors furnishing the capital essential to the operations of the corporations, and for that of the much larger body of consumers for the satisfaction of whose needs the corporation exists and from whom are derived the revenues by which the corporation is supported. Much of this information is not given when the report is confined to a summary statement of receipts and expenditures. It is also necessary to know who are the individuals whose identity is frequently hidden behind the legal entity or fiction of the corporation; cases have occurred in times past where by hiding behind various corporate clocks, individuals have been able to enrich themselves without rendering a fair return for the revenues collected from the public. The construction company and the supply company are familiar instances of such devices. For this reason it has been thought advisable, in the annual reports required of corporations, to go somewhat fully into the matter of intercorporate relationships, and to ascertain what corporations are related through being controlled one by the other or both by a third.

Another thing that has not needed to wait for a more complete establishment of a uniform system of accounts is the matter of new capital installed in service and old capital withdrawn from service. A much more complete return in this regard has been called for in the reports required of carriers for the period subsequent to June 30, 1907, than theretofore. It is hoped to develop this matter until there shall be on file with this commission a fairly complete exhibit of the changes occurring from time to time in the actual capital employed by public service corporations in rendering services to the public, to receive which the public has endowed them with corporate existence and privileges.

While these extensions of the scope of the annual reports necessarily make their preparation somewhat more expensive, the commission is of the opinion that the greater economy and efficiency of administration which it expects to result from them will more than compensate for the additional expense.

PREVENTION OF ACCIDENTS ON RAILROADS

This section relates chiefly to steam railroads, but the following reference is made to electric railways:

The inspector of electric railroads has been unable to cover all of the roads within the district during the year. The accidents to passengers upon electric railroads have been more numerous than to passengers upon steam railroads. Nearly 300 accidents have been investigated during the year by the inspectors employed by the commission. The causes of these accidents it is impracticable to reduce to mathematical percentages. The conclusions of the inspectors are very definite, however, upon certain points. The inspector of electric railroads says: "At least 90 per cent of the serious accidents on electric railroads in this district are the result of lack of proper equipment, failure of equipment, defective rules and methods of operation, or violations of rules. Not more than 10 per cent of the accidents are caused by defects in track or roadbed."

Among the recommendations made by the commission is one that the number of inspectors upon electric roads be increased.

WORK OF DIVISION OF STATISTICS AND ACCOUNTS

The commission says that many errors were found in the reports of corporations for the year ended June 30, 1907, and that nearly, if not quite every, corporation had to be written to once, and some of them several times, in order to secure the correction of errors. In most cases these letters brought replies indicating that greater effort would be made by the reporting corporations to make their subsequent reports more accurate. Examination of the reports received thus far for the year ended June 30, 1908, indicates, "on the part of most reporting corporations a conscientious effort to render accurate reports."

STREET RAILROAD INSPECTION

The report states that it was deemed advisable, when the inspection of electric railroads was commenced after the organization of the commission in July, 1907, to inspect first "those railroads on which the conditions and character of travel were such as to comparatively increase the dangers of operation. This class of railroads includes nearly all of the suburban and some of the smaller city railroads. During the six months ended Dec. 31, 1907, 36 such railroads were inspected, and the conditions on a number of them were found to be such that subsequent inspections were necessary, and some of these railroads have been inspected a number of times during the present year."

The report adds that "accident investigations upon electric railroads seem to be more imperatively needed than upon steam railroads, which is another reason for strengthening the accident investigation force relating to this class of railroads."

IMPROVEMENTS MADE

A list of some of the improvements made in consequence of recommendations and suggestions from the commission, affecting 27 roads, is given. The inspector reports that there has been a general improvement in track maintenance, methods of inspection, repair, cleaning and heating of cars, on nearly all the electric railroads subject to the supervision of the commission. In some cases improvements recommended have not been completed, and while companies affected have expressed a willingness to comply, financial conditions have prevented.

The Ohio Electric Railway, of Cincinnati, Ohio, has equipped for its Columbus & Dayton division a number of flat cars with removable sides, on which it is transporting large loads of hay and grain. To prevent fire accidents to the cargo, an asbestos fiber shield, 4 in. x 10 in., is placed under the trolley pole connection to catch any falling sparks.

COMBINATION CLOSED AND OPEN CAR OF PAY-AS-YOU-ENTER TYPE FOR THE THIRD AVENUE RAILROAD COMPANY, NEW YORK

The Third Avenue Railroad Company, of New York, through its receiver, Frederick W. Whitridge, has just placed an order with The J. G. Brill Company for 200 pay-as-you-enter cars, which are to be the first of this type designed for use as open prepayment cars, with center aisles and cross seats. This object will be attained by employing removable sash and supporting panels, which will permit the sides of the cars to be open to the floor level. To insure safety to passengers and prevent boarding on the side when the car is in summer service, a metal screen will be attached to the posts. Storm curtains also will be installed between the window posts, as in other open cars. In most other respects, however, the new cars will not differ materially from the original design, which was described in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1908.

PAY-AS-YOU-ENTER DOOR AND PLATFORM ARRANGEMENTS

The same arrangement of body and end doors designed for the original double-end pay-as-you-enter cars will be used for the new rolling stock both winter and summer. As this feature was described in detail in the article of Nov. 21, 1908, its main points may be summarized in the following paragraphs:

At the conductor's end the doors on the entering side of the vestibule are folded in a front corner with a raised platform bench, and the opposite side is closed with a sliding door; at the motorman's end the folding doors are closed and give backing to passengers seated on the bench, while the sliding door opposite is opened for exit only. Similarly, the body end doors will consist of a sliding double-entrance door with 24-in. opening and a swinging exit door (at conductor's end), also 24 in. wide. The platform, railings and cash boxes will be as before. When the car is in summer service a folding gate 5 ft. high will be installed on the controller side of the platform. A wedge will be put on the inside of the gate, so that when the step-operating bar is down it will jam the gate and hold it rigidly in position.

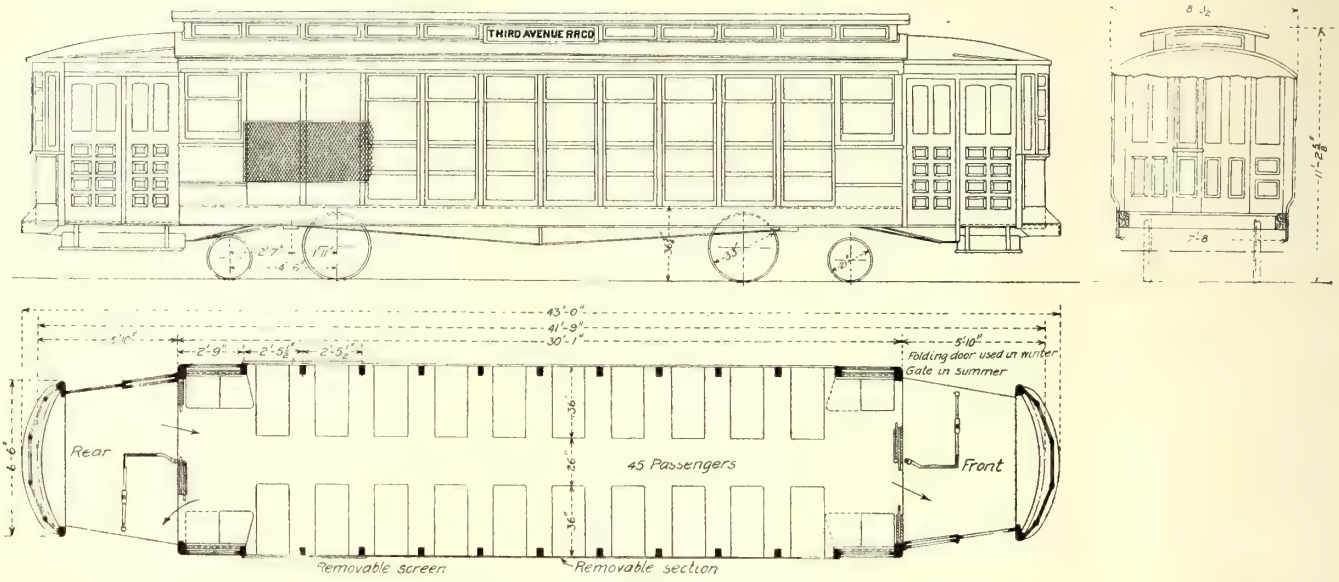
Only the sliding doors will be used for exit at the front end, the swinging door then being blocked by the bench previously noted. In the original cars the seating is longitudinal, with removable seats next to the doors in use; in the new cars, which will have cross seats, free end movement will be secured by short longitudinal seats with folding outer ends. The width of the aisle will be 26 in. and of the cross seats 36 in.

DIMENSIONS, TRUCKS AND OPERATING EQUIPMENT

In general dimensions the new car body will be 30 ft. 1 in. long over the corner posts, or 2 ft. 1 in. more than the first cars, and the length over the bumpers is 43 ft. instead of 41 ft. 1 in. Consequently no important change has been made in the platforms, which will be about 6 ft. long. The width of the car outside the sills will be 7 ft. 8 in., and there will be no material difference in the upper transverse dimensions. The maximum width over all is 8 ft. 3½ in., and over the window posts 8 ft. 2 in. The height from the rail to the top of the roof is not to exceed 11 ft. 2⅝ in.

The bodies will be mounted on two Brill No. 39-E center-bearing maximum traction trucks of 4 ft. 6 in. wheel base, with the pony wheels placed forward to reduce the platform overhang. The truck side frame is to consist

of solid forged side bars of a tensile strength of 55,000 lb. to 60,000 lb. per square inch. The Schoen rolled-steel driving wheels are 33 in. in diameter, and the chilled iron pony wheels 21 in. or 22 in., with 3¾-in. and 3-in. journals respectively. Symington gray iron journal boxes will be used. The driving axles are 4½-in. diameter steel, and pine plated with 14-in. x 9/16-in. steel plate; oak crown pieces 2¼ in. x 14½ in.; oak crossings 3½ in. x 5⅛ in. The four center crossings will be located 4 in. from the bottom of the floor to the top of the crossing and 1¾-in. x 4-in. bridging will be used to fill the space between. The object in depressing these center crossings is to allow the



Third Avenue Combination Cars—Floor Plan and Elevations

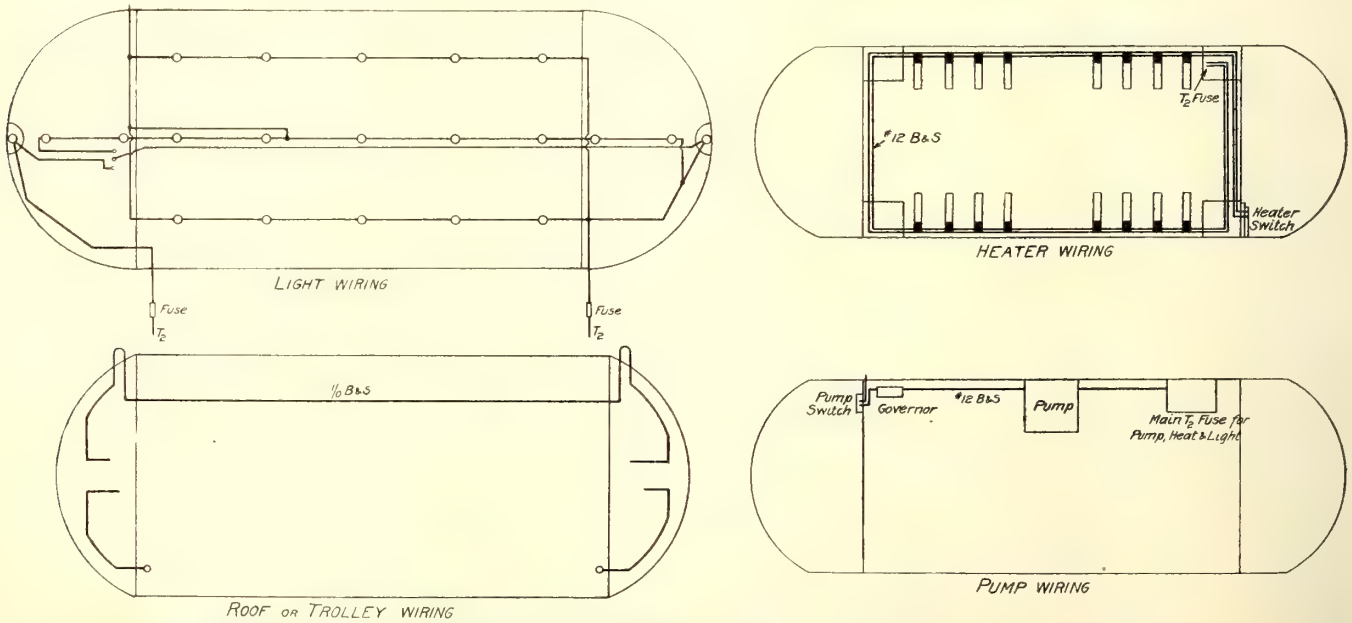
are specified to have an ultimate strength of 50,000 lb. to 60,000 lb. per square inch, with an elongation of 20 per cent in 8 in. The trail axles are 3⅞ in. in diameter.

The shortest radius curve over which these cars will operate is 35 ft. The two interpole motors are of Westinghouse 310 type, rated at 60 hp at 500 volts and 75 hp at 600 volts. In addition to Allis-Chalmers air brakes, each car will be equipped with Peacock hand brakes. The brake rigging will be inside hung, but it has not yet been decided whether separate rigging should be installed for air or hand operation. The brake shoes will be of the American Brake Shoe & Foundry Company's Lappin design for 2-in. tread.

UNDERFRAMING AND BOLSTERS

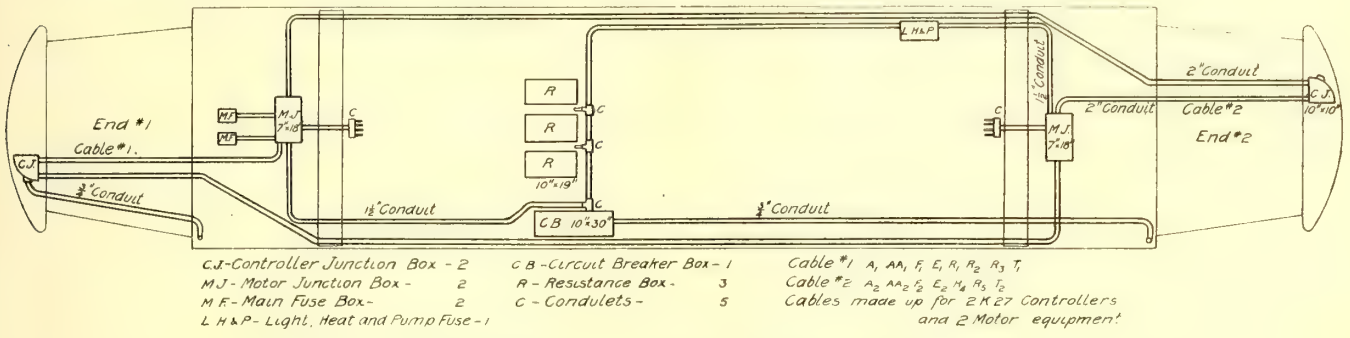
The side sills are to be 4½-in. x 7-in. long-leaf yellow various conduits, brake rigging and piping to be carried through the car without cutting the framing.

The two ⅝-in. diameter frame rods supplied at each of the four center crossings will be located as follows: The upper rod will be ½ in. from the bottom of the floor to the center of the rod, and the lower rod will be 5½ in. from the lower edge of the sill plate to the center of the rod. A ⅜-in. drop-forged steel plate extending 12 in. above the sill is to be used at the bottom of the post where it joins the sill. This plate is to be forged to fit the post closely and envelop the side post up to the curtain groove as well as the face of the post. This plate is to extend to the bottom of the steel sill plate and be securely fastened thereto. The end panels of the car are to be strengthened by cross braces.



Third Avenue Combination Cars—Wiring Diagrams of Principal Auxiliary Circuits

A 1⅛-in. truss rod will be placed under each side sill. It will be securely anchored by forged ends to the sill near the bolsters at each end of the car and be connected by turnbuckles near a suitable strain post located at the center. Each bolster will be made up of a 9-in. x ¾-in. wrought-iron top plate and a 9-in. x ⅞-in. steel bottom plate with a wood filler. There will be four platform knees per car, the outside knees being 7-in. x 2½-in. angles and the inside knees 4-in. x 3-in. angles. These platform knees will be attached to a 3½-in. x 5⅞-in. cross sill extending the full width of the car alongside the bolster.



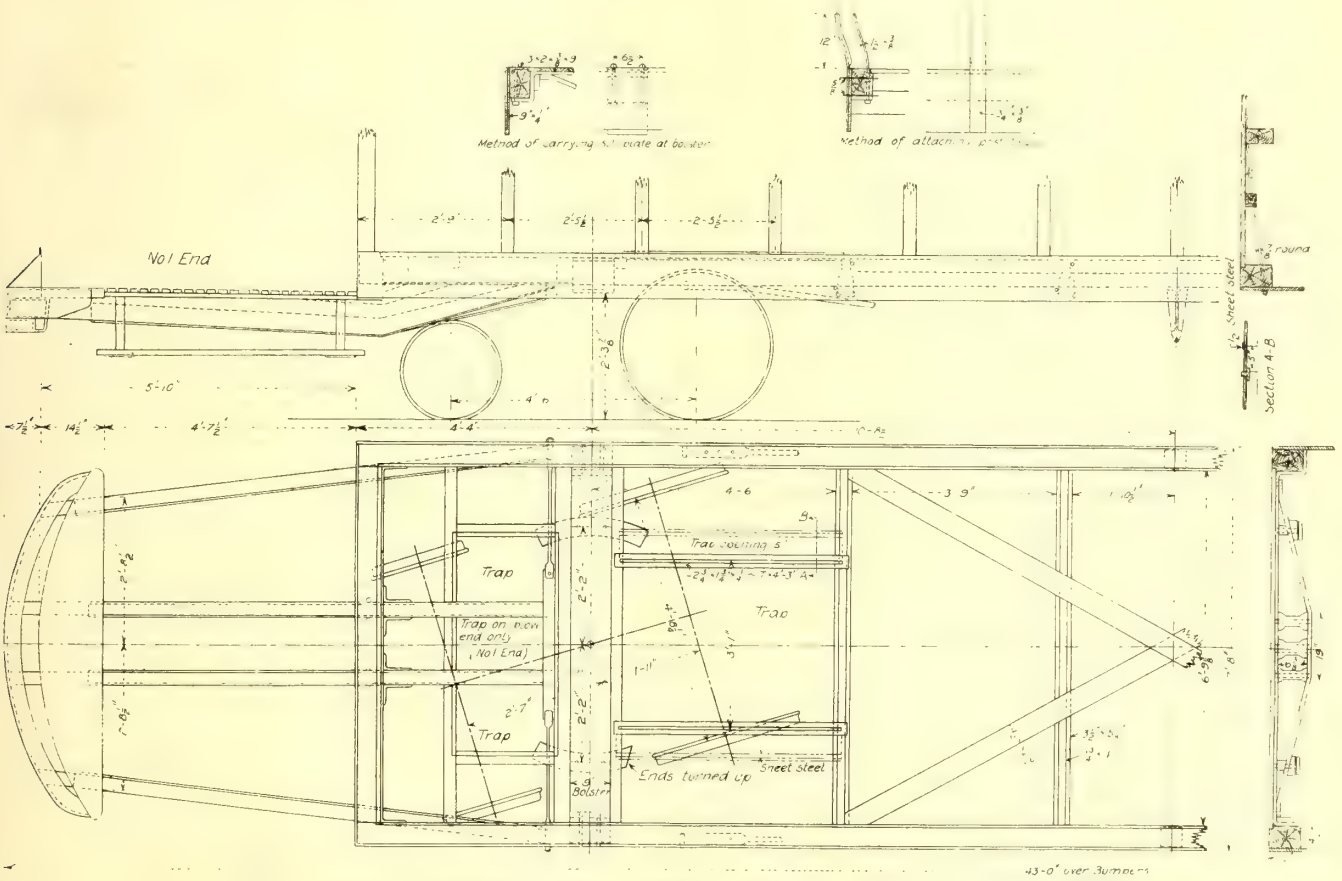
Third Avenue Combination Cars—Plan of Conduit for Main Motor Cables

BODY FRAMING, FLOORS AND ROOF

The car body will be arranged with 12 windows on each side, instead of the 10 customary for cars with longitudinal seats. Both the corner and side posts are to be of white ash, respectively 3⅝ in. and 2¾ in. thick, located as shown in the accompanying plan. The vestibule posts will be reinforced with sheet steel corner irons at the joints.

Each of the two end windows will be arranged with a pocket for dropping the upper half. The openings of the 10 windows opposite the cross seats will have fully convertible and interchangeable sash. The 1½-in. mesh screens used in the summer will be 30 in. high, and will be made in two non-rattling sections for each side. The vestibule sash will have five windows instead of three, to allow more room for controller and brake handle movement.

The car floor is to be of 13/16-in. Georgia pine screwed to the underframe. Between the seats the floor will be covered with maple strips. Motor and plow trap-doors are to be framed of ash and covered with galvanized iron on the under side. The platform flooring will be of ⅞-in. x 3-in. yellow pine on which maple strips will be screwed the entire length of the platform. The floor boards are to be screwed to wood fillers bolted to the knees. The platforms have folding steps.



Third Avenue Combination Cars—Details of Body and Platform Underframing

The roof is of monitor deck type, with 12 openings on each side with wired ventilator glass. The deck posts and wooden carlins are of white ash. The steel carlins are to be forged in one piece to the top of the roof and securely bolted to the side plates and wooden carlins. The upper and lower deck are of poplar boards treated with

two coats of white lead and boiled linseed oil and covered with No. 6 cotton duck. The detachable hoods will be made of the same material as the roof, and will be provided with a watershed and ¾-in. run-off pipe. Four Hunter destination signs will be installed in the ventilator roof of every car.

The inside finish will be of silvered white ash with as little dirt-collecting moldings as possible. The ceilings will be of "Agasote," and advertising moldings will be provided for 11-in. cards. All inside metal trimmings are to be plain bronze.

The interior seating consists of 10 Brill 34-in. width reversible cross seats on each side of the car, with longitudinal seats in the corners. One-half of each corner seat can be folded up to allow freer passenger movement. Straps are provided at the ends only as the seats are provided with grab handles. The curtains are of Pantasote with protected groove fixtures.

PAINTING

The cars are to be surfaced and varnished under the following painting schedule:

1st day—Prime woodwork with pure white lead in oil and all ironwork with primer (iron primer).
2d day—Putty.
3d day—One coat flat lead.
4th day—First coat rough stuff.
5th day—Second coat rough stuff.
6th day—Third coat rough stuff.
7th day—Rubbed with pumice-stone and water.
8th day—First coat body color.
9th day—Second coat body color.
10th day—Third coat body color.
11th day—Color and varnish.
12th day—Stripe and letter.
13th day—First coat finishing varnish.
14th day—Second coat finishing varnish.
15th day—Stand.
16th day—Third coat finishing varnish.
17th day—Stand.

INSIDE PAINTING

1st day—Filled, Moser's filler.
2d day—Shellac (grain alcohol shellac).
3d day—First coat rubbing varnish.
4th day—Second coat rubbing varnish.
5th day—One coat finishing varnish.

ROOF PAINTING

1st day—Prime, pure white lead and oil.
2d day—Stand.
3d day—Stand.
4th day—First coat standard roof color.
5th day—Stand.
6th day—Stand.
7th day—Stand.
8th day—Stand.
9th day—Second coat standard roof color.

FLOOR PAINTING

One coat of metallic brown and one coat of standard floor color and varnish. Bottom of floor painted with metallic brown. Murphy's best outside rubbing varnish for inside work and best wearing body for outside work. The colors for body, trimmings, lettering, roof and floor to be the standard of the Third Avenue Railroad Company.

THE CAR WIRING

The J. G. Brill Company will install all the wiring except that for power, heating and the air brakes, which will be done by the Third Avenue Railroad Company. The car-builder, however, will also install certain portions of the heater and pump wiring. All wiring and various material will be tested at 2000 volts, subject to the approval of the New York Fire Insurance Exchange, and will be carried out according to the following specifications and accompanying drawings:

ROOF OF TROLLEY WIRING SPECIFICATIONS

The conductor shall be designed for 600 volts No. 0 B. & S. stranded wire, insulated with a compound containing 30 per cent Para rubber of not less than 5/64 in. in thickness at any point. The rubber insulation will be protected by a substantial braid or tape covering with an additional flame-proof braid at least 1/32 in. thick and saturated with a preservative flame-proof compound. The finished covering will withstand any abrasion that may arise during the installation of the wire on the cars and will be satisfactorily elastic to permit being bent to a radius twice that of the wire without injury.

Flat wooden molding will be fastened to the side roof of the car and grooved on the bottom side to allow water to pass under the same. This is to run 6 in. beyond the last carlin on each end of the car. The roof or trolley wire is to be fastened to this molding with brass cleats and screws. Cleats are not to be over 8 in. apart. This wire will continue on the side roof to a point on the side of the vestibule roof. The wire then will enter the vestibule in an upward direction to avoid water following it and then around the top rail of the vestibule in the molding to the hood rafter and along the hood rafter to the main motor switchboard located on hood within easy reach of the motorman. The wire then should continue on the hood rafter around the vestibule top rail to the corner post, down the corner post in conduit and through floor. The conduit shall be suitably threaded for extension, leaving sufficient wire to reach the circuit-breaker box under the floor of the car at one end and sufficient wire to reach the controller junction box at the other end. The wire at the main motor switchboard is to have ends at least 18 in. long.

LIGHT WIRING SPECIFICATIONS

Each car will be wired for 16-cp lamps. The outlets are to be for single Keeler sockets distributed as follows: Five lamps on the longitudinal center line of the monitor ceiling, five lamps on the lower deck of each side of car, one lamp under each canopy hood to light the platform, one lamp for the electric headlight at each end of the car, to be operated by one two-way and one three-way switch; also one light back of each Hunter vestibule sign.

The wires on the ceiling of the monitor lower deck and under the canopy hoods are to be run in molding. This molding is not to be less than ⅜ in. in thickness at the back of the covers and the capping is to be not less than 3/16 in. The groove for the wires will have such a width that the wires will have to be pressed into them, but not tight enough to require pounding. The backing and capping will be secured in place by screws, no tacks or nails being used in the molding. Moldings will have both inside and outside two coats of waterproof paint. The joints of the moldings will be mitered to fit close, there will be no splinters or sharp corners in the moldings or base, all sharp edges being smoothed and all corners slightly rounded. Base blocks of same material as the interior finish of the car are to be provided at the outlets for lamp sockets and be not less than ⅜ in. thick where wires pass through and of a diameter not less than 2 in. larger than the socket. These blocks are to be securely fastened by overhead screws of the same material as the metal trimmings. The conductor is to be designed for 600 volts No. 14 B & S stranded wire insulated with a compound containing 30 per cent Para rubber of not less than 3/64 in. in thickness at any point and protected like the trolley wire.

PART AIR PUMP AND HEATER WIRING

The car-builder will furnish and install that part of the air-pump wiring from the switch located on the bulkhead down the corner post to the floor of the car, leaving 4 ft. of loose ends of wire. The conductor is to be designed for 600 volts No. 12 B & S stranded insulated with a compound containing 30 per cent Para rubber of not less than 3/64 in. thick at any point and protected like the trolley wire.

The car-builder also will furnish and install that part of the heater wiring from the heater switch located on the bulkhead down the corner post on the opposite side of car, leaving 4 ft. of loose ends of wire. Also the car-builder is

to install and the railroad company to furnish the heater switch and heaters. The word "install" in this instance is understood to mean that the car-builder will furnish the heater brackets and bolts to secure the heaters to the seats, the heater switch mounted on the switchboard and screwed to the backboard. Conductor to be No. 12 B & S stranded and of the same wire specifications as called for under lighting and pump wiring.

GALVANIZED IRON UNDER FLOOR OVER RESISTANCES AND MOTORS

The car-builder will furnish and install under the floor of car directly over the resistance boxes, galvanized No. 22 sheet iron. This sheet iron is to extend at least 12 in. beyond all sides of the boxes. An air space of 2 in. will be provided between the sheet iron and floor. Sheet iron shall cover that part of the car floor directly over the motors.

PUSH BUTTONS

The push-button circuit will be operated on 600-volt current through resistances instead of a storage battery, according to the method of the Consolidated Car Heating Company. The push buttons will be placed higher than usual to avoid their operation by children.

The conductor for this wiring is to be No. 14 B & S stranded and of the same wire specifications as called for under lighting and pump wiring. All splices or joints will be both mechanically and electrically secured without solder. The ends of the wires will be filled and turned in so that there will be no short projections to cut through the insulation. No acid will be used to clean wire and no acid flux shall be used in soldering. All joints are to be poured with hot solder and the material to be used is Allen's soldering paste. All wires are to be readily accessible, especially where taps are made and where wires are run to switches. The ends of the wire will be at least 6 in. long for convenient connection to switches. The wires running down the corner posts will be run under the end of each seat. All wires will be protected where they enter car or vestibule to prevent ingress of moisture.

WIRING DONE BY THE RAILWAY COMPANY

The railway company will do the installing of the power equipment, including metal junction boxes, metal conduit to carry the cables and other wires under the car floor; the transite for the resistance boxes, motor junction boxes, resistance junction boxes and controller junction boxes; bell mouths and rubber gaskets; metal junction boxes under controllers for protecting cables entering the controller; splash pans under the circuit-breaker box and resistance; pipe hangers, resistance sticks and hangers, circuit-breaker boxes and metal conduit brass sleeves are to be soldered on resistance lead so that they enter the lug on resistance boxes a neat fit. The railway will also attach the motor and resistance lead to cable. All trolley resistance leads and motor leads coming out of junction boxes or conduit are to be protected separately by rubber or porcelain bushings.

ENGINEERING

The specifications for these cars were prepared by T. F. Mullaney, chief engineer, under the direction of F. W. Whitridge, receiver, and E. A. Maher, general manager, Third Avenue Railroad Company.

Because the American-Canadian Company, of Rio de Janeiro, operating the city railway system, changed its fares and routes, a mob burned 12 of its cars on Jan. 11. The police were helpless. The company left the adjustment of affairs in the hands of the Mayor and quiet was restored.

In the British House of Commons a member has asked the consideration of a regulation compelling electric cars, among other vehicles, to carry speedometers, that the public be safeguarded against reckless speeding and the motormen protected against the charge of exceeding the speed limit.

THE PROBLEM OF REDUCING ACCIDENT DAMAGES—III.

BY FREDERICK W. JOHNSON, ASSISTANT GENERAL CLAIM AGENT, PHILADELPHIA RAPID TRANSIT COMPANY

The question has sometimes been asked in the past: "What is the character of the instruction given in the classes; how is it prepared, and under what conditions is it imparted to the men on the cars?"

There must be, of course, a wide difference of opinion on the points involved in a question of this character. What appeals to one man, may meet with the emphatic disapproval of another; likewise, what would prove applicable to one situation, may be entirely inappropriate in another. These problems can be solved easily, however, if the fact will be borne in mind that conditions in different localities necessarily require varying methods of procedure. Claim men have been inclined too often in the past to reject ideas or suggestions at their face value for conditions entirely different from those under which the ideas had been worked out.

We have often failed to go sufficiently deep into an idea as to enable us to get the real underlying principle. There has been a tendency to reject or to adopt measures on snap judgment. We have often neglected to consider just how an idea which has been giving results in one section, might be so revamped or revised as to meet difficulties in our own community which were practically the same, but which possibly might have to be approached from a little different angle.

This attitude has been fostered, perhaps unconsciously, by the belief of the average claim man that his own particular company is confronted by what is probably the hardest proposition in the entire country, and that methods used in other localities would prove of little value for him. If there is any one section where conditions are not trying, and becoming more and more so each year, we have yet to hear of it. In view of this fact, it is urged that greater consideration be given to suggestions of a remedial character than has been the case in the past.

Coming back, therefore, to the original question, we can offer, merely as suggestions, the methods pursued under the conditions which confronted us on the lines of the Connecticut Railway & Lighting Company. Whether the methods followed would have been feasible in other localities never received consideration for the reason that the company was interested in no situation outside of its own.

The material used in the earlier classes was founded on certain portions of the company's rule book which referred particularly to the work of handling accidents. These topics were taken up individually and enlarged upon and illustrations furnished; ample opportunity was given the men to ask questions. In some respects this idea proved successful, and in others it fell short of the object desired.

In the first place, the average company rule book is dry in its treatment of subjects, formal in tone, stilted in manner and more or less of an enigma to conductors and motormen. A good deal of it becomes obsolete and out of date eventually. Few trainmen ever get beyond the eighth or ninth page in reading it; taken even in its best light, the average book has serious limitations in its adaptability to accident work. It will immediately be argued that if the men are not familiar with its contents, so much the greater reason exists why they should become acquainted with it. That is very true, insofar as it relates to operating questions. But, with respect to accident work, why not place

instructions before the men in the most advantageous manner possible? If material can be imparted to them so as to make it interesting, and at the same time instructive, with the added probability that more satisfactory results will be secured thereby, why should one stick to the dry, stereotyped company rule book, which from time immemorial has proved a failure in this particular respect?

The rule book idea eventually gave way to the practice of speaking extemporaneously, with the aid of notes. This proved to be a step in the right direction, but still was not wholly satisfactory. The field was so extensive, and the desire to cover as much ground as possible so strong, that difficulties arose in regulating the length of time devoted to each class. One subject led to another and that to still another, until it was found that the allotted time had expired, with many points left still uncovered. Again, the instruction given in different localities was bound to vary under this method, and thus to detract from the uniformity of the work.

The advisability of allowing the men to ask questions at these meetings came up for consideration about this time. The practice up to that time had been to encourage the men to ask questions. It was eventually found, however, that this custom was not desirable inasmuch as the questions asked were usually of little value. The time allowed for classes was interfered with seriously if many questions were asked and the men took advantage of the opportunity to get in digs of various kinds at the expense of the local superintendent. The privilege was, therefore, withdrawn, and an announcement substituted that questions should be reserved until the dismissal of the class, when the instructor would be pleased to discuss the problems personally with those who desired still further information. This method has given satisfaction since and the change has proved beneficial in every way.

LENGTH OF TIME OF CLASSES

The length of time to be devoted to classes also received considerable thought. For the first year and a half, when the company was depending solely on oral instruction, the classes averaged from one hour and a quarter to one hour and a half in length. This was, without question, a little too long, especially for evening meetings, and the conclusion was reached that it would be better to cover less ground in the classes, and to make more forcible whatever points were taken up. The length of meetings was, therefore, reduced to one hour or a trifle less. This practice has since been adhered to.

The frequency with which classes could be held to the best advantage was another mooted question. This point has been touched upon already. The suggestion is advanced again that in this respect, as in all others, the method to be followed must be governed largely by the conditions existing in each individual community. With the men of some companies, classes can be held advantageously with greater frequency than with others. Dr. Ryan, of Syracuse, N. Y., in his very excellent paper before the Atlantic City convention in October last, stated that he had secured excellent results by holding classes monthly.

In the main, however, to such as have not heretofore taken up this work, the suggestion is advanced that there is some danger of dampening the interest of the men in the work by holding classes too frequently, and by thus covering much of the same ground at short intervals. Dr. Ryan, we believe, follows the custom of introducing an occasional smoker or similar form of entertainment in connection with his classes, which, of course, serves to quicken the interest of the men and to operate against the possibility of the danger mentioned.

Provided that some means is devised for keeping in touch with the men in the period intervening between the meetings, the writer personally favors but two classes a year, as stated. A distinction must be made, however, between large systems and small, and between urban and interurban properties. On systems of moderate size or on outlying roads it is possible to proceed on different lines than would be possible with systems of greater magnitude. The caliber of the men employed on the cars is decidedly different; in fact, all of the natural advantages in the work lie with the former as against the latter class of roads.

The size of classes is another point to which attention should be given. At first it would appear as though the best results could be obtained by keeping the size of classes somewhat restricted. Experience has demonstrated, however, that there is really little, if any, reason why classes should be restricted in size unless it is expressly desired. With the assurance of proper discipline, without which little progress can be made under any circumstances, the instructor will invariably find greater inspiration in addressing large classes than small classes. With the elimination of the question feature, large classes may be handled as rapidly as small classes, with the added advantage of covering the system with greater celerity. Work of this character consumes more or less of the nervous energy of the instructor; the greater the number of classes, therefore, the greater the strain on the instructor, who, we apprehend, will be obliged meanwhile to keep up his customary duties.

SCHEDULE OF CLASSES

Having prepared the material to be imparted to the men, in the form of a paper, a conference should be had with the officials of the operating department for the purpose of having a schedule of classes prepared covering the entire system. As far as possible avoid listing classes for extremely early or late hours. The reasons are obvious. The opening class at a carhouse should be scheduled as an evening class, for the reason that evening classes are more successful than others and are usually the heaviest in point of attendance. Notices that classes are to be held should be posted in the various car houses several days in advance of the first meeting in order that the attention of the men may be secured.

On the Connecticut system, with the final arrangement of but two classes a year, it was found necessary to establish monthly classes for the instruction of new employees. This has been enlarged on still further, as will be explained in a later issue. To these monthly classes older employees who had demonstrated their need of additional instruction were sent. This arrangement enabled the company to progress in the character of instruction given each year without repeating the work done for the benefit of new employees.

At first the company did not reimburse the men for the time consumed in attending classes. This plan was changed subsequently, and thereafter each man was allowed his regular rate of wage for time so spent; this practice unquestionably is fair to the men, and is, in the long run, advisable in every way.

The language to be followed in placing instruction of this character before the men should receive careful consideration. It should be remembered that the average company rule or regulation is written invariably in formal language. For this reason, many of the rules do not have the attention of the men as they should. Conductors and motormen

are often deficient in education, and consequently do not grasp the point of a ruling as quickly or as satisfactorily as might be desired. The well-known dry, stilted language employed, so often, adds to their difficulties, and likewise to those of the company.

The writer has always favored the adoption of a more or less free and easy style in directing work of this character. Every effort is made to make the material interesting to the men, by employing to a reasonable degree the language of the men themselves, avoiding, of course, anything which might detract from the dignity of the work, or which might suggest a way for ridicule or criticism. In seeking to secure the good-will and the hearty co-operation of the men on the cars in accident work, no real harm can come as the result of an effort to inject "red blood" into the work.

In addressing classes of conductors and motormen on the subject of accident work, or in preparing printed material for their instruction, so express yourself as to bring your thoughts within the scope of their understanding. Leave out unnecessary red-tape and superfluous preliminaries. Get right down to the point of the situation. Drive one point home solidly, rather than attempt to make a number weakly. Forget the question of accident damages; your men are not lying awake at night worrying over the cost of litigation to their employers. Confine your efforts rather toward improving the work of the men in handling accidents, and in preventing accidents. The financial end of the problem will take care of itself to your entire satisfaction if you will attend to the instruction of the men.

In the light of past experience, we cannot urge too strongly the importance of mapping the work out in advance on a systematic, business-like basis. In this way only can the work be so regulated as to produce results of a satisfactory nature within a reasonable period of time. A haphazard, uncertain, hit-or-miss plan of campaign can result only in confusing the minds of the men on the cars and will surely delay improvement in their accident work.

The field is so broad, and there are so many subjects that can be taken up with advantage, that the temptation is strong to pass rapidly from one to another, with the resultant danger of skimming along the surface without penetrating sufficiently deep to effect any permanent improvement. The question will be asked many times: "Why don't you take up this subject, or that, or some other?" Attention will then be directed to the fact that accidents of a certain type are occurring frequently in some particular locality, while still another type is giving trouble at the same time in a different direction. To give heed to all of these suggestions is to court demoralization for the work. Many minor difficulties will correct themselves as a direct result of the crusade against other and more important defects. The suggestion is, therefore, advanced that a plan of campaign be agreed upon first of all, and secondly, that having once decided upon a certain definite course of action that it be adhered to rigidly.

The question may be asked: "Just what is meant by a plan of campaign?" The answer is simply this: The mapping out of a definite plan, based on a course of instruction to last one, two or three years, depending on the size of the system and the seriousness of the undertaking; the determination of just what subjects are to be discussed with the men, and then a decision as to the order in which they will be taken up. Next, a distinction should be made between instructions which are designed to improve on the handling of accidents and those which are intended to operate to prevent accidents.

TWO YEARS FOR PRELIMINARY INSTRUCTION

Taking up these points in the order given, the writer favors a period of two years as a foundation for the period of preliminary instruction. Sufficient progress should have been made after that time had elapsed to enable those in charge of the work to broaden the scope of action considerably. With respect to the matter of subjects, it really simmers down to the question: "What are the points of greatest weakness in the system?" The following suggestions for subjects may be made: The importance of reporting promptly all accidents; instruction as to the correct method of making out accident reports, so as to bring out all of the essential facts; the vital necessity of obtaining witnesses; suggestions regarding the proper methods to be pursued in the work of securing witnesses; the value of reticence in connection with the subject of company accidents; the joint handling of accidents by conductors and motormen; the treacherous "unreported accident" problem. Then come such topics as head-on, rear-end or right-angle collisions of cars; collisions with teams; premature starts of cars while passengers are boarding or alighting; the absolute necessity for careful operation of cars when passing obstructions close to the track; accidents to pedestrians; passengers injured while attempting to board or to alight from moving cars; ejectments; derailments; dangers at grade railroad crossings; and so on without end.

The writer advocates strongly the practice of teaching the men first how to handle accidents satisfactorily, and of then taking up the subject of the prevention of accidents. To reverse this order or to attempt to take up the two subjects at once is to encourage an increase in the "unreported accident" record of the company. When a company begins to urge its men to avoid accidents, or to prevent accidents, it immediately opens wide the door to the "unreported accident" column, unless it first has inculcated in the minds of the men the conviction that when an accident actually happens, a prompt report must be submitted immediately to the proper department. The temptation is, of course, for a company to take up immediately the work of preventing accidents. In the end, it will be found, however, that the work of teaching men how to handle accidents properly will yield just as large returns on the investment as instruction concerning the prevention of accidents. This fact is overlooked frequently. Hence the advice is: First teach the men how to handle accidents, and then take up the work of preventing accidents.

Work of this character, when once started, should be followed up systematically. A regular course of instructions, delivered at certain stated intervals, and carried out on definite, intelligent, progressive lines will produce encouraging results of a permanent nature. On the other hand, occasional, spasmodic efforts, followed by long periods of inactivity, will produce disappointment. It is one thing to instruct a man, and to then let the subject drop; it is quite another thing, however, to instruct a man and then to follow him up for the purpose of seeing that he not only understands the orders, but also that he obeys them to the best of his ability.

The influence of the local superintendent is a powerful factor in gaining and holding an advantage. He is in daily contact with his men and, if so disposed, is in a position to help to hold their interest. The plan of having the superintendent examine personally the report and the crew in every case of accident has been of great assistance to the work in the past. He may do nothing more than compliment the men on the satisfactory manner in which they acquitted

themselves in handling an acident, or he may find it necessary to take them to task for some infraction of rules, or failure to do their best, or he may find it necessary to caution or instruct them regarding some particular feature of the work. In any event, the fact that it is understood by the men that they must appear in person before the superintendent in each case of mishap, has the effect of influencing them toward a strict observance of orders. Such a practice, however, may be carried too far through unreasonable severity on the part of the superintendent, or by obliging the men to lose valuable time in waiting indefinitely for an opportunity for an audience. Not only is such treatment unfair to the men, but it has the additional drawback that it lets conditions fall back into the old rut by again holding out the fatal temptation to the men to neglect to report their accidents; from that state of affairs the company has far more to lose than have the men.

DESIRABLE FOR THE CLAIM DEPARTMENT TO DO THE WORK

In treating this subject, the writer has proceeded on the assumption that work of the character outlined should be assigned to the claim department rather than to the operating department. The question as to which of the two departments should have supervision has been raised a number of times in the past, but in every case, so far as we have been able to learn, the work has been assigned to the claim department. It seems as though this is the proper course to pursue, inasmuch as the instruction involves necessarily a thorough knowledge of claim and of accident work. We have no doubt that the work could be carried on successfully by the operating department, provided sufficient time and study were to be given to the subject, but we question seriously whether as great a measure of success could be secured as would be probable if the claim department conducted the campaign. In any event, however, the closer the relationship between the two departments, the greater the probabilities of ultimate success.

What is probably the most important factor of all in connection with accident work is the spirit with which the work is received by the men on the cars. Whether it will prove successful, or will fail miserably, will depend directly upon the attitude of the men. If the work fails to appeal to them or to arouse sufficient interest to insure their hearty co-operation, the combination is wrong somewhere. The success of a company in work of this nature will depend primarily upon its ability to interest its men in the plan.

The adoption of a liberal, broad-gage policy toward the men is one of the first essentials to success. Every reasonable effort should be made to cultivate as friendly relations between the men and the company as possible. It is human nature to feel pleased at a word of commendation in appreciation of faithful work, and the man who actually has his heart in his labor is worth four of the type who are merely filling in time until pay-day.

The old "horse-car" idea of discharging employees right and left for minor infractions of rules, with a view to injecting carefulness into the men, is a distinct obstacle to the successful solution of the accident damage problem. Such a practice never served any good end, and never will.

We teach new men to operate our cars, and just when we have developed them as experienced conductors or motormen, we discharge them for petty reasons. Then, in the fullness of our wisdom, we employ other new men to replace the old, and proceed as before. Meanwhile, the company foots the bill. The object is, of course, to hold up the dismissed employees as "horrible examples" to the rest of the men. Here the scheme fails; the great majority of the men do not learn the details, and with those who do, the effect is temporary. They will remember, however, that a man was discharged for striking a team long after they have forgotten the name of the man; and more than one will conclude that the man really made his mistake in saying anything at all to the company about the affair. From such an argument the unreported accident of the future arises.

Allowing, of course, for reasonable exceptions, where is the justice of instructing a man in one breath to report all of his accidents and of discharging him in the next because he obeys orders? The better grade of men are not looking for employment of that sort. The average company does not hold a hair-trigger over its superintendents every time that they make a mistake. Then, why should it do so with its conductors and motormen?

Any type of man can criticise the efforts of others, but it requires men of a higher order of intelligence to distinguish between the good and the bad intentions in a man's work and to offer encouragement at a time and under circumstances which results in bringing to the surface feelings of friendship and of good-will, instead of bitterness and hostility. We should never lose sight of the fact that our most powerful allies in the work of preventing accidents, and of handling accidents, are the well-meaning, hard-working men upon our cars.

(To be continued.)

CAR HOUSE FIRE PROTECTION

At a recent meeting of the car-house foremen of the Boston Elevated Railway Company the question of fire protection was thoroughly discussed from the practical standpoint, and through the courtesy of the company the following notes of the meeting are printed. F. F. Low, architect of the company, opened the discussion with a paper in which he emphasized the importance of keeping the car houses clean, so that the blame for a fire cannot be laid to this cause. It is an easy matter to leave a little oily waste about or a few shavings in a corner or a little paper in a locker ready to catch a spark and smolder and then spring into a blaze at a time when least expected. It is just as easy after the habit is acquired to keep everything picked up. There is a standing order about dust and rubbish under car houses, and the building should be inspected all over occasionally to avoid trouble from this source. Rubbish should be kept away from the outside of the building as well as from the inside. The company cannot clean up its neighbors' land or order it cleaned up, but the insurance companies are interested in both properties and will see that it is cleaned up if complaint is made.

Many fires occur on account of cars being left in improper condition for the night. To see that cars have been left in the right condition when first pulled in for the night is not all that is necessary. All openings to the building need to be properly guarded so that trespassers cannot gain entrance to a car for malicious purposes or to find a resting place for the night. Mr. Low felt that there was more to fear from malicious persons entering a car and turning on the heaters or motors than from any other cause. Several fires have been caused by boys. In one case they set the brakes and then turned on the controller. Up to within a few months ago it was comparatively easy to gain access to the car houses of the company at any time of night through small unguarded doors. These should either be closed at night or, if left open for ventilation, a slatted door should be used.

Eternal vigilance, men on the ground with good knowledge of the apparatus, and plenty of fire-fighting equipment are essentials for the prevention of fires. All three of these features the company is constantly striving to maintain. It has recently expended more than $50,000 in sprinkler equipments besides several thousand dollars more in minor improvements. The company has lately introduced fire drills with water turned on at its car houses and the benefit is clear, although it is often difficult to secure permission from the municipalities to hold such drills, and in every case the cities have to be notified in advance. The object of the drill is lost if the men are informed beforehand that it is to take place. One of the most important matters to provide for is to have a responsible man in charge when the foreman of the house is away. The force needs to be drilled in charge of the sub-foreman as well as the foreman, and to have its duties clearly understood in case both of these men are away. Some of the drills can be held better with the foreman acting only as a spectator. It is of the utmost importance that the house shall not be left at any time, even for a short period, without some one in charge who knows what to do in case of fire. All men who are liable to be left in charge should be instructed that they are to be the brains of the establishment in case a fire breaks out, doing no work themselves other than to direct the rest and noting that every position is promptly filled. Such a man must be ready to jump in anywhere that he sees prompt and quick action is needed.

The best drills are made when the foreman has first called the men about him and given instructions in a clear and concise way and then sent them to their duties. At first a little time may be lost by this method, but it is more than made up because the men know perfectly what is required. Some of the poorest drills have been when the foreman has run out with the hose or has gone to turn on the water or do something else and left the men without instructions as to what they were to do. When the call for water is made a man should be at the standpipe valve. If a foreman directs instead of taking part in the work he will at once see that the position is properly filled or jump to the valve himself. Another point is to see that the starters take a more active part in the monthly drills. They are always on duty, used to giving directions, and as they are seldom shifted, make a strong addition to the fire-fighting force. The starter should have such knowledge of the equipment that if there is no one in the pit room to take charge the starter can do it. Finally, the report card is not intended as a matter of form, but as a reminder of the fact that the equipment needs constant care in order that it may be ready and efficient at all times. It will not answer the purpose to copy last month's record; to say a valve is open when it is closed, or to fail to report a bad hose or a leaky valve when discovered. It helps if the superintendent of a division takes a personal interest in this matter of fire prevention.

O. B. Johnson, of the Boston Board of Fire Underwriters, followed and spoke of the importance of fire protection and the special value of ability on the part of car-house pitmen to fight the fire, with their close personal familiarity with the local situation. The first gaining of headway is the vital point to prevent. Car houses are usually destroyed because the fire so often gets beyond control before the department can reach the spot.

Mr. Johnson then discussed a number of practical points which are of direct importance in fire prevention and extinguishing in electric railway car houses. While many of these appear self-evident, they are by no means imaginative from the point of view of the inspector who desires to improve conditions in properties insured by his company. Among these points were the following: Bells giving out in sounding the alarm; bells not provided with good pulls; bells not sounded loud enough nor long enough; poor adjustment of bells; extra hose not carried in the proper way, in some cases being tangled; twisting of hose in unrolling; occurrence of short bends of the hose at the valves and other points; failure of men to stay at the valves and insufficient knowledge of what is to be done to turn on the water; sticky gate valves at the foot of risers; ignorance as to which way to turn to open valves; turning on water before the hose line is completed and thus causing much delay; battered couplings and lack of proficiency in coupling; no definite and prompt action on fire doors; too many valves kept closed between the street supply and the hose during the cold season; failure to open valves wide; hose nozzle left to itself and lack of understanding as to which employees shall answer a fire call. The tendency to do something in great haste should be changed into an understanding of how to do a specified thing quickly and well. The process of getting water into a hose needs to be made as simple as possible. A man of inferior intelligence will be able to get simple apparatus into action, but will fail utterly with a little added complication. This fact has a direct bearing on the safety of railway property where only a few car washers are left on the premises at night. Perhaps $15,000,000 worth of property is in charge of the men in the car houses on the Boston Elevated system, and the man in the car house is in the last analysis the reliance of the company in fire protection.

The history of car-house fires shows conclusively that there has never been much done in the way of getting cars out of houses. The advisability of abandoning everything and taking the cars out is questionable. There is a standing order that in case of fire, however slight, the city department is to be called first and then the force must do all it can to fight the fire. When this is done, if the fire is too large, it must be left to the city department. If cars are taken out the street is filled up, interfering with the department and car movements. If the crews are doing all they can with the hose the starter who is in command may, if there is any help around, save the rolling stock, but it is questionable practice.

Paul Winsor, chief engineer of motive power and rolling stock, concluded the meeting by emphasizing the futility of trying to move out cars in case of fire and pointed out that the fighting of the fire is the first thing to do in all cases. He stated that most of the obstacles to getting water on promptly are of the simplest nature and that practice in these operations is most desirable. It is an easy thing to teach men to unreel a hose properly, so that it will not kink, to attend to the valve equipment, acquire proficiency in coupling up and general handling of the apparatus. In the Boston drills one crew succeeded in getting on the water in 48 seconds after the alarm was sounded and the average for 22 houses was 1 minute 52 seconds.

A recent heavy snowfall in Liverpool, England, and its vicinity delayed traffic on the electric railways for several days. About 104 miles of track were salted by 14 wagons, each manned by four men, who applied 300 tons of salt.

NEW CARS FOR THE STERLING, DIXON & EASTERN

During the past year the Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., has shown a very substantial increase in earnings. This additional income has been brought about by careful work on the part of the management, not only in soliciting traffic, but also by improving the service. The company has recently purchased from the St. Louis Car Company four cars which are especially well designed for use in local city service. The interurban line of this company connects the cities of Sterling and Dixon, each with a population of about 10,000, and in each city the railway company operates a local schedule with two cars. In regular operation a car crew comprises but one man, and the Johnson fare box is used for collecting fares. The new cars, here described and illustrated, have been in service now for two months.

All four cars are alike in design and equipment. The bodies are framed for eight windows on each side and two windows and single sliding doors in each end, provision being made alongside of the end doors for mounting a Johnson fare box. The body and roof framing is substantial with steel reinforcement and the underframing of oak is reinforced with ⅝-in. steel plate along the side sills. The drop platforms are enclosed with round-end vestibules having three windows and double folding doors on each side. The vestibule is covered below the windows with No. 14 sheet steel placed both inside and outside of the framing.

The general dimensions of the car are as follows:

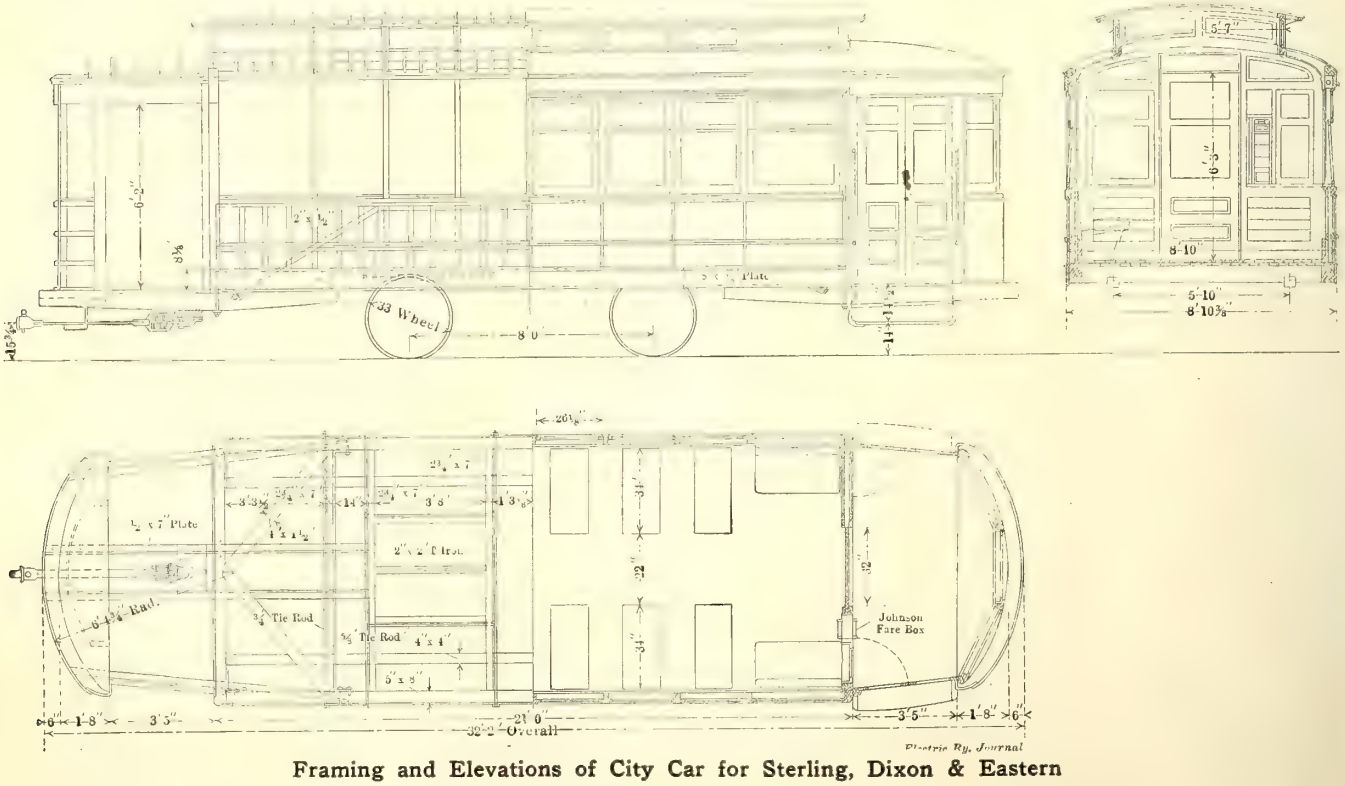
Length over body	21 ft.	0 in.
Length over all	32 ft.	2 in.
Length over panels at sills	8 ft.	10 in.
Width over all	9 ft.	0 in.
Height from top of rail to top of trolley board	11 ft.	8 in.

moldings, etc., is in plain oak and the side linings are No. 14 sheet steel held in place with screws. Three-ply bird's-eye maple veneer decorated on the face is used for the ceiling. All metal trimmings are of bronze held in



City Car for Sterling, Dixon & Eastern

place by oval-headed screws. Reference to the dimensions earlier presented will show that the extreme width of this car permits of a very comfortable seating arrangement. There are on each side of the car six reversible-back cross seats 34 in. long, a clear aisle space 22 in. wide remaining. At each of the four corners of the car body is a longitudinal seat 34 in. long. The 5-ft. 7-in. platforms not only render the car capable of loading and unloading quickly, but also on days of heavy traffic furnish a considerably larger standing space than ordinarily is found on cars of this size. The interior equipment of the car includes push buttons con-



Framing and Elevations of City Car for Sterling, Dixon & Eastern

The bodies are mounted on St. Louis Car Company No. 46 trucks carrying two GE-78-A motors. The wheels are 33 in. in diameter and the wheel base is 8 ft.

The interior finish of the cars, including the doors, sash, nected with call bells in each vestibule and three circuits of five lights each. All side and end windows have curtains of Pantasote hung on spring rollers with the Curtain Supply Company's No. 86 pinch-handle fixtures. The cars are

heated by Detroit Jewel stoves. The specifications for these cars were prepared by the Columbia Construction Company, of Milwaukee, engineer. Acknowledgment is made to E. E. Downs, general manager of the Sterling, Dixon & Eastern road, for the foregoing description.

CENSUS REPORT ON ELECTRIC RAILWAYS

On Monday of this week the United States Census Bureau made public its first bulletin with statistics of the street and electric railways of this country, based on the census taken last year. The statistics comprise the roads in continental United States; that is, they are exclusive of Alaska, Hawaii, Philippine Islands and Porto Rico.

The statistics relate to the years ended Dec. 31, 1907, and June 30, 1902. The totals include reports of operating and lessor companies and a considerable number of electric light plants operated in connection with electric railways, but do not include reports of railways under construction during the census years; nor do they include reports of financing companies which were not engaged in actual operation of railways or light plants.

	1907.	1902.	Per cent of increase.
Number of operating and lesser companies	1,236	987	25.2
Length of line (first main track), miles	25,547.19	16,651.58	53.4
Total length of single track, miles	34,403.56	22,576.99	52.4
Number of cars, total	83,641	66,784	25.2
Passenger	70,016	60,290	16.1
All other	13,625	6,494	109.8
Number of power houses	827	805	2.7
Steam and gas engines (including turbines), number	2,552	2,351	8.5
Horse-power	2,384,518	1,300,058	83.4
Water wheels, number	228	160	42.5
Horse-power	91,961	49,303	86.5
Total kilowatt capacity of dynamos	1,727,030	898,362	92.2
Output of stations, total kw-hours	4,759,130,100	2,261,484,397	110.4
Passengers carried, total	9,533,080,766	5,836,615,296	63.3
Fare	7,441,114,508	4,774,211,904	55.9
Transfer	1,995,658,101	1,062,403,392	87.8
Free	96,308,157	*	...
Total car mileage (passenger, express, freight, etc.)	1,618,343,584	1,144,430,466	41.4
Condensed income account, operating companies.			
Earnings from operation	$418,187,858	$247,553,999	68.9
Income from other sources	†11,556,396	2,950,628	291.7
Gross income	429,744,254	250,504,627	71.6
Operating expenses	251,309,252	142,312,597	76.6
Net earnings (earnings less operating expenses)	166,878,606	105,241,402	58.6
Gross income less operating expenses	178,435,002	108,192,030	64.9
Deductions from income (taxes and fixed charges)	138,094,716	77,595,053	78.0
Net income	40,340,286	30,596,977	31.8
Dividends (operating companies only)	25,558,857	15,882,110	60.9
Surplus	14,781,429	14,114,867	0.5
Capitalization, operating and lessor companies.			
Capital stock authorized, par value	$2,508,054,336	$1,529,199,589	64.0
Capital stock outstanding, par value	2,097,708,856	1,315,572,960	59.5
Dividends on stock	53,589,399	33,039,171	62.2
Bonds authorized, par value	2,319,220,837	1,341,429,727	72.9
Bonds outstanding, par value	1,677,063,240	992,709,139	68.9
Interest on bonds	71,468,788	43,578,961	64.0
Total par value stock and bonds outstanding‡	3,774,772,096	2,308,282,099	63.5
Employees and wages, operating companies.			
Salaried employees, number	11,700	7,128	64.1
Salaries	$12,909,466	$7,439,716	73.5
Wage-earners, average number	209,729	133,641	56.9
Wages	$138,081,633	$80,770,449	71.0

*Not reported separately.

†Includes $3,255,618 income from interest on bonds and dividends on stock of other electric railways.

‡Includes permanent and other investments, such as securities of other electric railways, treasury stocks and bonds, gas plants, etc.: 1907, $388,394,092; 1902, $152,513,997.

The final report for 1907 will contain an analysis of the above totals and present detail statistics for other phases of the industry.

The following averages, based upon the figures given above, were also made public:

	1907.	1902.
Capital liability per mile of track	$109,719	$102,240
Average horse power per engine	934	353
Average horse-power per water wheel	403	308
Kilowatt capacity of engines and water wheels	1,847,453	1,006,623
Kilowatt capacity of dynamos	1,727,030	898,362
Kilowatt consumption per car mile	2.94	1.97
Fare passengers per mile of track	216,286	211,464
Fare passengers per car mile	4.60	4.17
Income per car mile	25.8c.	21.6c.
Average yearly salary of officials	$1,103	$1,044
Average yearly wages of wage-earners	$658	$604

MASSACHUSETTS STREET RAILWAY ASSOCIATION MEETING

The regular monthly meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, on Jan. 13. The speaker of the evening was Edward Hungerford, of the Brooklyn Rapid Transit Company, his subject being, "The Entertaining Proposition of Carrying on a Transportation Business at a Loss." Mr. Hungerford discussed the Cleveland situation and said in part:

Cleveland had been told that the millennium and the Municipal Traction formed a team that trotted well in harness. Mayor Johnson was the charioteer. The Cleveland Electric Railway Company had offered as high as seven tickets for a quarter, but what was that?

The Municipal Traction on the day of its inauguration in April last carried every one free on its cars from midnight until midnight. The town became a delirium of traction joy. Free rides to-day, 3-cent rides to-morrow. Hurrah for Johnson! If he could only live to 150 and be Mayor of Cleveland all that while there might be free bread, free rent, free clothing. Who knew?

Within a month the joy in Cleveland was less delirious, appreciably less. Some of the folk who had shouted the pæans of Johnson most joyously had the audacity to criticise the service given the running partner of the millennium. Certain newspapers allowed that the cars had been weeded out more than a little. Those energetic preservers of the public weal—the boards of trade and the chambers of commerce—passed resolutions that might have sent cold chills down the backbone of any other operating man. Johnson only smiled his sententious smile. "Cleveland Electric," he whispered, and straightway proceeded in another cut of schedules.

You know there is nothing so potent in public opinion as the private comfort of the traveling passenger. These comforts, infinitely multiplied in large cities, go far toward making that intangible, all-powerful thing that we have learned to know as "public opinion." When Johnson's adherents had to hang on straps for the first time in their lives, when they had long waits at street corners for cars that seemingly never came, "public opinion" in Cleveland began slowly and surely to change. The Mayor might talk himself black in the face. The Utopia that he had promised had apparently set in as an era of discomfort. Clevelandites began asking one another: "What is Utopia? Does the dictionary give the correct meaning to millennium?"

After all, as a street railroad proposition, what else could Tom Johnson do? When after all his talkings he was confronted with a necessity for action there must have been only three paths open to him:

In the first he could give Cleveland as good service as the old company had given it and at a 3-cent fare for a time. I say "for a time" because under the lease of the remarkable contract that he made with the Cleveland Electric upon taking over its property was a clause that provided that in case the Municipal Traction—the Johnson company—did not pay its rent promptly the property should revert in 90 days to its owners for operation. It is this clause that has caused the recent upset in the joyous Johnson program and indirectly the appointment of receivers by the United States courts for the Municipal Traction Company. That was plainly an impossible path from the outset. Johnson had no desire to run at a loss, at least so great a loss as to cause the bonanza to slip from his fingers. The first path was closed.

The second was also *empassé*. By it he could back down and admit the truth—the impossibility of profit in a 3-cent fare—and continue to charge the same rates of fare as the old company. But Mayor Johnson has never relished a diet of his own words and he saw "failure" plainly written at the head of that path.

The third was obviously the only course that he might choose. He could skimp in the operation of the line, cut its service and expenses and perhaps crawl along on that basis. As to the efficacy of that plan ask those Clevelandites who hung on straps for the first time in the history of the town during the past year. Johnson did not hesitate to cut out

whole routes and streets where traffic was still in a state of development.

"I am not going to run lines that don't pay," was all that he would say.

Then came the strike. The Cleveland Electric had promised its men a 2-cent-an-hour raise if it obtained a new franchise and the deal by which it secured a longer lease of life in Cleveland streets in consideration of its handing its property over to Johnson's Municipal Traction for operation was considered a new franchise by the men. Johnson did not see it that way. He refused the men's demands and Cleveland went through the unpleasantness of a bitterly fought street-car strike for the first time in its history. Johnson blamed the entire business upon the Cleveland Electric. His sole regret was that there were no new forms of execration that he might heap upon "that crowd."

Johnson handled that strike like any sin-filled private corporation might have handled it and won a partial victory. To accomplish that partial victory he had the entire police force and machinery of the city government at his right hand. After the strike was over it made a fine excuse for both poor service and poor earnings for many months.

But the strikers had their revenge, at least Johnson thinks that they did, and he admits that the Cleveland Electric "crowd" was probably at the bottom of the business. They dug an initiative and referendum law out of the State statute books and Johnson might have said: "How sharper than a serpent's tooth is initiative and referendum." For it is a matter of actual fact that the Hon. Tom L. Johnson himself was largely responsible for the placing of that very statute upon the laws of Ohio.

Some one—no one seems to know or is willing to tell what one—started the initiative and referendum against the whole Johnson program, Municipal Traction, new franchises, leases from the helpless Cleveland Electric and all. Johnson raved and doubted the sincerity of the movement. The movement progressed despite that. Its progress was so certain that when the matter came to vote on Oct. 22 last, despite the frantic efforts of Mayor Johnson, the Mayor's cause was voted down. It was the first time that he had ever been beaten in a Cleveland election. He took his medicine hard. The Johnson smile disappeared. Instead there appeared a pathetic and truly characteristic philippic from the Mayor to the effect that he had sacrificed his entire personal fortune to the cause of "the peepul." But even that *coup d'etat* did not receive the welcome from the galleries that Tom Johnson might have expected. Johnson days beyond a doubt were past days. There is no king quite as dead as a dead king.

CHANGE IN MILK RATES IN MICHIGAN

Prior to July 6, 1908, the Detroit United Railway carried milk at a flat rate of 10 cents per can between any points within 25 miles of Detroit. This rate applied not only to milk, but to cream shipped for use in making butter and ice cream. After a careful consideration of the cost for handling milk and cream the Detroit United Railway adopted a new tariff, raising the rates and basing them on the mileage.

In the judgment of the management of the road the increase in milk rates as compared with the rates charged by competitive steam lines was justified because of the comparative excellence of the service. In collecting milk the electric cars made frequent stops for picking up a few cans and thereby saved the farmers teaming. Platforms and shelters were built for the protection of the milk in hot weather and the construction and maintenance of these platforms and shelters were an expense for the company. Other expenses in connection with operation, especially for labor, showed a tendency to increase gradually and the city of Detroit had demanded a tax of $1 per car per round trip for the privilege of permitting the express cars to be operated in and out of the city. The longest haul for milk made by the electric railway was 60 miles as compared with a haul of 150 miles made by some of the steam lines.

A careful consideration of these conditions seemed to justify the electric road in issuing a tariff calling for an increase in rates over the flat charge of 10 cents per can. Accordingly "Tariff No. 17" was issued making the rates as follows and classifying the shipments into milk and cream or butter fat:

	Milk.		Cream or butter fat.	
Distance.	In cents per 10 gal. or less.	In cents per carrier 100 lb. or less.	In cents per 10 gal. or less.	In cents per carrier 100 lb. or less.
1 to 30 miles inclusive	15	15	25	25
31 to 60 miles inclusive	20	20	35	35
61 to 90 miles inclusive	30	30	45	45
91 miles and over	40	40	55	55

This tariff sheet stated that "under this tariff the rates named will apply on milk, cream or butter fat in patent cans said to contain 10 gal. or less, or in bottles packed as carriers weighing not to exceed 100 lb. and will be the rates for one full can or carrier and the return empty.

"Milk, cream or butter fat in cans or carriers will be carried only on regular tickets, which must be produced in advance and accompany the cans or carriers in all cases.

"Cream or butter fat will be classified as such when it has been separated from milk by a separator or other process. The rates named on milk will also apply on skimmed milk or buttermilk."

One reason why it was found advisable to vary the rates as between milk and cream or butter fat was that a tendency had been shown by claimants for losses to put in claims for the value of cream when milk only had been lost. The settlement of such claims caused considerable friction in arriving at proper damage amounts.

The reasons stated for adopting a new tariff at slightly increased rates were understood by the patrons of the Detroit United Railway and no general complaint was made; but on Sept. 24, following an order of the Michigan Railroad Commission, the electric railway company issued tariff No. 18 in which the charges were given as follows:

	Milk.		Cream or butter fat.	
Distance.	In cents per 10 gal. or less.	In cents per carrier 100 lb. or less.	In cents per 10 gal. or less.	In cents per carrier 100 lb. or less.
1 to 20 miles inclusive	10	10	20	20
21 to 30 miles inclusive	15	15	25	25
31 to 60 miles inclusive	20	20	35	35
61 to 90 miles inclusive	30	30	40	40
91 miles and over	40	40	50	50

At the request of the commission these rates were to continue, unless prior to Jan. 10, 1909, complaint thereof should have been made to the commission, calling for a rehearing based on that complaint and showing that the rates were not satisfactory either to the shippers or the railroad company. The latter schedule of rates was adopted temporarily because the commission is treating this question of rates in a fair and impartial manner and because it is awaiting action on a similar subject by the Interstate Commerce Commission. As the Interstate commission has not issued its decision, the Michigan commission granted an extension of 30 days from Jan. 10.

The Detroit United Railway Company did not approve this second tariff and so placed itself on record before the commission. It is stated that at an informal conference before the commission complainants had objected to the earlier rate charged by steam roads as too high and the defendants, the steam railroads, contended that the existing rates were too low; therefore the commission made the arbitrary rates adopted and ordered them put into effect on both steam and electric lines so that a test might be given to determine what charges were necessary in all fairness to both sides.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Helena Street & Interurban Railroad, Helena, Ark.—This company has been incorporated for the purpose of establishing an electric street railway in Helena. Capital stock, $25,000. Officers: J. W. Burks, president; Charles S. Henry, vice-president, and J. W. Vineyard, secretary and treasurer. [E. R. J., Dec. 12, '08.]

***Eldorado Springs Railway, Denver, Col.**—This company has been incorporated to construct an electric railway from the springs up the mountain side on the north. In winding backward and forward up the steep ascent an elevation of several hundred feet will be attained in going 1½ miles, the approximate length of the line. At the summit of the mountain the company is establishing an amusement park. Incorporators: W. W. Seaver, C. W. Clark and Frank Hawley.

***Mount Hope Traction Company, Chicago, Ill.**—This company has been incorporated in Illinois to construct and operate street railways. Capital stock, $1,000. Incorporators: Samuel P. Parmly, Jr., T. Hood Little and Victor E. Lindle.

***Dubuque, Illinois & Wisconsin Interurban Railway, Dubuque, Ia.**—This company has been chartered to construct a standard gage road from Dubuque, Ia., to East Dubuque, Ill.; Fairplay, Cuba City and Platteville, Wis., a distance of 30 miles. The motive power will be both steam and gasoline. Victor H. Stevens, president of the company, states that it is possible that construction will be commenced in July. The repair shops will be erected at Dubuque. Capital stock authorized, $1,500,000. Officers—Victor H. Stevens, president; Dr. J. R. Gutherie, vice-president; S. M. Langstaff, secretary; J. J. Nagle, treasurer, all of Dubuque.

***Galesburg & Rock Island Traction Company, Rock Island, Ill.**—This company has been incorporated for the purpose of building an electric road from Galesburg through the counties of Knox, Warren, Mercer and Rock Island to the city of Rock Island. Headquarters, Rock Island. Capital stock, $10,000. Incorporators: Frank H. Clark, Springfield, Ohio; Alfred C. McWhinney and Robert P. McGeehan, Kansas City, Mo.; Earle H. Field, Monmouth, Ill.; R. V. Field, Galesburg, Ill., and E. Woodward, Warren Everett and J. Elliott, Chicago.

Kansas City, Olathe, Ottawa & Iola Railway, Topeka, Kan.—This company has applied for a charter to build an electric railway from Kansas City, Kan., south to Iola, a distance of 115 miles. Capital stock, $5,000,000. Incorporators: J. D. Bowerstock, Lawrence; Robert A. Barr, Kansas City, Mo.; Hugh A. Holmes, Kansas City, Kan.; W. S. Fallis, Garnett; C. H. Estabrook, Ottawa; J. P. Harris, Ottawa; Frank Hodges, Olathe; James O. Rodgers, Iola; J. I. Wolfe, Burlington; W. M. Riger, Burlington. [E. R. J., Dec. 12, '08.]

St. Louis, Creve Cœur & Western Railway, Clayton, Mo.—This company has been incorporated for the purpose of building an electric railway from the city limits of St. Louis to Creve Cœur Lake. It is stated that construction will be started by March 1. Three years ago a franchise was granted to a company known as the St. Louis, Fern Ridge & Western Railway to use the same route. Several of the stockholders in the old company are stockholders in the new one, which is practically a reorganization of the old company. The old franchise will be transferred to the new company. The company will have 14 miles of double track. Capital stock, $140,000.

Goldsboro (N. C.) Traction Company.—This company has been chartered in North Carolina to construct and operate an electric street railway in and around Goldsboro to the limit of 50 miles in any direction out of the city. There is already about one mile of the track ready, and the purpose is to have about 2½ miles in operation out to a park by June 1. Capital stock authorized, $150,000; issued, $45,000. Incorporators: A. T. Oliver, J. H. Trent, S. L. Blackburn and J. S. Oliver. [E. R. J., Sept. 26, '08.]

***Fulton Chain & Beaver River Railroad, Buffalo, N. Y.**—This company has been incorporated to operate a road in Herkimer county by steam or electric power, 9 miles long, from Fulton Chain, on the Mohawk & Malone Railway, to Otter Lake. Capital stock, $90,000. Directors: Lyon De Camp, Fulton Chain; W. L. Marcy, H. W. Sprague and W. M. Wheeler, Buffalo, and R. J. Gaffney, Bradford, Pa.

***Columbia Railway, Light & Power Company, Portland, Ore.**—This company has recently been incorporated in Oregon with a capital stock of $50,000. Incorporators: Goodwin A. Young, Ray W. Lang and N. A. Perry.

FRANCHISES

***Mesa, Ariz.**—Application has been made to the Town Council by Dr. A. J. Chandler for a franchise to build and operate a street railway on Main and MacDonald Streets.

Sandpoint, Idaho.—The City Council has granted to A. Filson, F. M. Molyneaux, J. F. McBride, J. M. Prater, J. B. Southmayd and H. C. Olney a 50-year franchise for a street railway in Sandpoint. The railway must be in operation by Dec. 1, 1909, otherwise the promoters forfeit a $5,000 bond. [E. R. J., June 6, '08.]

Chicago, Ill.—The City Council has passed an ordinance authorizing the Calumet & South Chicago Railway to build an extension in South Chicago Avenue, between Vincennes Avenue and South Park Avenue; also an ordinance permitting the company to build a single line of track on 115th Street from Michigan Avenue to Halsted Street.

Chicago, Ill.—The local transportation committee of the Chicago City Council has recommended the ordinance of the Kensington & Eastern Railroad. This road is an 8-mile connection between the Illinois Central Railroad at Pullman and the Chicago, Lake Shore & South Bend Railway at Hammond, Ind. It will be electrically equipped and not only will furnish an outlet into Chicago for the Chicago, Lake Shore & South Bend cars, but will give the Illinois Central an entrance to the Gary manufacturing district. The franchise recommended is for 20 years and the committee decided that the new road could not place more than six tracks across a street and also must pay as compensation at the switch-track rate of $1 a foot for 50 ft. and 50 cents a foot for the remainder. It is stated that this compensation will not amount to more than $3,000 a year.

Paxton, Ill.—The City Council has granted the Chicago, Kankakee & Champaign Electric Railway a franchise to operate a line on Railroad Avenue. The road, when completed, will be 75 miles in length and will extend from Kankakee to Champaign.

Bluffton, Ind.—Elections have been ordered by the Commissioners of Wells and Adams Counties to be held in four townships Feb. 8, for subsidies amounting to $34,000, asked by the Bluffton, Berne & Celina Traction Company. Franchises have been granted in Celina, Ohio, the eastern terminal, and at Berne, the midway point. The survey has been completed and the right of way has been taken for three-fourths of the mileage. [E. R. J., Jan. 2, '09.]

Jackson, Miss.—The application of R. L. Bradley, R. V. Powers and W. Q. Cole for a franchise for a belt line in Jackson has been rejected by the Board of Aldermen. [E. R. J., Dec. 26, '08.]

Clinton, Mo.—Application has been made to the City Council by the Western Missouri Interurban Railway for a franchise to build an electric railway through Clinton. The line is projected from Odessa through Warrensburg and Greenfield to Clinton, a distance of 75 miles. George S. Halliday, Clinton, president.

***Kansas City, Mo.**—James A. Stewart has applied to the Board of Commissioners of Wyandotte County for a franchise for a line to start at Graystone Avenue, at the State line, and follow the crest of the hill south of the Kaw River and the Junction cemetery. The distance is 4 miles.

New York, N. Y.—The Appellate Division of the Supreme Court has granted the application of the Public Service Commission for an extension of time until Oct. 15, 1911, to begin work on the Broadway-Lafayette Avenue subway. Under the previous ruling it would have been necessary to begin work before Jan. 25 to make valid the consent for the construction of the loop.

Ottawa, Ont.—The Toronto, Niagara & Western Railway will apply at the next session of the Canadian Parliament for an extension of time to build lines between Toronto and Niagara Falls, Toronto and Windsor and St. Catharines and Port Colborne, and for power to increase the bond issue. The line between Toronto and Niagara Falls will follow the route of the present power transmission line between these cities.

Astoria, Ore.—A franchise has been granted by the County Council to the Oregon Coast Railway to use the bridges across Youngs Bay and the Lewis and Clark River in the construction of its electric railroad to Seaside. [E. R. J., Oct. 10, '08.]

Honesdale, Pa.—The City Council has granted the Lackawaxen Valley Railway a 75-year franchise for a street railway in Honesdale. The Lackawaxen Valley Railway is the successor to the Honesdale & Hawley Railway, which was formed for the purpose of constructing an electric railway from Seeleyville to Hawley, a distance of 11.5 miles.

Lansdowne, Pa.—The Sharon Hill & Upper Darby Street Railway, which is a subsidiary company of the Interstate Railways Company, has made applications before the Borough Councils of Alden and Lansdowne boroughs for a franchise granting a double-track right of way from the Chester pike and Clifton Avenue, Sharon Hill, through the boroughs of Sharon Hill, Collingdale, Alden, Lansdowne and the township of Upper Darby to a terminus at Sixty-ninth Street, Philadelphia. The construction of this road will mean a through and direct line from Sixty-ninth Street to Wilmington, Del., as the connections will be made with the Chester Traction Company at Sharon Hill.

Meyersdale, Pa.—A franchise has been granted by the Council of the borough of Garrett to the Pennsylvania & Maryland Street Railway which permits the company to use three streets in the town and thus continue the line to Berlin. The company has a line in operation from Salisbury, through Meyersdale to Garrett.

Georgetown, S. C.—The City Council has granted H. C. Case, president of the Georgetown Electric Company, a franchise to build a street railway in Georgetown. It is said that Mr. Case will take up the construction of the road during this year. [E. R. J., Aug. 15, '08.]

***San Marcos, Tex.**—F. F. Beck, Buffalo, N. Y., representing an Eastern syndicate which contemplates building an interurban line from Austin to San Antonio, has applied to the City Council for a franchise over one of the through streets running east and west for the purpose of running their line through the city. The company agrees to construct a belt line in the city if the proper franchise is given, also to erect its power plant in San Marcos if a suitable site is donated.

***Wichita Falls, Tex.**—Edgar Scurry, Henry Sayles and N. Henderson are reported to have asked the City Council for a 50-year franchise to build and operate an electric street railway in Wichita Falls.

TRACK AND ROADWAY

Bentonville, Ark.—The citizens of Bentonville in a mass meeting on Jan. 7 instructed the committee of five, of which Mayor A. W. Morris is chairman, to close a contract with the Western Surety & Investment Company, Minneapolis, Minn., to build an electric railway from Joplin, Mo., to Bentonville, then to Gentry, Tarrytown, Springdale and back to Bentonville. The work upon the new railway is to begin immediately after the contract is signed, and the Western Surety & Investment Company is guaranteed an appropriation of $55,000 by citizens here as soon as the line is completed.

Pacific Electric Company, Los Angeles, Cal.—This company has begun the construction of a new line around the bay from Wilmington to connect with the tracks of the Inter-Urban Railroad at the north city limits of San Pedro. The work is being done under a franchise granted some time ago by the city of Wilmington. The line will be about 3 miles in length.

Ocean Shore Railway, San Francisco, Cal.—This company has laid 28 miles of new track during the past year. Twenty miles were built southerly from San Pedro terrace, and 1.5 miles north of Folger at the Santa Cruz end. About 26 miles of road remain to be completed before reaching Santa Cruz. Of this distance there are 6.5 miles already graded, and of the balance there are 2.5 miles of heavy bluff work, 1.5 miles of easy bluff work, and 16 miles of light work over level ground. The company plans to have the line to Santa Cruz in operation within the next four months.

Connecticut Company, Hartford, Conn.—This company has completed the construction of an extension from Griswoldsville to Rocky Hill, a distance of 2½ miles. It is the intention of the company to extend this new line to Middletown.

Lebanon (Conn.) Street Railway.—L. E. Livermore, president of this company, writes that the directors have not yet decided when construction will begin on the projected road, which is to extend from Yantic to South Manchester. By the construction of this link Hartford and Norwich will be practically connected by electric railway lines. The length of the road will be 28 miles. The overhead trolley system will be installed. Capital stock, authorized, $800,000. L. P. Smith, Lebanon, secretary and treasurer. [S. R. J., Jan. 26, 07.]

People's Traction Company, Galesburg, Ill.—At a meeting of the directors of this company, the authority of the board was given for proceeding immediately with the extension of the line from Galesburg to Galva. It is said that immediate steps will be taken toward securing the right-of-way and necessary franchises. The line will be 24 miles long.

Central Railway Company of Iowa, Clinton, Ia.—The Electric Railway Journal is advised that this company expects to begin the construction of its projected standard gage interurban line in May. The road will connect the following cities: Clinton, Elvira, Bryant, Goose Lake, Charlotte, Delmar, Maquoketa, Hurstville, Dugan, Garry Owen, Cascade, Rockdale and Dubuque. The system will be 83 miles in length and will be operated by electricity, both catenary construction and third rail being used. Officers: Thos. J. Wilcox, Clinton, president and general manager; L. E. Wiley, Chicago, Ill., vice-president; D. L. Wilcox, Clinton, secretary; M. A. Wilcox, Clinton, treasurer.

Davenport, Maquoketa & Dubuque Railway, Maquoketa, Ia.—O. M. McCaffrey, Maquoketa, writes it is the plan of this company to begin work on its projected interurban line this Spring. It will be 90 miles in length and will connect Davenport, Eldridge, Elwood, Grand Mound, Maquoketa, Andrew, La Motte and Dubuque. The motive power will be electricity and it is intended to install catenary construction. The power station and repair shops will be located in Maquoketa. Power for various purposes will be furnished to towns along the route. [S. R. J., Nov. 2, '07.]

Paris & Mt. Sterling Railway, Mt. Sterling, Ky.—The Electric Railway Journal is advised that this company will not be ready for some time to begin construction on its proposed railway, which is to be established between Mt. Sterling, North Middletown and Paris. The line will be standard gage and will be 23 miles in length. Capital stock, authorized, $100,000. Officers: John T. Collins, North Middletown, president; R. J. Neeley, Paris, vice-president; H. C. McKee, Mt. Sterling, secretary; Robert Talbott, Paris, treasurer.

Oakland, Swallow Falls & Uniontown Electric Railway, Oakland, Md.—This company has located and surveyed the route for its projected railway. It will be a double track, standard gage electric road, from Oakland, Md., to Uniontown, Pa., with a single track, lateral branch from Swallow Falls down the river about two miles, to the hydro-electric plant, also a single track, lateral branch, from Cranesville, on the main line, to Kingwood, W. Va. The road will be about 50 miles in length. A hydro-electric power plant will be erected at a point about 6 miles north of Oakland. It has not yet been decided when construction will begin. Power will be furnished both for lighting and heating. Capital stock, authorized, $150,000. Officers: A. G. Sturgiss, president; Truman West, vice-president; Bowie Johnson, secretary; James D. Hamill, treasurer; H. P. Tasker, general manager, all of Oakland; J. B. Hogg, Connellsville, Pa., chief engineer. [E. R. J., July 18, '08.]

Springfield, Mass.—Col. Stanhope E. Blunt, commandant at the United States armory, Springfield, has asked for an appropriation from Congress with which to build an electric railway for freight purposes. At present trucking forms a large item in the cost of manufacture, and to reduce this a line connecting the water shops plant with the armory, and also connecting both with the Wilbraham road freight station, is desired.

Mexico (Mex.) Tramways.—The secretary of communications has just approved the plans of this company for the electrification of its Peñon line, which at the present time is being operated by mule cars. The line begins at the Zocalo and extends as far as the mineral springs and baths at Peñon.

Kansas City & Kansas Southwestern Railroad, Kansas City, Mo.—A mortgage for $12,000,000 has been filed in Kansas City, Kan., by W. Laming, Tonganoxie, Kan., president of the Kansas City & Kansas Southwestern Railroad in favor of the Carnegie Trust Company, of New York City. It is to provide funds for the construction of electric railways between Kansas City and Topeka, by way of Tonganoxie and Lawrence, and the building of an electric railway from Lawrence to Independence, Kan. [S. R. J., March 28, '08.]

Nebraska Traction & Power Company, Omaha, Neb.—The General Construction Company, W. D. Crist, manager, Omaha, Neb., is building a 10-mile catenary line from South Omaha toward Lincoln, Neb. Material for this line has been purchased from the Ohio Brass Company. On the completion of the road the cars of the new line from Lincoln to Omaha will enter Omaha over the tracks of the Omaha & Council Bluffs Street Railway. [E. R. J., Dec. 5, '08.]

Moncton, N. B.—It is stated that the municipality of Moncton will apply at the coming legislature for power to construct and operate an electric railway in the city of Moncton and in the parishes of Moncton and Shediac. John S. McGee, City Clerk.

Atlantic City & Suburban Railway, Atlantic City, N. J.—Announcement is made that this company will build a new $250,000 bridge over Great Egg Harbor Bay, extending from Somers Point to Ocean City and rendering it possible

to carry passengers from Florida Avenue and the Boardwalk or Absecon to Ocean City. It is said that a contract will be awarded as soon as plans and specifications can be drawn and accepted by the Cape May authorities.

New York, N. Y.—The Public Service Commission of the Second District has dismissed the application of the New York, New Haven & Hartford Railroad and the Harlem & Port Chester Railroad for the consent of the commission to change its motive power on the Harlem & Port Chester Railroad from steam to electricity. The application is dismissed on the ground that the companies are authorized to make such change without the consent or approval of the commission.

Oneonta, Charlotte Valley & Cobleskill Railroad, Charlottesville, N. Y.—C. G. Payne writes that this company has not as yet completely financed its road. The promoters wish to communicate with parties who would be willing to take the project in hand and finance it. The route as decided upon will touch the following cities: Oneonta, Davenport, South Worcester, Charlotteville, Summit, Richmondville, Cobleskill and several smaller towns. Officers: C. G. Payne, Charlotteville, president and general manager; C. G. Mallette, Cobleskill, vice-president; F. W. Olmstead, South Worcester, secretary; B. W. Hoye, Oneonta, treasurer.

Rochester, Corning & Elmira Traction Company, Rochester, N. Y.—Announcement is made that this company will commence the construction of the first section of its proposed line between Rochester and Conesus Lake on April 1. The work will be done by the Southern Construction Company. It is planned to start the work at two points, Avon and Rush, with gangs working north and south, and with a gang working south from Rochester. It is hoped to have the main line past Dansville and the stub from Dansville to Hornell completed in 1910. With the completion of the first section, work is to be begun on the second section, from Conesus Lake to Dansville. On the south end of Conesus Lake will be built the power plant, car house and a fireproof repair shop covering an area of 200 ft. x 250 ft., and a two-story office building for headquarters of the company on a site 50 ft. x 80 ft. The power plant is to contain three generating units of 1500 kw with provision for the installation of a fourth unit. Officers: John Hofman, Rochester, president; Samuel B. Williams, Rochester, treasurer; Louis H. Whitebeck, secretary. [E. R. J., Dec. 12, '08.]

Burgrahaw Interurban Company, Burlington, N. C.—It is announced that this company has awarded the general contract for building its line to the Interurban Company, 25 Broad Street, New York. The line will connect Burlington, Graham and Haw River, and will be eight miles in length. James W. Murray, president. [E. R. J., Nov. 28, '08.]

Toledo & Michigan Electric Railway, Toledo, Ohio.—The Electric Railway Journal is informed that this company has graded its line for a distance of 32 miles. A number of concrete culverts and bridge abutments have been built and 14 miles of fence have been put in place. The road has not yet been completely financed. It will be 60 miles in length, extending from Adrian through Clayton, Hudson, Pittsford, Osseo, Hillsdale, Janesville, Quincy and Coldwater. The motive power will be electricity. The company expects to furnish power for lighting. Capital stock, authorized, $1,500,000. Bonds have been issued to the amount of $1,500,000. Headquarters, 244 Ohio Building, Toledo. Officers: Peter P. Duket, Toledo, president and general manager; L. E. Goodrich, Hillsdale, vice-president; J. W. Hellem, Adrian, secretary; Dr. C. H. Lards, Adrian, treasurer.

Morrisburg Electric Railway, Morewood, Ont.—C. M. Willard writes that this company has plans under consideration for beginning construction on its projected line this spring. The majority of the right-of-way has been secured. The road will be standard gage, 70 miles in length and will extend from Morrisburg to Ottawa, through the following cities: Williamsburg, Winchester, Chesterville, Morewood, Orwan, Kenmore and Metcalf. The overhead trolley system will be installed on the line. The power plant and repair shops will be erected in Morrisburg. Headquarters, Box 45, Morewood. Capital stock, authorized, $1,000,000; issued, $200,000. Bonds, authorized, $800,000. Officers: C. M. Willard, president and general manager; W. M. Louchridge, vice-president; Bradford Louchridge, secretary; J. H. Louchridge, treasurer, all of Morewood; Robert Merkley, Williamsburg, superintendent; G. Brown, Morrisburg, chief engineer. [E. R. J., June 20, '08.]

Windsor Tunnel & Lake Erie Company, Windsor, Ont.—George Bouteiller, Walkerville, Ont., writes that this company expects to begin construction about July on its proposed railway, which is to connect Windsor, Sandwich, West Vereker, New Canaan, McGregor, Huron and Oxley. From 26 to 30 miles of standard gage single track will be built. At the present time the company is at work securing franchises and will shortly apply for a charter. Officers: R. A. Bailey, Detroit, Mich., president; Dr. J. A. Smith, Windsor, vice-president; J. G. Leggatt, Laing Block, Windsor; Walter Boug, Windsor, treasurer. [E. R. J., Oct. 31, '08.]

Belleville & Reedville Railroad, Belleville, Pa.—F. W. Warner writes that it has not yet been definitely decided when construction will be commenced on this standard gage line, which is to connect Belleville and Reedsville, a distance of nearly 9 miles. It is probable that the company will establish a park along the line. Capital stock, authorized, $100,000. Officers: L. M. Yoder, Belleville, president; S. M. Patterson, Avondale, vice-president; F. W. Warner, Belleville, secretary and treasurer. [E. R. J., Aug. 15,, '08.]

Lehigh Valley Transit Company, Allentown, Pa.—R. P. Stevens, president of this company, writes that 5 miles of city track extensions will be built this spring. The company, together with the county, will also construct a $125,000 concrete bridge.

Pittsburg & Westmoreland Railway, Pittsburg, Pa.—At a meeting of the stockholders of this company it was decided to construct a new line from Herminie to West Newton. The contract is to be let in a few weeks. It was also decided to take over the rights-of-way of the Donora-Eldora Street Railway, which was organized for the purpose of building a line between Donora and Eldora. [E. R. J., Dec. 26, '08.]

Galveston & Houston Traction Company, Galveston, Tex.—This company and five steam railroads have signed a joint contract to build a causeway connecting Galveston Island with the mainland. The causeway will be 2 miles long, across Galveston Bay, and about half will be built of concrete, to cost nearly $2,000,000. It will have four railroad tracks, a wide wagonway and foot passage. It is expected that the construction of this road will be commenced simultaneously with the building of the causeway. The line will connect Galveston and Houston, a distance of about 50 miles.

Texas Union Traction Company, Clarksville, Texas.—W. B. Rollins, Beals Building, Kansas City, Mo., advises that this compnay has a charter to construct a number of electric railways in Texas, among which are the following: From Paris to Ennis, a distance of 124 miles; from Texarkana to Sherman, 154 miles; from Texarkana to Fort Worth, 215 miles; from Paris to Cleburne, 155 miles. It also has the right to build extensions from any city along any of the proposed lines into the country, a distance of 20 miles from the main line. It is the intention of the company to build one of these spurs first; this proposed spur is to extend from Paris through Deport to some other small town in that vicinity. Officers: C. P. Moore, Longfellow, president; A. A. St. John, vice-president; John T. Upchurch, Clarksville, secretary and treasurer.

Spokane & Inland Empire Railroad, Spokane, Wash.—It is stated that this company is planning to extend its lines from Colfax to Pullman, a distance of about 12 miles.

SHOPS AND BUILDINGS

Springfield (Vt.) Electric Railway.—This company is building a new car house, with cement foundations. The contract for the erection of the building has been awarded to Crosby & Parker. The company's old car house and work shop, together with five cars, were destroyed by fire on Oct. 18, 1908.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Champaign, Ill.—A new substation to contain one 300-kw rotary and having accommodations for freight and passengers is being built by this company at Clinton, Ill.

Springfield (Ill.) Consolidated Railway.—This company is planning to enlarge its power station by the installation of a 1,500-kw. unit, the type of which has not been decided upon.

Evansville (Ind.) Railways.—This company expects to purchase a 500-kw. turbine, with exciter set, and will also install one rotary converter substation outfit.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—It is stated that this company has plans under consideration for enlarging its power station at Terre Taute. The company expects to install a 3000 kw. turbine together with four additional boilers, two large brick stacks and coal and ash handling apparatus for the entire plant.

Hagerstown (Md.) Railway.—This company expects to install a 150 or 200-kw, 550-volt belted generator. The company will consider the use of a good second-hand machine without a switchboard.

Manufactures & Supplies

ROLLING STOCK

Murphysboro Street Railway, Murphysboro, Ill., is in the market for two electric motor cars.

Philadelphia, Coatesville & Lancaster Passenger Railway, Parkesburg, Pa., will soon be in the market for new cars.

Southwestern Interurban Railway, Arkansas City, Ark., has ordered two interurban cars from the American Car Company, St. Louis.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., has ordered 10 open and 44 closed cars from the Cincinnati Car Company.

Ottawa Electric Railway Company, Ottawa, Ont., has ordered 12 semi-convertible, single-truck cars, with 21-ft. bodies and pay-as-you-enter platforms.

British Columbia Electric Railway, Vancouver, B. C., is building 18 new cars which will have pay-as-you-enter platforms at its shops in Vancouver, B. C.

Gulf, Brownwood & Cisco Railway Company, Fort Worth, Tex., expects to install gasoline motor cars for the operation of the 20 miles of road outside of Brownwood which has been completed.

Third Avenue Railroad, New York City, has awarded the contract for air brakes for its 200 new pay-as-you-enter cars to the Allis-Chalmers Company. This concern will furnish both the compressors and the brakes.

Missouri & Kansas Interurban Railway, Kansas City, Mo., has been planning the purchase of two interurban cars. It is understood the order for these equipments will be placed through the Arnold Company, Chicago, Ill.

Halifax Electric Tramway Company, Halifax, N. S., has ordered from the Ottawa Car Company two semi-convertible, single-truck cars. These cars are similar to those already in service and have 21-ft. bodies, but will have pay-as-you-enter platforms.

Illinois Traction System, Peoria, Ill., has ordered 25 box cars of 80,000-lb. capacity from the American Car & Foundry Company, St. Louis, Mo. These equipments are to have long side bearings, which will allow the installation of Bosbury radial draw-bars.

Michigan United Railways, Lansing, Mich., has recently purchased six sets of trucks from the Baldwin Locomotive Company, 14 motor equipments from the General Electric Company and 200 high-backed seats from Hale & Kilburn Manufacturing Company, Philadelphia.

Atlantic City & Suburban Traction Company, Pleasantville, N. J., will be in the market soon for five new semi-convertible cars. These cars will be 40 ft. long and will probably be ordered from The J. G. Brill Company. The company also contemplates installing National movable advertising devices in 15 cars.

TRADE NOTES

Franklin Railway Supply Company, Franklin, Pa., has moved its general offices to 30 Church Street, New York.

Avery P. Eckert has opened offices at 50 Church Street, New York, where he will conduct a general railway and electrical supply business.

Oliver Electric Company, Birmingham, Ala., announces that W. J. Cameron, Jr., formerly secretary and treasurer of the McClary-Jemison Machine Company, has become sales manager for the Oliver company.

Mrs. Francis A. W. McIntosh, who was formerly advertising manager of the Buffalo Forge Company, has opened an office at 103 Anderson Place, Buffalo, N. Y., where she will be prepared to furnish advertising copy of every sort.

MacArthur Brothers Company, New York, has just closed a contract with the Eastern Colorado Power Company for the construction of the Barker reservoir dam, near Boulder, Col. The dam is located across Middle Boulder Creek at a point about 17 miles west of Boulder.

R. W. Marshall & Company, New York, announces that Thomas Bibber has recently been engaged to represent this company in the New England States. Mr. Bibber, being a native of New England and having been engaged in the electrical supply business for the past 15 years, has a wide circle of acquaintances and friends not only in New England but in all parts of the country.

Albert Smithnight, secretary and treasurer of the Electric Railway Improvement Company, Cleveland, died Jan. 11. While Mr. Smithnight has not been in his usual health for some time, his death occurred suddenly after a short illness. He had been associated with the Electric Railway Improvement Company since its organization and had made a large number of warm friends in the electric railway business.

Ohio Brass Company, Mansfield, Ohio, calls attention to a typographical error in its bulletin for January in an article entitled "The Interurban Coupler Problem." Referring to a statement made in the report of the Standardization Committee of the American Street & Interurban Railway Association the article said: "This statement seems to be the natural result of an investigation directed by an interested party. This should have read "any interested party."

H. W. Johns-Manville Company, New York, has recently placed on the market a new product known as H-O pipe-joint cement. This cement is put up in powder form and can be kept in stock indefinitely, as it is claimed that it does not dry out or deteriorate. The cement is mixed with either water or linseed oil, making it ready for use. The chemical properties of H-O cement are such that it expands after the joint is made up, thereby making a tight joint.

Wagner Electric Manufacturing Company, St. Louis, Mo., has placed on the market a portable polyphase wattmeter which gives in a single indication the total power consumed in single-phase, two-phase or three-phase circuits. This instrument has the same accuracy on an unbalanced as on a balanced circuit. The Wagner line of switchboard and portable instruments also includes ammeters, voltmeters, power-factor indicators, frequency meters, wattmeters, ground detectors, and synchronism indicators, together with current and potential transformers for all capacities, voltages and frequencies and any character of service.

Independent Pneumatic Tool Company, Chicago, Ill., announces that at the annual meeting, held in Jersey City, the following directors were chosen: James B. Brady, W. O. Jacquette, John P. Hopkins, M. S. Rosenwald, James J. McCarthy, S. Florsheim, John M. Glenn, John D. Hurley, John R. Turner. At the annual meeting of the directors, held in Chicago, the following officers were elected: James B. Brady, president; W. O. Jacquette, first vice-president; John D. Hurley, second vice-president; A. B. Holmes, secretary and treasurer. The annual report shows that the company is in excellent financial condition, and that during the quarter ended Dec. 31, 1908, 40 per cent more business was transacted than during the corresponding period of 1907.

National Car Wheel Company, Pittsburg, Pa.—At the meeting of the board of directors of the National Car Wheel Company, held in Pittsburg Jan. 14, Edward H. Chapin, New York representative of the company, was elected a vice-president and director of the company. He will retain, however, his office of head of the New York office. The appointment comes as a well-deserved recognition of worth. Mr. Chapin has had a long experience in the manufacture and sale of car wheels, having been with the National Car Wheel Company since its organization in 1903 and previously for a long time with the Rochester Car Wheel Company. At the time of the consolidation, five years ago, he was secretary of the Rochester company and was located at Rochester, but after the consolidation was appointed sales agent of the company at New York City. Although a young man, he has been identified with the electric railway industry for some 20 years and is a faithful attendant of the different conventions, where he is deservedly popular. His many friends will congratulate him upon the result of the election last week and the promotion which is well deserved.

ADVERTISING LITERATURE

Scully Steel & Iron Company, Chicago, Ill.—This company has issued a new price list which covers all of the various lines of material handled by the firm.

Dean Brothers' Steam Pump Works, Indianapolis, Ind.—This company has issued an illustrated leaflet describing the Dean vertical air pump and jet condenser.

MacGovern, Archer & Company, 118 Liberty Street, New York City.—This company has issued a list of electrical and steam apparatus and power-plant equipment which it has for sale.

Bausch & Lomb Optical Company, Rochester, N. Y.—This company has issued a new catalog of engineering instruments which contains complete specifications for the optical and mechanical construction of various types of transits, levels and theodolites. An entirely new form of mining transit is cataloged for the first time.

General Fire Extinguisher Company, Providence, R. I.—The latest number of the "Sprinkler Bulletin," which has just been issued by this company, discusses means to prevent fires in public buildings. The results of tests of Grinnell sprinklers are given, and also full details as to how apartment houses can be protected by automatic sprinklers.

HISTORY OF THE TWIN CITY RAPID TRANSIT COMPANY

As announced last week, the Twin City Rapid Transit Company is publishing during the present month through the medium of full-page advertisements the history of the company from its beginning, 35 years ago, up to date. Last week the first six of the advertisements were abstracted. The seventh advertisement contrasts the early service between Minneapolis and Excelsior, which included from four to six trains a day, and only two during the winter, with the electric service of to-day, operating trains as frequently as a five-minute headway. The running time of the old steam dummy service was 80 minutes, as against 42 minutes on the electric trains. The reductions in the rates of fare since these early days are also mentioned.

After the Minneapolis Street Railway Company took over the line several attempts were made to find a substitute for steam as a motive power. Finally electricity was introduced. In 1889 the company was directed to install cable lines, but, as a preliminary, the city ordered the company to equip electrically one of the existing horse-car lines, and if this experiment should prove "a practical success," the city might order the Minneapolis Street Railway Company to operate electrically. The company also was bound to pledge itself to the sum of $225,000, which, in the event of the failure on the part of the company to comply with the conditions of the resolution, should be forfeited to the city as follows: $100,000 for each of two cable lines not built as provided in the resolution, and $25,000 in case of default in construction and operation of the experimental electric line. Fourteen years of operation of horse-car lines had resulted in no dividends being paid to the stockholders, and therefore the financing of the cable construction was difficult. Nevertheless, the company was able to secure a number of leading business men as sureties, and the history gives their names.

In 1889 the company placed orders for cable engines and tracks, and also made a contract with the Thomson-Houston Electric Company for converting the Fourth Avenue horse-car line into an electric line. The bodies of the old horse-car trucks were placed upon heavy four-wheeled trucks built to receive the motors. A few experienced motormen were imported from the East to operate the first cars, and these experts educated the former horse-car drivers for motormen so the full complement of cars might be put in operation. The first car was put into regular service on Dec. 24, 1899. After the first few days' trial some of the smaller and older horse cars were used as trailers, thus practically doubling the capacity of the line. The historian asks:

In view of the "practical success" which this experimental line had demonstrated, who is there in Minneapolis today who would have purchased at a better price than scrap value the large amount of cable railway material which the Minneapolis Street Railway had on hand? It is a fact that this material was sold by the company for scrap.

The continued history of the Twin City lines includes a description of the reconstruction of all the track and the widening of the gage from 3 ft. 6 in. to standard. Attention is called to the heavy expense involved not only in the track work, but in the replacement of the then standard cars. By a resolution of the City Council, passed on Jan. 17, 1890, the Minneapolis Street Railway was directed to install electrical operation on its existing horse-car and motor lines. This resolution contained a clause stating that if electrical operation was found to be unsatisfactory the city might order cable lines substituted for electric lines. Thus it is seen that the hazard of the undertaking to finance the railway was a most dangerous one.

The 11th full-page installment of the Twin City history describes the electrical equipment first purchased. The boiler and engine installation aggregated 3000 hp. Current was generated by 16 175-kw, 500-volt, bipolar Edison generators belt driven from a line shaft. With the work of electrification in 1890 T-rails weighing 70 lb. per yard were first laid. The transfer from horse to electrical operation was made substantially within the time required by the ordinance.

ALBERT H. STANLEY IN AMERICA

Albert H. Stanley, general manager of the Underground Electric Railways Company, Ltd., London, England, is making a short visit in this country, the first since he resigned as general manager of the railway department of the Public Service Corporation of New Jersey two years ago to go to London. Mr. Stanley expects to go from New York to Detroit the latter part of this week, and will return to England Jan. 30.

In a recent interview with a representative of this paper, Mr. Stanley spoke enthusiastically of the development in traffic on the District Railway and tube lines controlled by the Underground Electric Railways Company, Ltd., and attributed this in large part to a better recognition of the transportation facilities now being afforded by these lines. The London public is as appreciative of rapid transit as that of any other community. This is shown by the fact that the steam railroads running out of London give probably the best suburban service in the world. Consequently the improvements in the way of equipment introduced in the District Railway and the construction of new underground railways have received prompt recognition. In fact, any increase or betterment in the service has met a quick response in increased traffic.

The underground railway routes in London are more complicated than in New York, where the subway between the Battery and Ninety-sixth Street is practically parallel to Broadway.

For this reason and because the entrances to the stations are not as conspicuous as in New York, being usually on private property instead of through kiosks in the street, the company has given a great deal of attention to advertising the routes and service given. It has, for instance, published a great many circulars, with maps of the underground lines, showing the stations and parts of the city reached by them. The entrance to each station is also marked by attractively illuminated signs 4 ft. x 6 ft. On the right of the entrance is a sign frame, surmounted by a tasteful scroll. Below the scroll are a silhouetted sky line of London in black and white and the word "Underground." The lower part of the sign contains the name of the station and the words, "Underground to anywhere; quickest way; cheapest way." In the middle of the sign is a map of the city plainly marked with all routes and stations of the company. On the left of the entrance to the station is a second tasteful frame of the same size, in which are set advertising posters, which are changed from time to time. Some of these posters are announcements of interest to the public. Others are pictorial. For preparing the latter the services of some of the leading illustrators in England have been secured. A recent poster of this kind represents two strangers consulting the map of the railway while a policeman stands

idly by. The poster bore the inscription, "No need to ask the policeman." Another poster showed a winter scene in London. The streets were covered with falling snow, but a section of the street showed that the passengers on the underground railway beneath the pavement were riding in well-heated and illuminated cars.

The company has also used illuminated signs extensively for different purposes in all of its stations and has found them especially useful to announce the destination of approaching trains at stations where there are services to different points. For this purpose a sign is arranged similar to that shown below:

1 2 3 — EARLS COURT	1 2 3 — EALING
1 2 3 — HARROW	1 2 3 — RICHMOND
1 2 3 — HOUNSLOW	1 2 3 — WIMBLEDON
1 2 3 — PUTNEY	1 2 3 — CIRCLE

In this sign the names of the terminal stations are always illuminated, but the numbers shown on the sign are visible only when the lamp, which is behind each number, is thrown into circuit. The destinations of the three next trains in the order of their arrival are shown in advance at the station by illuminating, for instance, the "1" in front of Ealing, the "2" in front of Wimbledon and the "3" in front of Putney. The lamps behind these three numbers are kept burning until the Ealing train passes out of the station. Then the "1" in front of Ealing is extinguished, the "2" in front of Wimbledon is changed to "1," the "3" in front of Putney is changed to "2," and the destination of the third train to arrive is properly indicated. In addition to these indicators, illuminated destination signs are carried on the front hood of the first motor car and elsewhere through the train. A large map of the system, enclosed in a frame, is also carried inside of each car at the center, attached to the monitor. The results have been very satisfactory.

In referring to the design of cars now used on the system with which he is connected, Mr. Stanley stated that all of the compartment cars with side doors had been taken off the lines of the company. All of the District Railway cars now have two end doors and one large side door. The tube cars operated by the Underground Electric Railways Company, Ltd., are supplied with end entrances only, as owing to the cylindrical shape of the car a side entrance is not practicable. The car-platform doors are opened and closed by hand by the passengers or station guards, and not by train guards as in New York. As an experiment, one train was equipped with pneumatic doors, which were operated by men on the train, but the plan did not prove popular. The present method saves time, as the passengers can unlatch the door before the train actually stops. The train crew, which usually consists of two men, not including the motorman, on trains of five cars or more in length, leave the train and step on the platform at each station. The signal for starting is given by the conductor when he is assured by the station or train guards that all doors are closed.

The zone system of fares is used on all the lines of the company. Each ticket when purchased indicates the farthest station on each line to which the passenger can ride for the fare paid. These tickets are punched before the passenger boards the train and are collected by the gateman at the station at which he gets off. In addition, a force of uniformed inspectors occasionally examines all tickets of all passengers in the stations or in the trains. This is made necessary because season tickets are sold, and passengers may board a train without showing their tickets. Cases of fraud caused by persons attempting to ride without tickets are rare. The law is very stringent in cases of this kind. Offenders are subject to a fine of 40 shillings, their names are published in the papers, and the company has the right to post up the names and addresses at all stations. Collusion between trainmen and passengers to defraud the company is also rare, as all trainmen must be licensed by the London Police Department, a condition which insures a high standard of men.

The earnings of the company are increasing, and it has bills in Parliament authorizing extensions of some of its subsidiary lines.

SEPARATING OIL IN CONDENSER DRIP

In the power station of the Metropolitan Elevated West Side Railway, Chicago, there has been built a home-made oil separator through which the leakage from the condensing equipment is passed and a considerable amount of oil thereby saved. The basement of this large power plant is floored with concrete and in the concrete are grooves by which the drips from the various pumps are led to a center drain. J. T. Lovett, chief engineer of the power station, noticed that the drip which flowed from the condensing engines and feed-water pumps carried on its surface a thin film of oil and with a view to saving this oil he designed the simple separator here described.

The separator consists of an old tank once used for carrying Pintsch gas when the elevated cars were first operated with steam locomotives. This tank is about 20 in. in diameter and holds 150 gal. It is installed below the level of the basement floor so that there is a head of about 3 ft. from the floor drain to the bottom of the tank. A tight pipe serves to carry the drainage from the floor pocket to the bottom of the tank. From the opposite end of the tank and connected with it at the bottom a large pipe leads up nearly to the level of the basement floor. In this way approximately a 3-ft. head is maintained at all times.

All the water mixed with oil which drains from about the condensing engines and feed-water pumps on the basement floor is led through this tank. The tank is so much larger than the connecting pipes that the progress of the flow is comparatively slow while the mixture is in the tank and therefore all the oil has ample time to separate from the water and rise to the surface. As the intake and the discharge from the tank are both close to the bottom all the oil in the water passing through the tank is trapped at the top. A gage glass serves to show the relative levels of the water and the oil, and provision is made for withdrawing the oil from the top of the tank through a pipe connection, with a stop cock under which a pail may be placed.

It is stated that this home-made oil-separating installation collects from 4 gal. to 5 gal. of oil each day. This oil is immediately put back into the engine oiling and cleaning system. It may safely be returned to this system because, from the very nature of the method of separation, the oil collected in the tank is thoroughly filtered and washed.

Robert Mather, president of the Rock Island Company, was elected chairman of the board of directors of the Westinghouse Electric & Manufacturing Company on Jan. 19. Charles A. Terry, secretary of the company, was elected vice-president.

COMING MEETINGS OF A. S. & I. R. A. COMMITTEES

A number of meetings of committees of the American Street & Interurban Railway Association and of its affiliated associations are scheduled for next week. All of them will be held at the headquarters of the association, 29 West Thirty-ninth Street, New York, at the day and hour given below.

On Jan. 27, at 10:30 a. m., there will be a meeting of the executive committee of the Transportation & Traffic Association.

On Jan. 28, at 10:30 a. m., meetings of the following committees are scheduled. The membership of these committees is given below:

Committee on subjects, of the American Association

Thos. N. McCarter, Chairman,

Dana Stevens	R. N. Wallis
C. O. Kruger	Paul Winsor
W. A. House	C. B. Hardin

C. Loomis Allen

Committee on revision of dues

Arthur W. Brady, Chairman,

Howard F. Grant	Jas. F. Shaw
L. S. Storrs	B. V. Swenson

Committee on revision of membership dues

Gen. George H. Harries, Chairman,

W. Caryl Ely	Paul Winsor
Thos. N. McCarter	H. R. Goshorn

Committee on Interstate Commerce Commission classification

Gen. George H. Harries, Chairman,

Frank R. Ford	C. S. Sergeant
A. W. Brady	Hon. W. B. McKinley

Committee on municipal ownership and public relations

Gen. W. A. Bancroft, Chairman,

W. Caryl Ely	E. C. Foster
H. J. McGowan	Russell Robb
J. C. Hutchins	Percy Warner
Horace C. Andrews	Chas. N. Black

J. N. Roach

Committee on suggestions in President Goodrich's address

Jas. F. Shaw, Chairman,

C. G. Goodrich	C. Loomis Allen
W. Caryl Ely	R. N. Wallis
A. W. Brady	A. E. Lang

G. T. Rogers

On Jan. 29, at 10:30 a. m., there will be a meeting of the executive committee of the American Association.

A meeting of the executive committee of the Accountants' Association has been called for Jan. 30, at 10:30 a. m. There will be no meeting of the executive committee of the Engineering Association at this time, as the committee met in New York on Nov. 16. This meeting was reported in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1908.

President Shaw, of the American Association, announced this week the membership for the coming year of several standing committees of the American Association in addition to those mentioned above. They are as follows:

Committee on compensation for carrying mail

Robert S. Goff, Chairman,

H. A. Nicholl	E. S. Fassett
G. B. Hippee	A. D. Schindler

Committee on education

Prof. H. H. Norris, Chairman,

R. E. Danforth	Howard F. Grant
Prof. A. S. Richey	Prof. D. C. Jackson

These committees are not scheduled, however, to meet next week. The membership of the committees on insurance and on welfare of employees has not yet been announced.

THE SUNDAY CAR QUESTION IN CANADA

After a vigorous campaign by citizens' committees of London, St. Thomas and Port Stanley, Ontario, the voters of those towns declared for Sunday cars at the election held on Jan. 4. As the matter now stands the Ontario Legislature has the option of giving the city councils permission to pass enacting ordinances or to call for another popular vote. The companies affected in this matter are the South Western Traction Company, operating in all the places named, the London Street Railway and the St. Thomas (municipal) Street Railway.

The leaders in the Sunday car movement in London began their work a year ago with the organization of a committee of 100 citizens of all classes which undertook a thorough investigation of the Sunday car question throughout Canada. After a list of the Sunday car cities and towns had been secured the city clerks of such communities were asked to furnish a list of all important city officials besides a list of editors, judges, ministers and other prominent men. The following letter was then sent to such persons:

A citizens' committee has been formed here for the purpose of investigating the Sunday car question, with a view of installing Sunday cars in our city. We would like to hear from those towns and cities which have had some experience, and are writing to you as a representative citizen. Would you kindly let us know if any abuses have resulted from having Sunday cars in your city? Has church attendance decreased or increased? Is there any opposition at present to their running?

To this information would you kindly add your own opinion concerning the benefit and usefulness of Sunday cars as to your own city?

Your information will be gladly received by our committee.

Besides this letter a list of questions was sent to all the street railway companies covering all phases of Sunday traffic and Sunday labor. About 500 answers were received from over 70 places. The information received was tabulated as follows:

There are 54 electric railways in Canada, of which 37 run on Sunday. The following with a population of 1000 and over have Sunday cars:

Nova Scotia: Stellarton, Sydney, Halifax, North Sydney, Dominion City, Sydney Mines, New Glasgow, Trenton, Westville.

New Brunswick: St. John.

Quebec: Lachine, Hull, Aylmer, Sherbrooke, Lennoxville, Quebec City, Notre Dame de Grace, St. Laurent, Ahuntic, Point au Trembles and Montreal.

Ontario: Ottawa, Chatham, Berlin, Galt, Wallaceburg, Brantford, Windsor, Hamilton, Sandwich, Waterloo, Amherstburg, Oakville, Dundas, Walkerville, Burlington, Grimsby, Paris, St. Catherines, Merritton, Niagara Falls, Pt. Dalhousie, Welland, Sarnia, Point Edward, Toronto, Pt. Arthur, Ft. William, Essex, Thorold and Sault Ste. Marie.

Manitoba: Winnipeg.

British Columbia: Victoria, New Westminster, Vancouver.

Besides this list there are over 35 smaller places that have Sunday cars.

The first Sunday street car system in Canada was started in Montreal in 1861 and the most recent is that of Fort William, July, 1908. There are six larger places than London and over 45 places smaller than London, above 1000 population, that have Sunday car service. Edmonton, Alberta, expects to have Sunday cars next summer. St. Thomas has voted favorably on the question. Two other towns in Ontario will have Sunday cars operated during next summer.

SUNDAY TRAFFIC AND CHURCH ATTENDANCE

In Victoria, B. C., the traffic on Sunday in winter is 25 per cent less than on week days; in summer it is about the same; in Ottawa it is much less; in Port Arthur, about one-third, and in Halifax, about two-thirds. In Windsor, Chatham, Montreal and Hamilton it is about the same while the cars are running. Sunday traffic differs in many ways from that on week days. The early morning traffic is light. From 10:30 a.m. to 1 p.m. it is from fair to heavy. Then follows an hour of light travel. The afternoon traffic varies according to the season; in July and August it is very fair. In the evening the amount of traffic depends upon the size of the city and the kind of weather.

Regarding church attendance being influenced by Sunday cars, 212 replies declared church attendance had increased, 78 said that there was no difference, 22 said they could not tell and 5 letters from ministers declared that the attendance at their churches had decreased. In general the church attendance is increased, because it is easier to attend in bad weather. It was found that some downtown churches in large cities would have had to close but for the Sunday cars and that certain missionary features in these central churches were made possible only by the Sunday car service as otherwise workers from the residential districts could not reach them.

SUNDAY LABOR

The conditions under which Sunday labor is carried on were given particular attention. No employees, except the manager and superintendent, are required to work in any town or city seven days a week. Since labor on Sunday is required to run cars and the law forbids compulsory seven days' labor, mutually satisfactory arrangements were made in all these places. By a system of shifts, all employees have half a day on Sunday to attend divine service. Spare men and relief men work on Sunday and are glad to get the employment. The committee did not come across one place in Canada where men are compelled to work seven days a week.

THE GOOD OR EVIL RESULTS

Replying to the question: "Have any abuses resulted?" only one letter from any city or town official had any other answer than an emphatic "No." Some ministers regarded going to the parks on Sunday afternoons as an evil, but the large majority of the clergy regarded such an outing as beneficial, particularly for those who are denied the privilege during the week.

The committee obtained considerable information about the different campaigns for Sunday cars waged in each city. In each contest there were many prophecies of such results as Sunday theaters, dancing pavilions, baseball, circuses, beer gardens and a wide-open Sunday generally. The committee found that Hamilton has had Sunday cars for over 20 years; Toronto, 11 years; Windsor, 24 years, and Victoria, B. C., 18 years, and that not one of these things exists in any way in any one of these cities.

NECESSITY FOR SUNDAY CARS IN LONDON

Taking up the question of Sunday cars in London, hundreds of people interviewed on this subject mentioned the inconvenience and distress that are undergone on the day of the week when nearly all transportation is cut off. London is a city practically 3½ miles square containing 50,000 people and extending rapidly. It contains 16 religious denominations, but only 4 have churches in all parts of the city. All those who are attached to the remaining 12 denominations must walk from all parts of the city or attend the nearest church. In addition there is a long list of people who, because of their calling, must do considerable traveling on Sunday and in all sorts of weather. A partial list comprises doctors, nurses, employees of electric light and city gas companies, commercial travelers, police, telephone girls, post office officials, druggists, dentists, janitors, city firemen, railroad employees and mission workers. In fact, there is scarcely a family in London not affected in some way throughout the year by the closing of street car service on Sunday. London is the only North American city of over 25,000 population which has no Sunday cars.

At the present time the privilege of riding on Sunday is confined to the well-to-do. With a Sunday car service all the advantages of travel will be open to each citizen. There are more men employed in London to-day as coachmen, chauffeurs or in livery stables than it would take to run the entire street car system.

RECOMMENDATIONS OF GOVERNORS TO THE LEGISLATURES

In the issue of the Electric Railway Journal of Jan. 16, 1909, extracts were presented from the messages of the Governors of a number of States relating to legislation affecting railroad interests and recommendations regarding the control of public utilities. The abstracts which are appended supplement those published last week. In addition references to these same subjects are reprinted from the inaugural addresses of Governor Marshall, of Indiana; Governor Carroll, of Iowa, and Governor Prouty, of Vermont:

GOVERNOR GARST, OF IOWA

The State Railroad Commission has authority only within the State and over railroads and express lines, but there has been such changes in the business world and so great a development of conflicting interests that a reasonable expansion of its powers seems to be necessary. The commission should have authority over the telegraph and telephone lines as much as over common carriers. The commission should also have some measure of authority over the public utilities of the State, such as street-car lines, water works, gas and electric plants; but care must be exercised so that there is left with the municipalities sufficient power for the proper police regulation of these private enterprises. Matters purely local must be left to the local communities.

I recommend that you provide by appointment for an attorney on behalf of the State to have charge of all controverted questions before the Railroad Commission in which the rights of the people are in any way involved, and who shall also appear before the executive council in all matters involving any of the activities which are under the Railroad Commission. He should be required to devote his entire time to the study of those questions that are likely to come before either of these bodies for adjustment or adjudication, and should have at his disposal facilities for making thorough investigation and preparation of all cases. He should be appointed by the State Executive Council, subject to removal at will by that body, should give his entire time to the work and receive a salary of not less than $3,000.

It may be thought that in entering upon the field of interstate commerce we are going beyond our duty as a State, but when it is understood that a very large proportion of the transportation business of Iowa is interstate in character, it is imperative that we make ample provision for protecting ourselves.

GOVERNOR FOLK, OF MISSOURI

Experience teaches that it is not prudent to trust the gen-

erosity of the owner of a monopoly, and every public-service corporation has a monopoly. There is no necessity for regulating the charges of individuals or corporations that engage in ordinary lines of business open to competition. The law of competition fixes their charges upon a reasonable basis.

Believing that the cities and towns should have that control, the passage of an act was recommended giving full power to municipalities to regulate the rates of street-car companies, lighting companies and all public utilities operating in such municipalities.

This law was enacted at the extra session of the General Assembly in 1907. Under it each city and town in the State was given absolute power to regulate the rates of public utilities, and is thereby enabled to protect its citizens against injustice. The matter of rates charged the people of a city by street-car lines, lighting companies and utilities of that character is one that concerns the people of that city alone and does not affect the people of the entire State. It is, therefore, a problem which I think the people of each city should settle for themselves. If they do not gain relief when they have the power in their own hands to get relief, they have only themselves to blame.

GOVERNOR STUBBS, OF KANSAS

I most earnestly recommend the enactment of a public utilities law in Kansas, using whatever may be used to advantage of the present railroad law as a basis and adding the best features of the New York and Wisconsin public utilities laws, which have had a severe practical test.

This law should empower a commission to supervise not only the railroads, but all public utilities, including water, gas, electric light, heat, power, express, car, pipe-line, telegraph and telephone companies, and all other public-service utilities; also have jurisdiction over the issue of stocks, bonds and securities of railway and all other public utilities corporations; also the power of determining whether public necessity and convenience demand the building of additional lines of railway, or additional water, gas and electric light plants in communities where there is in operation a plant of similar character, under an indeterminate franchise; also the power to ascertain the physical value of all public utilities property within the borders of the State.

It should be charged with the duty of prescribing proper and uniform accounting methods and of requiring from all companies under its jurisdiction reports containing operating and financial and other data, including schedules of rates charged for the service rendered.

It should be charged with the enforcement of the law relating to hours of employment for railway employees; with power over railway terminals; power to require railroads to install telephone lines; to compel railroads to furnish connections with spurs running to industries; power to determine the value of public utilities, including street railways, and in condemnation proceedings by municipalities under the public utilities law; to enforce statutory regulation of wires and other overhead obstructions crossing railroad tracks.

It should also have the power to secure all information pertaining to the cost of construction, maintenance, operation and transportation of supplies or service of any kind that is furnished to the public.

This commission should consist of five members, to be appointed by the governor and be subject to removal by him for cause. This law should also provide for the three railroad commissioners to be a part of this commission during the ensuing two years.

The present corporation law seems to provide that when a corporation abuses its power a receiver shall be appointed for the purpose of winding up its affairs and disposing of the corporate property. This is often too drastic. The law should be amended so as to provide for receivers to correct corporate abuses, and when corrected to hand back the corporate property, without dissolving the corporation, into the hands of its owners and managers, subject to the supervision of the court. This amendment should be supplementary to the present law, so that either judgment may be pronounced at the discretion of the court.

GOVERNOR DAWSON, OF WEST VIRGINIA

The advisability of creating a public service commission is another subject discussed at some length in my 1907 message. Formerly our attention was given largely to regulation of railroads only, but there are other public-service corporations whose operations should be regulated by law. Nearly every public-service corporation is a monopoly, either by its nature or by circumstances. Every railroad in the State is a monopoly. There is no competition among them, and in the nature of the case cannot be to most of the people living upon their lines, because these people have no other railroad. The telegraph companies, express companies, the telephone lines and the companies which furnish water and natural gas and other means of lighting and heating in our cities and towns are practically monopolies, because there is no competition. If competition arises it is got rid of by buying out the opposing concern or by consolidating or by agreement upon prices. But there are other things that need regulation besides prices, and this is especially true as to railroads. I will not take time to mention them; the subject has been so much discussed that it is certainly not necessary. Efforts to get competition usually result in the last condition being worse than the first. For example, take the telephone and the capital city of the State as a specific instance. At first there was one telephone company doing business in Charleston. The people thought its rates too high or its service inadequate or both, and to get competition and correction another telephone company was granted the privilege. Now a citizen of the city is practically compelled to have two telephones in his place of business or his residence, and therefore pay the rental of two, and pay for each of the two what he had to pay for one, and get only the service that one ought to have given him for the money. The effort to get competition therefore has resulted in paying double the price that ought to be paid.

We are told, however, that this State is just on the eve of development, that we should not have stringent laws, but that we should treat capital tenderly and wait until we reach a maturer period in our development. The right to regulate these quasi-public corporations and companies is undoubted, both from a legal and a moral point of view; and the duty of the Legislature to protect the public is one of the highest put upon a representative body, and the duty is urgently imperative. Municipalities should not grant franchises without public approval.

GOVERNOR MARSHALL, OF INDIANA, IN INAUGURAL ADDRESS

The General Assembly of this State in 1905 enacted what is commonly called "A Railroad Commission Law." In 1907 it either passed or pretended to pass an act amending certain sections thereof. The preamble as found on page 454 of the acts of 1907 is vague, uncertain and does not disclose what act was attempted to be amended. Whether the present commission is de jure and whether its orders are legal are mooted questions. To prevent useless litigation I recommend the repeal of the acts upon the subject and the passage of a new one, providing that no more than two of the commissioners shall be of the same political party, that one shall be an attorney having knowledge of and experience in railroad and transportation law, and another shall have knowledge of the mechanical part of railroading.

While upon this subject it is not inappropriate to say that great loss of life occurs from public trespassing on railroad property. Additional legislation should make it an offense to enter upon such property for any purpose other than to transact business with such company, giving employees police power to arrest such trespassers, but taking care not to relieve the company from damages in the event of false arrest or brutal treatment.

A railroad hereafter ought not to be permitted to cross another railroad at grade without express permission of the commission.

The hour has gone by when it is necessary to beg investors to accept franchises. Hereafter municipalities should be prohibited from granting franchises until the price the public is to pay to enjoy them is clearly defined, and the municipality is permitted to share in the profits arising therefrom. When those things have been provided for no second franchise should be granted until the first has been annulled for fraud or failure honestly and efficiently to serve the public.

GOVERNOR CARROLL, OF IOWA, IN INAUGURAL ADDRESS

The question of the establishment of a commission to regulate and control the public utilities of the State has been discussed to a greater or less extent by some of our people and is, in my judgment, a subject worthy of your careful consideration. Such a system has been adopted in several of the older and in some of the newer States. Just how to harmonize our present statutes to such a system I am not prepared to say. In the various States the power of the commission differs. The scope of the power in some States at least embraces railways, street railways, telephone lines, electric light plants, gas and water plants and possibly other interests. The commission is given authority to regulate the issue of stocks and bonds, the making of rates, the methods of accounting, has power to inspect, etc. The authority granted to the commission in other States is, in this State, lodged with various officials, viz.: The executive council of the State, the railway commission, the city councils and the people of cities by the granting of franchises. It would perhaps be more satisfactory if the exercise of these various powers were lodged with a single board or commission to be known as a "Public Utilities Commission." This might be done by the creation of an entirely new commission, by enlarging the powers of the railway commission or by converting the railway commission into a public utilities commission.

The fact that ours is a comparatively young State and has few large cities may lead to the conclusion that the same necessity for legislation along the lines above suggested does not exist as in older States, but it should be remembered that we legislate for the future as well as for the present.

This whole subject is one far reaching in its effect and of great importance to all of our people. In my judgment its consideration cannot and should not be long deferred. I believe that it is entitled now to your consideration.

GOVERNOR PROUTY, OF VERMONT, IN INAUGURAL ADDRESS

The law passed during the last session of the Legislature providing for the regulation of railroads and the abolishing of grade crossings has met with such universal favor and has proved of such great benefit that a demand has sprung up that all public service corporations should have similar State supervision.

The work of our railroad commission has shown what may be done by wise supervision, backed by proper authority for the enforcement of such regulations as it thinks proper to make. We have seen many of our dangerous grade crossings abolished and a general improvement in the service rendered the public, not only as regards safety, but also convenience. This is as it should be.

When any corporation receives a charter from this State or comes here to do business, such a corporation becomes a child of the State and the only supervision which can be exercised over that body being through the State, the State is under moral obligations to see that it carries on its business in a proper manner, subject to the rights of the people. The number of public-service corporations doing business in our State is increasing rapidly, and it is the part of wisdom at this time to place them under such control as shall retain for the people their full rights.

I have spoken particularly of the telephone and telegraph corporations because they are perhaps more prominently before the public than any others at this time, but the same arguments apply to other public-service corporations and should be applied to them. For the purpose, therefore, of providing such supervision, I recommend that the name of the railroad commission be changed to that of Public Service Commission, and that it be given supervision over all public-service corporations with such power and authority as are now given this commission for the supervision and control of railroads. This will, of course, increase the work of the commissioners very materially and their salaries should be increased in proportion. They should also be given such clerical assistance as is necessary for the proper carrying on of this work.

Finland, it is reported, is to be connected to St. Petersburg, Russia, by an electric railway.

COMMUNICATIONS

BOW COLLECTOR VS. PANTOGRAPH

MURALT & CO.

NEW YORK, Jan. 14, 1909.

To the Editors:

I notice your editorial of Dec. 19 on bow collectors and the letters of Messrs. Varney and Murray in your issue of Jan. 9 on the same subject.

Mr. Varney contends that European designs were tried on the New Haven and failed. Mr. Murray takes issue with Mr. Varney and states that the spring-supported auxiliary contactor, modeled on European practice, did not fail, but, on the contrary, gave better results. Unfortunately, Mr. Murray did not have time to go thoroughly into this question on account of other more important matters which diverted his attention.

Please let me correct a misapprehension under which both Varney and Murray are laboring. Service conditions in Europe and America are not essentially different as far as current collection is concerned.

As pointed out by Mr. Murray, the governing features are: (1) train speed, (2) variation in height of trolley wire, and (3) amount of current collected.

Speeds attained in Europe in regular, everyday service are directly comparable with those in use on the New Haven. During the well-known Zossen tests bow collectors proved to be successful even at speeds of 125 m.p.h. Variations in height as encountered in Europe are not unlike those of the New Haven. I recall offhand at least one road, with which I was somewhat connected 8 or 10 years ago, which has variations from 4.8 m (15.7 ft.) to 6.5 m (21.3 ft.), or almost exactly what Mr. Varney gives for the New Haven.

With reference to currents collected, the European roads do a great deal more than the New Haven. Not only are the trains handled by one locomotive heavier than those of the New Haven, but it will be remembered that the line pressure generally used in Europe is only about one-third of that employed by the New Haven, so that the amperage on the New Haven is certainly considerably smaller than is common in Europe.

On the whole, the New Haven conditions are in no way dissimilar to European conditions as far as collection of current is concerned. You were, therefore, undoubtedly correct in suggesting in your editorial that European practice might have been followed to good advantage. Indeed, this refers not only to the current collecting devices, but to almost every one of the items which have given trouble on the New Haven. As a matter of fact, Mr. Murray's experiments and the various changes recently made in the New Haven equipment clearly corroborate this view.

Mr. Varney's statement that the New Haven type of pantograph has been selected by several European roads calls for further explanation. To the best of my knowledge no continental maker has yet used a plain pantograph device, nor do I know of any one contemplating such use.

Mr. Varney himself indicates that it is necessary to distinguish between a pantograph subframe, as illustrated on page 61 of your issue of Jan. 9, and a regular pantograph collector, as used by the Westinghouse Company.

To me the essential differences between bow and pantograph collectors appear to be as follows:

The bow collector moves about a relatively fixed center, and the shoe or collecting surface swings in a circle. The

movable part is light in weight, always in a trailing position, and it closely hugs the wire, accommodating itself without difficulty to all the inequalities and variations of the overhead construction.

The pantograph collector is a much heavier mechanical structure, and it has a plain vertical movement. The shocks resulting when such a device passes over low spots at high speeds are perfectly obvious.

Perhaps the best solution of collector difficulties will in the end be found in the roller bow, which combines the broad surface of the bow with the rolling contact of the trolley wheel.

I, too, can sympathize with Mr. Varney's feelings. But I do not see that he has in any way made out a case against you, and the onus is still upon him of proving that European developments were properly considered in the unfortunate New Haven experiment.

C. L. DE MURALT.

BOSTON, Jan. 16, 1909.

To the Editors:

I was very much interested in the letters by Messrs. Varney and Murray as well as in Mr. Kenyon's article, published in your issue of Jan. 9. Mr. Kenyon hits the nail squarely on the head when he charges to needless inertia and a low natural period of vibration in the collecting devices most of the troubles to which they are heir. A flexible suspension of the overhead construction is only a halfway step toward reducing trolley wire trouble. It is equally important to secure flexibility in the collecting device. It is true that to a certain extent the designers of the New Haven contact system were between the devil and the deep sea, but it seems they chose the former when they might have found a lifeboat upon the latter.

The trouble in the present system is not, of course, chargeable to the pantograph support which may have use in overcoming great differences of level, so much as to the mounting of the actual contact-making device in an unnecessarily massive way. The pantograph had previously been used chiefly for mining locomotives in which the changes of contact level are great, but where the speed is low and the inertia of the collector relatively small. It is certainly a device which does not appeal to one's sense of mechanical propriety when applied to high speed. There is, too, in the up-and-down motion of the pantograph an opportunity for grinding and chattering on the wire at its points of support that might to advantage be avoided.

It may take considerable experimenting to adapt any sort of collecting device to the extreme variations in the height of the trolley wire found on the New Haven road and a Chinese copy of foreign devices might give trouble. But the foreign engineers have been working upon the right principle in keeping down the inertia of the contact parts instead of trying to get flexibility in a device intrinsically disqualified as regards flexibility by its structure.

ENGINEER.

The traffic on the different lines controlled by the Underground Electric Railways Company, Ltd., London, Eng., continues to improve. During the last half of 1908 the receipts from operation of the District Railway showed an increase of £39,000 as compared with the same period during 1907. The increases on the tube lines during the same time compared with the corresponding period of a year ago were: Baker & Waterloo, £14,000; Piccadilly & Brompton Circus, £22,000; Hampstead, £19,000.

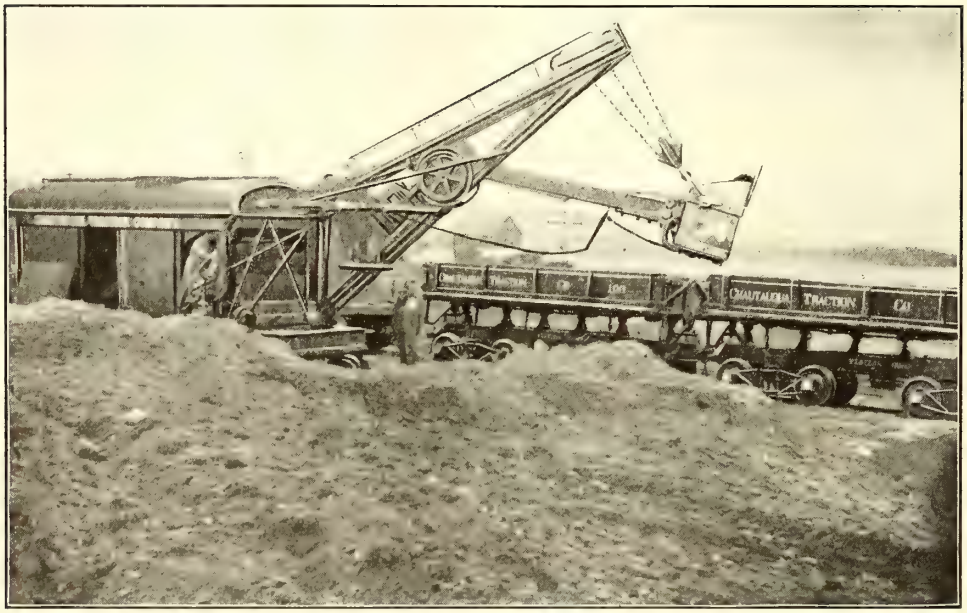
TRAINING SCHOOL FOR ELECTRIC RAILWAY EMPLOYEES

As a result of its success in training young men in the rudiments of steam railroad work, the National Railway Training Association, Kansas City, Mo., has enlarged its field, and is now giving a correspondence course in the duties of electric railway employees. The company's plan is to advertise extensively in such papers and periodicals as reach the homes of young men whom it is desired to interest in the possibilities of electric railway work. This advertising campaign has resulted in the association receiving many inquiries from men in all parts of the country. As far as it is possible to do so by correspondence, a selection is made from among these men of those who have the necessary requirements as to intelligence, education, morality, honesty, etc. The association also insists that the men who take up its course of training shall meet the proper physical requirements as to age, size, hearing and sight, and in addition, requires references from at least three responsible people. If a man qualifies in these requirements, a small fee is charged for enrollment and instruction, and the association agrees to use its best efforts in securing employment for students as near their homes as possible. The course of instruction is carried on along much the same lines as are employed by other well-known correspondence schools. The instruction sheets are fully illustrated with diagrams and engravings which are helpful to the student, and care is taken to avoid as much as possible anything which might confuse or prove to be too technical for the layman. The course does not claim to fit students to take charge of a car immediately. The object is to place within the reach of electric railways candidates for employment who have had a good elementary training in the fundamentals of their work. From these men it is possible to build up a force of efficient operatives within a short time and at a very small expense. When the student is taken for trial by the railway company, and is given a few days with an instructor on a car to familiarize him with the actual operation of it, he quickly grasps every point, because he has made a study of the fundamentals which candidates without any previous training take a long time to acquire. Two courses of instruction are given, one for motormen and one for conductors. Both courses are very complete, and include the study of the ordinary rules, an elementary exposition of the arrangement and use of the various parts of electrical apparatus on street cars, what to do in emergencies, how to handle accidents, the responsibility of motormen and conductors, methods of fare collection and many other points.

The National Railway Training Association has only been giving this course of instruction in electric railway work for a few months, but it has already received requests from five street railway companies in different parts of the country to have all men enrolled in the course near their cities sent to them for trial when they have completed their course. In one large city students of the association are given preference over all other applicants. The association receives its income solely from the small fee paid by students for the course of instruction. It charges neither railway companies nor its students any fee for furnishing men or obtaining employment. The railway companies which have approved the methods of the association by their request to have students sent to them are under no obligation on their part to employ any man who does not prove satisfactory on personal examination or to retain a man if he proves unsatisfactory later on.

COST RECORD OF AN ELECTRIC POWER SHOVEL

Some accurate records of the cost of operating an electric power shovel used in digging ballast have been furnished this paper by the Chatauqua Traction Company, Jamestown, N. Y. The shovel, which was built by the Vulcan Steam Shovel Company, Toledo, Ohio, weighs complete about 40 tons and the car body on which it is mounted is 27 ft. long. The dipper has a capacity of 1½ cu. yd. The various movements of the shovel are made with three d.c. 600-volt motors, one of 75 hp for hoisting, one of 30 hp for swinging the boom and one of 30 hp for crowding the shovel. These motors are protected from overloading by series overload relays, automatic controllers and circuit-breakers. In addition the swinging motor is fitted with a solenoid brake for overcoming the momentum of the boom and the crowding motor is equipped with a foot brake operated by the craneman.



Vulcan Electric Power Shovel Digging Ballast

The record of one of these shovels used by the Chatauqua Traction Company is given in the following quotation from a letter written by A. N. Broadhead, president:

A short time ago we placed an ammeter and voltmeter on the shovel for the purpose of ascertaining cost of operation per hour. Of course, the shovel did not work constantly during this time, owing to the shortage of cars—if we had been able to keep the shovel at work without a let-up, we feel sure the cost per hour would be materially reduced. The cost of power and help was as follows:

Yardage per hour	66 2/3
1 man	$0.33
1 man	0.25
2 men, at 15c	0.30
20.346 kw-hours at $0.0088	0.18
Oil and waste, estimated	0.04
Total cost per hour	$1.10
8 hours at $1.10	$8.80
8 hours at 66 2/3 cu. yd.	534 cu. yd.
$8.80 divided by 534 cu. yd.	0.0164 cent

The material in which the shovel was worked was a mixture of gravel, sticky clay and sand, which made it hard to dig, but as will be seen from the above figures, the cost was very low. There are, of course, several causes for this, the principal ones being, first, that as the shovel required no boiler, the cost of a fireman and of hauling coal and water was eliminated; second, that the work of the shovel was intermittent and when the shovel was idle no power was being consumed, as would be the case with a steam shovel where steam must be kept up constantly. The shovel could have been operated to its maximum capacity, which would have given twice the yardage at nearly the same cost, as the men had to be paid whether they were working or idle, and the additional cost for power would not have been more than twice what it was, which on the same basis would mean 1068 yd. at a cost of $10.24, or $0.00958 per cubic yard.

CONSOLIDATION OF AMERICAN BLOWER COMPANY AND THE SIROCCO ENGINEERING COMPANY

The American Blower Company, of Detroit, Mich., and the Sirocco Engineering Company, of New York, have been consolidated under the name of the former company with main offices at Detroit. The factory of the former Sirocco Company at Troy, N. Y., will continue in operation, together with the main works at Detroit. The personnel of the new company will be as follows: President, James Inglis, who has been the head of the American Blower Company; vice-president, William C. Redfield, former president of the Sirocco Engineering Company; treasurer, Charles H. Gifford, general manager of the B. F. Sturtevant Company up to a year ago, and secretary, Mr. Still, formerly chief engineer of the American Blower Company. S. C. Davidson, inventor of the original "Sirocco" apparatus, and now with the parent "Sirocco" works, Belfast, Ireland, is financially interested in this important merger.

The magnitude of this move is only in keeping with the rapid growth of the American Blower Company, which is one of Detroit's greatest industries, and shows that the company was thoroughly convinced of the merit of the "Sirocco" designs. In anticipation of a general improvement in business, the necessity for increased foundry facilities and the consummation of the "A B C"-"Sirocco" consolidation, the American Blower Company purchased outright during 1908 the complete foundry and plant formerly operated by the Northwestern Foundry & Supply Company, Detroit. The large triangular-shaped property owned and occupied by the American Blower Company since about 1881 has been entirely covered with buildings by the completion in 1907 and 1908 of a large steel plate fan shop and office addition. The company recently purchased a large tract of land across the street, upon which it is expected to erect within a comparatively short time new buildings, covering an area of approximately 175 ft. x 300 ft.

The Edinburgh (Scotland) Tramway Company will give its employees who have served 10 years a stripe, which carries with it increased pay. Merit medals are also to be introduced in recognition of any special meritorious act on the part of an employee.

News of Electric Railways

Fares for Cleveland Lines Under Consideration

Mayor Tom L. Johnson's absence from Cleveland has delayed the consideration of an increase in the street railway fare at Cleveland, and unless action is taken by F. A. Scott and Warren Bicknell, the receivers, a conclusion will not be reached immediately, as the Mayor and the City Council desire to have the matter taken up at public meetings. Few of the Councilmen have committed themselves on the request of the receivers for a short-term grant at the rate of six tickets for 25 cents or a cash fare of 5 cents. In anticipation of unfavorable action on the part of the city administration, the receivers have arranged to operate under the original franchises. If the contention of the Cleveland Railway that the franchises on Woodland Avenue and for the West Side lines do not expire until 1910 is sustained, the work of the receivers will be greatly simplified. If, however, it is decided that the franchises have expired and that the lines must be operated at a 3-cent fare in accordance with the franchise over these routes granted to the Municipal Traction Company, the receivers will not be obliged to give transfers to any other lines, because these lines are not earning 6 per cent on the capitalization, the condition on which free transfers would be given.

The lines on which the receivers have a right to make a fare of 5 cents or 11 tickets for 50 cents are as follows: St. Clair, Superior, Payne, Wade Park, Euclid, Cedar, Scovill, Broadway, Union, East Fifty-fifth, East 105th, Fairfield, West Fourteenth, Scranton Road, Clark Avenue, West Twenty-fifth and Burton. The undisputed 3-cent lines are Denison, Fulton, Central and Quincy. The lines on which the Cleveland Railway Company claims franchises until 1910, but which the city authorities claim have expired, are the following: Woodland, Kinsman, Lorain, Bridge, West Madison and Detroit to the city limits. The Clifton Boulevard line to Edgewater Park expires with the Detroit line, but from there to the western city limits it runs on a private right of way.

Robert W. Tayler, District Judge of the Circuit and District Courts of the United States for the Northern District of Ohio, addressed two letters to the receivers of the Municipal Traction Company on Jan. 11, on the subject of fares. Abstracts of these letters follow.

In the first letter Judge Tayler said:

"The early expiration of some ordinances and the comparatively short life of the longest of the 5-cent ordinances make it absolutely necessary for you to earn more money from operation than if there was a long-time franchise.

"The public burden thus imposed during the life of these short-time franchises can only be avoided, and can now and for all time be avoided, by the immediate passage of an ordinance, which, while allowing a rate of fare which will permit the raising of money for improvements and extensions in accordance with sound business principles, will, by its fixed and certain provisions, make a sure and effective contract between the city and the owners of the property that no more shall be charged than the service actually costs. In other words, an ordinance embracing all of the commendable features of the so-called security grant, but containing in addition the vital and distinguishing features and made so by valid contract:

"(1)—The limitation of fare to the actual cost of service, including in this, of course, 6 per cent and no more on the stock and values which have not passed into stock, and interest on the bonds; and,

"(2)—A system of accounting and inspection, in which the city has the right so far to participate as to make certain that only this cost of service is charged.

"Speaking as a citizen of Cleveland, such an ordinance ought now to be passed. If it should be passed, every creditor of either the Municipal Traction Company or the Cleveland Railway can, I am sure, have his claim satisfactorily adjusted immediately after the ordinance becomes effective; steps can at once be taken to provide for new equipment, and the community will be absolutely assured that it will never be required to pay more for street car service than it costs; there will be no speculating in the franchises; there will be no ground for suspecting anyone of corruption, and every incentive will be present to provide the highest kind of street car service, and what the people really want and are entitled to have will at last be accomplished.

"With such an ordinance, what the maximum rate of fare may be is only important in so far as it must be high enough to invite the investment of new money in extensions and improvements, many of which are needed in this community, and none of which can be made until after the passage of a permanent ordinance.

"The passage of such an ordinance now would not, in any way, affect or prejudice the rights or claims of the Municipal Traction Company or the Cleveland Railway, as between themselves, whether those rights or claims relate to the lease or to the property of the Forest City Railway. In other words, it would not at all affect the issues to be tried out in the pending litigation.

"Finally, it would put Cleveland in the position, after these years of struggle, of having solved the street railway problem on righteous lines."

Judge Tayler said in the second letter:

"The several things which you have to consider are as follows:

"First—That the property in your hands must be suitably protected and preserved. It ought not to be permitted to deteriorate in value to the slightest extent except as use, with a perfect care and maintenance, will necessarily cause deterioration.

"Second—The operation of the lines under your care is the performance of a public service and a public duty. A street railroad operated in any other way would be intolerable. To the extent, therefore, of the equipment, power and funds at your disposal good service must be given.

"Third—The creditors of the companies interested in the property must be protected. Those whose debts are due ought to be paid at the earliest possible moment. The propriety of their prompt payment depends not at all upon the question as to whether the property has been operated at too low a rate of fare, but upon the fact that the debts are due and arose out of the operation of the property.

"Fourth—The owners of the road, the lessor and the lessee as well, are entitled to have their property rights, whatever they may be, protected and preserved at all events, subject, of course, to their contract obligations to the public and to their creditors. There is one part of the property which the receivers are daily consuming which they cannot restore or replace, and that is the franchise right to operate the lines at all in this community. This is not a right to be trafficked in, but it does furnish the only basis on which they can receive any returns on their investment.

"Fifth—The contract rights of the Cleveland Railway Company permit it to charge 5 cents for one fare or 50 cents for 11 tickets on some lines, with certain transfer privileges, and 3 cents on the other lines with transfer rights depending upon certain conditions which, presumably, do not now exist. In view of the speedy termination of some of the franchises carrying the higher rates of fare and of the relatively early termination of other like franchises, it is quite apparent that unless some definite arrangements can be at once made with the City Council for a satisfactory and uniform rate of fare you must resort to the rights provided for in the franchises which were in effect last April before the passage of the ordinance which was defeated in October.

"Sixth—I approve the policy you have outlined that in ministering to a community like Cleveland it is impossible and undesirable to find an equality of profit in operating all lines, and that some portions of some lines can only be operated for the time being at a loss; it seems to me that every properly regulated and developed street railroad system must keep ahead of the community population, not behind it; it must encourage on its own account and for the public benefit the expansion, not the contraction, of the occupied area of homes; street railroad service is primarily allowed, not for the private profit, but for public convenience; and the kind of street railway service, the cost of which the public is willing to pay for, is the kind which I have outlined in this paragraph.

"Although the public convenience is the fundamental justification for the permission to use the streets for tracks and cars, the investment in these, whether made by the public as such or by private individuals, must, in common honesty, be protected, but the time is past, at least in this community, when more than that protection can be afforded. This permission means no more and no less than a fair return on the capital invested, with some assurance of the return of the principal sum when the time arrives for such return, either by a new franchise or by the purchase of the property at a fair price by the successors to the franchise or by the creation of a sinking fund which will safely protect such a precarious property as tracks and equipment in the streets of a city with no right to operate

them. The latter is a contingency always to be avoided, if possible; for, in the long run, the public must suffer any consequent loss.

"The pole star, therefore, to guide you is that such a rate of fare only is to be charged as will be sufficient to give the best practicable service at cost, having regard to the comfort and convenience of the public who use the lines, their suitable operation by competent employees, the payment of a fair return on the investment and the protection of the investment as such.

"Under your administration the community can be protected no matter what the rate of fare may be; for, if it should happen that the rate of fare as charged by you is large enough to create a surplus the public can be certainly protected from any distribution of this surplus among the owners of the property by suitable stipulations and conditions in the permanent franchises which must, in the nature of things, be hereafter granted."

Attorney A. C. Dustin has announced that the stockholders and directors of the Municipal Traction Company may be asked to return the money that was paid out to the holders of guaranteed stock as dividends after the Cleveland Railway refused to make a definite promise of paying the rental money out as dividends. The amount so paid was about $29,000, and if action is started to recover it, it will be on the ground of misapplication of funds.

J. B. Tanner has resigned as auditor of the Municipal Traction Company in order to aid the new State Treasurer of Ohio to reorganize the accounting system of the office. He became auditor of the company on Aug. 25. L. W. Blyth, of the firm of Ernst & Ernst, will fill the position temporarily.

The hearing on claims before Master Commissioner Belford has begun. Secretary Henry J. Davies and Attorney Harry J. Crawford are endeavoring to reach a decision regarding them, so that the attorneys for the company may decide each as it comes before the master. The work is progressing slowly. Considerable controversy arose over bills for material used in converting old cars to the pay-as-you-enter type. An attempt has been made to have all this material classed with the items representing maintenance and operation. The creditors are endeavoring to show that they did not know for what purpose the materials were to be used when the purchases were made. The claims of S. B. Clark and Bronson Winthrop for legal services were also brought up. Attorney Crawford objected to the amount of the claims and the classification. D. C. Westenhaver, attorney of the Municipal Traction Company, stated that in his opinion the claims are unclassified.

The notice issued by the receivers some time ago that all former employees of the Cleveland Electric Railway who desired to re-enter the employ of the company should file their applications by Jan. 5 in order to be preferred over others, has resulted in the filing of 800 applications. About 500 men had already been given positions.

On Jan. 18 the Standard Underground Cable Company and the Electric Storage Battery Company, creditors of the Municipal Traction Company, through their attorneys, A. V. Cannon and S. H. Tolles, respectively, filed a motion in the United States Circuit Court, asking that the receivers of the Municipal Traction Company be instructed to charge the fares provided for in the franchises granted to the several companies now included in the Cleveland Railway Company. The motion states that debts have accumulated against the Municipal Traction Company to the extent of more than $400,000, all of which is unpaid. The receivers took over $335,000 when they were given charge of the property. This amount was applicable to the payment of debts and expenses, but has been drawn upon, the motion states, by the receivers for the payment of taxes, fixed charges and other running expenses. The fund for the payment of creditors is thus being depleted. The motion takes the initiative for raising the fare from the receivers and puts it upon a court for decision.

Recommendations Affecting Subways in New York

The Public Service Commission of the First District of New York has made public Chapter II of its annual report to the New York Legislature. The necessity for new legislation regarding rapid transit in New York is discussed, specific recommendations are made for such new legislation, and there is an exposition of the action of the Board of Estimate of New York in not taking action regarding rapid transit progress in New York. Briefly stated, the commission recommends a constitutional amendment exempting rapid transit bonds from the consideration of the debt limit of New York City; an amendment providing for the termination of franchises at the time the franchise for the connecting main line expires; an amendment permitting construction by private capital, and payment of part earnings to the city; an amendment putting extensions under the same law, practically, as new lines; an amendment to the Elsberg law permitting the granting of franchises for a longer term than 25 years, and an amendment having to do with the payment by operating companies of annual interest and sinking fund charges. The commission favors permitting the cost of rapid transit lines to be assessed in whole or part on the lands benefited, but says that it is not yet prepared to recommend a definite method.

In reviewing the history of the Elsberg law, passed, in the commission's opinion, when every one had an erroneous impression as to the probable earnings of the subway, the commission says:

"All know now that both sides were deluded as to the profits of subway railroads, because subsequent events and the experience of this city and others have furnished instruction. Subway operation does not prove so profitable or attractive as it appeared to be in 1904. The rapid transit board, believing that the law as it stood would obtain more subways for New York City on a safe basis, opposed the alteration of the Rapid Transit act, which would shorten the term of operation and make possible the separation of contracts for construction, equipment and operation. Later events show that some of the main features of the amendments were based on a miscalculation."

The main argument in favor of construction by private capital, the commission says, is that the rapid development of the city makes necessary more construction than can be accomplished with city money.

The report then takes up the loop subway line, now under construction, and the probable difficulty in getting an operating company when it is finished, urging that greater freedom should be given those empowered to make operating contracts. Next the commission asserts that it is not of the opinion that the city would have obtained a thoroughly effective subway system had the Elsberg law not been passed. The probable advantages of the assessment plan are gone into somewhat thoroughly, on the basis that, in undeveloped districts particularly, it would be well for the city to bear at least a portion of the burden of expense at the outset. The drawbacks of the plan are also dealt with, notably the possibility of the operation proving a losing venture in the beginning.

The commission's recommendations are:

"A constitutional amendment exempting from the 10 per cent debt limit bonds for the construction of rapid transit lines, when, so far and so long as such rapid transit lines shall be self-supporting.

"An amendment to the Rapid Transit act providing that operating contracts for extensions of rapid transit lines may be made to terminate at the same time as the original operating contract, this commission having the power in conjunction with the Board of Estimate to fix the terms, conditions and compensation and to readjust the same each 20 years thereafter.

"An amendment to the act which shall give this commission the power in conjunction with the Board of Estimate to allow the construction and operation of radid transit lines by private companies upon payment of part of the earnings to the city, or other proper terms and with a reservation to the city to purchase at any time after a certain period not more than 20 years and without any payment for the franchise itself.

"An amendment to the act which shall give this commission the power, in conjunction with the Board of Estimate, to grant franchises to existing corporations owning rapid transit lines, to construct and maintain extensions or to lay and maintain additional tracks, with the reservation to the city of the right to purchase after a period of not more than 20 years.

"An amendment to the act making it possible for this commission, in conjunction with the Board of Estimate, to make operating contracts for a longer period than 20 years or else to make operating contracts terminable at any time after a certain period of not more than 20 years, with a provision that the equipment shall be purchased at a fair price by the city at the termination of the contract.

"An amendment to the act rescinding the requirement that the operator must pay interest and a specific annual sum for sinking fund on the entire cost of a rapid transit line, and permitting the commission and the Board of Estimate to adapt the operating contract to the specific needs of each case."

Then follows the history of the Fourth Avenue subway, Brooklyn, with a reference to the fact that while $23,000,000 was supposedly set aside for the construction work, when the contracts were submitted not even $2,850,000 was forthcoming, and that the Board of Estimate has been restrained from acting on the contract by a suit admittedly instigated by one of its own members. The report continues:

"If the board has acted unwisely in the past, desires to

change its action, and will do so, this commission will adjust itself to the new conditions. Several miles of new subway would now be under construction if the Board of Estimate had acted upon the contracts before it and authorized an expenditure of less than $3,000,000."

Resolution Urges Electrification of Buffalo Terminal Lines.—Alderman Fisher, of Buffalo, has offered a resolution to the Council of Buffalo for the adoption of an ordinance that shall provide for the electrification of all the railroad lines now operated by steam within the city limits of Buffalo.

Chicago & Oak Park Elevated Railroad Ordinance.—The City Council of Chicago has resubmitted the pending ordinances of the Chicago & Oak Park Elevated Railroad to the local transportation committee at the request of Mayor Busse, who is said to be opposed to the 14-year franchise extension, but is willing to grant a franchise for an extension to Humboldt Park.

Trial of Chester Strikers Postponed.—The trial of the 13 men charged with complicity in dynamiting cars of the Chester (Pa.) Traction Company and with conspiring to damage the company's property and interfere with the operation of its cars during the recent strike, has been postponed until March. The bail in each case is $1,000. At the first trial the jury disagreed.

New Offer for Sale of Steinway Tunnel.—It is stated that the Interborough Rapid Transit Company, New York, will soon make another offer to sell the Steinway tunnel under the East River to the City of New York. The previous offer of the company to sell to the city was rejected on Jan. 5 on the advice of the Public Service Commission of the First District of New York.

Southern & Southwestern Railway Club.—The Southern & Southwestern Railway Club was to meet at the Piedmont Hotel, Atlanta, on Jan. 21. The subject of headlights was to be concluded and Mr. Klinck was invited to address the club briefly on "Records of Shop Cost." The advisability of holding future meetings of the club in the new club rooms of The Mechanical & Manufacturers Club was to be considered.

Newspaper Series on Boston Problems.—As one of the answers to the question, What is the matter with Boston? the Boston *Herald* is publishing a series of 10 articles by George W. R. Harriman on the transportation problems of Greater Boston. Mr. Harriman, the author, is a civil engineer of Boston and has been employed as a special agent of the Interstate Commerce Commission. The articles are illustrated by numerous half-tones and line engravings.

Consideration of Forty-second Street Tunnel, New York, Postponed.—The Board of Estimate of New York on Jan. 15 postponed for two weeks consideration of the plan to build a tunnel on Forty-second Street from the Grand Central Station to Sixth Avenue, for all street railway and vehicular traffic. The junction of Fifth Avenue and Forty-second Street is one of the most congested traffic points in New York.

Request for Information Regarding Broken Rails.—The Public Service Commission of the Second District of New York has adopted a resolution requesting the steam railroads within its jurisdiction to report on or before March 1, 1909, the number of broken rails in service on their lines in New York State including the electrically operated portions of such railways showing the weight of rail per yard, the year rolled, the name of the maker and whether the rail was made by the Bessemer or open-hearth process.

New York Commission Disclaims Jurisdiction Over Electrification.—The Public Service Commission of the First District of New York recently dismissed the application of the New York, New Haven & Hartford Railroad for permission to electrify the so-called local line between Mott Haven and New Rochelle, on the ground that it had no jurisdiction in the matter. Commissioner Bassett says that the New York, New Haven & Hartford Railroad may make the proposed change of motive power without obtaining the approval of the commission.

Tenant Sought for Steinway Tunnel.—At the meeting of the Board of Estimate of New York on Jan. 15, Herman A. Metz, comptroller of New York, offered a formal resolution asking the New York & Long Island Railroad to apply to the Board of Estimate for a franchise to operate the Steinway tunnel under the East River. Mayor McClellan and Patrick H. McGowan, president of the Board of Aldermen, succeeded in having the resolution held over, saying that it pledged the board to pass the franchise if the company applied for a grant.

Pennsylvania Railroad Commission Presents Report.—The Pennsylvania State Railroad Commission has presented its first annual report to Governor Stuart. The commission reviews both street railway and steam railroad conditions within the State and recommends among other things the passage of a law to provide for the supervision by the commission of all increases in the capital stock of both steam railroads and electric railways. The commission also says that it should be given power to authorize the adoption by steam railroads and street railways of safety appliances at the grade crossings, and that trespassing upon the private right-of-way of steam or electric railways in Pennsylvania should be made a misdemeanor punishable by a fine or imprisonment.

Suit to Prevent Passage of Low Fare Ordinance in Detroit.—Arguments were begun in the United States Court of Appeals at Cincinnati in the Detroit 3-cent fare case on Jan. 8. The franchises that have expired in Detroit were for connecting links in various routes, for the most part short gaps in the lines. The city in renewing these undertook to impose a fare of 3 cents. The Guaranty Trust Company, New York, holder of first mortgage bonds of the Detroit United Railways, brought suit in the United States Circuit Court at Detroit to prevent the city from advertising the ordinance, as provided by law, and secured an injunction. The city carried the case to the Appellate Court. Attorneys for the Guaranty Trust Company contend that if the ordinance goes into effect it will impair existing contracts with the city and that further damages would result to the company.

New England Railroad Club.—The regular meeting of the New England Railroad Club was held at the Copley Square Hotel, Boston, on Jan. 12. The speaker was N. W. Storer, of the Westinghouse Electric & Manufacturing Company, and his subject was "Single-Phase Railway Systems." He discussed the limitations of direct-current transmissions for railway service, and pointed out the advantages of alternating current for long-distance work, with special reference to interurban practice and the electrification of steam railroads. He also emphasized the advantages of eliminating the rotary converter substation and substituting when necessary the stationary transformer installation which requires only occasional attendance. Part of the address was devoted to a description of the single-phase installation of the New York, New Haven & Hartford Railroad's terminal lines at New York, and was illustrated by the stereopticon. About 200 members and guests were present.

Negotiations for Sale of Winnipeg Electric Railway to City.—D. D. Mann, representing the Winnipeg Electric Railway, met the power committee of the City Council of Winnipeg, Man., on Jan. 16, regarding the sale of the property of the Winnipeg Electric Railway to the city. Mayor Evans said that the city was willing to take over the holdings of the company at a fair valuation and asked Mr. Mann to set a price on the property. Mr. Mann replied that he could not act without the authority of the directors of the company, but said that he knew that no arrangement for the sale of the property to the city would be entertained by the directors that did not provide a consideration for the franchise. This value, he said, the directors felt should be fixed at 6 per cent of the annual earnings of the company. This would mean that on the earnings of 1907, the company would want $16,645,000 for its property and on the earnings of 1908 approximately $19,000,000. On Jan. 18, Mr. Mann made an alternative proposition to the city, one of the features of which was a proposed reduction of 20 per cent in the price of commercial lighting providing the city would abandon its plan to build a municipal lighting station. The offer was rejected.

New England Street Railway Club to Co-Operate with American Street & Interurban Railway Association.—Matthew C. Brush, president of the New England Street Railway Club, has announced that he has appointed the following committee to co-operate with James F. Shaw, president of the American Street & Interurban Railway Association, in increasing the associate membership of the American Street & Interurban Railway Association: Henry C. Page, M. H. Bronsdon, A. H. Warren, Geo. W. Palmer, Jr., Franklin Woodman, Geo. W. Knowlton, H. R. Luther, W. D. Wright, E. P. Shaw, Jr., Robert S. Goff, J. H. Neal, F. J. Stone, C. A. Sylvester, John J. Lane. Members of the New England Street Railway Club who wish to become associate members of the American Street & Interurban Railway Association are requested by Mr. Brush to present their applications to any one of the above-named committee or to send them direct to John J. Lane, secretary of the New England Street Railway Club, who will forward them to the secretary-treasurer of the American Street & Interurban Railway Association in New York. Mr. Brush enclosed in his circular to members of the New England Street Railway Club a booklet regarding associate membership in the American Street & Interurban Railway Association.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Indiana.—The Indiana Railroad Commission proposes to have introduced into the Legislature several measures which will cover points brought out in the study of electric railway and railroad conditions in Indiana made by it during the past year. One of the measures would impose a penalty for reckless driving of automobiles and wagons at grade crossings, and make it a misdemeanor for the driver of an automobile or vehicle to cross railroad tracks without first dismounting to observe whether a train or car is approaching. Another measure will make it a misdemeanor to trespass upon the right of way of steam or electric railways. The Indiana Manufacturers' & Shippers' Association has had a bill prepared for introduction, which provides for the enlargement of the power of the railroad commission so as to give that body supervision over the rates charged by street railway, gas, water, telephone and other public service corporations. Senator Stotsonburg has introduced a bill to permit toll road companies to construct electric railways on right of way. It is said that the purpose of this measure is to secure electric railway rights on the New Albany & Paoli Plank Road Company. A bill has been introduced to amend the employers' liability law so as include all common carriers.

Massachusetts.—A bill has been introduced in connection with the petition of Butler Ames for legislation to authorize the Boston, Lowell & Lawrence Electric Railroad to construct an elevated structure and subway in Lowell, Lawrence, Somerville and Boston. The proposed legislation is sought in accordance with the so-called interurban or electric railroad law of 1906 (Chap. 516), and the Railroad Commission is to pass upon the project as to locations, appurtenances, terminals, track facilities and its necessity. A bill has been introduced giving the Highway Commission power to order electric railways and other public service corporations to place their wires underground where the commission deems it consistent with safety and proper operation, the work to be done by 1914 in cities of more than 25,000 inhabitants, and by 1915 in all other places in the State. A bill has been introduced in which provision is made for the construction of a tunnel from Sullivan Square to the North Station, Boston, by the Boston Transit Commission.

New Jersey.—The Legislature convened on Jan. 12. In accordance with the recommendation of Governor Fort in his annual message that the authority of the Railroad Commission should be broadened and extended to include all public service corporations, at least two public utility measures will be presented shortly. In fact, Assemblyman Martin has already had a bill drawn which places all the public service corporations under State control and delegates rate-making power to the controlling body. Senator Gebhardt, the Democratic minority leader, will present a similar bill. The State Board of Agriculture of New Jersey, in session at the State House, Trenton, will consider the resolutions introduced with the approval of a special committee on railroad rates and transportation, demanding that the Legislature enact a public utility commission law, with rate-making features, and also that the present electric railway freight law be repealed. As now framed, the electric railway freight law cannot be utilized except where all the municipalities through which a street railway passes adopt ordinances with uniform regulations. This condition, it is argued, cannot be complied with by the companies, owing to the varying views in different town-governing boards over the question of how freight should be carried under the law.

New York.—Chairman Willcox, of the Public Service Commission of the First District of New York, and Chairman Stevens, of the Public Service Commission of the Second District of New York, have been in conference at Albany regarding the amendments to be made to the Public Service Commission law in accordance with the recommendations of Governor Hughes to the Legislature. Senator Travis has introduced the amendment to the Rapid Transit Act, which permits the construction of subways in New York by private capital. Assemblyman Robinson has also introduced the same bill. A plan to do away with the steam railroad tracks on Eleventh Avenue, New York, and other streets on the lower West Side of New York has been sent to the Legislature by the Public Service Commission of the First District. The plan is for the construction of a freight subway under the marginal streets of New York, and the report recommends the passage of an act which will allow the commission to grant a franchise for the building of the subway by private capital. To this end, it would be necessary, according to the report, to grant a franchise for more than 25 years, which is the limit allowed under the rapid transit laws, for otherwise it would be impossible to attract the necessary capital.

Financial and Corporate

New York Stock and Money Market

January 19, 1909.

The stock market in Wall Street has been dull during the past week and, in fact, there has been little trading except that of the professionals. Prices have fluctuated within a narrow margin, but the general tendency has been toward lower levels. The sales to-day amounted only to 597,000 shares, one of the smallest totals since the beginning of the new year. The copper stocks have been fairly well sustained in spite of the fact that the price for copper metal is lower and that there seems to be a vast over-production. This is due, of course, to the fact that the large financial interests back of the copper production and the copper stocks are determined that prices shall be maintained. There has been some activity in traction stocks, which is hardly explainable except upon the theory that the reorganization plans for the Metropolitan system are under way. So far, no announcement of these plans has been made. Interborough-Metropolitan preferred was active in to-day's market and recorded a break which was explained by the report that an assessment might be made if the company attempted eventually to take over the Metropolitan Street Railway. The stock recovered, however, and closed at almost as good a place as the opening.

There is still a good market for all kinds of bonds, and every offer that is made is absorbed without any apparent effect upon either the money market or the stock market. As long as the banks throughout the country continue to hold large cash balances the bond market will remain good. As short-time notes mature, the debts which they represent will be funded.

Money remains remarkably cheap when it is considered that there is serious disturbance in the European financial centers and that the Bank of England has increased its discount rate from 2½ to 3 per cent. The quotations to-day were for call loans, 1½ to 2 per cent, and for 90-day paper, 2¾ to 3 per cent.

Other Markets

In the Boston market, traction stocks have been inactive during the last week. Massachusetts Electric in both issues was offered for sale and prices were about those which have prevailed for some months past. The common sold up to 12¼ and the preferred sold for 59¼. Boston Elevated was traded in at 128¾.

In the Philadelphia market, Rapid Transit stock was the most active traction issue. This stock has been fairly active all week and closed at about the top figure for the present movement. Union Traction was also traded in to some extent, the average price being about 52.

In Chicago, tractions were almost entirely out of the market. A few shares of Metropolitan Elevated came to light and changed hands at about 50. Trading in the City Railway's rights has been very slow. There continues to be some market for Subway stocks.

In Baltimore the various bond issues of the United Railways Company continued to be active. While there is little trading in stock, there always seems to be a market for these traction bonds. The 4s are selling for 85½ and the funding 5s for 78½.

Quotations of various traction securities as compared with last week follow:

	Jan. 12.	Jan. 19.
American Railways Company, Philadelphia	*45½	45
Boston Elevated Railway	128½	128¾
Brooklyn Rapid Transit Company	69¾	71¼
Chicago City Railway	180	*180
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a73½	a75
Consolidated Traction Company of New Jersey, 5 per cent bonds	a104½	a105½
Detroit United Railway	*55½	*55
Interborough-Metropolitan Company	15	15¾
Interborough-Metropolitan Company (preferred)	43	44½
Manhattan Railway	149	153
Massachusetts Electric Companies (common)	11¼	12¼
Massachusetts Electric Companies (preferred)	59	59¼
Metropolitan West Side Elevated Railway, Chicago (common)	16	16
Metropolitan West Side Elevated Railway, Chicago (preferred)	50	46
Metropolitan Street Railway	*42	*42
North American Company	73	73⅞
Philadelphia Company, Pittsburg (common)	43⅛	*42¼
Philadelphia Company, Pittsburg (preferred)	43½	*44
Philadelphia Rapid Transit Company	25¾	26
Philadelphia Traction Company	90½	91
Public Service Corporation, 5 per cent collateral notes	—	a99½
Public Service Corporation certificates	—	a76½
Twin City Rapid Transit Company, Minneapolis (common)	100⅜	*99½
Union Traction Company, Philadelphia	52	52¼

a Asked.
*Last sale.

Annual Report of Quebec Railway, Light & Power Company

Net earnings of the Quebec Railway, Light & Power Company for the year ended June 30, 1908, amounted to $238,461. After the deduction of interest and preferred stock dividends a surplus was left of $87,066, of which $20,000 was transferred to the "accident insurance" account.

George H. Thomson, the president, says in his report to shareholders:

"Considering the financial stringency existing during the year, and the fact that the completion of our new power house and transmission lines was unavoidably delayed, and that no income was received from this source, your directors feel that the results are satisfactory.

"The new power house, transformer houses and transmission lines, etc., are now practically completed and have been in operation since the close of our year, with very gratifying results. We look forward with confidence to increased profits from this source during the current year.

"The proceeds from the sale of $250,000 additional preferred stock will be used to pay off the floating indebtedness, the whole of which has been incurred in developing the resources of the company.

"We have pleasure in reporting that the company's operations during the late Tercentenary celebration were successfully carried out and that notwithstanding the crowded state of the streets and the large number of passengers carried, no accident of a serious nature was reported. As the festivities took place after the close of our financial year, the benefits accruing to the company do not appear in the figures of the present annual statement."

The report of Edward A. Evans, general manager of the company, says in part:

"The total number of passengers carried on the Citadel division was 6,049,203, an increase of 534,075 over that of the previous year. The average fare per passenger was 4.22 cents, as against 4.24 cents the previous year, but the income per capita of the population increased from $3.24 to $3.55, still an exceptionally low figure as compared with other cities.

"The operating expenses of this division have increased from 12.86 cents per car-mile to 13.64 cents; this is principally accounted for by the increased cost of labor and material, representing an increase of nearly half a cent per car-mile, and the increased cost of the removal of snow, representing nearly another quarter of a cent per car-mile; the exceptionally unfavorable climatic conditions last winter brought the total cost of snow removal up to $17,380—the highest record since the inception of the road. Six new open cars and five new closed cars, as also five double electrical equipments, have been added to the rolling stock of this division during the year.

"It having been decided to build a new roof to the car barn of this division, plans were prepared for a steel and concrete roof, so as to render the building more secure from the risk of fire; this work is progressing satisfactorily and will be completed by the end of October next.

"For the information of the shareholders, it might be well to mention that during the Tercentenary, viz, from July 21 to 31, both days inclusive, this division carried 679,000 passengers, an increase of 412,000 over the corresponding period of the previous year, the largest number carried in any one day being 74,000.

"During the year, no fatal or serious accident happened upon this division.

"The total number of passengers carried on the Montmorency division was 1,398,345, an increase of 163,085 over the previous year. The average fare per passenger was 10.10 cents as against 10.40 cents last year. Upon the elevator at Montmorency 239,910 passengers were carried, as against 226,213. The freight business represents 111,001 tons, or 5826 car loads, an increase of 84,897 tons.

"The operating expenses upon this division have increased considerably, due to a variety of causes, but have, certainly for some considerable time, reached the maximum. The principal causes are: increased cost of labor and material, Government taxes (increased from $10 to $30 a mile) and the running of late trains to and from St. Anne and Quebec during the winter months. There was also a considerable expenditure for the use of foreign freight cars; since, however, the division has been provided with 30 additional flat cars received just before the close of our financial year, this expenditure will be very much reduced.

"During the summer, commencing July 6 last, a special tourist car, in charge of an efficient guide, has been run between Quebec and St. Anne Church, stopping only at Montmorency upon its return; this car has been extremely well patronized and, as a special fare is charged, it has so far proved very remunerative.

"It is pleasing to report again that there has been no injury of any kind to passengers upon this division, and although there have been a few accidents to employees, the account for injuries and damages is nil.

"During the Tercentenary, on this division, 98,843 passengers were carried, an increase of 29,342 over the same period of last year."

List of Holders of Securities of New York Companies

The Public Service Commission of the First District of New York has completed from the reports of the street railway companies within its jurisdiction details of the stock holdings of individuals and corporations in the various companies. The Metropolitan Street Railway has not filed its report. The Brooklyn Rapid Transit Company is not an operating company and is not required to report. Among the large holders are:

INTERBOROUGH RAPID TRANSIT COMPANY

Capital stock	$35,000,000
George B. Agnew	20,000
Frederick Ayer	145,600
E. M. Davison, Charles B. Ludlow and B. Bamburger, voting trustees	294,400
Windsor Trust Company, as trustee of the trust indenture of Interborough-Metropolitan Company	912,800
John C. Wilson	200,000

MANHATTAN RAILWAY

Capital stock, June 30, 1908	$60,000,000
The executors and trustees under the will of Jay Gould, deceased	8,140,100
General Education Board	2,813,400
Henry J. Cammann	2,290,000
Russell Sage	1,247,800
Day, Adams & Company	1,045,500
J. H. Amory & Son	1,000,000
C. W. MacQuoid & Company	998,600
George P. Butler & Brother	909,000
Henry Phipps	710,000
C. P. Morosini	644,000
Louis M. Bailey	550,000
John Gilchrist	550,000
Harry I. Tuthill	510,000
Frank J. Irving	500,000
R. R. Hunter	450,000
James H. Hyde	401,000
Charles Head & Company	310,000
John McKay, Jr.	340,000
University of Chicago	300,000

NEW YORK CITY INTERBOROUGH RAILWAY

Capital stock, June 30, 1908	$5,000,000
Interborough Rapid Transit Company	2,741,000
Walter Luttgen	395,000
Donald C. Roberts	233,900
George W. Young	170,000
J. Craig Havemeyer	134,000
H. McCarthy	100,000
William W. Littie	100,000

BROOKLYN CITY RAILROAD

Capital stock, June 30, 1908	$12,000,000
Mutual Life Insurance Company	1,237,000
Equitable Life Assurance Society	466,810
W. A. & A. M. White	303,220
Emily S. Watson	300,000
Estate of J. J. Studwell	277,500
David G. Legget	241,500
Lucy D. Rice	190,000
Charles Pratt & Company	190,560
Robert Walton Goelet	180,000
Trustees estate of Ludvic Benet	150,400
Continental Insurance Company	140,000
Charlotte B. Wilbur	120,000
William Rockefeller	110,000
Samuel W. Bowne	110,930
Seth L. Keeney	100,000
F. P. Olcott	100,000

CONEY ISLAND & BROOKLYN RAILROAD

Capital stock, June 30, 1908	$2,975,300
Estate of Louis Fitzgerald	400,000
Estate of H. B. Hyde	400,000
James H. Hyde	289,800
Annie F. Hyde	107,500
Franklin Trust Company	50,000

Annual Meeting of Interborough Rapid Transit Company

The annual meeting of the stockholders of the Interborough-Metropolitan Company, New York, was held on Jan. 22. The retiring directors were re-elected. Theodore P. Shonts, president of the company, made the following statement with reference to the condition of the company:

"The conditions affecting your property have improved since the last annual meeting, although the general situation remains practically the same. Your equity in the property of the Interborough Rapid Transit Company is gradually increasing in value. The increase in earnings for October of last year amounted to $70,000; for November, $150,000, and for December, $264,000. While this increase began in October, owing to business depression during the greater part of the year and consequent curtailment of travel, the results for the calendar year are practically the same as in the previous year.

"So far as the Metropolitan Street Railway, operated by the receivers, is concerned, it was also affected during the summer months by the business depression, but began

showing better results about the same time as the Interborough Rapid Transit Company did, the increase for October being $22,700; for November, $36,000 and for December, $101,000."

Mr. Shonts is quoted as saying in an informal conversation with some of the shareholders after the meeting that the company had not yet decided whether or not it would retain its interest in the Metropolitan Street Railway, about $43,000,000 of whose stock it holds.

Atlantic Shore Line Railway, Kennebunkport, Maine.—Announcement has been made that a syndicate composed of Earnest W. Goodall, George E. Goodall, Louis B. Goodall, Frederick J. Allen, Charles S. Cook and Arthur S. Bosworth and their associates has acquired control of the Atlantic Shore Line Railway. Charles S. Cook and Arthur S. Bosworth, both of Portland, Maine, have been elected directors of the company to represent the new interests.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—The Buffalo & Lackawanna Traction Company has applied to the Public Service Commission of the Second District of New York for permission to issue a mortgage for $1,500,000 covering its property.

Chicago (Ill.) Railways Company, Chicago, Ill.—The Chicago Railways Company announces that as successor through the Chicago Union Traction Company to the West Chicago Street Railroad and the North Chicago Street Railroad, it will redeem at 102 and interest on Feb. 1, 1909, the following equipment trust obligations issued by the West Chicago Street Railroad and the North Chicago Street Railroad: West Chicago Street Railroad, all of series C, Nos. 1 to 70, series B, Nos. 1 to 73, inclusive; North Chicago Street Railroad, all of series C, Nos. 1 to 38, and series D, Nos. 1 to 40, both inclusive.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—The stockholders of the Fonda, Johnstown & Gloversville Railroad will meet on Jan. 26 to authorize an issue of $1,000,000 of 6 per cent cumulative preferred stock.

Gainesville (Ga.) Electric Railway.—Upon the petition of the Knickerbocker Trust Company, New York, Judge Newman of the Federal Court has issued an order postponing the sale of the Gainesville Electric Railway from Feb. 2 to March 2.

Manistee Light & Traction Company, Manistee, Mich.—John P. Reynolds, Jr., has been appointed receiver of the Manistee Light & Traction Company by Judge Knappan of the Federal Court on application of the New England Trust Company, Boston, Mass., trustee of the first mortgage bonds. The company is alleged to have defaulted in the payment of taxes and interest and otherwise to have violated the provisions of the mortgage.

Syracuse & Suburban Railroad, Syracuse, N. Y.—A syndicate headed by John J. Stanley as syndicate manager has purchased the capital stock of the Syracuse & Suburban Railroad, Syracuse, N. Y. The company has organized as follows: John J. Stanley, Cleveland; C. Loomis Allen, Syracuse; James S. Sherman, Utica; Charles E. Hubbell, Syracuse; Giles H. Stilwell, Syracuse; H. C. Stone, Oneida; Maurice Rohrheimer, Cleveland; Edward Powell, Philadelphia; William P. Gannon, Syracuse; Granger A. Hollister, Rochester, and Chester H. King, Syracuse, directors; C. Loomis Allen, president; William P. Gannon, vice-president; Giles H. Stilwell, secretary-treasurer.

Tarrytown, White Plains & Mamaroneck Railway, New York, N. Y.—Justice Morschauser, of the Supreme Court, has confirmed the report of T. A. Atkins, referee, regarding the Tarrytown, White Plains & Mamaroneck Railway, and has appointed J. Addison Young permanent receiver of the company. The report of Mr. Atkins shows that the liabilities of the company exceed its assets by $194,944.

Third Avenue Railroad, New York, N. Y.—Frederick Whitridge, receiver of the Third Avenue Railroad, has paid to W. A. Ladd, receiver of the New York City Railway, $42,772 awarded to that company by Judge Lacombe as payment for a claim made in the Circuit Court for $51,000 to cover the cost of coal and supplies used by the Federal receiver.

Virginia Passenger & Power Company, Richmond, Va.—The argument has been concluded in the United States Circuit Court of Appeals in the hearing of the appeal from Judge Waddill's decree ordering the immediate sale of the property of the Virginia Passenger & Power Company.

Yonkers (N. Y.) Railroad.—Application has been made to the Supreme Court at White Plains for the appointment of a permanent receiver for the Yonkers Railroad. George W. Alger, referee, has reported the company to be insolvent. Of the 10,000 shares of stock, 9880 are held by the Central Trust Company, New York. The Manhattan Trust Company, New York, holds a mortgage for $1,000,000 covering the property of the company.

Traffic and Transportation

Hearing by Massachusetts Railroad Commission on Easthampton Service

The Massachusetts Railroad Commission gave a hearing on Jan. 14 on the petition of the selectmen of Easthampton for additional service between Easthampton and Northampton, Mass. J. C. Hammond, president of the Northampton Street Railway, presented a brief bearing upon the facilities and traffic now existing. An abstract of the brief follows:

"The Northampton Street Railway was incorporated in 1865, and for the first 29 years of its operation paid no dividends. For the last 16 years dividends have been paid. The company now operates 24.3 miles of road, of which 9.5 miles are the Easthampton line from the Boston & Maine Railroad station in Northampton through Easthampton to Mt. Tom junction. Regarding the request for more cars, the Railroad Commission is well informed by its own observations, from the annual reports made by all street railways, and from the thorough examinations made by its efficient inspectors. Tables have been prepared to show the results of a traffic count on the company's lines covering the travel between Northampton and Easthampton for the week beginning Jan. 5, 1909, and the passenger movement between Easthampton and Mt. Tom junction via East Street and in the opposite direction. They show the seating capacity of the cars, the type of car, and the number of passengers in each car at turnouts No. 17 and No. 13 for each trip during the day. The capacity of each single-truck car was 28 passengers, and of each double-truck car, 44 passengers. As Easthampton is located on a loop the inhabitants have 70 opportunities daily to take a car to Northampton, there being 35 round trips through the former town. On Saturdays and Sundays there are 10 more cars, and in every case the trip can be made for a single fare of 6 cents, regardless of the direction of the car. On Jan. 5, 41 double-truck car trips were made over the loop, the balance being single-truck car movements. The proportion of double-truck car service on other days in the record was about the same."

The average number of passengers counted in the cars in the different directions by days was as follows:

	Northampton to Easthampton.	Easthampton to Mt. Tom Jctn.	Mt. Tom Jctn. to Easthampton.	Easthampton to Northampton.
Jan. 5	13	6	7	13
Jan. 6	17	10	9	16
Jan. 7	15	8	9	15
Jan. 8	17	8	8	16
Jan. 9	22	13	14	22
Jan. 10	17	16	16	15
Jan. 11	16	8	8	15

On Jan. 9, the day of largest traffic, 90 cars were run over the Easthampton line. The earnings per car mile were as follows, for the period of the count:

Jan.	5	6	7	8	9	10	11
Cents per car mile	14.7	16.9	16.7	16.3	23.2	20.0	16.

The figures filed showed that the number of trips on which standing passengers were counted was very small in proportion to the total number run, the tabulated results being as follows:

Trips in Which Passengers Stood.

	Total trips.	Trips by single-truck cars.	Trips by double-truck cars.
Jan. 5	70	2	2
Jan. 6	70	2	2
Jan. 7	70	1	1
Jan. 8	70	4	3
Jan. 9	90	9	11
Jan. 10	60	4	0
Jan. 11	68	2	2

Judge Hammond stated that in the rush of the holiday season all lines were crowded at certain hours of the day beyond the figures of January. Chairman Hall of the Railroad Commission stated that if the company's figures are correct there appears to be no congestion on the road, although it is open to question whether there would be congestion with a 5-cent fare. The whole question is embarassed because the fare unit has been altered, but the petitioners do not show that congestion exists, in general.

Judge Hammond pointed out in his brief in continuation that the service on the Easthampton line has always been about 25 per cent in excess of that furnished on any of the other three lines. The receipts from fares on the car-mile basis are invariably less on the Easthampton line. In 10 days in November, 1908, considered, the results were:

Bay State line..... 18.25 cts. per car mile
Williamsburg line..... 21.31 cts. per car mile
Holyoke line..... 25.75 cts. per car mile
Easthampton line..... 15.82 cts. per car mile

For December the patronage of the Easthampton line per car mile was almost exactly 25 per cent less than the average of all lines. On the line from Easthampton to

Northampton the through passenger average is only 16.2 per car. This line is especially for suburban service, and the patronage fluctuates more than on city lines which have more varied demands. The company has made every possible effort to meet demands for heavy riding when they can be foreseen. Demands which overload cars cannot always be seen or remedied, as on Saturday nights. An unusual added demand like theater travel may require attention at the same time that other travel occurs, and in such case all the cars on all the lines will be unavoidably overcrowded. Regarding complaints of the theater service in Northampton Judge Hammond said that a full house frequently requires two extra cars on each of the four lines of the company; these cars must be assigned before the play is out, and the time cannot be determined within 10 or 15 minutes. On a single-track road there must at times be a few minutes wait to some passengers.

The total transfers used on the system are 8 2/3 per cent of the register readings, and the Easthampton line uses about one-third the total transfers asked for. There are 21 double-truck car round trips on the Easthampton line compared with 7 double-truck trips on the Williamsburg and only 15 single-truck Easthampton trips compared with 24 on the Williamsburg. The company believes that it has ever maintained a high grade of efficiency and service.

The hearing was continued by the Railroad Commission, with the suggestion that a conference be held between the town representatives and the company in the effort to arrive at a mutual understanding of exact changes locally desired.

Receiver Whitridge on Ambulance Chasers

Frederick W. Whitridge, receiver of the Third Avenue Railroad, New York, who has been greatly annoyed by unscrupulous lawyers who make a specialty of accident cases, since he has been in charge of the property has had introduced in the Legislature a bill providing that the lawyer for the plaintiff in damage suits shall pay the cost. Mr. Whitridge himself is a lawyer. The bill reads, in part:

"Where an attorney or attorneys enter into an agreement or a contract with a party having an action against a defendant to recover damages for personal injuries, death as the result of personal injuries, or damages to personal property by reason of negligence, giving such attorney or attorneys a contingent interest in a future judgment or settlement of an action or claim, before judgment, or where such attorney or attorneys enter into an agreement or contract with any person or persons having a contingent agreement or a contract in such an action for a share of such contingent agreement or contract, or where such attorney or attorneys is or are attorneys of record in such an action, such attorney or attorneys shall be liable for the costs and may be required to file an undertaking as prescribed in Section 3272 of this act."

In connection with this legislation Mr. Whitridge addressed the following letter to the daily newspapers:

"I send you herewith a copy of a bill which has been introduced into the Assembly, and which I venture to commend to your attention and to ask you—so far as it meets with your approval—to advocate its passage.

"There are thousands of accidents on the surface roads of this city, many of them inevitable because of the traffic conditions and the absence of the regulations which exist in many cities of Europe, compelling pedestrians, except upon their own peril, to cross the streets only at the crossings.

"A class of lawyers has been developed by this circumstance who make it a regular business to seek and promote claims against the railroads upon a contingent basis which runs as high as 50 per cent, and is seldom less than 20 per cent of the amount recovered.

"In my experience of a year I have found that the amount which the lawyer was able to obtain over and above the amount which the client would have obtained in any case never exceeded the amount of the contingent fee. That is to say, the injured person was just as well off without a lawyer as he was with one.

"This may not be true in the case of all railroads, but in the case of the Third Avenue Railroad it is the desire of the management to see that every one who has been injured through the fault of the company shall be compensated for that injury, and I avoid litigation wherever I can.

"I believe in every civilized country it is the rule that a plaintiff who goes into court and is defeated is responsible for costs. In most countries these costs include the expense to which the defendant has been put by reason of litigation. In this State it includes, however, only certain costs fixed by the code, which never exceed $50 or $100.

"So long as an attorney is at liberty to take any sort of a case and subject the railroad to the expense of defending it, many cases are brought which are not meritorious and a considerable number which are positively fraudulent, and it seems to me to be just and fair—I hope it will seem so to you—that an attorney who has got a large interest in the claim should be liable for the costs in case he is defeated and his client cannot pay the same, and though the liability is, as I say, not over $50 or $100, I am satisfied that some such amendment to the law as that I am now proposing would sift the claims which are brought against the railroad and dispose of or prevent the bringing of many which are fraudulent."

Service in New York

The Public Service Commission of the First District of New York has passed the following resolution calling upon the receivers of the Metropolitan Street Railway, New York, to file by Jan. 25 a report of the number of cars assigned to the various lines of the company:

"*Resolved*, That Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, be required to file by Jan. 25, 1909, the following information:

"(a) For each line or route specified in their tariff schedules the number of cars of each type, classified according to seating capacity, used thereon or assigned thereto, stating which, upon the following days:

"July 1, 1906; Oct. 1, 1906; Jan. 1, 1907; April 1, 1907; July 1, 1907; Oct. 1, 1907; Jan. 1, 1908; April 1, 1908; July 1, 1908; Oct. 1, 1908; Jan. 1, 1909.

"(b) The number of new cars of each type purchased for use upon each of the lines given under (a) above between July 1, 1906, and Jan. 1, 1909, with dates when they were put into operation.

"(c) The number of cars of each type withdrawn from use upon each of the lines given under (a) above, between July 1, 1906, and Jan. 1, 1909, with dates when they were withdrawn.

"(d) The number of cars of each type which have been ordered but not yet delivered, with approximate date when they will be delivered."

A hearing will be held by the commission on Jan. 26 to determine whether the service of the Metropolitan Street Railway, New York, on the Fourteenth Street and Williamsburg Bridge line should be increased.

Experimental Side-Door Subway Train in New York.—The Public Service Commission of the First District of New York has announced that the first of the Interborough Rapid Transit Company's experimental side-door subway trains will be placed in operation at a date not later than Feb. 5.

Cost of Dummies for Tests by New York Commission.—The Public Service Commission of the First District of New York has presented a bill for $3,524.15 to the Board of Estimate of New York for the dummies used by the Commission in the elaborate tests of fenders conducted by it recently at Schenectady and Pittsburg.

Pay-As-You-Enter Cars on Van Buren Street, Chicago.—Pay-as-you-enter cars have been placed in service on the Van Buren Street line of the Chicago Railways Company. This is the sixth trunk line of the company which has been equipped with the new cars. The company now has a total of 250 pay-as-you-enter cars in service on its lines.

Freight Service over Dayton & Western Branch of Ohio Electric Railway.—The freight service over the Dayton & Western branch of the Ohio Electric Railway, which was suspended more than a year ago on account of litigation in Richmond, Ind., regarding franchise rights, was reestablished on Jan. 9, and through freight is now being handled between Indianapolis and points on the Ohio Electric Railway in Ohio.

Accident on Brooklyn Elevated.—Two cars of an elevated train of the Brooklyn Rapid Transit Company jumped the track on Broadway near the Myrtle Avenue station on Jan. 15. There were about 50 passengers, mostly women, in the derailed cars. The only injuries they sustained were slight and were due to the panic among them to escape from the cars. The accident is said to have been caused by the splitting of a switch.

Consideration of Passenger Tariffs by Central Electric Traffic Association.—A meeting of the Central Electric Traffic Association was held in the office of Chairman A. L. Neereamer, Indianapolis, Ind., on Jan. 14 and 15, for the purpose of checking in rates for the new joint passenger tariff now under consideration. About 25 of the companies in Ohio and Indiana were represented. The next rate meetings of the association will be held at the office of Chairman Neereamer on Jan. 27, and on Feb. 12 and 13.

Personal Mention

Mr. Alfred Anderson has been appointed purchasing agent of the Metropolitan Street Railway, New York, N. Y.

Mr. Eugene Holcomb has resigned as general manager of the Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.

Mr. John P. Hartman has been elected secretary and treasurer of the Loyal Railway Company, Seattle, Wash., to succeed Mr. I. D. Trenholme.

Mr. Alfred F. Pratt has been elected treasurer of the Winona Interurban Railway Company, with headquarters at Winona Lake, Ind. Mr. Pratt is an attorney, with offices in Indianapolis.

Mr. D. S. Carll, second vice-president and general manager of the Capital Traction Company, Washington, D. C., has been elected president of the Washington Society of Engineers.

Mr. Arthur Wagner has been appointed train dispatcher for the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind. Mr. Wagner was graduated from Purdue University and has been connected with the Fort Wayne & Wabash Traction Company at Peru.

Mr. F. K. Breckenridge has been appointed superintendent of purchases and stores of the Waterloo, Cedar Falls & Northern Railway, to succeed A. I. Breckenridge, deceased. Mr. F. K. Breckenridge's duties will include those of purchasing agent and general storekeeper, which positions have been abolished.

Mr. C. O. Vandevanter, who resigned recently as chief engineer of the United Railways & Electric Company, Baltimore, Md., proposes to open an office in Baltimore as an independent consulting engineer. Before becoming connected with the United Railways & Electric Company Mr. Vandevanter and Mr. J. M. Hood, Jr., who succeeds him as chief engineer of the company, were associated as consulting engineers, with offices in Baltimore.

Mr. Joseph W. Bailey, who was recently appointed superintendent of the Ogden (Utah) Rapid Transit Company to succeed N. C. Flygare, deceased, has been connected with the street railways of Ogden since 1888, when he entered the employ of the Ogden Street Railway. The cars in Ogden were operated by mules at first, but in 1891 steam dummies were placed in service and a number of extensions were constructed to the system. Mr. Bailey served in the repair shops of the company and as engineer on the dummies. In 1895, the Ogden Street Railway changed the motive power of its lines to electricity and during the reconstruction Mr. Bailey acted as superintendent of electrical equipment. Subsequently he became foreman of the principal car barn of the company and remained in this position until Jan. 1, 1900, when he was elected sheriff of Weber County, which position he held until March 5, 1905, when he resigned to become assistant superintendent of the Ogden Rapid Transit Company, which succeeded the Ogden Street Railway.

Mr. John N. Ackerman has been appointed general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J., to succeed Mr. S. S. Neff, who resigned recently to accept another position. Mr. Ackerman has been connected with street railway properties throughout the United States for more than 25 years. He was born in Brooklyn on March 4, 1854, and began his railroad career in 1873 with the South Boston Railroad. In 1877 he became connected with the Middlesex Railroad. Subsequently he became superintendent of the Charles River Street Railway, Boston. Four years later, when this company was consolidated with the Cambridge Railroad Mr. Ackerman was appointed general superintendent of the Worcester (Mass.) Consolidated Street Railway. Later he negotiated the sale of the electric railways in Newark and Elizabeth, N. J., and in Worcester. He then became connected with the Elizabeth, Plainfield & Central Jersey Railway and when the property of that company was sold to the Public Service Corporation entered its employ, holding the positions, in turn, of traffic superintendent, general passenger agent and general superintendent of the South Jersey division.

Mr. L. H. Conklin, who, as noted in the Electric Railway Journal of Jan. 16, has resigned as general superintendent of the West Penn Railways Company to become general manager of the Scranton (Pa.) Electric Company, was graduated from Pratt Institute, Brooklyn, N. Y., in 1891. From 1891 to 1894 he worked in various capacities in several manufacturing plants to gain practical experience, and in 1894 became expert on the arc apparatus for the Excelsior Electric Company, which then manufactured the arc machines designed by Mr. Wm. Hockhousen, to whom Mr. Conklin afterward became chief assistant. From 1896 to 1900 Mr. Conklin was superintendent of the electric plant of the Flatbush Gas Company, Brooklyn, N. Y., and from 1900 to 1904 he was a member of the firm of Weiderman & Conklin, New York, which business is still being conducted. In the spring of 1905 Mr. Conklin entered the employ of Mr. A. M. Young, a director of the American Gas & Electric Company and several other electrical companies, for whom, as engineer in the New England territory, he rebuilt and modernized several electric light plants and constructed an electric railway. In the spring of 1907 Mr. Conklin became connected with the West Penn Electric Company, Pittsburg, Pa., as superintendant of lighting, and in August, 1907 was appointed general superintendent of the West Penn Railways Company, the West Penn Electric Company, McKeesport & Greensburg Railway, Westmoreland Light, Heat & Power Company and the Latrobe Street Railway, constituting what is known as the West Penn System. He is a member of the American Institute of Electrical Engineers and is president of the Pennsylvania Electric Association.

OBITUARY

A. I. Breckenridge, purchasing agent and general storekeeper of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., is dead. Mr. Breckenridge was born in Meriden, Conn., on Aug. 12, 1845, and was graduated from Trinity College, Hartford, in 1870. He entered business in Brooklyn, N. Y., in 1871, but in 1873 removed to Waterloo, where he became a member of a firm of coal merchants. Later he entered the real estate business. Mr. Breckenridge had been purchasing agent and general storekeeper of the Waterloo, Cedar Falls & Northern Railway about two years.

Joshua Rhoades, who was prominently identified with street railway companies of Pittsburg for many years, died in Pittsburg recently. Mr. Rhoades was born in London, Eng., on March 19, 1824, and was brought to the United States by his father and mother in 1828. Mr. Rhoades' parents lived in Albany, N. Y., at first, but later moved to Buffalo and finally to Allegheny. When Mr. Rhoades was 12 years old both his parents died, and he immediately sought employment. A few years later he became interested in river traffic and opened a ship chandlery business at New Orleans. This he sold to return to Pittsburg, where he became interested with Mr. James Verner in the firm of Joshua Rhoades & Company, wholesale grocers. The fire of 1845 destroyed the company's property, but its plant was soon rebuilt and new members were taken into the firm. In the meanwhile Mr. Rhoades had become interested in the Pittsburg & Lake Erie Railroad, and with former associates bought the property of the Creston Tool Company, in Soho, which eventually became the Pennsylvania Tool Company. Anxious to increase the business of this company, Mr. Rhoades assisted in organizing the National Tube Company, of which he was made president and in which capacity he served until the property of the company was taken over by the United States Steel Corporation. During this active business career Mr. Rhoades became interested in the first horse car line in Pittsburg and later in the building of the Pittsburg, Allegheny & Manchester Railway. He also took an active part in the movement to electrify the horse and cable lines in Pittsburg and was elected president of the Consolidated Traction Company. At the time of his death Mr. Rhoades was a director of The Philadelphia Company, the Pittsburg Railways Company, the Freehold Bank, Colonial Trust Company, Keystone National Bank, Columbia National Company, Bessemer Coke Company, American Window Glass Company, Cherry Valley Iron Company and the Pennsylvania Casting & Machine Company.

The Fourth Annual Electrical Show at Chicago was opened on Saturday afternoon, Jan. 16, and admission during the afternoon was by invitation only. This prevented overcrowding and was generally approved. Among the exhibitors are: Allis-Chalmers Company, Milwaukee, Wis.; American Steel & Wire Company, Chicago, Ill.; A. & J. M. Anderson, Boston, Mass.; Chicago Pneumatic Tool Company, Chicago, Ill.; Crane Company, Chicago, Ill.; Electrical Testing Laboratories, New York City; Fort Wayne Electric Works, Fort Wayne, Ind.; General Electric Company, Schenectady, N. Y.; International Correspondence Schools, Scranton, Pa.; H. W. Johns-Manville Company, New York City; Kellogg Switchboard & Supply Company, Chicago, Ill.; McRoy Clay Works, Brazil, Ind.; National Battery Company, Buffalo, N. Y.; Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.; Swedish-American Telephone Company, Chicago; United Pump & Power Company, Chicago; Wagner Electric Manufacturing Company, St. Louis; Westinghouse Electric & Manufacturing Company, Pittsburg.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JANUARY 30, 1909 No. 5

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9500 copies are printed.*

Subway Report

The report of B. J. Arnold on the traffic of the New York subway, which appears elsewhere in this issue, shows that the maximum number of seats for each express track per hour which can be operated, even after all the changes now suggested have been completed, is only 18,000. No further changes, barring practically complete reconstruction of the subway, can increase this maximum seated carrying capacity. The present peak load is more than 22,000 passengers per hour, and it is estimated that by the time the contemplated improvements could be made the peak load will have increased to 36,000 passengers per hour, or 100 per cent more than the maximum seated capacity. Overcrowding during rush hours, therefore, cannot be reduced and if no new rapid transit lines are built, will probably increase. The only remedies, then, are more subways, and, if possible, extensions of the present elevated railway facilities. Significant phases of the future development of the present subway traffic are that all extensions of the outlying districts of the city will tend to increase inevitably the average length of haul on the subway, that the consequent further crowding of the express trains will drive many long-distance riders to the local trains, and that, according to the report, the long-haul traffic, when separated from the short-haul business, is unprofitable. Mr. Arnold shows the wisdom of development of the short-haul business, and makes the suggestion that this perhaps can best be accomplished through the construction of a movable sidewalk.

Electric Railway Parks

This is the season when the manager's fancy lightly turns to thoughts of amusement parks. So many roads have had a try at the business that discussion would seem almost needless were it not that amusement parks are not always successful from the business standpoint. A park is a somewhat considerable investment if it is really attractive, and it must gather in large traffic to get back the total expense. The main thing in planning a park annex is to gage accurately the temperament and habits of the community with respect to amusements, and this is not always an easy task. The attractions that are successful in one place may fall flat in another for no exactly assignable reason. For instance, the biergarten, that is a fixture, and a most agreeable one, in Continental life, could not be commended in a prohibition community. It has, more's the pity, shown on American soil a rather uniform tendency to degenerate into unqualified toughness. Again, in some cases, too much money has been spent to develop the park, and as the cost of maintaining the attractions is constant, the park property represents a large annual outlay. Viewing the situation generally, however, most managers are firm advocates of the practice of establishing street railway parks, and can testify to their advantages from a monetary standpoint. Certainly, most of the projected electric railways whose plans are reported in these columns contemplate the ownership of parks, and many companies are expecting to extend and improve their park properties during the coming year. Following a custom initiated several years ago, this paper will devote two issues during the winter and early spring especially to the sub-

ject of street railway parks, and this number is the first of the series.

Broadly speaking, parks controlled by city railway companies can be divided into two classes. The first includes those parks which are designed to cater to the cosmopolitan population of a large city where expensive amusements can profitably be installed and where a fare of 10 cents, or even 15 cents, can be charged for transportation in each direction. The second class belongs to cities of, say, 60,000 inhabitants and under, where the charge for entertainments, if provided, should be small, and where, as a rule, the park should be located within a 5-cent zone.

A number of interurban railways have developed parks along lines which are quite different from the typical park of a city railway system. These parks are, more properly speaking, picnic or assembly grounds, and their equipment is quite simple and inexpensive. The cost of operation is correspondingly low, as no amusement devices other than boats or a carousel are usually operated. These parks are commonly located at some point along the main line where the natural beauty of the grounds is sufficient to attract pleasure seekers. Such parks, if properly advertised, can be made to yield the railway company a satisfactory income on the sale of excursion tickets only. If the rates are made low enough, traffic can be obtained from distances as great as 40 or 50 miles on special occasions. On pleasant days during the summer months considerable additional traffic revenue is obtained from small family parties at practically no expense and with no increase in the number of cars required to handle the traffic.

Many treatises have been written on the proper surroundings, general scheme of arrangement of buildings and proper methods of conducting the operation of a park. It will be impossible to analyze here all of the factors which go to make up the success of a resort of this kind. It might be well, however, to call attention to two fundamental features which are common to all. One relates to the question of transportation to and from the park, the other to the general arrangement of the grounds and buildings themselves.

Transportation to the Park

Some roads have made a mistake in placing their parks at too great a distance. This means long hauls for the patrons and the consumption of a good deal of time, which has indirectly the effect of cutting down patronage for a considerable part of the season. One must, of course, get away from the immediate surroundings of the city, but it is very easy to go out too far. During what is usually a very brief season of extreme heat people like a long car ride or lake side all the better. Such traffic, however, falls off at once as the hot season wanes, and leaves the expense still going on. It strikes us that a shorter ride with more going on at the end of it is likely to draw for more days in the year than the more remote attractions. Such a plan practically increases the available length of the park season. If pleasant amusements are not too distant, people will slip out to them more readily and frequently. Of course, available space is cheaper at a considerable distance. It is not, however, so much area that is needed as the successful use of it. A small and accessible park thoroughly worked up, with a big casino and plenty going on in it, seems likely to get a larger total attendance than anything else, and what it may lose in attendance during the few very hot days will more than likely be made up during the early and late season.

The quality of the transportation is equally essential. The facilities for carrying the passengers on the line or lines serving the park should be such as not to occasion serious delays or much crowding at the time when the people want to travel. Preferably, a park should be on the main line. If this is not possible, it should be provided with ample terminal facilities so that delays in the late afternoon or evening in returning home will not discourage a second visit. In all cases a single-track line with turnouts should be avoided. Even a slow rate of travel is much less annoying to the average pleasure-seeker, when on either his outward or return trip, than waiting on a turnout or siding. Moreover, it is very difficult to dispatch a number of cars at the close of a day or evening on a single-track road, whereas the headway can be made as long or short as may be necessary when the line is double track.

Park Amusements and Buildings

The question of amusements, like that of the poor, is always with us. Certain attractions, like the old-fashioned, but never unpopular, carousel, will probably always remain a safe selection. As the patronage increases, good music and vaudeville will have their place, and undoubtedly will prove as satisfactory as any attraction which can be provided. In occasional places winter sports have been tried with some success. The proper selection of entertainment depends, as we have already intimated, on the community and the general nature of the patronage. No one recipe for success can be written. The thing to be cultivated is the amusement park habit among the patrons, and this requires a rapid shifting of attractions and correspondingly vigorous advertising. A single show, even a very good one, cannot hold people for long, while one success whets the appetite of people for another, and presently they fall into the pleasant usage of looking ahead for what is coming and making a point of seeing it.

An important factor in the success of the different attractions at the park is the systematic location of the buildings and different concessions with reference to each other. Every effort should be made to keep them as close together as the circumstances permit. Enthusiasm and curiosity are contagious, and to both of these qualities appeal must be made if the different forms of entertainment are to be well patronized. Both also are born of a crowd, and there is usually no greater inducement to try some form of recreation than to see others busily engaged in the same sport or to enter a theater than to see a long crowd standing in front of the box office and imagine that all the best seats will be gone unless a ticket is secured forthwith. The manifest desirability of grouping the different forms of entertainment does not mean that it is necessary to place the carousel directly behind the music stand or in front of the theater entrance. It should be far

enough away so that its organ will not interfere with the pleasure of the auditors at the quieter performances. But a few hundred feet will usually suffice for this result, and there will be no violation of the principle of keeping fairly close together those who like the light and glare of the arc lamps and to be in and a part of the crowd of pleasure seekers.

A Failure in Park Location

We have referred to the importance of studying the local conditions and the habits of the community served in all plans relating to the establishment of parks. An incident illustrates the importance of this policy. An electric railway company, operating in two not-greatly distant towns, owned a small park in each. The chief industry was manufacturing, and both parks were well patronized. Subsequently the company joined the two cities by an interurban connection, and the company conceived the plan of replacing the two small parks by a single large one half-way between the neighboring communities. The original pleasure resorts were pleasant natural groves, with no pretentious attractions, cost little to maintain and were accessible for a 5-cent fare. The large park was laid out as an elaborate resort, with numerous special pay attractions. To reach the park a 10-cent fare was necessary. Unfortunately, the laudable desire of the traction company to confer Coney Island pleasures on its patrons met with little encouragement. Ere many days had sped the tinseled Heidelberg castle became as forlorn as the ruins of its prototype on the Rhine, and the Streets of Cairo might well have been renamed the Streets of Pompeii, so lacking were they of life. On the other hand, the patrons of the road were discontented because they had been deprived of the old-time playgrounds, which had become a fixed part of their summer pleasures.

Doubtless, the principal reason for the failure of this project was the change from a 5-cent to a 10-cent fare. Most of the people are factory hands, who had gladly availed themselves of every opportunity for open-air enjoyment at their home parks. Under the new conditions, however, the difference in fare was too great a drain on their scanty purses, especially when a family outing was planned and the children would want to try everything in sight and hearing. The greater distance of the new park also deterred mothers from undertaking frequent week-day excursions with their children. Formerly it was a simple matter to go off for a half-day's sport, then return in time to prepare dinner and attend to other household duties. Had the same pleasure resort been close to larger or more wealthy cities, the result might and probably would have been far different. But no good purpose is attained by attempting to serve the public with what they are unable or unwilling to purchase.

This does not necessarily mean, however, that a community cannot be educated, or that what would prove unsuccessful one year would certainly meet with popular disfavor a season or two later. A better plan is to add gradually such features as seem desirable, a course which has the double advantage of proportioning expenditures to the patronage and of imparting novelty to the attractions available each year.

Truck Adjustments and Motor Flashing

The prevention of motor flashes in electric railway service is an ever-present problem on large systems operating great numbers of cars in varied traffic. Rolling stock experts have studied this question with increasing interest in the last few years, particularly in relation to the application of multiple-unit control apparatus in city and suburban car service. The intimate connection between the mechanical adjustment of the trucks and motors and the prevalence of flashing is not always appreciated. Many carhouse employees are inclined to the idea that flashing is mainly an electrical difficulty, but experience shows that loose parts of the truck are quite as prolific causes of flashing as any other improper condition. It is not proper always to assume that two motors in a car equipment are running together in parallel with an equal division of the load between them, since an examination of the conditions with an ammeter in the circuit of each machine may show a decided difference in the work done. It is often instructive to install a wattmeter in the circuit of each motor on both a two- and a four-motor car and to study the energy input among the separate units. When this is done in a thorough way for service of definite character the data secured is frequently very suggestive to the mechanical department. For most conditions, however, the ammeter will supply all the necessary quantitative information needed to enable one to check the mutual performance of motors on single car equipments.

Loose suspension is a fertile cause of trouble, but one of the less widely realized causes is excessive play or lost motion between the journal boxes and the pedestals. This accumulates through wear and tear and is dependent somewhat upon the direction in which the car is running. In one direction the tendency is for the motor to force the motor wheel up against the pedestal, bringing the wheel against the brake shoe. The movement of the truck in a forward direction causes the corresponding trailer wheel to come back against the pedestal, assuming one motor per truck, and the trailer wheel is likewise forced against the shoe. On the other truck of the car the reverse condition occurs. The motor on the second truck may be hung so that it tends to drive forward and thus travel away from the nearest shoe, clearing the wheel. The resulting condition of uneven distribution of work through the irregular and dissimilar mechanical status of the wheels may easily cause one motor to spin, and in passing from series to multiple, when flashes are especially likely to occur, a short circuit may result from feeding the controller too fast. The motor which spins becomes a generator with practically a heavy short circuit across its terminals and the flash resulting frequently causes trouble through the introduction of the line current in the controller case. The prevention of the trouble is obviously the proper and frequent mechanical adjustment of loose truck parts, but in cases where the wheels spin and acceleration is delayed the motorman can do a good deal to avoid trouble by working the car forward slowly and keeping out of the multiple notches of the controller until the speed begins to pick up normally. Weak release springs on the brakes and too tight brake adjustment are similar predisposing causes of flashing.

BINGHAMTON (N. Y.) RAILWAY AND PARK SYSTEM

Binghamton, N. Y., is a progressive community of some 45,000 people, and forms one of the important towns in the so-called southern tier of counties in New York State just north of Pennsylvania. It is located in a valley formed by the junction of the Susquehanna and Chenango rivers, and, set within its mountain frame, makes an ideal residential city. The manufactures are numerous and varied enough to diffuse the general air of prosperity essential to the success of a street railway system, but as many of the shops are within reasonable walking distance, a frequent and comfortable car service must be given to induce short distance riding. Such a railway service is given by the Binghamton Railway Company, which operates about 47 miles of track, 35 miles of which are within the city limits and the balance, a 6-mile double track line extending westward through Lestershire, Endicott and Union. This extension is largely on private right-of-way and carries a heavy summer traffic.

In the natural endeavor to build up its business the Binghamton Railway Company not only has made large num-



Binghamton Railway—Looking East Along Court Street in Binghamton

bers of people familiar with the advantages of this district through its park system and annual agricultural fair, but also has been responsible for creating the prosperous manufacturing town of Endicott, in which over 3,000 people are now employed. As this realty undertaking has proved so successful, a brief history of its inception and present state may be in order.

ENDICOTT, "CITY OF PAYROLLS"

About 1903 interests connected with the Binghamton Railway Company and organized as the Endicott Land Company were the owners of 1100 acres of open country some 8 miles west of Binghamton, consisting of land adjacent to the Erie Railroad and but ½ mile distant from the Lackawanna Railroad, on the opposite bank of the Susquehanna River. The double-track electric railway to Union, 1 mile further, passes directly through the grounds, and, in fact, is the same line which has served this company's Casino Park for years. Consequently, no additional railway facilities were needed immediately for the development of the property.

At this time the Endicott-Johnson Company, a large shoe manufacturer, was contemplating an extension of its works in Lestershire, which is practically a westerly continuation of Binghamton. As the new territory had the necessary railway facilities and could offer a lower tax rate, the shoe company was induced to purchase 250 acres,



Binghamton Railway—The State Hospital Terminal on the Easterly Outskirts of Binghamton

reserving 80 acres for building lots. This was the nucleus of Endicott, which has grown from a straggling 10-house hamlet to a flourishing town with half a dozen important industries and several hundred trim business and residential structures. There is also a modern hotel, which is used as a noon-day dining club by the clerical forces of the Endicott factories.

All of the streets have a uniform width of 60 ft. The streets are graded, have sidewalks, drainage systems, water supply, etc. All of the factories have private fire protection in addition to the public fire department. The streets and many of the houses are electrically lighted by current from the nearby substation of the Binghamton Railway Company.



Binghamton Railway—A Busy Day at the Fair Grounds

While the Endicott Land Company conducts an energetic lot-selling campaign and the different manufacturers are building homes for their employees on part payment conditions, many of the workers live in Binghamton or Lestershire. By arrangement with these firms, most of the em-

ployees are brought in the trains to and from the factories at certain hours for a special fare presented from a book containing 100 tickets. During the day a half-hour service is maintained for the usual 12½-cent fare. No transfers are given on the Endicott line except in the town itself, where a branch line has been built to the works of the International Time Recorder Company, maker of the Bundy clock. The Erie Railroad operates one morning and evening train between Endicott and Binghamton for a 5-cent fare, but the electric railway gets the bulk of the travel, because it runs along the principal street in Lestershire and Binghamton.

It will be understood from the foregoing how the Binghamton Railway Company has built up a profitable long-haul business through a judicious presentation of the advantages manufacturers and their employees could obtain by building a city deliberately designed for their mutual convenience. Happily, the benefits are not confined to the projectors, for Endicott represents to both classes the partial solution, at least, of a great economic problem. Its success emphasizes the truth that it is a good thing to break away from the instinct of herding in large cities when there are so many places where work can be done under more favorable conditions.

ANNUAL FAIR AND PARK BUSINESS

Another departure from the humdrum activities of an electric railway is the annual fair, known as the Binghamton Industrial Exposition, conducted by the Binghamton Railway Company. This gathering is second only to the exhibition at Syracuse, and familiarizes many thousands of strangers with the advantages of Binghamton. The operation of an agricultural fair by an electric railway is exceptional, of course, but in this instance is due largely to the fact that the railway owned a large, convenient plot in Binghamton adjacent to its power station and car houses. Here a grandstand has been erected overlooking a half-mile race course, and all the necessary provisions made for handling a full-fledged agricultural fair and the accompanying entertainments. At other times these grounds are placed at the free disposal of local educational institutions for baseball, football and other athletic events. The posters, folders, signs and similar advertising matter are designed by the railway. It also arranges the fireworks for both the fair and park events.



Binghamton Railway—Fair Grounds, Base Ball Diamond and Race Track, Comprising 55 Acres in Binghamton



Binghamton Railway—General View of the Fair Grounds Looking Toward the Grand Stand and Race Track

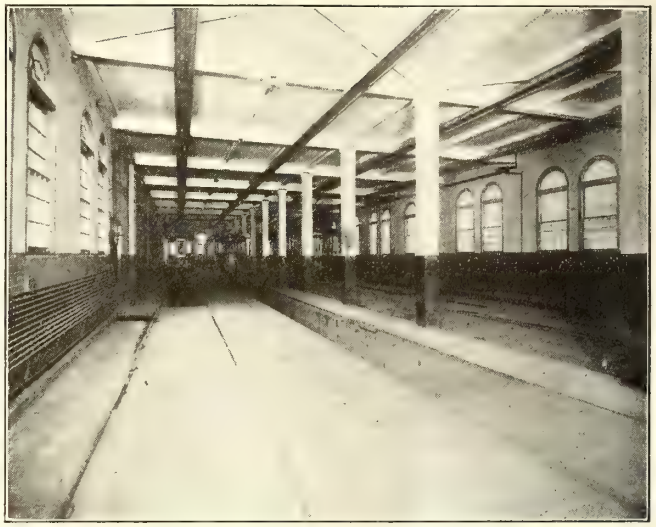
The park business of the railway company differs in some respects from common practice, inasmuch as one of the parks is leased public property and the other has been developed to such a degree that it is visited by thousands of people from neighboring cities. There is no admission charged to either park.

The land owned by the city is Ross Park, located 1½ miles from the center of Binghamton and reached for 5 cents. The railway company operates the park under a long-term lease, books all attractions and sublets the concessions on a percentage basis. Ross Park is 100 acres in extent and is made doubly attractive for picnics by abundantly providing such facilities as tables, benches, cook houses and dishes. The other attractions at this park include Sunday afternoon band concerts and open air vaudeville, with a small number of pay seats reserved as an accommodation. Fireworks are also given weekly and on holidays.

The other park, which is owned by the railway, is known as the Casino, after its principal building. The playground has an area of 30 acres and is about 9 miles from Binghamton, from which it is reached by a 25-cent excursion fare. Band concerts and vaudeville attractions are presented alternately at this place and Ross Park, but its location along the Susquehanna has given it the added attraction of water sports. Besides this, there are two electric fountains, baseball, tennis and croquet grounds, etc. As at Ross Park, kitchen facilities are provided, together with an eating pavilion for 500 people. The Casino theater contains 700 chairs, for which 5 cents each is charged at performances. This park also contains a small animal and bird exhibit housed in Ross Park during the winter.

In general, the grounds are tastefully laid out with many flower beds, and the rest is carefully sodded. At night the park is brilliantly illuminated by 1,400 lights, including a considerable number of arch lamps. The substation adjacent contains two 250-kw G. E. rotaries for the railway service and one 150-kw motor generator for lighting the park and Endicott. The drinking water comes from an artesian well on the park grounds. The park buildings are protected from fire by a fully-equipped hose cart and fire hydrants located throughout the grounds.

The Casino has become favorably known in other cities in this territory besides Binghamton. For instance, from July 14 to 28 next season it will be turned over, without cost, for the annual encampment of the Royal Lancers, an organization of Catholic total-abstainers from Scranton, Wilkes-Barre and other cities in the anthracite district of Pennsylvania. This body, composed of two regiments of 500 each, will bring its own tenting and cooking equipment, with 50 waiters, military band of 40 pieces, vaudeville, minstrel show and other amusements, to which the general public will be welcome. It will give a dress parade every day, and on Sundays 60 priests will conduct the open-air services. It goes without saying that an encampment of this kind is a splendid attraction, and one which incidentally promotes a better understanding between neighboring communities. At the Lancers' encampments last year in Cooperstown, N. Y., over 20,000 visitors were entertained in one day.



Binghamton Railway—Interior of Utilities Building, Showing General Construction of Pits, Lighting and Heating

CONSTRUCTIONAL STANDARDS AND BUILDINGS

Despite the industrial depresssion this year, the Binghamton Railway Company rebuilt 3½ miles to 4 miles of double track in paved streets with 94-lb. Lorain girder rail laid on rock oak or chestnut ties in gravel or concrete, and recently placed in operation a 1-mile extension known as the Beethoven Street division, on which it is using 60-lb. T-rail.

The rolling stock embraces several types of open and closed cars with single or double trucks. The closed single-truck cars are 32 ft. over all, with 22-ft. bodies, and



Binghamton Railway—General Headquarters, Showing Combined Shop and Office Building at the Left, Old Car Storage Sheds in the Middle and Two Employees' Houses on the Right

carry two GE-67 or two GE-800 motors. The double-truck cars, which are used in the Endicott service, are 37 ft. over all, with 28-ft. bodies, with four GE-67 or four GE-800 motors and Christensen air brakes; three of these cars have smoking compartments. During busy hours the double-truck cars are used in connection with single-truck motor cars as trailers. No record is kept of the trailer mileage, as the saving is confined to a reduction in the crews rather than in power. The single-truck open cars are of either 8 or 10-bench capacity, with two GE-67 motors; the larger cars have 15 benches and have four GE-800 motors. Both open and closed cars are provided with Consolidated fenders.

The location of the power house, car storage repair shop and offices at one place, five minutes from the heart of Binghamton, has proved a most economical arrangement. The power house and car sheds are comparatively old structures, but later the company erected a brick storage battery house for chloride accumulators, and in 1906 completed a model combination repair shop and general office building. This building was described in the STREET RAILWAY REVIEW of April 15, 1906, but a recapitulation of its principal features may be given here.

The foundation and floors are of concrete, the side walls of brick and the roof is supported by concrete-encased steel girders. The steel columns supporting the roof are also strengthened and protected from fire by a covering of concrete and wire mesh reinforcement faced with cement. The building is heated with steam from the adjacent boiler house, cast-iron piping being used in the shop and radiators in the office. The ground floor is divided into three sections, having brick partition walls and standard sliding fire doors to protect the openings. The largest division contains two storage tracks and two pit tracks, with 3-ton hydraulic hoists. A fireproof vault for documents and the toilets are located in the rear of this bay.

The middle section is used as a general repair shop, and in addition to the smaller hydraulic jacks has one of 30-ton capacity for raising car bodies. The pits in this section



Binghamton Railway—Sub-Station No. 1 at Endicott, N. Y., Showing the Neat Effect Attainable with Brick

are of the open type, with track rails carried on I-beams resting on brick piers. The rear portion of this bay, used for carpentry, contains an hydraulic elevator for transporting armatures and supplies between the winding shop and stock room above.

The third bay is subdivided by a brick wall, to isolate the blacksmith and paint shops. The paint shop is forward and has two tracks.

The second floor of this building is carried over the storage section only. It is divided into a handsomely appointed office section and an L-shaped room which is used for preparing advertising signs, coil winding and stock supplies. The partition walls and ceilings on this floor



Binghamton Railway—Interior of Sub-Station No. 1 at Endicott, N. Y.

are of asbestos composition and finished with wood-pulp plaster. The floor in the office is of inlaid tiles and the rest of concrete.

The fire protection of the building resides not only in its construction, but in the installation of standpipes with hose, fire pails and extinguishers. The insurance rate is only $0.086 per $1,000 carried.

COIL IMPREGNATING PRACTICE

In these times, when the use of ovens and vacuum treatment for field and armature coils has become rather common, it is interesting to note that this railway is securing satisfactory insulation with the simplest means. The master mechanic of this railway believes that the heat of the oven hardens the varnish to a degree which impairs the pliability of the coils and which may even cause the varnish to check or crack when the wires are heated by heavy currents or when being wound.

Armature coils receive the following treatment: After being wound, that portion of each coil forming an armature slot is glued with fish paper pressed on with a hot iron. The entire coil is then taped with linen and dipped into a shallow pan containing Sterling armature varnish, where it remains for 20 minutes. After being allowed to dry in the open room, which is never below 60 deg. F., the coil is taped with oil linen and the leads are covered with cotton sleeving. Another linen tape is put on from the point where the wires enter the slot, and then the coil is ready for its second dip. It is immersed for 20 minutes and allowed to dry out for three or four days. Finally, the coil is sprinkled with ground soapstone, to enable it to slip into the slots more easily, and it is then pressed into form ready for use.

Fields are insulated as follows: After forming a coil, it is dipped, before taping, 10 hours in a vertical pan containing Sterling insulating varnish. After drying, the coil is covered with two layers of oil paper and three layers of No. 250 drilling cloth lapped over the corners to

strengthen and cushion the coil. The final covering consists of two layers of oil paper and two layers of drilling, and then the coil is ready for the second dip, which lasts 30 minutes. One day is allowed for drying.

HANDLING CAR MEN

The Binghamton Railway management uses no printed rule book, believing that the fundamental rules of car operation can be instilled without one. No book, of course, really can be complete, and some form of bulletin board is necessary to post the occasional orders issued to meet special traffic and weather conditions. In Binghamton all such orders are posted in typewritten form on a board in the car house and removed for filing by the master mechanic. The more general rules relating to operating changes are kept on view for 30 days. A typical special order refers to the opening of the new Beethoven Street line, and calls upon the car men to exercise particular care in familiarizing themselves with traffic conditions at all crossings, and in general to do all in their power to create and hold the new business. The bulletin board bears one permanent order signed by the general manager: "All employees must look to daily order board daily for instruction." To railway managers interested in this matter from a legal standpoint it may be stated that this company's bulletin order practice has been examined by a representative of the Public Service Commission and found satisfactory.

For emergency purposes a smaller board next to the bulletin carries the name and address of every platform man in the service. The runs are not assigned in the car house, however, but from an assembly room in the city, where most of the lines center. A rotation board in the car house shows the company's method of assigning the crews to a different run every week. There are 42 runs in all, and the rotation of crews on them has been found to be an effective method of checking up the average income of each run, and thereby detecting irregularities.

EMPLOYEES' AID ASSOCIATION

The employees of the Binghamton Railway Company have one of the first street railway aid associations in the United States, having been organized since October, 1895. The society has enjoyed a most successful career, having always remained self-supporting, despite the grueling ordeal of a strike which lasted from April 26 to July 20. 1907. It has two classes of membership—the sick aid society proper, with about 180 members (50 per cent of all employees), and a death benefit fund, with 140 to 145 members. The railway management is cordially interested in the association and gives it free meeting rooms, the use of Casino Park for an annual field day and prepares the advertising material for the annual ball. While the company stands ready to make good any deficits, this has never been necessary. On the contrary, since 1899 the association has distributed over $1,500 in dividends to members and purchased $550 of new furniture. The quarterly report of the aid association, ending June 30, 1908, showed receipts of $426.70 and disbursements of $414.25, including two death claims. Similarly, the annual report for the year ending Dec. 31, 1907, showed a favorable balance of $1,145.61.

Any employee of the railway company in good health is eligible for admission to the association, and can remain a member as long as he pays his dues in accordance with the rules, whether or not he remains in the company's service. This retention of membership principle is an important feature, as it removes much of the distrust that some men feel toward joining organizations of this character. It is a guarantee that no matter where they may work in future, their money has not been wasted.

The initiation fee is $2 and the monthly dues 50 cents. In case of total disability to perform regular duties, members receive $5 a week up to 10 weeks in any 12 months. While no benefit is paid for periods of disablement less than one week, it should be noted that when payments are made they include the first week as well as any fraction of a week (on a pro rata basis) within the maximum sick benefit period.

Money received is distributed as follows: Benefit fund, 75 per cent; management fund, 15 per cent; benevolent fund, 5 per cent, and amusement fund, 5 per cent. If the surpluses of these funds respectively exceed $375, $75, $25 and $25 per 100 members, a dividend is declared. Dividends are not given to members of less than two years' standing. They are disbursed at the rate of $10 each in the order of membership certificate numbers. Should any fund fall below the mark, money from some other fund is transferred to it by a two-thirds vote of the members present at a meeting.

Members may join the special death benefit fund by paying an initiation fee of $1.10. An assessment of $1 is levied upon the death of any member of said fund, and 50 cents upon the death of any member's wife or child between the ages of 7 days and 14 years. This class of insurance is popular with family men because of its low cost.

The salary expenses of the aid association are confined to the following: Financial secretary, $50; recording secretary, $20, and treasurer, $50. The financial secretary and treasurer must give bonds for at least double the amount handled by them.

The association's physicians are those regularly employed by the Binghamton Railway Company in claim work and examination of employment applicants. The association gives free treatment to indigent members from the benevolent fund money.

The government of the association is vested in a board of trustees consisting of one motorman, one conductor and some other employee, thus giving the platform men majority control at all times. A trustee's term is three years. Trusteeship, presidential and other elections are held annually. Regular meetings are held once a month, when a full financial report must be presented to the members.

The association has, of course, the usual relief, law and other committees required in organizations of this character.

The new Italian electric railway from Castle Raymondo to Camerino is 10 miles long and has several heavy grades up to 10 per cent, but is built throughout as an adhesion road. Water power is utilized to generate three-phase current, which is converted to direct current before feeding to the trolley line.

The first electric street railway to be operated in Warsaw, Russia, was put in service in April, 1908, and will be managed by a syndicate which has a contract with the city until 1922. The company operates 304 cars and charges 3.6 cents for first-class passengers and 2.5 cents for second-class. The daily hours of labor for employees are from 7 a.m. to 11:30 p.m., for which motormen receive 62 cents to 67 cents and conductors are paid 62 cents to 83 cents.

PARKS OF THE AURORA, ELGIN & CHICAGO RAILROAD

The Aurora, Elgin & Chicago Railroad Company owns and operates two parks, known as "Riverview" and "Glenwood." Although both of these parks are favored with natural attractiveness, they differ in that Glenwood has been improved with a view to affording a wooded spot suitable for picnicking, while Riverview has been built into an amusement resort.

RIVERVIEW PARK

Riverview Park is especially interesting because it has been laid out in accordance with a systematic plan, and all



Riverview Park—Novel Gateway and Illumination

improvements have been made to harmonize with this scheme. The park is located on the Fox River, 3 miles south of Aurora, Ill., a city of 30,000 people and the terminus of two divisions of the Aurora, Elgin & Chicago Railroad. The business district of Chicago is one hour distant by the high-speed trains of the company, and an interurban trolley line which runs along the Fox River connects the property with Aurora, Geneva, Elgin and Carpentersville.

Two years ago, when the company decided to enlarge the park, it possessed few attractions other than those bestowed by nature, and the few structures within its boundaries were unsymmetrically located. The first step taken was to adopt a comprehensive plan for development, by which full use should be made of the naturally attractive topographical features of Riverview. It was also decided that the plan should be so broad in scope that as money was available from year to year various additions to the park could be made, all in harmony with the general scheme.

This method of park development by units has many features to commend it. It is necessary in an amusement resort of this kind, which caters to a city of from 30,000 to 50,000 people, to add something new each year if the interest of the public in it is to be maintained. The unit development scheme suits this need admirably. Only such improvements need be made as the earnings of each year warrant, but as they are added the property becomes continually more efficient and profitable.

An engraving shows the general arrangement followed. It will be noted that a main thoroughfare extends across the park, from the entrance at the electric railway station to a bridge leading to a pavilion on the wooded island. All of the concessions and amusement features are to be arranged symmetrically on this thoroughfare. After arrival at the park, the visitor passes through an attractive gateway, which gives an impression of stability and good taste. The large pillars shown in the illustration are of timber covered with rough plaster, and each is surmounted by a pedestal of artistic design bearing five lamps within frosted spheres. Within the gate the visitor finds numerous paths leading to a semi-circular thoroughfare, around which the concessions are grouped.

The plan of arranging the buildings in semi-circular form was chosen because it was believed that the best impression is thus made on the incoming visitor. It has also been found very desirable to keep the attractions grouped closely together. In a resort of this kind the crowds will form and unconsciously move in a body from one concession to another. Thus if the concessions are in line or adjoining each other, there is a tendency to form a crowd which will in itself add to the enthusiasm.

All of the space set apart for concessions around this semi-circle is not yet occupied, but as rapidly as new buildings are put up from year to year they will be connected with the other structure by an ornamental wall or peristyle,



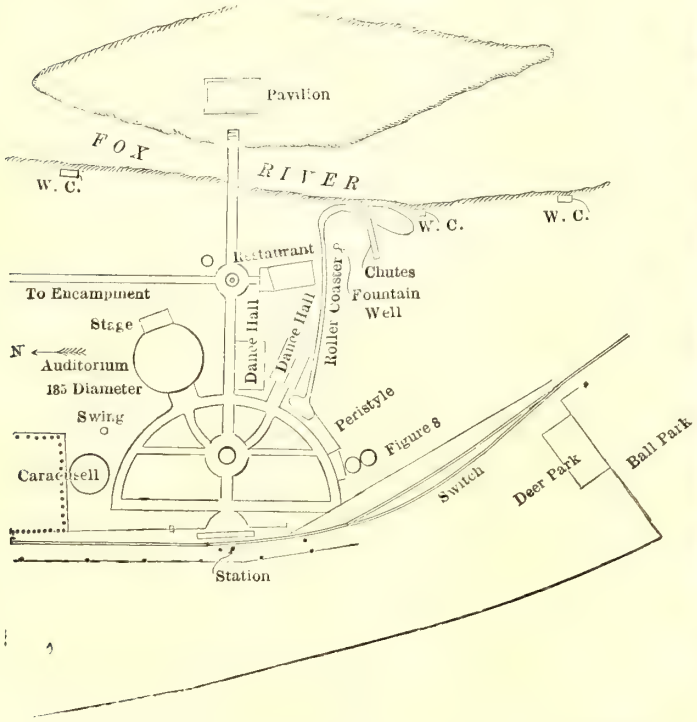
Riverview Park—A General View of the Grounds, Showing the Wide Paths, Wide Grass-Covered Areas, Lighting Scheme and Some of the Amusement Buildings

so that finally the eye of the visitor as he enters the park will be greeted by a complete semi-circle of amusement structures with ornamental connections.

As mentioned earlier, when the present plan for the development of this park was adopted two years ago, several buildings were located promiscuously among the trees. When the new work was begun in earnest, these structures were moved at a cost of approximately $1,000, so that now

in their new locations they form a part of the general scheme.

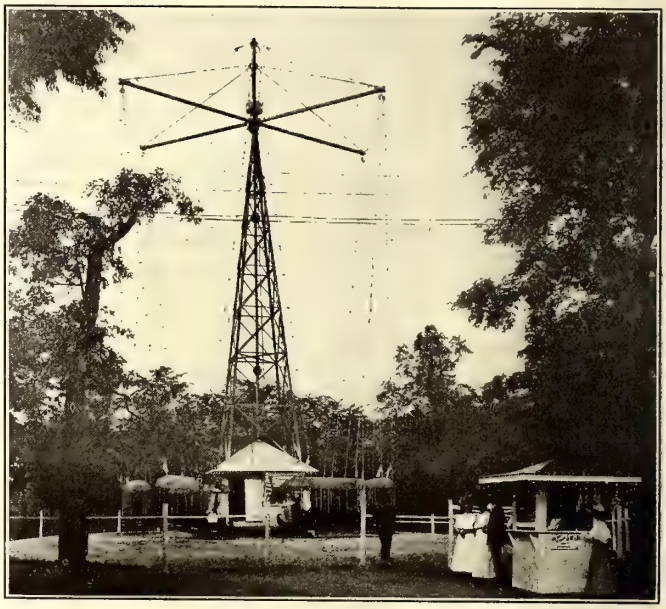
At present the following amusement features, all located on the semi-circle, are operated: Figure eight; roller coaster, 3000 ft. long, extending to the river bank and back to the circle; dance hall; restaurant; Chautauqua



Riverview Park—Plan Showing Location of Amusement and Utility Structures

building; merry widow swing (illustrated). An ornamental peristyle connects the roller coaster and the figure eight, making complete the southern end of the circular row of building fronts. In this peristyle are a penny arcade and a Japanese novelty booth. There are yet unoccupied spaces for three concessions on the circle. The Coaster Construction Company, Chicago, Ill., was the builder of the roller coaster, figure eight and merry widow swing.

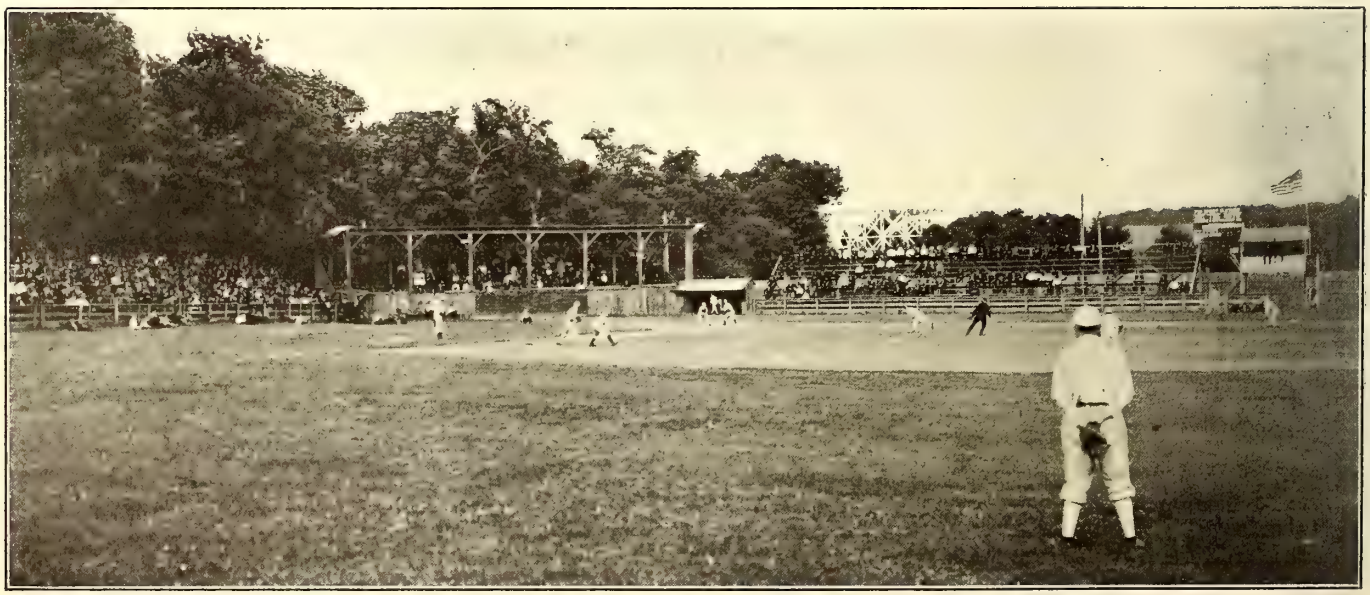
An illustration is presented showing the attractive front of the restaurant, located among the trees and about halfway down the center thoroughfare between the circle and the river. This restaurant building, before the present improvements were made, did not conform to the alignment of the general scheme, so a new front in the "Mission"



Riverview Park—The Merry Widow Swing

style of architecture was added. The change improved the general appearance of the circle marvelously.

Reference to the plan of the park will show that the central thoroughfare leads across the river to a pavilion on the island. This pavilion or casino and the bridge have not yet been built, but will form a part of the fully developed park. From the central point on the main thoroughfare a lateral walk leads to an encampment ground, which is available for Chautauqua purposes. At the opposite extremity of the park is a well-built and equipped baseball diamond and athletic field, an illustration of which is presented. The auditorium, which fronts on the semi-circle, has an umbrella type of roof supported by a steel structure 135 ft. in diameter. This auditorium has a seating



Riverview Park—A Never-Failing Attraction Which Needs No Description

capacity for 3500 and is provided with an enclosed stage. As a part of the stage equipment are dressing rooms and a complete installation of theater properties, dimmers and similar mechanisms for artificial lighting.

Good music in the form of orchestral or band concerts has been found to be a most important feature. The whole territory tributary to the Aurora, Elgin & Chicago Railroad Company's service is an attractive farming and woodland country, so that it is necessary for the company to offer at this park something more than shade trees. It has been found that the music meets the approval of the



Riverview Park—Comfortable Cars to Add to the Pleasures on the Scenic Railway

patrons, and it has also been demonstrated that when vaudeville attractions are presented they must be short and the price of admission must be low. People who go to a park do not care to sit for an hour and a half in a theater on a pleasant afternoon or evening.

A restaurant, it is said, needs close attention, and if properly handled is an important factor in a park drawing its patronage from a small community. At Riverview



Riverview Park—The Handsome Refreshment Pavilion

endeavor is made to give service to the full value of the patrons' bills and to make no profit on the restaurant feature. No admission is charged to Riverview Park, and accommodations are provided for automobiles and other vehicles. A 5-cent fare is charged on the company's cars from Aurora to the park.

Special efforts are made in the early summer thoroughly to advertise the park. Local papers are used freely and special folders are issued. Some space also is devoted to the park in the regular railroad timetable folders. Whenever baseball games are to be played at Riverview they are advertised by means of large posters and by cards in the local papers.

GLENWOOD PARK

Glenwood Park is located on the Fox River, near the company's central power station, at Batavia, Ill., and the railroad company has been successful in securing large



Riverview Park—Up and Down the Dizzy Grades of the Scenic Railway

picnic parties for this place. Excursion parties of from 4000 to 5000 people are brought here from Chicago, and while it is 40 miles from this city, these parties are handled easily and rapidly in 10-car trains, which cover the distance in 70 minutes.

This park is a beautifully wooded spot, and, excepting for the care given to the trees and shrubs, has had no improvements other than a restaurant and dancing pavilion. It has been found that picnic parties from Chicago go to the country for a day's outing and select a park having natural beauty in preference to a resort whose main feature is an aggregation of amusement devices.

The Ft. Wayne & Wabash Valley Traction Company will improve its Spencer Park at Logansport, Ind., by adding a scenic railway.

The Grand Rapids, Holland & Chicago Railway Company has an amusement park on the shore of Macatawa Bay, close to Lake Michigan. This park is 30 miles from Grand Rapids and 6 miles from Holland. The ride is so long that no great crowds make the trip from Grand Rapids, but there is a large all-summer business from the nearby resorts and an average of about one picnic a day from Grand Rapids. For the picnic business an excursion rate of 50 cents for the round trip is made. During the past four years the company has steadily added concessions comprising the usual amusement devices. The boat livery is said to be one of the most profitable concessions. No admission is charged to the park, as it is maintained principally for excursion parties.

THE OAKS, PORTLAND, OREGON

The Portland Railway & Light Company, Portland, Ore., is making extensive preparations to increase the attractiveness of its park property, "The Oaks," for the coming season. Owing to the milder climate on the Pacific Coast, the park season extends from May 1 to Oct. 1, inclusive. This favorable condition makes it practicable to make more liberal expenditures for attractions, and, of course, also shortens the interval during which the park investment is idle. The attendance during 1907 was about 350,000 for four months, equivalent to over three visits per inhabitant of Portland and vicinity. On Sundays and other holidays the attendance runs from 15,000 to 30,000.



The Oaks, Portland, Ore.—A View from the Willamette River

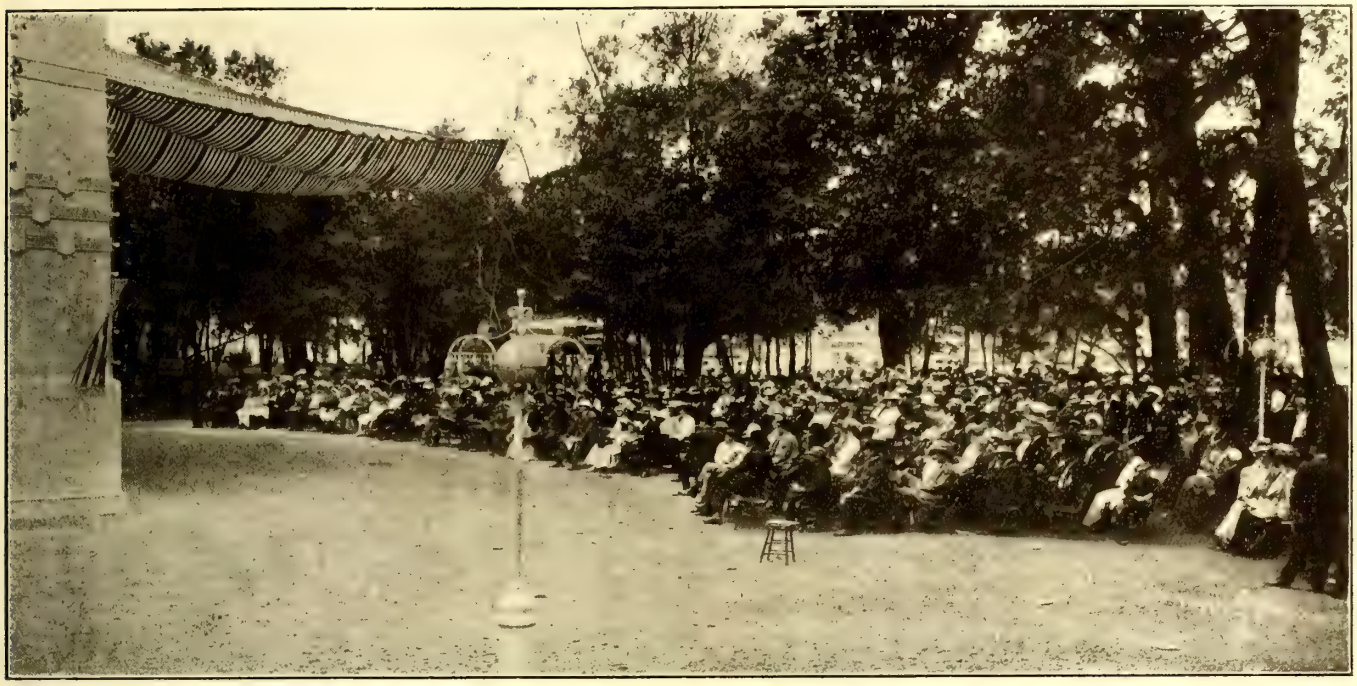
"The Oaks" is a natural park, situated about 4 miles south of Portland, along the regular line running to Oregon City. The company owns a very large tract of land in the vicinity of the park, but the actual amusement property covers not more than 22 acres or 23 acres of high land along the banks of the Willamette River. This portion is densely covered by a grove of oak trees, from which the park derives its name. In laying out the grounds for pleasure purposes this natural forest beauty has been retained as much as possible, and even enhanced in various ways by flower gardens and lawns.

During the park season the company runs separate trains, consisting of a motor car and from two to three large open trailers. Each trailer has a seating capacity of about 150, thus making a full train load of about 500 people. During weekdays these special trains run at intervals of from 10 to 15 minutes, and on Sundays and special occasions from 5 to 7 minutes. The fare to "The Oaks" is only 5 cents, and passengers can transfer from any of the city lines without paying extra fare. All of the passengers are unloaded from the cars on one large platform used for entrance only, another platform serving exclusively for exit. Home-going passengers purchase their tickets at the latter platform, and also have the privilege of transferring to any city line.



The Oaks, Portland, Ore.—Along the Trail, with the Concessions on One Side and Oak Trees on the Other

The principal attraction at "The Oaks" usually is some celebrated band giving afternoon and evening concerts, with programs made up to suit both classical and popular tastes. During 1908 the company had such bands part of the season and comic opera and vaudeville at other times. The shows are given on a large covered stage, from which projects a large covered "Airdome," having a seating capacity of about 2000.



The Oaks, Portland, Ore.—Listening to the Music

The other standard attractions in the park are the trail, on which are installed the figure 8 roller coaster, the merry-go-round, the "Old Mill," "The Tickler," laughing gallery, "Bump-the-Bumps," "Giant Whirl," and a large roller skating rink having a floor space of 200 ft. x 400 ft. There is also a large dance pavilion. This trail continues around to the side facing the river, where there is a large restaurant with a roof garden and a wide porch surrounding all sides. The swimming tank is placed right in the Willamette River. During each season there are other special attractions, such as balloons, loop-the-loop automobiles, high-wire performers, etc.

Fireworks constitute another attraction, and are usually displayed on Saturdays and holidays. At night, when the fireworks are most elaborate, they are discharged from a large barge placed about 200 ft. from the river bank. This arrangement makes it possible for crowds of 10,000 to 12,000 people to have an unobstructed view from the high ground along the river.



The Oaks, Portland, Ore.—Along the Trail, Showing also the Lighting Sprays

Considerable money is being spent this year to beautify

the grounds by laying out almost the entire vacant part with beds of roses. The idea is to make a rose park in which roses will be in bloom from the opening of the season until the close. This novel horticultural feature is expected to prove exceptionally interesting to visitors from the Eastern States.



The Oaks, Portland, Ore.—The Water Chutes between the Entrance and Exit Platforms

The natural beauty of "The Oaks" makes it an ideal resort for family and society picnics, separate days being set aside for the larger organizations. Every attention is given to encourage the women and children to attend so that they may feel at home and enjoy themselves without feeling that the presence of undesirable elements will require an escort. Each season a special prize is given on Children's Day. Last year the prize was a Shetland pony and cart, complete, valued at $350.

The good reputation of the park is kept up by the company's special police corps, the force being increased on special occasions whenever necessary. "The Oaks" has the splendid record of no reported robbery or other violence since its opening, so it is no wonder that it has become popular with the great majority of Portland people.

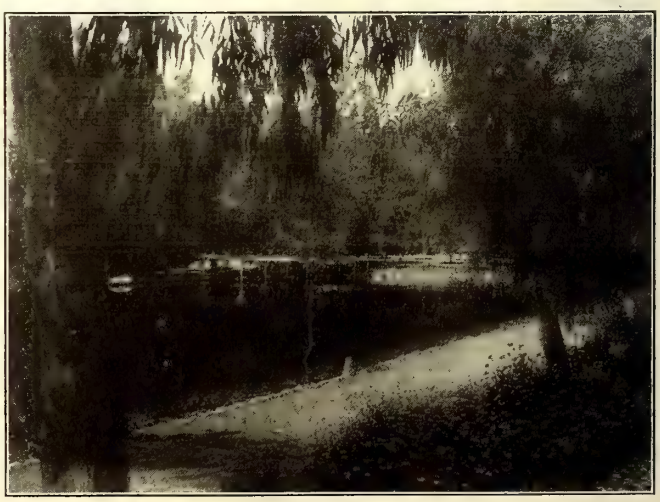
Of the illustrations, one on page 180 is an excellent view of "The Oaks" taken from the river. A second on page 181 shows part of the trail and the ground covered with a mass of oak trees. The spray design electric fixtures which can be seen in this picture are used all over the trail and part of the grounds. They are the same handsome design employed for similar purposes at the Lewis & Clark Fair held in Portland in 1905. The total amount of lighting in this park is equivalent to about 13,000 lamps. A very good view of the water chute, and incidentally of the exits and entrance platforms on opposite sides, is also reproduced. Other views show an afternoon audience on a hot summer's day listening to the band and a part of the trail or boardwalk on Sunday afternoon. It will be noticed that most of the concessions are placed on one side, so that visitors will not forget that they are in a real forest park, and not on a sun-baked boardwalk.

PARKS OF THE SAN BERNARDINO (CAL.) VALLEY TRACTION COMPANY

The San Bernardino Valley Traction Company, of San Bernardino, Cal., owns and operates two parks, both of which have some rather novel features. Urbita Hot Springs Park, located between San Bernardino and Colton, has the unusual feature of an artesian well of sulphur water which reaches the plunge and tub baths at 110 deg. Fahr. There is also a bath house with a plunge 50 ft. x 100 ft. and dressing rooms for about 100 people. Porcelain tub baths are available for 40 patrons at a time. Other water pleasures are to be had on a 7-acre lake which is provided with gasoline motor and rowboats. Several attractions appealing especially to young folks are a zoo, a merry-go-round and store building containing stands for soft drinks, candies, post cards, etc. There is also a 50-ft. x 100-ft. dance hall



Urbita Hot Springs Park—In the Cool, Deep Shadows



Urbita Hot Springs Park—Along the Lake

which the company proposes to use as a skating rink in the near future. As shown in the accompanying views, Urbita Park is also especially attractive for its semi-tropical woodland features.

The other pleasure resort operated by this company is the Association Park race track between Redlands and San Bernardino, where the principal attractions are racing for horses, automobiles, bicycles and motor cycles. Both parks are in charge of A. B. Merrihew, manager of the railway company.

KEYSTONE PARK, SAYRE, PA.

On July 9, 1908, the Waverly, Sayre & Athens Traction Company, operating between Waverly, N. Y., and Sayre and Athens, Pa., opened a 5-acre pleasure ground known as Keystone Park. This is located on the main line joining these contiguous towns and can be reached for a 5-cent fare over the company's lines by about 20,000 people. The park is only 1¼ miles from Waverly and Sayre and 3 miles from Athens. There is no admission charge to the railway company's patrons and but 5 cents is demanded of other visitors. The park was well patronized during its first season extending from July 9 to Sept. 18, entertaining 85,000 visitors, 10,000 of whom paid gate admission.

Keystone Park has been laid out along modest yet attractive lines. It is a well-wooded grove with numerous flower beds and plenty of rustic furniture for the convenience of the patrons. Illumination has received careful attention, there being installed over 600 16-cp lamps which are strung between the trees at intervals of 12 ft. in the manner illustrated. The entrance to the park is equipped with a large illuminated sign giving the name of the park in addition to the flaming keystone.

The park is particularly attractive to picnic parties through the installation of a public kitchen and tables to accommodate over 350 people at one time. The kitchen matron has charge of a large supply of dishes, which are loaned to picnickers for the nominal charge of 5 cents per dozen to cover expenses.

The costliest attraction is a local band of 23 pieces which gives concerts Tuesday, Thursday and Saturday evenings and Saturday and Sunday afternoons. The orchestra engaged for the dancing pavilion plays on a per cent partnership basis. The railway company furnishes the pavilion and lighting, and charges 5 cents per couple.

Special events the first season included a balloon ascension every other Saturday, trapeze performances and fireworks. Toward the end of the season the management tried out several vaudeville acts, and as these found approval with the public, this class of entertainment will be given on a larger scale next summer.



Keystone Park—Rustic Entrance



Keystone Park—Flower Beds and Lighting Scheme



Keystone Park—Plenty of Trees, Wide Walks and Benches



Keystone Park—Shooting Gallery

The park contains the usual merry-go-round, miniature railway, swings, shooting gallery, moving picture-theater, photograph gallery, candy stands, etc., all of which are in the hands of concessionaires on a percentage basis. The merry-go-round proved the best money-maker last season.

The results of the first year's operation of Keystone Park have shown that conducted along the lines described, it is more than likely to pay its own way besides inducing a large short-haul traffic.

PAXTANG PARK, HARRISBURG, PA.

One of the prettiest and best-kept pleasure grounds in Pennsylvania is Paxtang Park, a 35-acre amusement property owned and operated by the Central Pennsylvania Traction Company, of Harrisburg. The park is about ¼ mile from the main line and is served by a double-track on which crowds can be transported for a 5-cent fare as fast as cars can be made available for them. The tendency of the company is to eliminate gradually the use of open cars in this and other service, as Harrisburg is in a region of sudden and heavy rainstorms.

The park is situated in a district of great natural beauty and the constant effort of the park management has been to retain this inherent advantage by soliciting only the patronage of the best classes of people. There are no sensational amusements of the kind which are expensive to install and soon cloy the public. Instead, the grounds are made as attractive as possible by an abundant supply of standard amusements. In the absence of a dancing pavilion this park is unusual, but this omission was made purposely to avoid undesirable patronage. For the same excellent reason, no liquors are sold in the park, and thus disorder of any kind is a rarity.

During the last season the park entertained 197,866 visitors from a territory of about 100,000 population. As the season does not extend over 15 weeks, this is really a fine record. The attendance in 1908 was about 20,000 less than in 1907 on account of the depression in the iron and railroad industries, which severely affected Harrisburg. Decoration Day usually marks the opening of all the principal entertainments.



Paxtang Park—Boating Among the Hills



Paxtang Park—A Turn in the Lake

Paxtang Park is not operated on an admission-fee basis as the company is satisfied simply to have the park pay its own way. The principal pay attraction is high-grade vaudeville from the William Morris circuit, which is given in a building with open sides. This structure has 800 seats, of which 300 are reserved at 15 cents and the balance made



Paxtang Park—Entrance to the Grounds, Illustrating the Rustic Simplicity of the Park Buildings

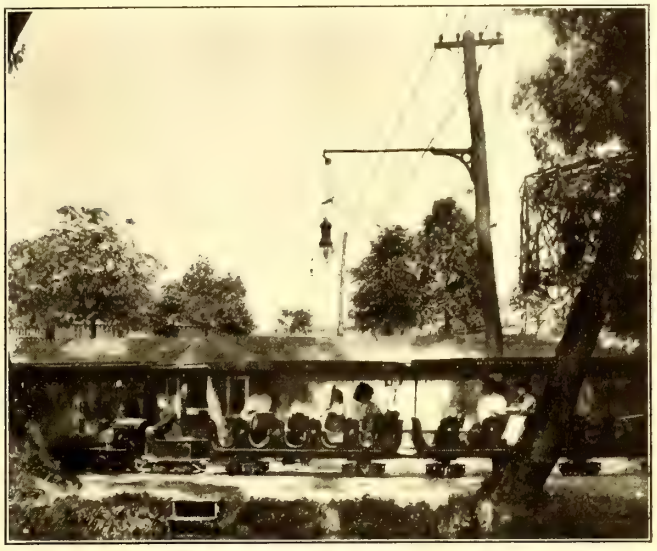
available for 10 cents. It is a noteworthy fact that despite the reduced attendance last year the vaudeville suffered less than other attractions. The people did not have as much money to spend, but were willing to economize in popcorn and sodas that they might forget their financial worries by going to the theater.

The natural configuration of the grounds has made it possible to provide a fine lake for boating and a concrete swimming pool, both of which are very popular. A spring of pure cold water bubbling forth from a great jagged rock is another attraction best appreciated in hot weather. It is hardly necessary to say anything about the artistic appearance of the grounds as this will be noted from the accompanying illustrations taken last summer. Tables and benches, of course, are numerous as befits such a place for family and association meetings. Many of these benches formerly did faithful service on the old-time open cars. As indicated in the illustrations, both arc and incandescent lamps are used liberally for the illumination of the grounds and buildings.

Paxtang Park is especially attractive to the younger element because of the numerous swings, the safe boating, the merry-go-round, the miniature railway, figure-eight roller coaster, box-ball alleys and the swimming pool. These, together with the vaudeville, comprise the principal pleasures aside from such special events as balloon ascensions. Among the other standbys are the shooting gallery, photograph gallery, soda booth and the usual stands, including one in which post-card souvenirs of the park are sold.



Paxtang Park—One of the Shelter Houses with the Scenic Railway in the Background



Paxtang Park—The Starting Point of the Miniature Railway

The merry-go-round and theater are managed directly by the company. The boating and swimming privilege is sold for $500 a season, the concessionaire in turn charging 25 cents an hour for the former and 25 cents for the latter, including a suit. The operators of the roller coaster and miniature railway respectively pay the company 25 per cent and 25 per cent of their gross receipts. Miniature railway rides are six for 25 cents and for the roller coaster 5 cents per trip is charged, or six tickets are sold for 25 cents.

Paxtang Park is under the direction of F. M. Davis, superintendent of transportation and park manager of the Central Pennsylvania Traction Company. Acknowledgment is due Mr. Davis and F. B. Musser, president of the company, for the views and information from which this description was prepared.



Paxtang Park—The Concrete Swimming Pool and Steps for Diving



Paxtang Park—Benches for the Weary and a Bridge for the Thoughtful

THE PROBLEM OF REDUCING ACCIDENT DAMAGES—IV.

BY FREDERICK W. JOHNSON, ASSISTANT GENERAL CLAIM AGENT, PHILADELPHIA RAPID TRANSIT COMPANY

In the month of July, 1907, the Philadelphia Rapid Transit Company still further took up the matter of the systematic instruction of car men in the various branches of accident work. The Frankford barn, at which between 500 and 600 conductors and motormen report, was assigned to the claim department for experimental purposes.

This barn was selected for the purpose for several reasons. It was, first of all, a barn of fairly good size. Secondly, its lines operated principally through congested portions of the city, where accident conditions were anything but of the best. Thirdly, in several essential respects the accident work of the men of this barn was felt to be open to improvement. The intention was to test certain suggested improvements under unfavorable, rather than under favorable, circumstances.

Accordingly, the men of this barn were gathered together into classes, about six in number, for the first series of meetings. In point of attendance, the classes ranged from 40 to over 120. A remarkably well-appointed assembly room at the barn afforded ample accommodations for the purpose. The first meeting was held at night, and was attended by the superintendent and a number of officials of the company, in order that the men might understand from the start that the work had the approval and support of the company.

The classes averaged one hour in length. The men manifested their interest in the subject from the very beginning, a number seeking the privilege of attending more than one of the meetings. At this time only rudimentary principles in accident work were discussed, the intention being to start in at the very bottom for the purpose of laying as good a foundation as circumstances would permit. The series passed without special incident.

Early in the following October a second series of meetings was arranged at the same barn. Again the same interest was apparent upon the part of the men. The instruction given this time was a little more advanced in character. The classes were reduced to four in number, which gave a somewhat higher average attendance per class. Superintendent Gutherman attended practically all of these first classes and endeavored in every way within his power to advance the success of the work among the men of his barn. This series likewise terminated without special incident.

On Feb. 18, 1908, the first issue of the company's weekly accident bulletin in connection with its instruction work appeared. This and subsequent issues for some time were confined entirely to the Frankford barn. The bulletin was issued in individual form, a copy being handed to every conductor and motorman with his pay check each week. This idea also seemed to meet with the approval of the men on the cars, and it proved a source of no little encouragement to find that they looked forward from week to week for the next issue of the bulletin. When a man unintentionally was overlooked in the distribution of bulletins, he invariably made it his business to step up to the desk and to ask for one.

During all of this time no effort was made to "prevent" accidents; rather was every endeavor bent in the direction of teaching the men how to handle certain types of accidents properly. The reason for adopting this course has been discussed at some length in a former article. In a word, experience has demonstrated the fact that prevention of accident work cannot be prosecuted successfully without the construction first of a suitable foundation. For the time being it was believed that the importance of submitting a prompt report upon every accident and of obtaining an adequate number of witnesses to these accidents afforded abundant opportunity for missionary work.

What about results? Well, the results were nothing startling. They never are in accident work. The company was contending with conditions which had been in force for many, many years past. It was not to be expected that a grand upheaval would follow as a result of a few months' work. But, for all that, there were encouraging features about the work of the men. The number of "unreported accidents" ceased to show an increase, and gradually began to decrease, very slowly to be sure, but the drift, nevertheless, was in the proper direction. The accident reports submitted by the men began to show an improvement in their recital of important facts. The average number of witnesses obtained per accident increased steadily from month to month, while the barn meanwhile went from the foot of the list in this respect to the very top, and then stayed there. In such branches of the work as were touched upon the Frankford barn readily outdistanced the other 18 of the company.

EXTENSION OF THE WORK

During the following April Mr. Goshorn, head of the company's claim department, received authority to extend the work of instruction throughout the entire system. Schedules were immediately drawn to cover all of the barns. Plans were rearranged, material for lectures prepared, advance bulletins printed and a corps of instructors selected. Arrangements were perfected for meeting places and for innumerable other details incident to the instruction of about 7000 conductors and motormen.

By the middle of the month the department was prepared to go ahead with the work. It required 12 working days for the corps of seven instructors to cover the system. The men were allowed their regular rate of wage for time used in attending classes. Throughout the course of meetings but a single instance of inattention or discourtesy developed, and this was upon the part of but one man. Upon completion of the classes the company's accident bulletins were promptly swung into operation. Various other innovations were introduced at short intervals, all of which have since demonstrated their value toward the end sought, but which do not properly come within the scope of these articles.

Immediately upon completion of this series of meetings a school for the instruction of new employees was established at headquarters. To this school all new men are sent by the various superintendents immediately upon completion of their period of probation on the cars. No attempt is made, however, to give the new employees a full detailed history of accident work from the time of the big wind down to the present. For one hour they receive good, solid instruction upon a number of vitally essential features in connection with accident work. They are then given return cards to their superintendent, certifying their attendance at the school. From this point on the new man is given a copy of the bulletin each week, but receives no further verbal instruction until the next regularly scheduled series of classes, in the fall or the spring following. To this school also are sent experienced conductors and motormen who demonstrate their need of further instruction from time to time.

Again, during the latter part of September, a second series of meetings was conducted successfully throughout the system, present arrangements calling for but two talks a year, one in the spring, the other in the fall. This series likewise was marked by the closest attention upon the part of the men, and proved most encouraging in every way.

To date the work has been confined principally to a consideration of such subjects as the importance of reporting promptly all accidents; suggestions regarding the method of making out accident reports; the matter of colliding cars, and the work of obtaining witnesses to accidents, with occasional references to other topics with a view to guarding against any possibility that the work might become monotonous because of the instructor holding too closely to any particular topic.

THE UNREPORTED ACCIDENT

The "unreported accident" unquestionably is one of the most serious problems with which the average street railway claim department is confronted to-day. It is demoralizing in its effect upon the men upon the cars; one man neglects to report an accident and possibly gets off scot-free because of the fact that the company is unable to determine the guilty person; the next man obeys orders, sends in a prompt report of his accident, and possibly is rewarded with a lay-off or dismissal, because of some alleged carelessness or neglect. Hence, there is a constant temptation upon the part of the men to conceal the occurrence of accidents. It is more or less disconcerting to the superintendent, inasmuch as he is frequently under fire from headquarters because of the unfavorable showing of his barn or division in the "unreported accident" column; especially so, if his showing is growing progressively worse.

It is detrimental in its effect upon the claim department because of the fact that the department is forced to grope its way in darkness in dealing with claims of this character. It necessitates additional help which otherwise would not be required. It strangles the customary careful investigation of claims for the protection of the company, and oftentimes reduces the disposition of a claim or lawsuit to a matter of mere guesswork, for the simple reason that the average claim agent is neither a mind-reader, second-sight artist nor clairvoyant. With many companies the expenditure of thousands of dollars each year depends upon the judgment and experience of their claim agents in considering blind claims of this sort.

It is discouraging in its effect upon the legal representatives of a company in that it forces them to trial upon cases concerning the real merits of which they know but little. It is not to be supposed, of course, that every blind claim will be adjusted simply because it is blind. Hundreds of them crumble away when exposed to the light of day. But for all that, the average trial attorney prefers to know something definite and tangible regarding the merits of a case at issue.

It is harmful in its effect upon the claimant who really has a just cause of action, in that it necessarily places his claim temporarily upon the suspicious list. The accident complained of may have happened, and it may not. That question must first be determined as clearly as possible, one way or the other, before action can be taken by the company upon the matter of the disposition of the claim. It is only in this way that the honest claimant can be distinguished from the fraudulent.

And, lastly, the "unreported accident" is a menace to the best interests of a company by reason of the fact that it strikes directly at its resources. An increase in accident damages is equivalent to a proportionate decrease in revenue. The "unreported accident" column includes, of course, accidents for which the company's employees were responsible, as well as those for which they were not responsible. In either event, however, the results are pretty much the same, inasmuch as the company is ever at a disadvantage in dealing with cases of this character.

That has been, and is to-day, the experience of many an otherwise well-managed street railway property. And the really surprising feature of the whole situation is that many of these same companies view this state of affairs with a marvelous degree of complacency. It has been going on for so long that they have sort of become accustomed to it. Time and time again have substantial verdicts been rendered against them upon blind, unreported accidents, yet to-day they are doing practically nothing to alleviate so unsatisfactory a condition. Far be it from them to admit that such is the case, yet facts are stubborn things. But with these same companies let the cost of operation of a certain line vary four-tenths of a cent per day, or the expense of labor in a certain car barn show an increase of $1.38, and the official board of inquiry immediately springs into commendable activity.

The larger the system the greater the spread of the "unreported accident" evil. Various reasons contribute to this end. First, the matter of labor; the larger the city the more unstable the grade of men available. Secondly, the comparative ease with which the occurrence of accidents may temporarily be concealed. Thirdly, the utter impossibility of as close a relationship between the men upon the cars and the officials of the company, as upon smaller systems. A company of moderate size, employing a larger percentage of natives upon its cars as conductors and motormen should experience comparatively little difficulty in practically eliminating the "unreported accident" for all time, if only the problem be approached from the proper angle and in an intelligent, energetic, broad-gaged manner.

REDUCTION IN UNREPORTED ACCIDENTS IN PHILADELPHIA

The following figures are given as bearing upon a portion of the work covered to date by the work of the Philadelphia Rapid Transit Company. No claims of any description are made in connection with them. Whether the results thus far accomplished are due in part to this work or to some other contributing cause will be left for the future to determine. Whether the apparent improvement is permanent or temporary will also be left as an open question. If the results merely chance to be coincident with the inauguration of instruction work they are none the less acceptable for that fact.

Taking up the "unreported accident" problem as the first of three subjects toward which especial attention has been directed thus far, the following results are submitted. The result for each month is obtained by comparing its totals with those of the corresponding month in 1907:

REDUCTION IN NUMBER OF UNREPORTED ACCIDENTS.

	Per cent
June	45
July	60
August	54
September	54
October	63
November	60
December	45

The work has been in actual operation throughout the system for but nine months, and as the plan of campaign is mapped out upon a basis of two years, it will readily be

seen that the major portion of the work still lies in the future.

For the five months immediately preceding the inauguration of the first classes in April last the average number of witnesses obtained per accident for the system stood at 3.1.

For the month of April the average number of witnesses obtained per accident for the system increased to 4.5.

The following month of May showed a still further increase, the general average for this month standing at 5.5.

The next month, June, rolled up a general average of 7.3.

The month of July rounded out a general average of 7.0. August likewise turned in an average of 7.0 witnesses per accident for the entire system.

Below is given the individual standing of the various barns for the month of October. The figures denote the average number of witnesses obtained per accident by each barn:

1.	Richmond 11.1	9.	Second & Wyoming 8.0
2.	Folsom 10.1	10.	Hancock & Lehigh 7.8
3.	Second & Third 9.2	11.	Sixteenth & Jackson 7.6
4.	Fifth & Sixth 9.1	12.	Twenty-sixth & Allegheny .. 7.5
5.	Fifteenth & Cumberland 8.8	13.	Ridge Avenue 7.1
	Tenth & Eleventh 8.8		Hestonville 7.1
6.	Market Street 8.7	14.	Twenty-seventh & Girard .. 6.6
7.	Lancaster Avenue 8.5	15.	Woodland Avenue 6.3
8.	Pelham 8.4	16.	Gray's Ferry 5.9
	Willow Grove 8.4		

General average for the entire system, 8.0.

It is also interesting to note that during Founders' Week in Philadelphia, when travel upon the cars was exceptionally heavy (the company's record for the number of passengers handled during a single day being bettered twice during the week), the average number of witnesses obtained per accident reached 8.3 for the period of seven days, the actual figures for each day being as follows:

Sunday	7.2	Thursday	9.3
Monday	8.7	Friday	8.8
Tuesday	8.0	Saturday	7.7
Wednesday	8.0	Average for entire week	8.3

November, the first of the winter months, returned a general average of 6.6 witnesses per accident, while December averaged 6.0. It is expected that during the winter months, when it is a somewhat more difficult proposition to secure the names of witnesses than during the other three seasons of the year, the general average will fluctuate between 6.0 and 6.6. In connection with this it might be explained that the standing of all barns is furnished the men each month through the bulletin just as it appears in the foregoing table, in order that they may be kept advised of the progress of the work.

A natural inquiry is, "How does the proportion of fictitious witnesses to the total number of names secured at the present time compare with conditions prior to the increase above noted?" As far as it has been able to determine the ratio of "fakes" to the total number of witnesses obtained remains at about the same proportion as heretofore.

With regard to the subject of collisions of cars the records of the department furnish the following statistics. The result for each month is obtained by comparing its totals with those of the corresponding month in 1907:

REDUCTION IN NUMBER OF COLLISIONS.

	Per cent
May	48
June	59
July	58
August	59
September	42
October	57
November	56
December	56

The next and concluding paper will touch upon the value of printed matter in connection with instruction work of this character.

(To be continued)

ARNOLD REPORT ON NEW YORK SUBWAY TRAFFIC

The sixth report in the series relating to the subway of the Interborough Rapid Transit Company, New York, prepared by Bion J. Arnold for the New York Public Service Commission, First District, has been issued. This report is on the traffic of the subway, and is dated Dec. 31, 1908. In his letter of transmittal Mr. Arnold says:

ADVANTAGES OF SUBWAY

This report shows the advantages that are being enjoyed by the citizens of Greater New York as a result of the operation of the present subway. To design, build and operate an expensive system of subsurface transportation furnishing facilities for a 17½-mile continuous ride at high speed through the heart of a crowded city and underneath a broad river for one 5-cent fare is an accomplishment which appears more creditable as the difficulties of duplicating it become appreciated.

The information in this report emphasizes the fact that has already been pointed out—that one of the most serious defects of the present subway is its lack of overload capacity; that is, its inability properly to carry the peak-load traffic which must be handled twice each business day. In the building of future subways this defect should be remedied, and in the operation of the present subway every effort should be made to increase the carrying capacity during these rush-hour periods.

During the past few months the carrying capacity during rush hours of the express tracks of the subway has been increased about 10 per cent by changes in the signal system, and of the improvements that will further increase this capacity there still remain to be carried out the following:

1. Additional doors in each side of each car. (Now being installed on experimental trains.)

2. Speed control signals at the approach to each express station. (Now being developed and in operation at one point.)

3. The elimination of the Ninety-sixth Street crossover and the introduction of reservoir tracks at this point. (Now under construction.)

4. The running of all express trains to Brooklyn by providing a shuttle-train service between Bowling Green and South Ferry. (Necessary changes to accomplish this now under construction.)

5. The adding of an additional car to each express train during the rush-hour periods.

6. The adoption of an automatic coupler so that trains can be quickly made up and broken up at intermediate points to save dead-car mileage.

Much has been said in regard to furnishing "a seat for every passenger." With the present subway there are more seat-miles operated each day than there are passenger-miles traveled, and therefore, if the passenger movement could be made to coincide with the seat movement there would be a seat for every passenger and some seats to spare. However, as the passengers cannot be expected to travel to fit the convenience of railroad operations, unremitting efforts should be made to move the seats coincident with the passenger movement. In adopting a method of regulation for the future car movement of the present subway upon a basis which will not be unjust to the subway company, my recommendation is to divide the probable number of passengers by a constant determined as shown in the report, in order to establish the number of car-miles that should be run, and then prepare a schedule calling for this number of car-miles so distributed as to carry the greatest number of seated passengers.

DESIRABILITY OF SUBWAY

In the introduction to the report Mr. Arnold says that the technical success of the subway during the three years a large part of it has been running demonstrates the practicability and desirability of a subsurface system of transportation under the conditions existing in New York City. An abstract of the report follows:

VARIATIONS IN YEARLY TRAFFIC

In order that a comprehensive idea of the magnitude and

growth of the passenger traffic of the subway may be obtained this data may be studied to advantage.

COMPARATIVE PASSENGER TRAFFIC BY YEARS.

Period.	Tickets sold.
*Oct. 27, 1904, to Dec. 31, 1904	16,241,869
Jan. 1, 1905, to Dec. 31, 1905	116,209,313
Jan. 1, 1906, to Dec. 31, 1906	149,778,370
Jan. 1, 1907, to Dec. 31, 1907	182,559,990
Jan. 1, 1908, to Dec. 31, 1908	220,991,212

*The date the subway was opened to traffic.

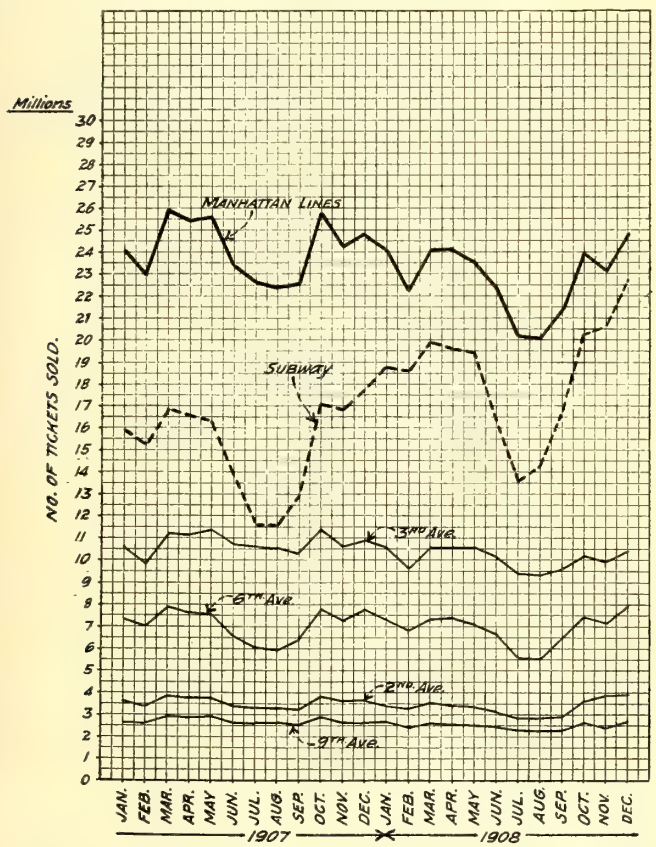
COMPARATIVE TRAFFIC FIGURES FOR ONE YEAR.

	Miles of single track operated.	Car-miles, total.	Number of passengers, total.	Number of passengers per mile of road.	Number of passengers per mile of single track.	Ratio passengers to car-miles.
Interborough subway	69.9	44,005,211	200,415,050	7,819,549	2,870,172	4.56
Manhattan elevated..	90.66	64,584,611	282,870,590	7,523,153	3,120,125	4.38
*London underground tubes.....	167.3	32,728,130	160,000,998	4,010,024	958,762	4.90
Chicago elev'd rds.	150.53	39,264,008	147,267,113	4,134,390	981,780	3.75

*In order to compare the New York subway with enterprises of a similar character, the results of six months' operation of the subways of London, England, ended June 30, 1908, have been doubled so as to show a period of one year, and these figures are compared to the corresponding results with the Interborough, or New York, subway for the year ended June 30, 1908, with the results of the four Manhattan elevated lines for the same year, and with the four Chicago elevated roads for the year 1907. Each mile of track in the New York subway is used on an average of three times as efficiently for moving both cars and passengers as is the case with the London tubes, and on both the elevated and subway tracks of New York City there are also three times as many passengers moved each year as are handled on an average on each mile of single track of all of the Chicago elevated roads, including the Union Loop.

TRAFFIC BY STATIONS

The business at the Times Square station is increasing more rapidly than the business at the Grand Central station,

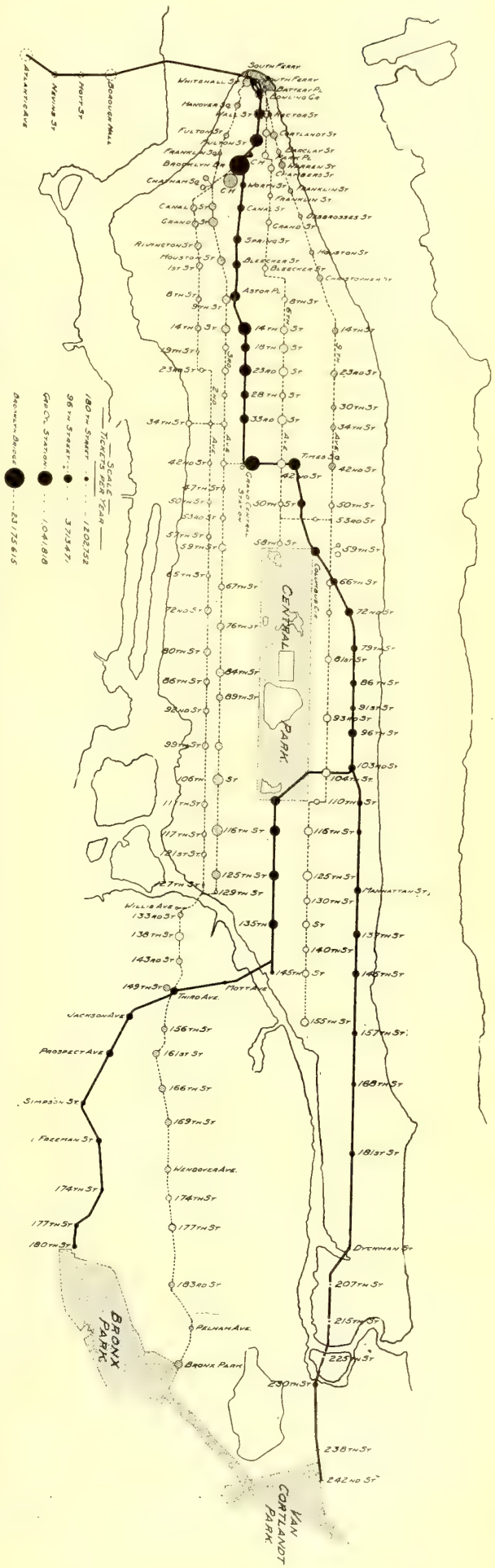


Arnold Report—Chart of Comparative Traffic by Months of Subway and Elevated Lines

making it probable that the Times Square station may soon handle as many pay passengers as those who now purchase tickets at the Grand Central station.

The Lenox branch is much better patronized than the Broadway line and attention is at once attracted to the fact that the stations at the outlying ends of both branches show comparatively the least number of ticket sales.

The opening of the Brooklyn extension to Borough Hall

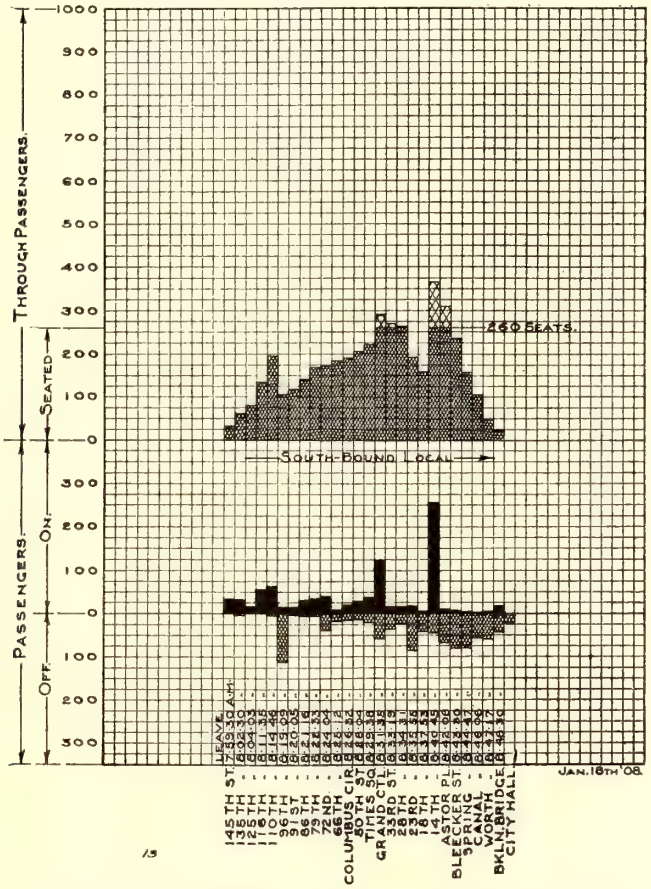


Arnold Report—Chart of Comparative Ticket Sales at Stations on Subway and Elevated Lines for 1907

station on Jan. 1, 1908, and to Atlantic Avenue on May 1, 1908, has decreased the number of ticket sales sold at the Brooklyn Bridge station by over 20 per cent and at the same time has increased considerably the ticket sales at Bowling Green, Wall Street and Fulton Street. The total increase in ticket sales at these three stations will show an increase of approximately 5,000,000 tickets during 1908 which will offset the falling off of ticket sales at Brooklyn Bridge. As a result the entire ticket sales on the Brooklyn side of the tubes under the East River may be taken as the measure of the influence of the Brooklyn extension on the earning power of the subway. As near as the earnings can be estimated at present the ticket sales at the various Brooklyn stations after May 1, 1908, will be at about the following rates per year:

Borough Hall	7,500,000
Atlantic Avenue	9,500,000
Nevins Street	2,500,000
Hoyt Street	2,500,000

—or a total for the Brooklyn extension of 22,000,000 passengers per year. The passenger traffic to and from Brooklyn is a fortunate addition to the subway business, as a



Arnold Report—Loading Diagram of Southbound Local Train, Morning Rush Hour

large portion of the Brooklyn passengers ride a comparatively short distance and in a direction opposite to the Manhattan load tending to use more effectively the return cars and thus cut down the proportion of empty seats.

MONTHLY VARIATIONS IN TRAFFIC

The ticket sales from month to month show a characteristic variation throughout the year, the lowest values occurring during July and August of each year and the highest during December. The percentage relation of the lowest and highest monthly values to the average monthly value for the corresponding year and the ratio each year between the maximum month and the minimum month are shown in the accompanying table. It will be noticed that this latter ratio is decreasing; that is, that the falling off in patronage during the summer months is less evidenced each year.

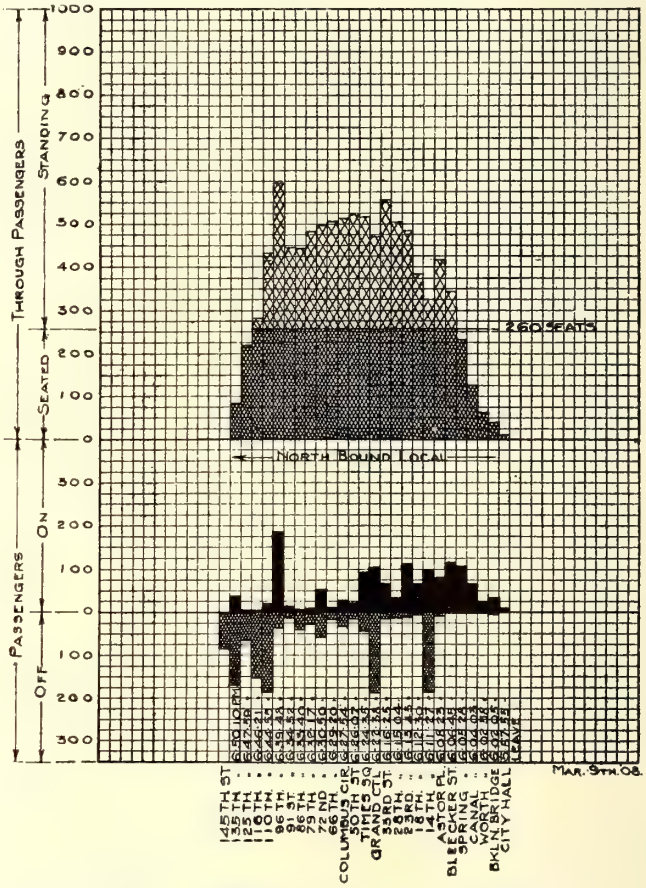
The decrease in the traffic of the subway during the summer months is much more marked than the decrease in patronage of the elevated roads during the same time. Some of the patrons of the subway leave the city for the summer months while many other passengers who regularly ride in the subway prefer the elevated and surface cars during the summer. While the subway does not get its pro-

Year.	Monthly average.	Lowest month.	Percentage of mo. average.	Highest month.	Percentage of mo. average.	Ratio of max. mo. to min. month.
1905..	9,684,109	6,070,908	62.7	13,704,576	141.5	2.25
1906..	12,481,530	8,555,795	68.67	15,609,516	125.1	1.82
1907..	15,502,000	11,550,000	76.	17,750,000	116.8	1.58

portion of passengers during the summer months it more than makes up this loss in the winter months, when riding in the subway is more comfortable than in the surface or elevated cars.

DAILY VARIATION IN TRAFFIC

Information with regard to the daily variation in traffic has not been shown as the ticket sales cannot be considered a measure of the number of passengers carried, since many persons acquire a small stock of tickets for convenience, thus apparently increasing the day's traffic. The effect of



Arnold Report—Loading Diagram of Northbound Local Train, Evening Rush Hour

such practice on the apparent volume of traffic when considering periods of more than a day, however, is minimized to such an extent that it can be neglected. As a matter of general observation, it may be stated that the lightest traffic occurs on Sunday and the heaviest on Monday, the latter being due to the travel of shoppers attracted by the advertising in the Sunday papers.

At the present time the subway is carrying from 650,000 to 750,000 passengers per day. At the time of writing this report the heaviest record of ticket sales for one day was 886,000 on Monday, Dec. 21, 1908.

Upon Sunday the traffic fluctuates between 350,000 and 450,000 passengers per day except in bad weather.

DAILY SCHEDULES

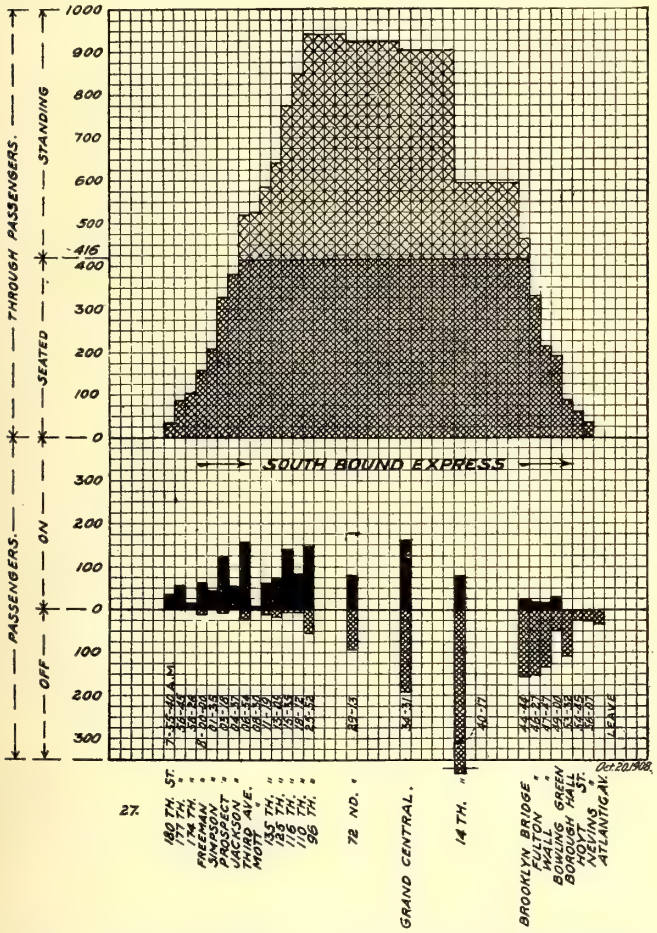
Upon ordinary week days the cars and trains are run upon pre-determined schedules. These schedules, as at present operated, dispatch the cars from five different points and the table on the opposite page shows these routes, distances and running times.

ACTUAL TIME AS COMPARED WITH SCHEDULE TIME

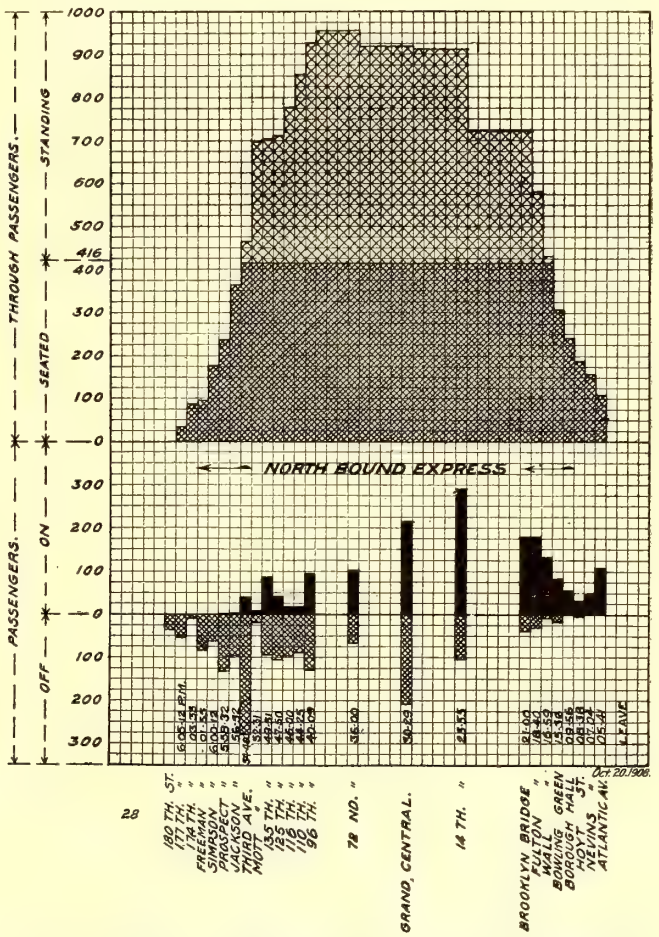
Under normal conditions and in non-rush hours the trains are generally on time, showing that the time cards are not

	Length of route in miles.	Cars each way each day.	Min. number of cars to maintain schedule.	Total time to run one way, minutes.
Broadway Lines:				
Local from 137th Street to Brooklyn Bridge	8.55	954	90	33
Local-Express from 242d Street to South Ferry	15.16	840	104	47
Local-Express from Dyckman Street to South Ferry	12.68	741	96	38
Lenox Avenue Line:				
Local from 145th Street to Brooklyn Bridge	9.45	1,020	125	37
Local-Express from 180th Street to Atlantic Avenue, Brooklyn	17.52	1,726	278	50

unreasonable. At the beginning of the rush hours the trains keep up to their schedule satisfactorily, indicating that even with heavy loads the motors are sufficiently large to maintain the speed that is necessary to make the trips on time.



Arnold Report—Loading Diagram of Southbound Express Train, Morning Rush Hour



Arnold Report—Loading Diagram of Northbound Express Train, Evening Rush Hour

As soon, however, as the rush starts in the trains are held longer at the platforms, the delays begin to accumulate and a general congestion of train movement spreads along the line, particularly in that part of the system between Ninety-sixth Street and Brooklyn Bridge.

STUDY OF PASSENGER MOVEMENT OF INDIVIDUAL TRAINS

Observers were placed on different trains during various days and in the rush-hour periods to count the passengers getting on and off at the stations in order to determine

a—Location and extent of the standing load.

b—Average length of travel of passengers on the express and the local trains.

c—Relative carrying efficiency of the express and the local trains.

d—Distribution of passengers throughout the different cars of the trains.

The trains chosen for these observations were eight local trains during various days in February and March, 1908, and 10 express trains during January and February, 1908. Subsequently when the subway system was extended to 242d Street and the Brooklyn extension was opened to Atlantic Avenue, observations were made on six additional express trains in order to measure the influence of the fall traffic and the longer runs due to the two extensions upon the averages already obtained.

A study of the results of the detailed observations will show the following conclusions:

a—Taking an average of eight local trains, the total number of passengers carried on each trip averaged 2.58 times the maximum number carried on the trains at any one time, while with the 10 express trains first taken this ratio averaged but 1.62, and with the six express trains in October, 1908, this ratio averaged 1.64. These figures indicate that the local trains are used to much better advantage than the express trains.

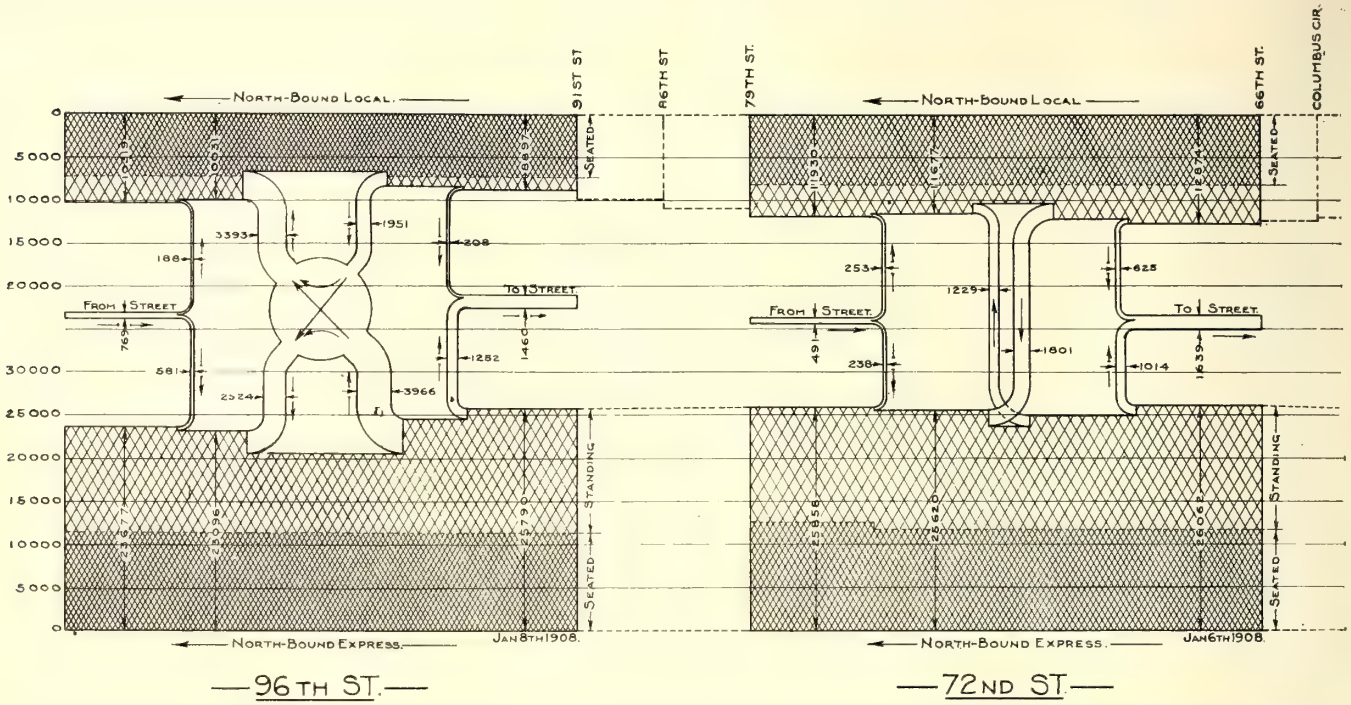
b—The ratio of the total number of passengers boarding the train to the number of seats in the train shows that these local trains carried 4.36 passengers for every seat, while the express trains carried 3.24 and 3.62 passengers per seat, thus showing again that the seating capacity of the locals is used more efficiently than the seating capacity of the express trains.

c—The ratio of the number of passengers in the train at the time of maximum load to the total number of seats provided which indicates the comparative crowding of the trains is less with the local trains (1.71) than with the express trains, which show averages of 2.17 passengers and 2.20 passengers per seat in the trains at points of heaviest loading.

d—The average distance traveled by passengers on local trains, taking the results of the count of eight local trains referred to, was found to be slightly more than 2 miles, and the average distance traveled by passengers on the 10 express trains studied was found to be 5.5 miles and of the later six express trains to be 5.75 miles, thus indicating the extent to which the local trains get the benefit of the short-

haul passengers and also the extent of the burden of the long-haul passengers upon the express trains.

e—The average length of passenger haul on the express trains is gradually increasing as the road is added to and as the outlying districts become built up. The total number of passengers entering a train is a measure of its earning power, whereas the number of car-miles traveled by the train is a measure of the expense involved in moving the passengers; therefore if the number of passengers upon any train is divided by the number of car-miles made by the train in making a trip in one direction, the result will be the average number of passengers per car-mile, and the higher this result the greater will be what might be called the earning power of the train. This ratio for the eight local trains shows 26 passengers per car-mile, whereas the result from the express trains shows 12.6 and 11.4 passengers per car-mile, thus indicating that during rush hours the locals have an earning power equal to fully twice that of the express trains.



Arnold Report—Diagrams Showing Transfer of Passengers Between Local and Express Trains at Express Stations

COMPARISON OF LOCAL WITH EXPRESS TRAINS.

	Average of 8 local trains Feb. and March, 1908.	Average of 10 express trains Jan. and Feb., 1908.	Average of 6 express trains Oct., 1908.
Time lost between 96th Street and Brooklyn Bridge	6 min. 20 sec.	5 min. 52 sec.	2 min. 27 sec.
Ratio of the total number of passengers boarding the train to the maximum number on the train at the time of heaviest load	2.58	1.62	1.64
Ratio of the total number of passengers boarding the train to the number of seats provided	4.36	3.24	3.62
Ratio of the maximum number of passengers on the train at the time of the heaviest load to the number of seats provided	1.71	2.17	2.20
Average length of trip of each passenger, miles	2.08	5.52	5.75
Average number of passengers per car	53	69.5	65.5
Average number of passengers per car-mile	26	12.6	11.4

DISTRIBUTION OF PASSENGERS THROUGHOUT THE TRAINS

It is often said that while the middle cars of the train are crowded, there is plenty of room in the end cars. In order to determine the relative location of the standing passengers in the various cars of the train diagrams were prepared to show the extent of the location of the standing load in the cars of four different trains, two of which were 137th Street locals, one north and one south bound, and the other two trains were Kingsbridge express trains, one north and one south bound.

There is a much more even distribution of passengers through the express trains than through the local trains, due, no doubt, to the fact that the passengers will take more trouble to avoid a crowded car in boarding an express train than they will in boarding a local train, as in the latter case most passengers travel but a short distance. Considerable improvement could be made in more evenly distributing the passengers throughout the length of all of the trains.

HOURLY VARIATIONS OF TRAFFIC

A large number of studies of the hourly variation in traffic have been made by the transportation bureau of the Public Service Commission from time to time. Some typical results of the information collected have been plotted in the form of graphical logs. Each curve (p. 194) shows the passenger movement through the station during the day and also the number of seats in the trains at the same time, indicating at once the number of passengers who were standing in the trains as they left that particular station.

A study of these curves reveals several characteristics, among them the following:

The peak load during which standing passengers appear for any great length of time lasts for about two hours in the morning and again for two hours in the evening. This rush-hour load rises to a sharp peak for a half hour during each period.

The seating capacity during these rush-hour periods is limited by the physical limitations of the subway.

Of the passengers traveling in one direction during the day fully 33 per cent travel during the two hours of the rush period.

As the subway is now operated there are more than enough seats passed through it each day to provide a seat for every passenger if the passenger load and the train movement could coincide, but unfortunately this condition cannot be approximated without making radical changes in its design and construction.

The train movement in future subways, however, can be made to approximately coincide with the passenger load by doubling the track facilities at stations, either by double-decking or otherwise, and providing suitable storage yards at both ends of the longer lines so as to reduce to a minimum the movement of empty cars.

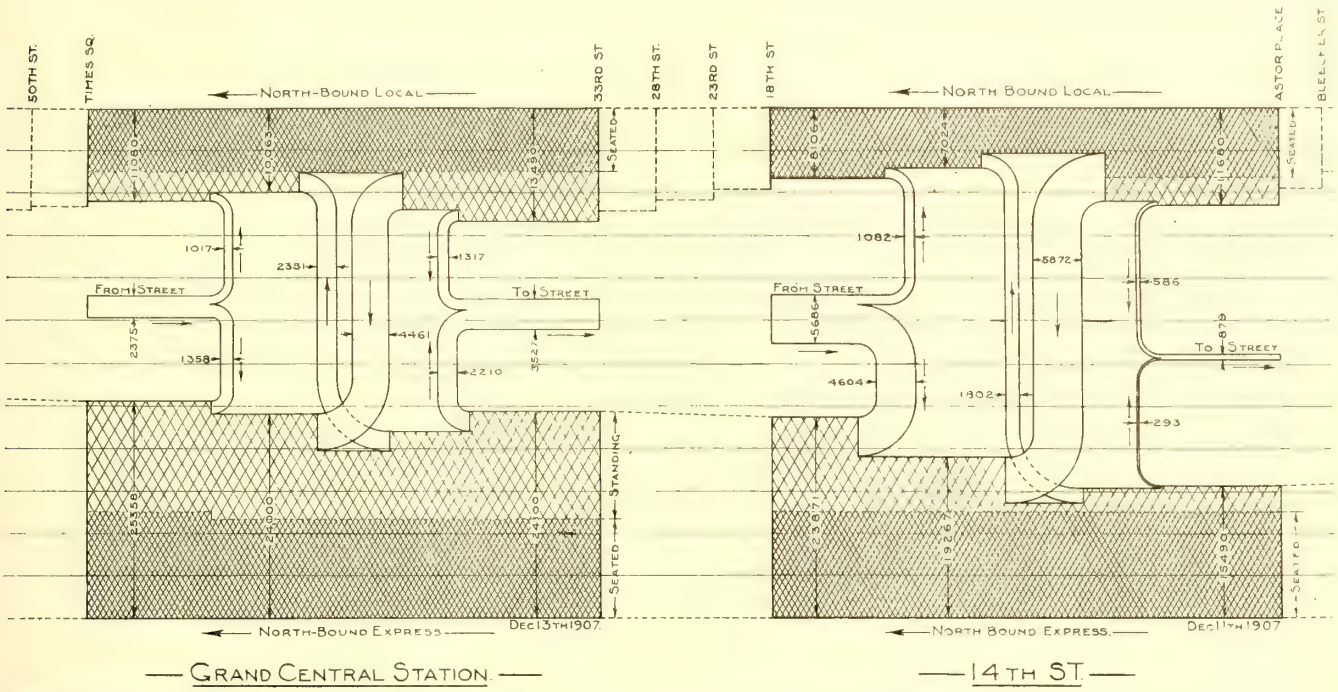
INCREASES IN CAPACITY TO BE EXPECTED

The one great difficulty in the way of supplying every passenger with a seat during the rush hours is due to the physical limitations of the subway. The peak-load capacity of the express tracks in seats per hour may be taken as shown in the table on the opposite page.

While these improvements are being made it is easy to be seen that the maximum passenger load, which last year averaged about 22,000 passengers per hour, will probably increase to 36,000 passengers per hour. The result will be that the relative crowding during the rush-hour period will not be decreased until other subways are built.

Of 1400 passengers, therefore, using a local train, 326 have come from express trains and 474 are on their way to express trains, leaving 600 passengers or 43 per cent of the total number using the local trains who are strictly local passengers riding from one local station to another.

Of the 1400 passengers who patronize a local train there



Arnold Report—Diagrams Showing Transfer of Passengers Between Local and Express Trains at Express Stations

These future subways should be designed with reservoir stations on the express tracks, and with this arrangement

	Seats per Hour—Increase.	Total.
Capacity during fall of 1907	....	12,000
Improvement during year 1907	1,250	13,250
Improvement anticipated due to additional doors in sides of cars near ends	1,250	14,500
Improvements anticipated by use of a speed-control signal system	650	15,150
Improvements anticipated due to changes at 96th Street	850	16,000
Additional capacity to be secured by running 9 cars on each express train, instead of 8 cars	2,000	18,000

of tracks may be expected to have a maximum seat capacity of 30,000 seats per hour.

PROPOSED SYSTEM FOR REGULATION OF SUBWAY TRAFFIC

If the service in the subway is to be regulated so as to provide for the constantly increasing traffic and not be worse in the future than it has been in the past, an effort should be made to anticipate the requirements of the service and provide a schedule calling for sufficient car-miles, so that the ratio between passengers and car-miles will never exceed 5. From a study of the record of the past year it would appear to be fair to the subway company to require a ratio of 5 during the months of October to April, inclusive, 4.5 for May, 4 for June, July and August and 4.5 for September

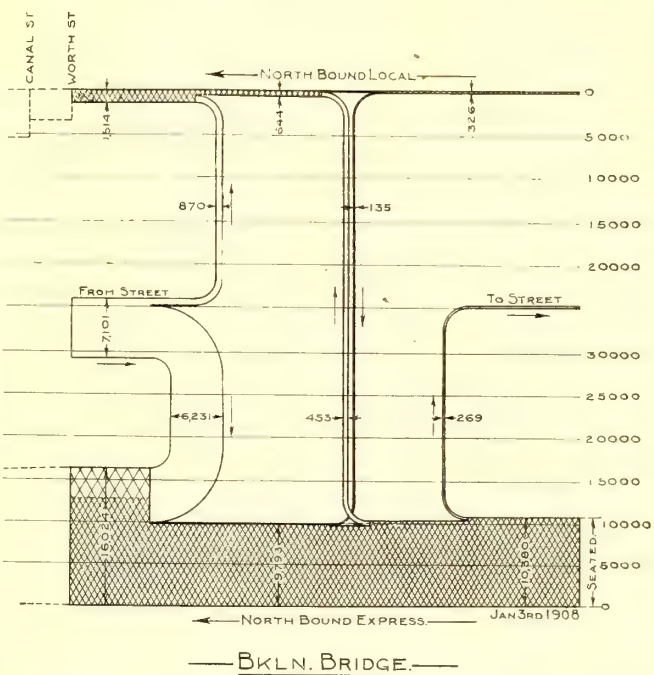
STUDY OF THE TRANSFER SYSTEM

The accompanying diagrams indicate the number of passengers traveling for one hour during the evening rush period on both the local and the express north-bound trains from Brooklyn Bridge to Ninety-sixth Street.

A study of these figures shows a number of conclusions, it being understood that all of the facts relate to the north-bound trains during the evening rush hours, as follows:

The average number of passengers entering the doors of the express trains is 1300 per train, of which an average of 326 or 25 per cent transfer to the local service—that is, the local distributing service is used by 25 per cent of the patrons of the express service.

The average number of passengers entering the doors of the local trains is 1400 per train, of which an average of 474 or 34 per cent transfer to the express service, i. e., the express trains are the destination of 34 per cent of the local train patrons.



Arnold Report—Diagram Showing Transfer of Passengers Between Local and Express Trains at Brooklyn Bridge Station

are 474 who transfer to the express trains. The income from this local trip may therefore be taken at (1400 — 474) × 5 cents, or $46.30, and as this train is composed of five cars and has traveled an average of 9 miles in one direction the income per car-mile for this part of the trip is equal to

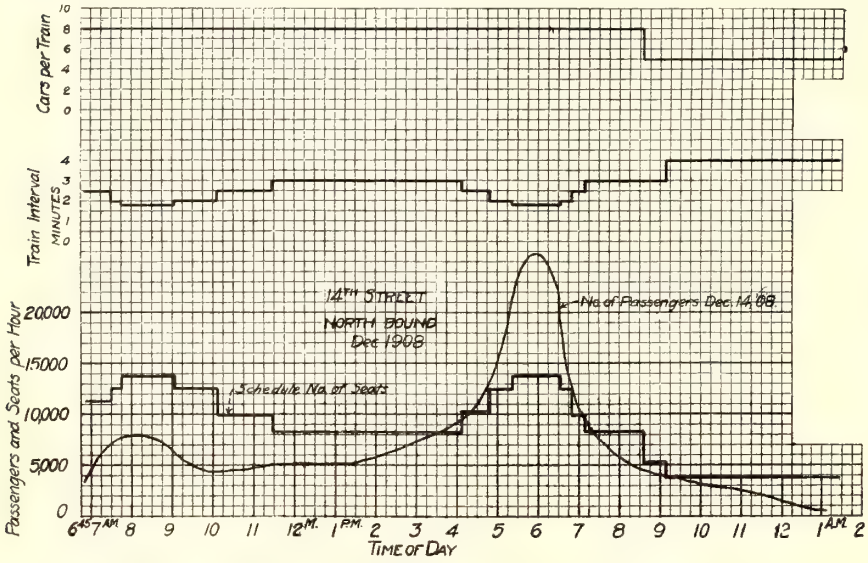
$$\frac{\$46.30}{5 \times 9}$$ or $1.03 per car-mile for rush-hour service.

In a similar way the income from an express train carrying 1300 passengers may be found by deducting the 326

passengers who transfer to the local trains, making the income for one express train north-bound trip (1300 — 326) × 5 cents, or $48.70. This express train, however, consists of eight cars and travels an average of 15.38 miles in one direction, thus reducing the income per car-mile to $\frac{\$48.70}{8 \times 15.38}$ or 39 cents.

SHORT-HAUL PASSENGERS IN SHORT-HAUL CARS

The subway system has now been in operation long enough to demonstrate that in order to make this method of transportation self-sustaining upon the present flat-fare basis the income should average at least 1 cent per passenger-mile. In other words, with a uniform fare of 5 cents the average length of ride should not exceed 5 miles.



Arnold Report—Diagram Showing Schedule Number of Seats and Number of Passengers Carried, North Bound Express Traffic, 14th Street Station, December, 1908

The analysis resulting from the study of the passenger movement on individual trains proves that the average length of travel on the express trains is now 5½ miles, or slightly above the critical average, whereas the average length of ride on the local trains is but 2 miles. It is apparent that as the subway is extended and outlying districts become more thickly populated that the average length of the long-haul rides will become greater, and that unless the fare for these longer rides is increased it will be necessary to cultivate the short-haul business and increase the profit from that source if the present 5-cent flat fare is to be retained.

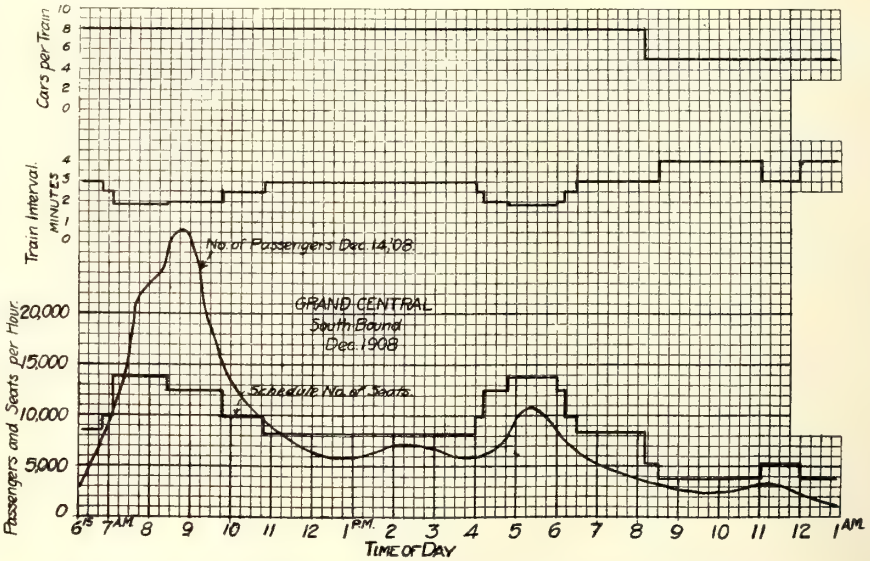
The problem of the future, therefore, if the fixed fare of 5 cents is retained, will be to find a way to handle short-haul passengers in short-haul cars and to make enough profit on this short-haul business to be able to sustain the loss due to the long-haul burden. In other words, the fact that the local trains in the present subway are proved by careful analysis to have twice the earning power of the express trains points out the solution of the problem of eventually developing a comprehensive subway system for Greater New York. The development of the short-haul business must be encouraged by furnishing a convenient, rapid, safe and comfortable service of ample capacity. It is not improbable that a commercial demonstration of the moving platform may prove that the short-haul passengers can be transported at a lower cost by means of a moving platform than by the present local-train method. Irrespective of whether the short-haul business is handled by means of moving platforms or by cars—the profit made from the short-haul rides should be so used as to offset the losses due to the long haul.

The building of subways should start at the center of the city and work out rather than start from the outlying districts and work in. Any plan for future subways which fails to make ample provision for the down-town local business, in a degree greater than is done with the present subway, will suffer from a fundamental defect which will not only cripple its usefulness from the start, but this defect will become more apparent as the outlying districts develop and as the average length of the long haul becomes greater.

CONCLUSIONS

1. The capacity of the express tracks of the present subway can be increased (from 12,500 seats per hour) to 18,000 seats per hour, and as the peak load is now over 28,000 passengers per hour, and increasing rapidly, every effort should be made to augment the maximum carrying capacity. Additional doors should be put in the sides of the cars and the speed-control signal system which has now been developed should be installed at all express stations. These improvements should be followed by the addition of one extra car on each express train and the use of an automatic coupler should receive early consideration. The installation of a shuttle-train service at Bowling Green station, in order to increase the capacity of the Brooklyn tubes, should be pushed, and eventually the cross-overs should be eliminated at Ninety-sixth Street.

2. The equitable way to control the number of cars which should be furnished to provide for the constantly increasing subway traffic is to determine upon a constant by which the number of passengers to be expected can be divided. The result will be the number of car-miles which the schedule should provide. Judging from past records this constant during the winter months may be taken as 5.



Arnold Report—Diagram Showing Schedule Number of Seats and Number of Passengers Carried, South Bound Express Traffic, Grand Central Station, December, 1908

3. A more thorough study should be made to determine where useless car-miles can be eliminated from the present schedule and where an equal number of car-miles can be introduced in such a way as to reduce the standing load to a minimum.

4. A study of the transfer system indicates that the local tracks have a greater earning power than the express tracks. If a uniform fare of 5 cents is to be maintained with the present and future subways, progress must be made along the lines of cultivating and effectively serving

the short-haul business by providing a comprehensive system of local short-haul trains. In this connection the merits of the moving platform system of transportation should be thoroughly investigated.

5. The measure of the ultimate usefulness of any subway is its peak or overload capacity. If the present subway could handle 60 trains an hour on each express track, its usefulness would be materially increased over its present service of 30 trains and beyond its ultimate capacity of 40 trains per hour. Future subways should be planned to get the full advantage of the investment in the main-line tracks by running 60 trains an hour during the morning and evening rush periods.

FACTORS DETERMINING THE EFFICIENCY OF TROLLEY WIRE*

BY CARL F. WOODS, ARTHUR D. LITTLE LABORATORY, BOSTON, MASS.

No department of electric railroading has received less attention than the transmission line, and particularly the trolley wire. In the construction and maintenance of an electric railroad no expense is spared to obtain power-station equipment of the highest efficiency, while the trolley wire, which is just as essential for operation, is generally purchased with no restrictions on the quality of material.

Ordinary soft copper does not have sufficient strength for this service so that reliance has had to be placed upon either steel, bronze or hard-drawn copper; while steel wire has the requisite strength it is subject to severe corrosion from the weather and has vastly greater electrical resistance. The silicon, phosphorus and other bronzes of a similar nature possess great strength, but all have the serious defect of much lessened conductivity. Soft copper wire has a strength of about 34,000 lb. per square inch, while hard-drawn wire can be made having a strength of as high as 67,000 lb. per square inch. Hard-drawn wire, although possessing some serious defects, has therefore been accepted as being much better than the other materials available for the purpose.

To give efficient service under the conditions trolley wire must possess the following qualities: (1) Conductivity, to secure economical operation; (2) tensile strength, to withstand the abnormal loads; (3) flexibility, to permit stringing and enable the wire to adjust itself under strains and blows; (4) homogeneity, that the stresses may be distributed uniformly along the wire, and (5) toughness, to withstand kinking, wrenching and distortion.

Each of these qualities is essential and no one of them can be increased beyond a certain point without a proportionate reduction of one or more of the others. For example, certain wires have been made from an alloy of copper and tin which have high tensile strength, great toughness and homogeneity, but are lacking in flexibility and have a conductivity only half that of pure copper. On the other hand, by proper drawing wire can be made very homogeneous, flexible and tough, but lacking in tensile strength, the conductivity being unimpaired.

Attention naturally turns next to the methods of determining to what extent wire possesses the five essential properties mentioned. The conductivity is very readily and accurately measured with a Wheatstone bridge or one of the several appliances based upon the same principle which are especially adapted for trolley wire. Tensile strength may be determined in a testing machine of suitable capacity, but owing to the nature of copper the elastic limit cannot be determined by a drop of the beam, as the metal apparently yields quite steadily up to the breaking point. Numerous conflicting figures are in print regarding the yield point of copper, but as a stress and strain diagram shows a nearly perfect curve, the actual elastic limit can be accurately determined only by applying increased loads for a definite length of time and measuring the permanent set in each case. Such a procedure is obviously too complicated for commercial testing so that the elasticity of the wire has to be judged by other means. Under ordinary circumstances power to resist the effects of twisting is not necessary for conducting wire, but the torsional strength measures indirectly but accurately two of the most important mechanical properties that a wire can possess, namely, homogeneity and toughness. In a tensile strength test the maximum tensile load is largely a factor of the cross-sectional area and the amount of work which has been put into the hardening of the surface. This test will detect inferior drawing or inherent weakness of the copper, but it gives no idea of the power of the wire to resist distortion nor of defects such as oxide seams which run lengthwise of the wire, and do not have a cross-sectional area of sufficient size to affect the breaking strength. Under a torsional strain, however, such defects are quickly noted. If the wire contains an oxide seam, spoken of above, the twisting will open it up and at once weaken the strength of the wire. If the wire is of unequal hardness the twists will tend to bunch up in the softest portion and very noticeably show this spot. Inferior copper not only shows a very low number of turns, but splinters and slivers of metal appear on the surface which in very bad wires fall off to such an extent that a paper held beneath the sample during torsion will show a considerable collection of copper fragments. Non-homogeneous copper, due either to impure metal or uneven drawing, will show a great difference in the number of turns which different specimens will stand without breaking, while high-grade metal which has been carefully drawn, twists evenly and uniformly with no slivering and shows little difference in the number of turns on different specimens. It is, therefore, desirable to make at least three torsion tests, whereas one tensile-strength test is sufficient to obtain an accurate measure of the strength.

TABLE I.—TESTS ON COPPER WIRE

Number	Diameter In	Torsion Turns in 10 in. (Average)	Tensile Load Lb.	Conductivity Per Cent.
A	0.365	12	5650	98.4
B	0.364	11	5550	98.6
C	0.362	16	5500	98.2
D	0.365	17	5260	98.6
E	0.365	15	5270	98.7
F	0.364	14	5370	98.7
G	0.364	22	5070	98.9
H	0.364	23	5110	98.4
I	0.365	24	5210	98.4
X	0.364	28	5400	98.3
Y	0.364	26	5490	98.4
Z	0.364	26	5590	98.2

In Table I are given a series of tests which clearly illustrate the four general divisions into which the trolley wire of commerce may be divided by reason of difference in physical qualities. Specimens A-B-C, having tensile strengths of 5500 lb. or higher and torsion tests averaging about 13, represent wire lacking toughness, which has been given a high tensile strength by drawing. Specimens D-E-F, having tensile strengths around 5300 lb. and torsion tests of about 15, are wires lacking both toughness and surface hardness. Specimens G-H-I, having tensile strengths of about 5100 lb., but torsion tests of approximately 23, are typical of wires in which the torsion has been obtained at the expense of tensile strength, while specimens X-Y-Z, with tensile strengths over 5400 lb. together with torsion tests of 26 and even higher, represent the best wire which can be made at a reasonable price.

Of these four classes there is again a distinction in that the first two represent copper of an inferior grade which cannot be made the equal of the wires of the last two classes by any treatment in the rod mill. On the other hand, wires of the last two classes are made from excellent copper, although specimens X-Y-Z are wires greatly superior in all respects to the preceding three. It is interesting to note that all of these wires have practically the same conductivity which shows clearly the fallacy of attempting to value trolley wire by conductivity and tensile strength alone, as is so frequently done. It is therefore necessary, not only to obtain high-grade copper, but also to secure the proper balance between tensile strength and torsion, as these two properties are correlated and increase in one beyond a certain point results in a proportionate decrease of the other.

The preceding remarks have shown the conditions under which wire must work and the qualities which are necessary to successfully meet these conditions. Attention must

*Abstract of paper read before the Division of Industrial Chemists and Chemical Engineers of the American Chemical Society, Dec. 31, 1908.

now be turned to the process of manufacture to determine how these qualities may be obtained and what defects of such processes injure the finished wire.

In the refining furnace the copper, which is already at least 96 per cent pure from the blister furnace, is oxidized by air until a large part of the impurities have been removed and copper oxide is formed in considerable excess. Cuprous oxide is readily soluble in molten copper and acts as a powerful oxidizing agent by giving up its oxygen to any metallic bases present, so that an excess of oxide insures the presence of all metallic impurities in the oxide form. The excess cuprous oxide is then removed by burying a piece of green wood in the molten mass and covering the surface with charcoal. This process must be stopped within very narrow limits as over-reduction will throw the impurities back into the metallic state. On the other hand, the presence of a large amount of cuprous oxide is known to harden copper and cause it to become short or brittle.

In purchasing copper for drawing trolley wire the manufacturer insists upon conductivity, but as a rule cares little for the other physical qualities, as he can obtain sufficient tensile strength by drawing. Lake copper possesses both high conductivity and excellent mechanical qualities, but this kind of copper costs from ⅛ cent to ¾ cent per pound more than electrolytic. Why the latter should be inferior to Lake is difficult to explain, but experience shows that the general run of commercial electrolytic copper is by no means uniform in physical qualities and as a general thing is distinctly inferior to Lake for wire-drawing purposes. The cheaper price of electrolytic results in its use by many manufacturers, although they frequently understand that the wire will be inferior.

The refined copper comes to the rod mill in bars weighing about 200 lb. each, approximately 10 of which are used in the manufacture of a mile of wire. These bars frequently have ridges along the sides, due to faults in casting, and the surface is often covered with a layer of oxide. These bars are heated in a furnace until sufficiently soft for rolling and are passed through a series of rolls diminishing in size until a rod of the proper diameter is obtained. The rod is then cooled and drawn through dies, the rods being connected by brazing. The dies give the wire a dense hard exterior coating which increases its tenacity. As the strength obtainable is almost a direct factor of the work expended upon the wire, the smaller the size the greater the tensile strength per square inch, so that the strength of the trolley wire is readily varied by changing the size of the rod and the number of dies.

One of the most serious defects occurring to wire at this point is from ridged bars as above described. Ordinarily the bar will not be sufficiently heated to dissolve the copper oxide on the surface, so that as the softened bar enters the first passes of the rolls the ridges are lapped over, enclosing the oxide scale. The subsequent passes and the drawing through the dies obscure this flaw almost entirely, but it remains a serious menace to the toughness and the resistance to wear of the copper, as has been previously shown in remarks on the torsion test.

A second cause of trouble arises at the same point by overheating the copper in the furnace, in which case copper oxide is formed on the surface and quickly dissolves through the entire bar, thereby increasing the oxide content and tending toward the production of brittleness. Both of these dangers can be avoided by careful selection of the bars and by proper regulating of the temperature of the softening furnace.

As the proportion of the hard surface from drawing is at best a rather delicate operation, careless handling, uneven welding of the rods and unequal temperature of the wire while passing through the dies will all produce noticeable effects in the quality of the finished wire, so that care throughout the mill is absolutely necessary for the best results.

It therefore appears that the most efficient wire must possess not only high conductivity, but the maximum torsion and tensile strength possible in commercial copper and that to obtain this it is necessary first to use high-grade copper and to prevent an excess of cuprous oxide entering it at any stage of the manufacture, and, secondly, to select as perfect bars as possible and to observe extreme care in every treatment through which they pass. The question at once arises: Can such wire be purchased at a commercial price? The writer must admit that this high-grade wire cannot be obtained at the ordinary market price, but requires the payment of a premium of ½ cent per pound. To produce wire of this grade consistently the wire manufacturer must use the higher priced Lake copper and observe unusual care in its treatment so that he is justified in demanding a higher price. Experience in the use of this wire has shown conclusively that it is well worth the additional cost.

Table II gives the results obtained upon 13 consecutive miles of trolley wire made from selected bars of Lake copper. The tests were made upon each mile of the wire and the results show the great uniformity obtainable with proper care. It should be said in this connection that this wire was not made as an experiment, but was drawn by a certain wire company as a part of a regular contract.

The point must be kept clearly in mind, however, that even the best of wire is of little value if improperly used,

TABLE II.—TESTS ON COPPER WIRE

Number	Diameter In.	Torsion Turns in 10 in. (Average)	Tensile Load Lb.	Conductivity Per Cent.
1	0.363	23½	5470	99
2	0.364	23½	5490	98.7
3	0.363	21½	5400	97.8
4	0.363	24	5470	98.8
5	0.363	22½	5450	97.8
6	0.363	22¾	5500	98.6
7	0.363	23½	5420	97.8
8	0.365	22	5510	98.5
9	0.363	22	5540	98
10	0.363	21½	5470	98.8
11	0.363	22½	5490	98.8
12	0.363	25½	5500	98.5
13	0.363	22½	5450	98.7

and the consumer must realize that the same degree of care which he insists upon from the manufacturer is essential in the handling and stringing of the finished wire.

The study of copper wire and the demands made upon it show the great need of a more thorough knowledge of this material. Owing to the minute quantity of impurities which exert a marked effect upon the qualities of copper, a chemical analysis is too difficult for technical purposes. The iron and steel industry is largely controlled to-day by microchemistry, and, in the same way, there is a future for this same practice in the copper industry. Of first importance is the careful working out of the copper-cuprous oxide system with the determination of the number of phases occurring and the physical properties incident to different alloys. Doubtless much of this information is already in the hands of the copper refiners, but it remains for chemical engineers and chemists interested in industrial materials to verify and complete the work for the consumer.

JANUARY MEETING OF THE ELECTRIC RAILWAY SHOP FOREMEN'S ASSOCIATION

At the January meeting of the Electric Railway Shop Foremen's Association, held on Jan. 18, at the Plank Road Shops of the Public Service Railway, matters of organization were taken up before the customary discussions on mechanical subjects. The association has broadened its scope to take in like classes of men from other companies, and hereafter will be known as the Electric Railway Shop Foremen's Association of America. The initiation fee for all voting members was fixed at $1 and the monthly dues at 50 cents.

F. P. Maize, traveling inspector, started the mechanical discussion by criticising the practice of some shopmen who drive a punch through the keyhole of brake-shoe heads. He said that this was unnecessary and resulted in loosening the brake shoe. One of the foremen thought that looseness was a proof that the shoe was too large. Another foreman asserted that it was necessary to punch through the keyhole to remove burrs. Mr. Maize disputed this contention, and after obtaining a head with an

old and new shoe from the shop, proved that the key could be driven in simply by light hammering. Mr. Maize also started a talk on limits of brake-shoe wear by submitting a badly worn shoe which he had discovered in service.

The talk on journal troubles brought out various theories for their occurrence. One man believed that low bearings or bearings of improper size were principally responsible; another had found that his journal troubles decreased when using new clean waste instead of old waste which had been resoaked but still contained grit; a third said that apparently only one size of journal box was furnished, although two axle diameters—3¾ in. and 4½ in.—are in use. It was suggested, also, that as the Brill No. 27-G trucks in service originally were made for feed wick lubrication, waste would not be entirely satisfactory until the box was changed by breaking out the shelf.

Mr. Feeney, representing R. E. Danforth, general manager of the Public Service Railway Company, read a number of the usual monthly statistics comparing the different divisions. One of the greatest improvements shown as the result of previous discussions was a 25 per cent reduction in journal troubles.

Gear lubrication also came up for attention. A number of foremen apparently were unfamiliar with the proper application of a new gear grease the company is trying out. Mr. Maize explained that when the gears were in the shop they were given 5 lb. of grease and that thereafter they should receive 2 lb. of grease per month, distributing it to a thickness of 1/16 in. on both faces of the teeth. As this lubricant is hard in cold weather, it must be heated before application, and the car should afterward be given a run up and down the car house. Probably a good deal of the trouble the users experienced was caused by long open-air exposure of the cars, thereby freezing the lubricant.

Mr. Feeney pointed out to the foremen the desirability of examining journal boxes, trolley wheels, trolley spindles and other parts to see that the shops are turning out exactly what is wanted. As long as they suffered in silence they could hardly expect the shop to know what troubles to correct.

Mr. Ricker called attention to the inaccurate reports turned in by crews relative to the condition of their cars, some apparently signing in "O. K." because they either could not or would not spell out the names of the parts. He suggested that every car be furnished with a record card listing various car parts for O. K., or otherwise, by the crews. Such cards should be handed to the proper official when the car is turned in and be accessible to the shop foremen whenever necessary. This would be much better than a book record, which often is incomplete. Mr. Ricker's suggestion met with the approval of most of the members. The meeting concluded with a talk on sandboxes and trolley wheels.

TRANSFER CRUSADE IN CHICAGO

Since the article was prepared on the crusade against the illegal use of transfers in Chicago, which was printed in the ELECTRIC RAILWAY JOURNAL for Jan. 2, 1909, page 26, a large number of additional arrests have been made, bringing the total up to more than 300. Through a typographical error in the article in question the abuse of the privilege was exaggerated. One sentence was made to read, "The misuse of hundreds of thousands of transfer tickets every day then seemed to become an important item." This should have read "hundreds or thousands."

ADDRESS OF RETIRING PRESIDENT OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

BY F. D. CARPENTER, GENERAL MANAGER, WESTERN OHIO RAILWAY

It has been my pleasure to preside over the meetings of this association for the past year and in so doing it has been my great desire to be able to note at the close of the year some substantial progress for the future welfare of our association. The third year of the history of the Central Electric Railway Association has just passed and we are at the close of the first year's history of our adopted Central Electric Traffic Association. This traffic association came to us with nothing but a name and the work of the year has of necessity been along the lines of finance. It is with pleasure we are able to note that all of the bills of the year have been paid and we have a small balance to our credit.

Your chairman, with the assistance of the executive committee, has performed a most admirable service in practically financing the association until Dec. 31, 1909. Without doubt the small amount of mileage required to meet our additional requirements and supply a sufficient sum to meet the naturally increasing demand upon our treasury during the ensuing year will soon be subscribed.

The Central Electric mileage book has been placed on sale and is meeting with much favor and the benefits to be derived from the tariffs the association is now preparing can hardly be estimated; without doubt the use of the tariffs will be greatly appreciated and the development of our properties greatly enhanced. Our chairman has been somewhat handicapped in his work by reason of the lack of knowledge of some companies relative to details of the requirements placed upon us by the Interstate Commerce Commission and the various State railroad commissions. This, however, we will be able to overcome in time, and with the continued hearty co-operation of our members we believe we will be able to work out to a conclusion many problems that are now before the interurban railway properties.

It is to some extent unfortunate that we could not have had a little education and practice relative to requirements of the new laws that have been passed regulating our operating and accounting systems previous to the organization of our association which would have enabled us to have passed through the year much more smoothly and with less friction.

There are before us many very important problems, the solution of which this association, together with other like associations, should work harmoniously with the American Street & Interurban Railway Association, among which is the standardization of equipment. I regret very much that during the past year our standardization committee has not been able to work out to a conclusion some of the problems before it. These, however, may be submitted for your consideration during the coming season and I trust many improvements made.

Another matter of great importance is the securing of better rates to interurban railways for handling United States mail. Our committee has just entered upon this work and by co-operating with other similar committees will without doubt be able to effect changes in the laws relative to compensation to be paid that will prove to be of great benefit to many interurban railways.

When I review the work of the Central Freight Association and the Central Passenger Association of the steam railroads and note the possibilities before the similar association of the interurban railways I am more than ever impressed with the importance of the work of our association. Together we are to formulate and plan the necessary devices that will make possible the proper development of this great force that moves us. He who makes the great success of the enterprise in which he may be engaged is the man who can look beyond and spread upon an imaginary canvas a structure of his completed work, a touch here and there bringing out its fulness and beauty, and the inspiration caught from this is the power that moves him on to victory. Did it ever occur to you that even now capital and talent have been combined and the man is now spread-

ing the canvas, the background of which we to-day form an important part, upon which a structure is to be built, more grand and more beautiful than anything that man ever yet beheld; where electric trains are to flash across the continent from ocean to ocean at a rate of speed that has hitherto been unknown and where all the power that moves this vast sea of vehicles will be generated and distributed from one central point? And not only this, but all current used to move every imaginable mechanical device and to light every village and city throughout this broad universe will also flash along the same wires that move these trains. This does not more than compare with that which has transpired in the few years that have just passed, for within the natural life of a man we have witnessed the transformation of the Indian trail and village to the macadamed streets and flourishing and prosperous cities, the development of the phonograph, the telegraph, the steam engine, the telephone and many other wonderful inventions, all of which are the fruits of the fertile mind of man. We are living in an age of transportation, in an age where all the skill of man is being concentrated on one great problem. Wonderful results must follow, and I believe I am safe in predicting that we are to-day but toys as compared with that which will be developed within the next 50 years.

I thank you one and all most heartily for the support you have given me during the past year and I trust the coming year will be attended with steady onward progress.

THE LUMINOUS ARC HEADLIGHT *

BY W. S. CULVER, ENGINEER, CINCINNATI OFFICE, GENERAL ELECTRIC COMPANY

The light from the luminous arc comes from the arc stream, and not from the tips of the electrodes, as in the older form of arc lamps, and in order to get the greatest amount of light from the arc with a given amount of energy, it has been found necessary to employ, not electrodes of carbon as in the older arc lamps, but of metals or their oxides. Stable operation, with the greatest amount of light, is secured by the use of a positive electrode of pure copper and a negative electrode composed of magnetite, titanium and chromium. The magnetite gives conductivity and color, the titanium brilliancy and color, and the chromium long life and steadiness.

One peculiarity of the luminous arc is that the arc is more luminous at the negative end, and, with the same current, the longer the arc, up to a length where the arc becomes unstable, the farther from the negative electrode the luminous portion extends. On the other hand, if the length of arc remains the same, but the current is varied, the distance of the luminous portion of the arc from the negative electrode will vary with the amount of current. It will be understood, of course, that there is a certain relation of current, length of arc and voltage that will give the most stable operation with the most light.

Another peculiarity of the luminous arc is that with the positive electrode above and the negative electrode below, the maximum intensity of illumination is in nearly a horizontal plane, which makes it ideal for headlight purposes. A further peculiarity of the luminous arc is that if the direction of current flow is reversed, making the copper electrode negative and the magnetite electrode positive, there is less light from the same amount of current. Advantage is taken of this feature, as will be later explained.

The luminous arc headlight is very similar in appearance to the carbon headlight, and consists of a galvanized sheet steel casing about 15 in. in diameter, 9 in. deep, reinforced by iron door castings, making a rigid structure. The mechanism is not of a regulating type, but is so arranged as to strike an arc of a fixed length. With the slow rate of consumption of the electrodes there are sufficient interruptions of the circuit incidental to regular operation to maintain the arc within safe voltage limits. This permits a simple and rugged construction, suitable for high-speed interurban railway service. The lamp and reflector are held in place by one wing nut on the back of the casing, and can be readily removed for inspection or repair.

To protect the arc from air which might otherwise get between the sections of the glass and the door, two separate panes, with the joints overlapped, are used. This slat construction lessens the liability of breakage from extreme temperature changes.

The luminous arc is at the focus of a highly polished metal reflector. The upper electrode is a T-shaped copper forging, and as it has a life of 2000 to 3000 hours, it may be considered as non-consuming, and as it is stationary, the arc remains in the focus of the reflector. This upper electrode is held at the bottom of the draft chimney, and the natural draft keeps the arc burning on the ends of the electrodes and carries off the fumes from the electrodes. The chimney is covered at the top by a hinged shield so designed as to protect the arc from high winds and rain and to make the tube easily accessible for cleaning with a brush furnished for the purpose. The lower electrode consists of a sheet-iron tube, ½ in. x 5 in., filled with materials which give the necessary vapor in the arc stream to produce an efficient luminous arc.

The headlight not only illuminates the track for a distance of 1200 ft. to 1800 ft. ahead of the car, but the width of the beam is very noticeable. The lighting of a considerable area each side of the track is found to be of great assistance to a motorman in approaching and taking curves. It also is an additional insurance against collision with vehicles, animals or persons approaching the track. If a narrower and farther reaching beam of light is desired the headlight can be furnished with a Mangin mirror instead of the standard type of reflector.

The luminous arc headlight is designed to operate at 75 volts and 4 amp. To take up the difference between the line potential and arc potential either a resistance or incandescent lamps for lighting the interior of the car may be employed. In this latter case one very satisfactory combination is a group of 16 32-cp, 110-volt lamps, consisting of four series of four lamps each, connected in multiple. If more incandescent lamps are desired, 32 16-cp lamps may be used, in eight series of four lamps each, connected in multiple. These incandescent lamps may be kept burning when the headlight is removed by substituting a resistance wired up to a pair of two-way snap switches, one placed at each end of the car. This arrangement permits the headlight to be turned on or off without interfering with the incandescent lamps.

To take advantage of the reduction of light with reversed current, the feature already mentioned, a reversing switch may be supplied, by means of which the light can be dimmed when required for certain sections of the route. The dimming due to the current reversal can be carried still further by a slight reduction of the current. If too great a reduction of light by this method of reversal and low current is attempted, a point of unstable operation is reached, so that where extreme reduction of light is required an incandescent lamp should be mounted in front of the reflector. The headlight may be so adjusted that satisfactory operation will be obtained with a widely varying line voltage, although there is, of course, a low limit of line voltage below which operation will be unsatisfactory. This limit is lower with the normal arc than with the arc reversed and the extra resistance in circuit. If unusually low voltage points exist, it may be necessary to carry a somewhat shorter arc than usual.

The advantages of the luminous arc headlight may be summed up as follows:

The higher efficiency of the luminous arc, giving quantity and quality of illumination.

Arc maintained at focus of reflector, insuring permanent direction of rays.

No enclosing globe used, thereby eliminating greatest expense of enclosed headlight maintenance.

Long life of electrodes, 2000 to 3000 hours for upper, 50 to 75 hours for lower, showing a further reduction in operating expense.

Available means of quickly and effectually dimming the light—either by reversal of the arc or by the substitution of an incandescent lamp.

Simple and exceedingly strong mechanism.

*Abstract of paper read at meeting of Central Electric Railway Association, Indianapolis, Jan. 28, 1909.

REPORT OF THE BOSTON TRANSIT COMMISSION

The fourteenth annual report of the Boston Transit Commission covering the fiscal year ending June 30, 1908, has been made public. It deals with the final work which was necessary to complete the Washington Street tunnel, the advertising privileges therein, takings of real estate and settlements for it, and the prospective connection between the East Boston tunnel and the Tremont Street subway. The commission is now proceeding to make provision for this connection according to law.

The toll receipts in the East Boston tunnel amounted to $111,821 for the year, exclusive of the cost of collection at ticket offices, which came to $18,118, including wages, cost of exit tickets, cost of entrance tickets, power for lighting and heating, cost of necessary accounting, proportion of indemnity insurance premiums on bonds of collectors, toll collectors and ticket sellers. The Boston Elevated Railway paid $51,371 in rentals in the year 1907, or three-eighths of one per cent of its gross receipts for one year.

The commission outlines the plans which have been considered by it in connection with the location of the Riverbank subway in Boston, authorized by the Act of 1907. Under the terms of the act the construction of this subway does not have to be begun before a year has elapsed after the opening of the Washington Street tunnel, except by agreement between the Boston Elevated Railway and the commission. The commission feels that this work should be undertaken, but the railway company does not consider it advisable at present in view of the expenditures to which the company is already committed and the need of studying the effect of the opening of the Washington Street tunnel upon the Boylston Street traffic.

The commission has expended a total of about $16,000,000 on the Tremont Street subway, East Boston tunnel, Charlestown bridge, East Boston and Washington Street tunnels and investigations.

The report of Howard A. Carson, chief engineer, discusses the final construction work on the Washington Street tunnel, alterations of the Tremont Street subway, the effect of street irregularities on the tunnel and its approaches, the design of shelters, progress of work and studies of probable noise and vibration in buildings from the Washington Street tunnel. As a considerable portion of the Washington Street tunnel lies directly under private buildings experimental study was given to the question of preventing annoyance to the occupants by sound and other vibrations caused by the running of trains. Among the means thought of were: (*a*) Building the track on separate foundations, like piles or piers, passing through the invert or floor of the tunnel and having little or no connection with the floor; (*b*) substituting for the ordinary stone ballast some other support for the track itself, such as concrete made with Portland cement or with asphaltic material. Consultation on this general subject was had with A. Mallock, who had made a careful study of vibrations in buildings near the Central London Railway; Prof. C. R. Cross, of the Massachusetts Institute of Technology, and Prof. G. W. Pierce, of Harvard University. Mr. Mallock did not expect any benefit from either plan; in his opinion relief would be expected almost entirely from having the weight of the trains as far as practicable borne on springs. When trouble occurred on the Central London Railway the non-spring-carried load of the locomotives there used amounted to about 8 tons per wheel, while on the motor cars operated by the Boston Elevated Railway in the Washington Street tunnel the maximum non-spring-borne load is about 1.5 tons per wheel.

Among other experiments a radial truck was used with a non-spring-borne load revolved by an electric motor on a circular rail, the latter having forms of support as mentioned above. Experiments were also made with standard cars running on about 200 ft. of track. The relative effects of various experiments were measured directly with the ear and also by observing with a telescope with cross wires the movements of an image on a surface of mercury. The information secured indicated that sounds or sensible vibrations coming from the tunnel were much less likely to be noticed than vibrations caused by teams and cars on the surface of the street. It also appeared that the support of ties by ordinary stone ballast was practically as good as any form tried, and accordingly that method has been used in all parts of the tunnel. The full report of the commission on "Street Traffic," made to the Legislature of 1908, is included in the appendix.

HEARINGS ON CAR DESTINATION SIGNS BEFORE THE PUBLIC SERVICE COMMISSION

On Jan. 14 a hearing was held before Commissioner John E. Eustis, of the Public Service Commission, on the lack of adequate signs in the New York subway trains. At present the different classes of trains are indicated only by colored lights on the front end and by destination signs in the corners of alternate cars. The complainants were the rapid transit committee of one hundred, represented by J. A. Hodge, and the New York City Federation of Women's Clubs, represented by Mrs. D. F. Cartright. Mr. Hodge suggested a high illuminated destination sign of 1-ft. letters at the front of each car, illuminated station indicators at the ends, readable from the inside of the car, and a car placard bearing a city map, with the stations indicated thereon. Mrs. Cartright made substantially the same suggestions, and added that some form of bridging should be used to cover the gaps between car and station platforms at curves. The hearing was then adjourned until Jan. 22 to give the Interborough Rapid Transit Company the opportunity to reply to these suggestions.

At this second hearing the railway company was represented by Frank Hedley, vice-president and general manager. Mr. Hedley referred to the practice of having the two principal classes of express trains stop opposite appropriate signs on the platforms for the convenience of the passengers, but admitted that it was difficult for the motorman always to make these stops accurately. Recently the company had determined that passengers would be materially aided if every car had a destination sign in diagonal corners. These signs are to be of metal, and all will be installed in about three months. The company had also considered the desirability of placing a map in every station, as well as a colored sign explaining the train light markers. At present only employees are furnished with cards explaining the markers. Mr. Hedley objected to movable station indicators because of their complexity, especially in the case of the subway. It was true that the guards did not always speak distinctly, but the company was doing its best to train the men to do better, and has an inspection system for this purpose. He thought it would be objectionable to have interior signs, as then the passengers might get into the habit of not seeking the proper sign until they were in the car.

ANNUAL MEETING OF THE NORTHWESTERN ELECTRICAL ASSOCIATION

The seventeenth annual meeting of the Northwestern Electrical Association was held in Milwaukee on Jan. 20 and 21, 1909. The morning session of the first day was devoted to routine business. A committee report was presented which was adverse to the proposed consolidation of the Wisconsin Electric & Interurban Railway Association with the Northwestern Electrical Association.

A subject of most vital interest to the railways, lighting companies and other public utilities of Wisconsin, namely, operation under the regulation of a commission, was freely discussed by members representing companies widely scattered throughout the State and furnishing many kinds of service. The present commission and its methods of regulation and inspection were highly complimented. It was stated that the rulings of the commission had been conservative and fair and that the public utilities were in far better shape as regards finances and general stability than ever before. Rumors had been current that certain groups of politicians, wishing to make capital before election, had announced that they would foster a change in the present plan of regulation and suggest that each municipality have a local commission. The weaknesses of such a plan are apparent and it was thought obvious that such a method would find few supporters outside of the politicians of lesser caliber. The principal reason why any material change in the present plans would be very doubtful of acceptance is that the public utilities which have made a study of the existing laws creating the Wisconsin Railroad Commission are satisfied with the present method of control and regulation.

At the afternoon session of the first day the following papers were read: "Series Tungsten Lighting," by H. Schroeder, General Electric Company; "The Commercial Development of the Tungsten Lamp," by S. E. Doane, National Electric Lamp Association; "Keeping Track of Supplies and Handling the Contracting End of the Business," by Ludwig Kemper, Albert Lea, Minn.

Thursday morning, through the courtesy of the Allis-Chalmers Company, about 50 members of the association and their guests were entertained with a trip through the large works of that company at West Allis.

The afternoon session was devoted to a general discussion of the regulation of service by the commission. This subject was introduced by F. A. Vaughn, electrical engineer, lighting department, The Milwaukee Electric Railway & Light Company, who presented a paper on "The Control of the Adequacy of Electric Service." In this paper Mr. Vaughn included a detailed discussion of the Milwaukee company's methods of handling the inspection and replacement of light and power current meters. Suggestions were made as to possible improvement in the instructions issued by the commission and a complete set of the meter blanks used by the Milwaukee company formed a part of the printed papers which were distributed.

Prof. B. H. Meyer, chairman of the Wisconsin Railroad Commission, addressed the convention at length and strongly impressed upon the minds of the delegates that it was the desire and ambition of the present commission to fulfil with absolute impartiality the instructions of the law creating that commission. Professor Meyer discussed in detail the relations which existed by virtue of law between the public utilities companies and the commission. It was intimated that the time would soon come when the commission would call for a meeting of all the public utilities companies within the State for the purpose of discussing the basis for a sliding scale of rates. The scale would undertake to lower the rates in a way compatible with the increase in the efficiency of a plant, brought about by improvement in operating methods and extension of service. It was stated that the ideal condition of affairs would exist when the value placed upon a property for taxation purposes should equal the value on which rates were based. However, the present discrepancy in these values is not necessarily unjust because of the hazard in the operation of public utilities.

C. N. Duffy, comptroller of The Milwaukee Electric Railway & Light Company, made a strong plea for the acceptance of the classification of accounts as promulgated by the Wisconsin commission and explained that these accounts were of the utmost value to small properties which heretofore had not had available so close an analysis of their operating methods that they could be administered efficiently.

Following the close of the second day's session about 90 members and guests of the association banqueted at the Pfister Hotel and listened to interesting addresses by Professor Meyer, chairman of the Wisconsin Railroad Commission; John I. Beggs, president of The Milwaukee Electric Railway & Light Company; Neil Brown, president of the Wausau Street Railway, and Franklyn Hobbs, advertising specialist. C. N. Duffy presided at the banquet as toastmaster.

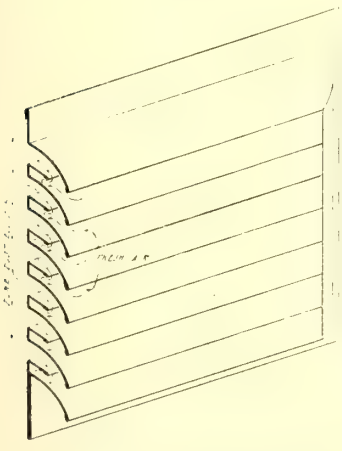
Mr. Beggs discussed in characteristic manner the relations existing by virtue of law between the public utilities companies of Wisconsin and the State commission. He asserted that the public utilities companies of the State are now in a more secure condition and are more substantial as financial undertakings than they ever have been before. The State had offered the public utilities companies an opportunity to obtain "indeterminate franchises," giving each a monopoly in its class of service within a limited district. Basing his arguments upon his broad experience and calling attention to the conditions of the indeterminate franchise Mr. Beggs strongly emphasized the necessity for laying aside surpluses that would in the future take care of the loss of value of a property by reason of the obsolescence of the parts composing that property. Under the provisions of an indeterminate franchise the municipality is permitted to take over a public-service property at its existing value, and so if the property has not laid aside a fund to balance the earlier expenditures for parts obsolete at the time of the taking over of the property there must be a loss. Only by the setting up of such surpluses could this loss by reason of obsolescence be taken care of and the interests of the investors upheld.

The following officers of the association were elected for the coming year: President, Ernest Gonzenbach, general manager, Sheboygan Light, Power & Railway Company, Sheboygan, Wis.; first vice-president, George B. Wheeler, general manager, Chippewa Valley Railway, Light & Power Company, Eau Clair, Wis.; second vice-president, Roger Kimball, general manager, Kenosha Gas & Electric Company, Kenosha, Wis.; secretary and treasurer, James G. Allen, secretary and treasurer, Equitable Electric Company, Lake Geneva, Wis.

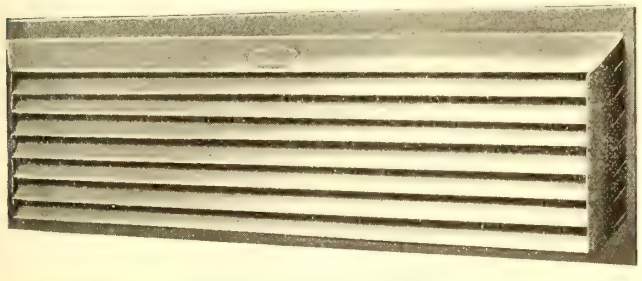
The Hungarian Minister of Commerce is said to have recently stated that during the coming year the entire railway system of Budapest will be electrified.

AN AUTOMATIC CAR VENTILATOR

The accompanying engravings illustrate the construction and operation of the Perry ventilator. The peculiar construction of this device causes fresh air to be forced into the car at one end of the ventilator and foul air to be exhausted from the same ventilator at the other end while the car is running. As will be seen from the line engraving, the ventilator is made up of a series of curved metal slats which are bent over at their inner edges to form longitudinal deflector plates. Fresh air is entrained between the curved outer slats and passes in and over the deflector slats. All snow, rain, cinders and dirt carried in with the air is deposited under the deflector slats before the air passes into the car. Dirt collecting under the deflector slats is carried along to the end of the ventilator and ejected past the curved end plate. When the car is in motion a strong current of air passes along under the deflector slats and creates a suction over the deflector slats at the front end of the ventilator. It is claimed that the air in a car fitted with these ventilators in the monitor deck in which all passengers are smoking is kept fresh and pure enough to pass any reasonable air test. The ventilators are made to fit any space and are easily installed. They are built of heavy plate and do not require any large expenditure for maintenance or repairs. Large numbers of them have recently been applied to the cars of the Boston Elevated Railway Company, Hudson Companies and the New Orleans Railway & Light Company. They are made by the Perry Ventilator Company, New Bedford, Mass.



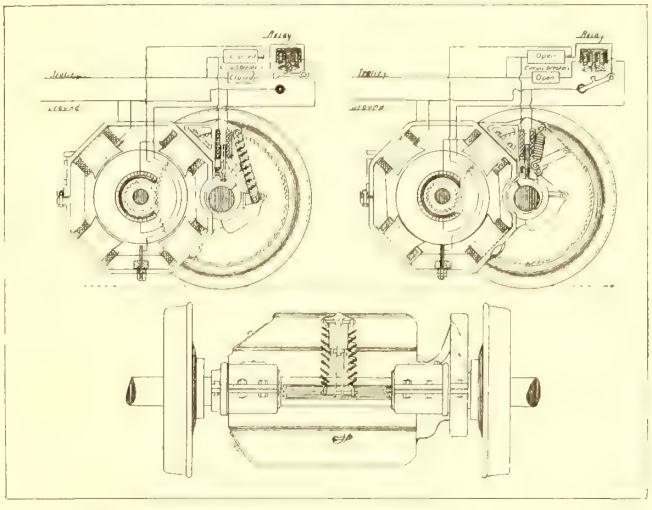
Sectional View of Ventilator



Exterior View of Ventilator

MOTOR TRIPPING DEVICE

An automatic device for throwing the pinion of a railway motor out of mesh with the gear when there is danger of the armature rubbing on the pole piece from worn bearings has recently been placed on the market by the Herath & Hultman Manufacturing & Equipment Company, of Schenectady, N. Y., and is illustrated in the accompanying diagrams. The linings of the axle bearings of the motor are eccentric, so that when they are revolved from left to right as shown in the diagram, the distance between the axle and the armature shaft is increased sufficiently to throw the pinion and gear out of engagement. The movement is effected by a spring which is held extended by a toggle when in operation, but which can be tripped by the solenoid. The solenoid is located on the motor casing midway between the bearings, so that it can operate both pairs by a cross-bar. The solenoid is actuated by the trolley current when it is thrown into service by the automatic relay, which operates when the armature is in danger of destruction from worn bearings.



Application of Motor Tripping Device to Truck

As the depth of a standard tooth is only 9/16 in., it has been found that the maximum movement required is therefore less than an inch, so that no change is required in the gear case. It will also be noticed that there is an adjustable screw at the end of the solenoid plunger. By this plunger all lost motion caused by the wear of the pinion and gear is taken up in the eccentric bearing.

As shown in the diagram, a contact piece or brush extending the entire length of the armature shaft is carried within the lower part of the motor frame and in a vertical position so as to make contact with the band wires before the armature has an opportunity to scrape on the pole pieces. Contact of any part of the armature with this brush will open the circuit breaker and close the circuit of the relay. This trips the solenoid which is in series with the circuit breaker, opens the toggle which normally holds the axle bearing in position, and allows the axle bearing to revolve. Thus the short-circuit instantly disconnects the motor mechanically and electrically. When the motor is once tripped it is dead mechanically and electrically, and requires no further attention until it is replaced in its proper position at the car house.

The explanation given describes the action of the tripping device from worn bearings, but it will be understood that it will also act whenever the circuit breaker opens. In this way it disconnects the motor with equal promptness in case of grounding or arcing, or if any short-circuit occurs between the field and the armature, or if a band wire becomes loose or tangled.

The weight of the device is from 30 to 50 lb., and the company claims that it can be installed for from one-half to one-fourth the cost of any serious repair to the armature winding. It can be used with practically any type of motor on the market except one or two of the latest designs. With these it is only necessary to increase the diameter of the axle bearings about ⅛ in.

The company has had a motor equipped with the device in operation in Schenectady, and is planning to equip a two-motor car for demonstration purposes in other cities.

CAR EQUIPMENT FUSE BOX

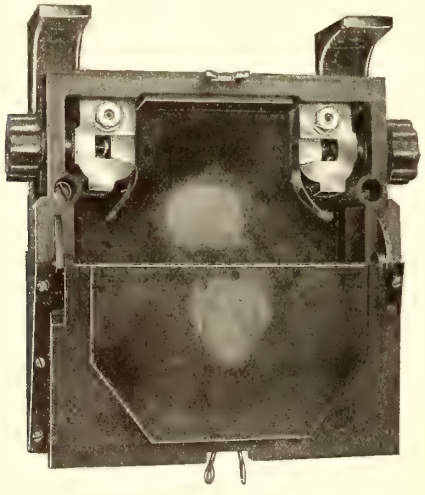
To meet the demand for a fuse box suitable for car equipments not exceeding 200 hp, the General Electric Company has developed the MA-13 magnetic blowout copper ribbon fuse box illustrated in the accompanying cut. Over 10,000 of these boxes are now in use by a large number of electric railway companies.

The sides, top and back of the box are molded in one piece of a durable insulating material composed largely of asbestos. This will not soften and lose its shape under heat. A shield at the base of the chute renders the most severe arc practically invisible. This shield is not, however essential to satisfactory operation, and if desired can be removed.

The copper ribbon fuse is clamped at the ends by wedge-shaped blocks, which are drawn into place with hand-screws to exert a powerful pressure on the fuse and insure good contact. Ready access to the fuse is obtained by dropping the hinged cover of the box, which is normally held closed by a convenient latch. Replacing a fuse, therefore, is a very simple matter, a few turns of the hand-screw, the grips of which are made large for ease in manipulation, being sufficient to free or bind it in place.

A feature of this fuse box is the peculiar form of magnetic blowout employed. Unlike the ordinary method of obtaining a magnetic field, no coil is used, the flux set up about the fuse as a conductor alone producing the field. The blowout is obtained by an arrangement of soft iron plates or poles built in the cover and the back of the box, which, being brought together at the hinges, distribute the magnetic lines to the best advantage.

For attaching the fuse box to the car two malleable iron feet, one at each end, are substantially fixed to it. Holes for ½-in. bolts or lag screws are provided for carrying it from the car beams or sills. These feet can be readily removed if desired, and the holes used for holding them to the box can be utilized for attaching the box to the car. The relative advantages of the two methods of



Car Equipment Fuse Box

carrying depend largely upon the place available for the installation of the fuse box. The feet admit of its being placed in a hanging position, while without them it can be clamped against a support at its back by the use of spacing cleats.

The terminal blocks are provided with tapered holes for receiving corresponding sleeves, which are to be soldered to the ends of the entering cables. The sleeves are drawn tightly into place by nuts secured by lock washers.

THE HELTER-SKELTER

A well-constructed and artistically designed helter-skelter is an amusement device which can be relied upon to amuse both onlookers and partakers. It is perfectly safe, and can be built for so little that it is frequently a free attraction in the larger parks which charge admission at the gate. As a pay attraction it has been found very profitable at the minimum fee of 5 cents. The popularity of this form of riding device has led the L. A. Thompson



An Artistic Helter-Skelter

Scenic Railway Company, of New York, to give it the artistic treatment and variety it deserves. One possibility is shown in the accompanying cut, which illustrates a mountain effect with several tunnels. The experience of this company in building scenic railways naturally is of valuable aid in the construction of helter-skelters at reasonable cost for different-sized parks. The expense for maintenance and power is very little. In fact, a 5-hp slow-speed motor suffices to carry 1200 people an hour. The company is prepared to build these devices complete or sell the plans and operating equipment.

PROGRESS OF THE CIRCLE SWING

The Novelty Machine Company, of New York, took over the business of the Traver Circle Swing Company more than a year ago. It has continued to build and operate these swings and improved their construction considerably in the past year. Many railways operating in cities of less than 40,000 could not afford to buy a new swing, but since several city parks recently have been cut up into city lots a few machines have been made available at lower figures. These used swings have since been re-erected and repainted in high-class operating condition. They should serve well in every particular, while costing about one-half the price of a new circle swing. As the parts are composed of steel, these plants should last for 15 or 20 years. After a circle swing has been used in one park for four or five seasons it can be disposed of to good advantage elsewhere, if desired. Instead of the expensive illuminated tower which some parks have adopted, the swing can be given a central location and serve for lighting a park better than a tower, because its electrical effects are more beautiful and possess the additional feature of lights in motion.

The export business of swings is constantly growing, and this year the first shipment will go to South America and to the Philippine Islands. The first circle swing in Spain was installed by a street railway company. Per-

haps its introduction will result in a general adoption of the amusement park idea in connection with Spanish and South American street railways.

THE RACING DIPS

According to Frederick Ingersoll, of the Ingersoll Engineering & Constructing Company, Pittsburg, financial failure of summer parks in a majority of instances is largely due to the lack of earning capacity. The most careful investigation of the summer amusement business, not from casual observation, but from accurate daily reports and a thorough study of results, will reveal the correctness of this conclusion. If a man visits his tailor and finds the tailor busy, he returns another day. But in the amusement business each day's business has to be reckoned by itself. One dollar lost to-day is never made up and is never regained. A prospective attendant at a park show, or a prospective rider on a park device who loses that desire to ride upon a device or to attend a show is lost forever. A new desire in that same patron is "new business."

Amusement parks are subject to wholly different elements for success than any other form of amusement or entertainment. The park's receipts are acquired in nickels and dimes, while a theater, circus or other form of amusement acquires receipts in bulk. These park receipts must be acquired in driblets within a short time, placing the park management under a handicap. The longest period of business in any park of the distinctly amusement variety is three hours, and most of the parks have but two hours or two and one-half hours in which to earn the day's expenses and profits. Allowing for several inclement days each week, or each month, the receipts must be proportionately larger each day than the expenses.

It is a common sight at any park in any part of the country to witness crowds of prospective riders so closely assembled about the entrance to a riding device that they are uncomfortable, perhaps uncomfortable to a degree which prevents them ever again becoming enthusiastic enough to enter a similar crush. The accompanying illustration shows such a lack of earning capacity. In the meantime hundreds, and perhaps thousands, of other patrons who might ride on the device if it were not so uncomfortably crowded are passing the entrance and losing their desire to enjoy that same device's novelty and exhilaration.

To solve this problem, Mr. Ingersoll, assisted by his chief engineer, J. A. Miller, has devised a new attraction, called the Racing Dips, which is being put on the market by the Ingersoll Engineering & Constructing Company. With the racing dips it is possible to haul fares amounting to $500 an hour with ease and safety. Instead of the old-style coaster car, a modern three-seated car is used, and these cars are operated in trains of three cars each. This gives a seating capacity of 18 passengers to each train, and as two trains can be forwarded from the loading station every 20 seconds, it is easy to calculate the receipts for an evening.

The racing dips was installed at an Ingersoll park last summer, and proved such a success that the Ingersoll company has been awarded a host of contracts to alter old-fashioned coasters and scenic railways into racing dips. Construction was begun on a large racing dips at White City, Chicago, Jan. 1, this year, to cost $75,000, and an equally elaborate one is to be installed at Riverview Park, Chicago, this summer, while racing dips already in operation at Mt. Clemens, Mich., and Hot Springs, Ark., and other well-known resorts are demonstrating the advantage of this new device over old-style coasters with a limited earning capacity.



Crowds Waiting in Line to Patronize Riding Devices

On the racing dips two trains are started from the same platform at the same instant, and are shot forward at exciting speed in a sensational race along parallel tracks. First one car is ahead by reason of the advantage of an inside track at a curve, then the other car is ahead at the next curve. This order is reversed six times in one trip, alternately increasing the excitement in each carful of people. Few park visitors in search of diversion can resist these rides with an element of chance and a tinge of real "sport" in them. With two trains filled with merry pleasure seekers shouting gleefully to each other, holding onto the sides of the cars for dear life and fairly flying up and down hill at terrific speed, racing merrily along side by side, they have reached the pinacle of outdoor fun. When, finally, the cars dash into the loading station again, almost at the same instant, the occupants of the car are sufficiently enthused over the trip to want to remain aboard for another flying trip around the course.

Instead of antiquated light wheel and maple track, the racing dips is constructed with iron railroad tracks, and the cars are equipped with flanged wheels. The "pickup" is so good that the rider is never aware when the car is coast-

ing up a dip or being drawn over a grade by the chain, no matter whether the car is picked up at the rate of 20 m.p.h. or 1 m.p.h. The most attractive feature from an operating standpoint is the fact that the cars are controlled by brakes along the track, instead of the customary brakes upon cars. The entire system is controlled by one brakeman from one station. The whole system of trains can be stopped at once, no matter where the cars are along the tracks, or any one train can be stopped or its speed slackened at any time. By doing away with brakemen on each train that many chances of danger are eliminated, for while it is sometimes impossible to find a skilled brakeman for every train operated on any device, it is always possible to have one clever brakeman on duty to control the system.

COURT DECLARES OWNERS NOT RESPONSIBLE FOR INJURIES TO PASSENGERS ON SCENIC RAILWAYS

Electric railway companies and others operating parks containing special riding devices such as scenic railways will be much interested in a decision on this subject handed down in New York on Jan. 22, by the Appellate Division of the Supreme Court. The ruling of the court was to the effect that any person who takes the thrilling and unusual forms of amusement of the type given by these devices does so at his or her own risk, and cannot expect to recover damages for injuries. This question came up in the suit of Mrs. Phœbe Lumden against a scenic railway company for $10,000 for injuries received when she was thrown out of a car as it plunged down an incline in the scenic route. In the lower court the plaintiff received a verdict of $3,000. The Appellate Division reversed the judgment on the appeal of the defendant and ordered a new trial. In the decision Justice Ingraham says:

"The attractiveness of these appliances depends solely on the sensation that the rapid change of speed gives to the persons using the appliances. There is necessarily a lurch or jerk as the car descends the incline, and there is nothing to show that the lurch or jerk that happened when the plaintiff fell was unusual or that it was anything more than must have been anticipated by any one using the appliance.

"It seems to me that the accident was the result of one of the dangers that the plaintiff had been warned against and the existence of which was the attraction which induced her to take the ride and was a risk she assumed in undertaking it."

NOTES ON PARK ATTRACTIONS AND AGENCIES

A few years ago the big theatrical vaudeville agencies paid but small attention to summer park theaters. As summer parks were laid out on more elaborate scale, larger theaters constructed and consequently better talent required, these agencies began to realize that there were large possibilities in this new field. Especially was this true as the summer park theater business comes at a season of the year when most city theaters are closed. The accompanying notes on some of the plans of the park amusement companies during the coming season may be of interest.

The United Booking Offices, New York, the largest theatrical vaudeville booking agency in the United States, is anticipating an active season. Among the parks booked by these offices may be mentioned: Celeron Park, Jamestown, N. Y.; Henderson's Music Hall, Coney Island; Idora Park, Youngstown, Ohio; Sacandaga Park, Gloversville, N. Y.; Rock Springs Park, East Liverpool, Ohio; Farm Theater, Toledo, Ohio; Fairview Park, Dayton, Ohio; Cascade Park, Newcastle, Pa.; Valley Theater, Syracuse, N. Y.; Electric Park, Passaic, N. J.; Union Lake Park, Millville, N. J.; Four-Mile Creek Park, Erie, Pa.; Orange Park, Newburgh, N. Y.; Oakford Park, Greensburgh, Pa.; Olympia Park, McKeesport, Pa. This agency controls exclusively more than 2000 standard acts, costing from $50 to $200 per week each. Variety is therefore assured. During the dull summer season many of the best vaudeville actors are willing to play in summer parks at greatly reduced prices; contracts are therefore made by the performers with the United Booking Offices for the entire year. Programs are sent to the park manager at least 10 days in advance and if any change in the bill is deemed necessary it is promptly attended to. The manner of billing the show and advertising it, order of program, scene and plot are all prepared for and sent to the park managers in ample time to issue successful preparation and performance.

The Prudential Vaudeville Exchange, New York, N. Y., managed by W. S. Cleveland, reports increasing appreciation of its vaudeville offerings. In 1906 this company furnished attractions for only nine parks and six fairs; in 1907 it booked 23 parks, 12 theaters and 16 fairs; in 1908 it had the exclusive booking for 18 theaters, 39 parks and 43 fairs. For this year, 1909, the exchange will supply approximately 186 parks and fairs and 106 theaters, of which 70 per cent are booked exclusively.

Lampham's Red Hussar Band, an organization which last year had a very successful season at Ontario Beach Park, near Rochester, N. Y., is now accepting bookings for its eighth season. The band is accompanied by several soloists, including the bandmaster, who is a well-known cornetist.

Willoughbeach Park, of the Cleveland, Painesville & Eastern Railroad Company, will be improved this year by the enlargement of some of the buildings. It is expected that the capacity of the dance hall will be increased by one-third.

STATISTICS OF OHIO INTERURBAN ROADS

The Railroad Commission of Ohio has issued the totals of statistics returned by the electric interurban railroads of the State, as shown in their annual reports. The lines show an increased business. The following general results are shown:

COMBINED OPERATING REPORT FOR TRACKAGE IN OHIO

	1908.	1907.	Increase.
Passenger earnings	$11,458,511	$10,920,913	$537,598
Freight earnings	754,770	620,981	133,789
Other earnings	769,175	714,765	54,410
Gross earnings	$12,982,456	$12,256,659	$725,797
Operating expenses	7,972,364	7,403,396	568,968
Income from operations	$5,013,695	$4,863,334	$150,361
Deficit from operations	3,603	10,071	*6,468

*Decrease

CAPITALIZATION, ENTIRE LINE

	1908.	1907.	Increase.
Common stock	$108,741,523	$98,362,678	$10,378,845
Preferred stock	27,720,169	15,964,225	11,755,944
Total stock	136,461,692	114.326,903	22,134,789
Funded debt outstanding	89,308,100	82,920,000	6,388,100

GENERAL STATISTICS

	1908.	1907.	Increase.
Miles of main track operated in Ohio	2,479.71	2,406.12	73.59
Total miles of track operated in Ohio	2,794.18	2,646.14	148.04
Employees in Ohio	7,735	6,952	783

The 1908 year was concluded on June 30, while the previous fiscal year ended April 30.

News of Electric Railways

The Cleveland Traction Situation

At a called meeting of the City Council of Cleveland on Jan. 20 Mayor Tom L. Johnson said that he was willing to co-operate with Judge R. W. Tayler, of the United States District Court, in regard to a long-time franchise for the Cleveland Railway system along the lines laid down by Judge Tayler in his letters to the receivers. Mr. Johnson still favors the idea that the residents of the suburbs should pay more fare than the people living within the city limits and indicated that he might insist upon this.

Mr. Johnson further stated that he is not altogether satisfied with the financial reports that have been issued and that he does not feel that all or the greater part of the deficit resulted from operation at a 3-cent fare. He says that he cannot reach any conclusion until he has had time to analyze the reports. He promises that if he finds anything to bear out his contentions, he will present it to the receivers for correction before a conclusion is reached.

He also disagreed with the receivers as to the rate of fare that would result from the operation of the systems as they have suggested. In the case of six tickets for a quarter, he figures that the rate would be reduced when the franchises on some of the lines have expired.

With the idea of working out a franchise, the Mayor named Judge Tayler, Attorney John G. White, City Solicitor Newton D. Baker and himself as a committee to arrive at a conclusion and frame a franchise. Frederick H. Goff and Attorney D. C. Westenhaver have since been called into the consultations.

Officials of the Cleveland Railway Company are said to be willing that the returns on the investment shall be limited to 6 per cent, but they will also be careful that no action taken by the city shall result in leaving the property in the hands of the Municipal Traction Company. Although it is understood that the Mayor broached the subject of another holding company in one of the committee meetings, the results of operation under the present company make improbable a return to a holding company scheme.

Mayor Johnson expressed his willingness to take the valuation of the property found last spring as the basis of negotiations on the fare this time. Some of the councilmen suggested that the amount allowed for good-will be dropped from the considerations, but the Mayor stated that nothing had been added for the improvements made since that valuation was fixed, and that it would not be fair to insist upon such a reduction.

In order to satisfy himself that conductors are collecting all the fares, Mayor Johnson detailed employees of the waterworks department to act as spotters for a few days and report to Superintendent Bemis, who acted as expert statistician during the former negotiations.

The Chamber of Commerce had taken action toward drafting an ordinance along the lines suggested by Judge Tayler before it was decided that a special committee should take the matter up, but will content itself with suggestions until the result of the work being done is announced.

Meetings of the committee were held every day during the week ended Jan. 23, in an effort to reach a conclusion at an early date. The court promised to hold the advance in fares in abeyance for a few days in order to ascertain whether there was a possibility of reaching a settlement with the city. If it is found that negotiations will extend over too long a period, it is possible that the court will permit the receivers to increase the fares to the point allowed on the different lines, as he indicated in hearing the motion of creditors to that end last week. The report of the receivers for December follows:

Gross earnings	$404,459
Operating expenses	319,061
Net earnings	$82,398
Miscellaneous income	2,352
Gross income less operating expenses	$84,750
Taxes	23,544
Income less taxes and operating expenses	$61,206
Interest	40,293
Other deductions	891
Net income	$20,022
Cleveland railway rental	73,378
Deficit	$53,356

This brings the total deficit for the last quarter of the year up to $120,816, and for the entire time the property has been operated by the Municipal Traction Company to $163,851. This latter figure is based upon those given in the statements of the Municipal Traction Company previous to the appointment of receivers.

City Solicitor Baker has filed an intervening petition in behalf of the city of Cleveland to the motion made by creditors that the fare be advanced to the figures allowed by the franchises of the various lines. Mr. Baker states that unless the court intervenes the receivers will so interpret the regulations and restrictions contained in the grants as to operate against the interests of the people and in favor of the creditors of the Municipal Traction Company. He states that it is the intention of the receivers to treat the Woodland Avenue and West Side lines as having franchises authorizing high fares, and contends that these franchises have long since expired and only 3 cents may be charged on them. The petition asks that only such fares shall be charged as may be authorized by an interpretation of the franchise.

The Municipal Traction Company filed an answer on Jan. 20 to the bill of complaint of the Central Trust Company, New York, in which it alleges that the referendum election was illegal because of the condition of some of the voting machines and that the lease of the Cleveland Railway properties has not terminated. It denies that it is no longer entitled to control the properties. The company admitted, however, the allegations regarding the ownership of all the original lines by the Cleveland Railway Company and the bond issues for which it is liable to the Central Trust Company, but denied that the Cleveland Railway Company was at any time the owner of any of the rights or privileges of the Forest City Railway, referred to in the agreements of April 27, 1908. It also denies that the plaintiff has any rights under its bond for any amount against the property formerly owned by the Forest City Railway, but admits that the mortgage provides for covering the property then owned by the Cleveland Electric Railway Company and any that it might afterward acquire.

The answer acknowledges all the agreements made on April 27, but asserts that the Cleveland Railway Company is not entitled to become owner of the property of the Forest City Railway as a result of its performance of the contract between them.

The company says that of the authorized capital stock of $10,000, only $1,000 has been issued. It contends, however, that the conditions of the lease were understood and signed and that the consideration for the use of the property was to be an amount equal to 6 per cent on a valuation of $14,675,000.

Special Master Belford has delayed consideration of the claims against the Municipal Traction Company pending the outcome of the franchise negotiations. It is thought that if a franchise such as is desired by the court should be granted, the claims may be arranged satisfactorily. If not, Mr. Belford will proceed with the classification.

The Pay-Enter Fare Box Company has delivered the remainder of the boxes called for by the contract with the Municipal Traction Company. It has not been decided whether they will be used or not.

History of the Twin City Rapid Transit Company

The Twin City Rapid Transit Company is publishing during the present month through the medium of full-page advertisements the history of this company from its beginning, 35 years ago, up to date. In the past two issues of the ELECTRIC RAILWAY JOURNAL abstracts have been presented of the first 11 of these advertisements. This portion of the history included the period up to the electrification in 1890 and the change from horse to electric operation. An abstract of the additional advertisements follows:

In the fall of 1892, when the Minneapolis Street Railway had been completely electrified, the company anticipated increased earnings with which to pay off the heavy indebtedness necessary for reconstruction and electrification. The financial panic of 1893 and the "bicycle craze" so greatly reduced the company's revenues that it was almost impossible to obtain money with which to keep pace with public improvements. Just at this time the city required the reconstruction of track that had been down but five years. This work had to be done, however, and it was found to be a most advantageous time to remove the feeder wires from the poles and place them under ground. The finances were available for this work only after the most rigid economies in operation had been enforced.

The 12 years from 1896 to 1908 were years of rapid and constant progress in the growth and development of the Minneapolis Street Railway. Some of the most important features of the growth during this period were as follows:

Second interurban line between Minneapolis and St. Paul completed, giving a continuous ride of 17 miles for 10 cents. Contract made for 10,000 hp in water capacity available at the site of its steam station on Third Avenue N. In 1904 a general office building 80 ft. x 160 ft. three stories high was built. In 1905 several important extensions were made including a third interurban line to St. Paul, the extension to Ft. Snelling. A 14-mile line to Excelsior on the route of the "old motor line" was built this year and the Minneapolis & St. Paul Suburban Railway operating this line also launched a fleet of nine new boats and purchased four other boats to run in connection with the electric trains to and from Minneapolis. Big Island Park in Lake Minnetonka was equipped that year. The growth of traffic began to demand larger cars and it was found necessary to rebuild practically all of the existing lines in Minneapolis. It is stated that only about 5 per cent of the track in use in 1896 is now in service.

In 1898 the company commenced the manufacture of its own cars. The repair shops and manufacturing plant were located at Nicollet Avenue and Thirty-first Street, but ultimately there was a demand for better facilities, so a tract of 60 acres was purchased in the Midway district on University Avenue and the general shops for the manufacture of cars as well as for all classes of repair work were erected. This plant has been described in these columns. The use of the 10 old horse car stations was gradually discontinued and three electric car stations were established. The construction by the company of the cars required for its service has grown from a small beginning until now all the cars in operation in the Twin Cities are manufactured in the company's shops. At the present time 500 to 550 skilled workmen are regularly employed in these shops.

The fifteenth installment of the history of the Twin City Rapid Transit Company is a tribute to Thomas Lowry.

The sixteenth full-page advertisement bears four illustrations and a clear description of the track and paving used in Minneapolis. This construction costs the company $12 per running foot of double track, or over $60,000 per mile. The illustrated description of the trackwork is followed by a story about the power houses.

Alternative Proposition for Sale of Steinway Tunnel

In a letter addressed to the Public Service Commission of the First District of New York on Jan. 20, 1909, Theodore P. Shonts, chairman of the executive committee of the Interborough Rapid Transit Company, New York, signified that his company was willing to amend the original proposition made to the commission for the sale of the Steinway tunnel to the City of New York, mention of the rejection of which by the commission was made in the Electric Railway Journal of Jan. 16. As an alternative to the proposition that if the city bought the tunnel an agreement should be made with the New York & Queens County Railroad for operating it, Mr. Shonts new proposes that if the city buys the tunnel the New York & Queens County Railway shall apply for a franchise to operate it independent of all conditions which have heretofore been made. Mr. Shonts says:

"The proposition submitted to your honorable commission by the Interborough Rapid Transit Company in February, 1908, was the result of months of careful study of the situation and was decided upon as being the only possible plan by which the City of New York could give to the people of the Borough of Queens a 5-cent fare from every part of the borough into the heart of Manhattan.

"The Interborough Rapid Transit Company recognized the right of the people of Queens to ask of the city facilities which would put their borough in a position of fair progressive competition with the other parts of the municipality and was not willing to stand before the citizens of Queens as opposing any effort by the city to do for Queens as it has done for Brooklyn and the Bronx. The company was, therefore, willing that the Queens tunnel should become a rapid transit road, to be acquired by the city at cost, and was willing to go further and undertake operation with an agreement for a single 5-cent fare over the whole Queens County railway surface system. The idea of the operating arrangement was that the New York & Queens County Railway would share with the city during the first few years of operation any losses which the city might be put to by reason of the tunnel patronage not being sufficiently great to meet operating expenses and interest and sinking fund payments on the bonds issued for the purchase, and that after the first few years the development of Queens Borough would be so great that the city's annual share of the profits from the railroad and tunnel traffic would be considerable for all time to come.

"If, however, the provision to make an operating agreement with the New York & Queens County Railway, which was intended as an advantage to the city in case of purchase by it, is regarded as a drawback, the owners of the tunnel are willing to sell it to the city at actual cost, as outlined in our previous offer under date of Feb. 27, 1908, free from any condition, or they are prepared to follow the suggestion contained in your memorandum of opinion and apply under the provisions of the city charter for a franchise. This latter course, however, will involve an independent operation of the tunnel for an additional 5-cent fare. It was to avoid the contingency of this 5-cent fare that our original offer was made."

New Associate Members of the A. S. & I. R. A.

Secretary Swenson, of the American Street & Interurban Railway Association, reports that between Jan. 12 and Jan. 25, 121 applications for associate membership in the association were received at his office. Of these new members, 81 were secured by H. H. Adams and J. S. Doyle, of New York. The total number of associate members of the association on Jan. 25 was 245. A list of the names of those applying for membership between Jan. 1 and Jan. 12 was published on page 113 of the issue of the Electric Railway Journal for Jan. 16. Those applying between Jan. 12 and Jan. 25 follow:

Baltimore, Md.—H. A. Leonhouser.
Boston, Mass.—F. M. Nellis, Frank J. Stone, L. R. Speare.
Brightwood, Mass.—Henry Pearson.
Brooklyn, N. Y.—T. W. Budden, J. G. Buehler, W. G. Clayton.
Buffalo, N. Y.—F. B. H. Paine.
Camden, N. J.—John Hanf.
Charleston, S. C.—Chas. J. Bendt, Louis Y. Dawson.
Chyenne, Wyo.—A. T. Young.
Chicago, Ill.—W. S. Bartholomew, A. H. Sisson, Forsyth Brothers.
Columbus, Ohio.—J. L. Bone.
Corning, N. Y.—Fred C. Cameron.
Dayton, Ohio.—D. L. Paulis.
Detroit, Mich.—T. J. Lawlor.
Elizabeth, N. J.—T. S. Adams, F. H. Gordon, L. A. Kling.
Jersey City, N. J.—P. A. Clerkin.
Kennebunk, Maine.—E. B. Kirk.
Mahwah, N. J.—F. W. Sargent.
Milwaukee, Wis.—C. L. Jones.
Montreal, Can.—A. Douglas Gourd.
Newark, N. J.—H. V. Brown, Edw. J. Dunne, J. R. Case, H. J. Kuhn, James G. Mowry, Wm. R. Ricker, John L. Kane, John J. Murphy, C. Remelius, L. A. Shepard.
New York, N. Y.—A. T. Oesterreich, H. E. Cozzens, Azel Ames, G. G. MacCracken, J. S. McWhirter, H. P. Clarke, E. H. Chapin, S. A. Megeath, F. H. Shepard, Wesley Meeteer, H. W. Sheldon, Harry B. Logan, Frank Samuelson, Jr., C. B. Beckwith, E. H. Dewson, F. F. Mullaney, H. G. Grier, A. V. Porter, O. C. Gayley, H. W. Brown, P. W. Robertson, Joseph Maycock, E. H. Stearns, F. G. Robinson, E. A. Simmons, Ray Morris, J. L. Single, Carl Schwartz, E. B. Katte, Percy M. Brotherhood, F. A. Elmquist, Harry E. Baer, W. F. Reeves, C. H. Dorland, C. H. Cole, A. F. Old, L. T. Carter, F. W. Gardiner, C. B. Keyes, E. G. Davis, H. C. Johnstone, O. C. Reinecke, Thomas Farmer, Jr., S. D. Smith, G. Thyberg, D. E. Lenehan, J. K. Hearn, L. Rasmusson, E. B. Blandy, Geo. E. Austin, James O'Shea, Jr., H. G. Stott, R. C. Green.
Philadelphia, Pa.—E. L. Langworthy.
Pittsburg, Pa.—J. M. Flannery, A. S. King, W. V. Turner, E. A. Craig, N. B. Trist, C. G. Bacon, Chas. N. Bennett,
Providence, R. I.—A. E. Potter.
Reading, Pa.—W. B. Sullivan.
St. Louis, Mo.—E. L. Adreon.
St. Marys, Pa.—J. S. Speer.
Salt Lake City, Utah.—E. A. Johnston.
Schenectady, N. Y.—Geo. L. Radcliffe, W. H. Wright, T. W. Williams, G. H. Hill, E. D. Priest, J. G. Barry.
Seattle, Wash.—F. Dabney.
Seneca Falls, N. Y.—W. C. Gray.
Spartanburg, S. C.—F. H. Knox.
Trenton, N. J.—S. B. Keys.
Washington, D. C.—Clarence F. Norment, Ward Theron, Charles J. Bell, M. E. Ailes, George Truesdell.
West Lynn, Mass.—J. M. Darke.
Worcester, Mass.—John E. Bradley.

Funds Authorized for Public Service Commission.—The Board of Estimate of New York, has authorized the issue of $300,000 of special revenue bonds as a part of the $987,500 asked by the Public Service Commission of the First District of New York for its expenses for the current year.

Meeting of New York Association.—At a meeting of the executive committee of the Street Railway Association of the State of New York on Jan. 19, 1909, it was decided to

hold the next quarterly meeting of the association in Schenectady on March 24, at which time the committees will report. The subjects of transfers and claims will also be discussed.

Accident Fakir Sentenced.—Through the efforts of W. A. Rice, general claim agent of the Boston & Northern Street Railway, Boston, Mass., Bert Winslow, alias F. Gordon Wilson, alias Jack McIntyre, was convicted at Brockton, Mass., on Jan. 21, of obtaining money under false pretences by accident faking and was sentenced to one year. It is thought that this man served a term in Pennsylvania under the name of Hart, and that he was also arrested in New Jersey under the name of McIntyre several years ago.

Missouri & Kansas Interurban Railway Operating into Kansas City.—The Missouri & Kansas Interurban Railway has begun operating its cars over the Seventh Street Loop of the Metropolitan Street Railway in down-town, Kansas City. The Missouri & Kansas Interurban Railway formerly operated gasoline-electric cars, but it has recently changed its motive power to electricity. Traffic is reported to have increased appreciably since cars have been in operation into Kansas City proper.

Museum of Safety and Sanitation.—Announcement has just been made of the acceptance of the treasurership of the Museum of Safety and Sanitation by Frank A. Vanderlip, and the opening of an office at the United Engineering Societies Building, 29 West Thirty-ninth Street. The chairman of the committee on plan and scope is Prof. F. R. Hutton. Charles Kirchhoff, editor of *The Iron Age*, is the chairman of the committee of direction; T. C. Martin, editor of the *Electrical World*, is vice-chairman, and Dr. William H. Tolman, director.

Wisconsin Electric & Interurban Railway Association.—An executive session of the Wisconsin Electric & Interurban Railway Association was held in Milwaukee on Jan. 20 at which 15 companies were represented. Clement C. Smith, president, announced that meetings would be held jointly with the Fox River Valley Gas & Electric Association at Sheboygan, Wis., on April 12 and 13, for the purpose of discussing operating methods. Other meetings throughout the year will be held at Waupaca, Eau Claire and Janesville, the dates to be decided and announced by the executive committee.

Park Tax Declared to Be a Franchise Tax in Baltimore.—Judge Niles, in the Baltimore City Court, has decided that the park tax is a franchise tax and not an easement tax, and that it is legal for the Appeal Tax Court to assess the United Railways & Electric Company, Baltimore, with an easement tax. He also decided that the assessment made for the easements by the Appeal Tax Court was excessive and reduced the same from more than $11,000,000 to less than $3,000,000. The United Railways & Electric Company appealed from an assessment made by the Appeal Tax Court of $11,214,460 on what are known as easements. The company contended that as it paid a park tax of 9 per cent on its gross receipts such tax constituted a tax on the easements, and that the amount assessed by the Appeal Tax Court was excessive and not computed upon equitable valuations. As the Court of Appeals of Maryland had already declared that an easement tax upon public utility corporations was legal, the question before the court was the application of the tax. The distinction drawn between a franchise tax and an easement tax is that the former is a consideration for the right to use the streets and the latter is a direct consideration for the use of the streets. It is stated that the United Railways & Electric Company will appeal the case upon its contention that, having paid a tax of 9 per cent on its gross receipts, the city has not the legal right to impose a further tax for easements upon the company.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Kansas.—The recommendation of Governor Stubbs regarding the passage by the Kansas Legislature of a public utilities law embodying the principal features of the New York and Wisconsin public utility laws, as noted in the recommendations of the Governors published on page 152 of the ELECTRIC RAILWAY JOURNAL of Jan. 23, 1909, has not been without effect, for a bill has been introduced by Senator Hamilton to create a public service commission to be composed at first of the three present railroad commissioners and two persons to be appointed by the Governor and confirmed by the Senate, all the members to serve for two years. Subsequent boards are to be selected by the Governor, and are to be non-partisan, not more than three members to be selected from any one political party. The proposed law includes under its provisions electric railway, electric light, telephone and other public utility corporations. Its most striking feature is the provision that all companies shall enjoy an indeterminate right to operate, subject to the regulation of the commission and the right of the municipality to purchase the property according to the valuation of the commission. It is provided that companies now operating with a fixed franchise limit may surrender their grants for the indeterminate rights under the new law.

Massachusetts.—The Public Transit Improvement Association will ask for legislation to restore the elevated train service in the old Tremont Street Subway. A bill has been introduced to require street railway companies to equip their cars with lifting jacks. The Railroad Commission has lately gone on record against the use of jacks by inexperienced persons on electric cars. A bill has been introduced to provide for the use of fenders on all cars operated within the State. Another resolution requests the New York, New Haven & Hartford Railroad to inform the House if it was directly or indirectly concerned in the securities of any street railway organized under the laws of Massachusetts, or in any holding corporation directly or indirectly in the stock of the Boston & Maine Railroad, and what disposition has been made of street railway securities which it was directed to dispose of by the Supreme Court last May. A petition has also been introduced for legislation providing that any officer of any railway or street railway company operating in Massachusetts who violates the law in respect to the combination of properties shall be guilty of a criminal offense and punished by fine or imprisonment. A bill has been introduced providing for the construction of a tunnel from the vicinity of Park Street by the Boston Transit Commission. The tunnel is to be leased to the Boston Elevated Railway, according to the bill, at a rental of 4.5 per cent of its net cost of construction. A referendum is attached. According to another measure, the Railroad Commission is to investigate the issue of passes by railroads and electric railways. The Railroad Commission in conclusions presented to the Legislature opposes special legislation to permit the New York, New Haven & Hartford Railroad to continue to hold and operate the Berkshire Street Railway.

New York.—The constitutional amendment which is designed to put the city of New York in a position to finance the construction of subways, or other public improvements which will be self-sustaining, has already been introduced. It was passed by last year's Legislature. An amendment must pass two Legislatures and then be submitted to the people at a general election. The present amendment must be passed by this year's Senate and Assembly before it can go to the people. If it is in any way altered, it becomes a new proposition entirely and must pass not only this year, but next year, before it can be voted on. The amendment has received the indorsement of the Public Service Commission of the First District, is in accord with the views of Governor Hughes and has, in the past, been urged by the city authorities.

Ohio.—It is stated that several bills, which were introduced into the Legislature last winter providing for the placing of telephone and telegraph companies of the State under the jurisdiction of the State Railroad Commission and which were not reached, will be revived in the present extra session, and the outcome of the controversy over the reappointment of J. C. Morris as a member of the Railroad Commission by former Governor Harris will probably influence the passage of such a bill. Before he retired on Jan 11, ex-Governor Harris reappointed Mr. Morris and had the appointment confirmed by the Legislature, although the new member will not enter upon his term until February. Governor Harmon has sent to the Senate the name of John Sullivan as successor to Mr. Morris as Railroad Commissioner, and it has been referred to the committee on railways and telegraphy. A bill has been passed by the Senate which proposes to give to interurban electric railways the same rights of eminent domain that are enjoyed by steam railroads in Ohio. A bill introduced in the House provides for heating all steam, electric and city cars used for the transportation of passengers to a temperature of 70 deg. F. It has been referred to the committee on cities.

Vermont.—In accordance with the recommendation of Governor Prouty in his inaugural address that the name of the Railroad Commission of Vermont be changed to that of the Public Service Commission with power of supervision over all public service corporations, Representative Barber, of Brattleboro, has secured passage by the House of the public utility bill of which he was the author. The bill, however, was not put through as originally drawn up by Mr. Barber, but was amended and recommitted in amended form and then reported upon favorably. The bill as passed by the House changed the name of the Railroad Commission to the Public Service Commission of Vermont, and gives the Public Service Commission authority over railroad, telegraph, telephone, gas and power companies with the right to fix rates and regulate the conditions of service.

Financial and Corporate

New York Stock and Money Market

Jan. 26, 1909.

Although there was a good deal of financial news of interest in Wall Street to-day the trading was very light and was generally professional in character. The publication of the report of the Consolidated Gas Company furnished the basis for a bear raid on the stock. At the opening of the exchange a strong selling movement developed which carried the price in the first hour from 126½ down to 117⅛. At that point some support developed, but the stock was never strong. There were other influences, however, which tended to strengthen the market. The announcement that Edwin Hawley and his associates had purchased control of the Chesapeake & Ohio Railroad and would possibly take over a portion of the Cincinnati, Hamilton & Dayton road, had little direct influence on prices, but was a bracing feature. The announcement of this change of control gives an insight into a possible combination effecting a large system from smaller properties.

Local traction stocks have not been nearly so active during the last week as earlier in the month. There have been some losses in prices. Whatever the influence may have been that stimulated Interborough-Metropolitan and Metropolitan Street Railway a few weeks ago, it seems to have disappeared for the present. Brooklyn Rapid Transit has lost its activity since the rumors of possible dividends have ceased to receive attention.

The money market continues favorable to speculation and to investment. The same bountiful supply of cash that has been in evidence for so many months is still in the banks. Although funds are offered to borrowers at rates that seem peculiarly tempting, money is not in great demand. Neither the heavy withdrawals of the Treasury Department nor the liberal bond takings seem to have the effect of reducing the surplus. Rates to-day were 1½ to 1¾ per cent for call loans and 2½ to 2¾ per cent for 90-day funds.

Other Markets

The sales of traction securities in the Boston market were only moderate in amount during the last week and the transactions were mostly in broken lots. Massachusetts Electric common and the preferred have been sold to some extent, the former around 13 and the latter at 63; Boston Elevated has sold at 128, and West End at about 92½.

In the Chicago market little was done in the traction issues. The various series of the Chicago Railways, which have been active recently, were practically out of the market. A few shares of Chicago City Railway changed hands at 184½ to 185.

In the Philadelphia market, Rapid Transit stock continued to be the most active issue. During the week prices advanced steadily and the close to-day was at 28¼, an advance of two points in the week. Union Traction sold at stronger prices. Few transactions in bonds have been recorded.

In Baltimore, as usual, the trading in tractions was confined largely to United Railways bonds. These were not nearly so active as a few months ago. The 4s sold for 84⅜ and the 5s at 78⅜.

Quotations of various traction securities as compared with last week follow:

	Jan. 19.	Jan. 26.
American Railways Company, Philadelphia	45	45
Boston Elevated Railway	128¼	128
Brooklyn Rapid Transit Company	71¼	70⅞
Chicago City Railway	*180	185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a75	a75
Consolidated Traction Company of New Jersey, 5 per cent bonds	a105½	*105½
Detroit United Railway	*55	*56
Interborough-Metropolitan Company	15¾	15½
Interborough-Metropolitan Company (preferred)	44½	43½
Manhattan Railway	153	151½
Massachusetts Electric Companies (common)	12¾	12¾
Massachusetts Electric Companies (preferred)	59¼	63
Metropolitan West Side Elevated Railway, Chicago (common)	16	16
Metropolitan West Side Elevated Railway, Chicago (preferred)	46	48
Metropolitan Street Railway	*42	*42
North American Company	73⅞	82½
Philadelphia Company, Pittsburg (common)	*42¼	42
Philadelphia Company, Pittsburg (preferred)	*44	44
Philadelphia Rapid Transit Company	26	28¼
Philadelphia Traction Company	91	93
Public Service Corporation, 5 per cent collateral notes	a99½	*99½
Public Service Corporation certificates	a76½	*76½
Twin City Rapid Transit Company, Minneapolis (common)	*99½	99½
Union Traction Company, Philadelphia	52¼	54¼

a Asked.
*Last sale.

Final Argument Heard in New York Foreclosure Proceedings

Judge Lacombe in the United States Circuit Court heard final argument on Jan. 21 on the motion of the Guaranty Trust Company, New York, to foreclose the mortgage for $12,500,000 on the property of the Metropolitan Street Railway. The motion was made on the ground that the company had failed to pay taxes and had defaulted on interest on April 1, 1908, and Oct. 1, 1908, and also on the principal of the bonds.

Julien P. Davies, who represented the Guaranty Trust Company, claimed that all property in the hands of the receivers, except cash and bonded real estate, should be sold at foreclosure and the proceeds turned over to the mortgagor. Bronson Winthrop, representing the Morton Trust Company, said that the Thirty-Fourth Street Crosstown Railroad and Twenty-Eighth & Twenty-Ninth Street Crosstown Railroad and the Fulton Street Crosstown Railroad should not be included in this application for the reason that they were not parts of the Metropolitan Street Railway. Judge Lacombe said at this point that he was inclined to agree with Mr. Winthrop, but would hear Mr. Davies in opposition. The latter said that these three crosstown roads were operated by the Metropolitan Street Railway under a contract for trackage service, and that parts of these three roads were owned by the Metropolitan Street Railway. Judge Lacombe reserved decision.

On Jan. 25 Judge Ward, of the United States Circuit Court, handed down his findings in a suit brought by Adrian H. Joline and Douglas Robinson, receivers of the New York City Railway, against the Metropolitan Securities Company, in connection with the settlement of accounts between the two companies. The court allows the receivers $4,964,000, with interest at 6 per cent on $1,345,754 from Oct. 18, 1907, and on $3,718,245 from March 8, 1908, together with the costs of the action. The findings are supplementary to a decision rendered by Judge Ward in November, 1908.

In his finding Judge Ward tells of the lease made by the Metropolitan Street Railway in 1902 of all its lines to the New York City Railway. Under this the lessor paid to the lessee $23,000,000, which was expended up to May, 1907, by the New York City Railway for purposes mentioned in the lease. Moreover, the New York City Railway advanced $2,834,484 for the same objects and had a floating indebtedness of $1,550,774, and contemplated further capital expenditures of at least $4,000,000. The Metropolitan Street Railway on May 22, 1907, proposed to issue improvement notes to the amount of $8,000,000, and these, by agreement between the Metropolitan Street Railway, the Metropolitan Securities Company and the New York City Railway, were placed with the Metropolitan Securities Company.

The court finds that the Metropolitan Securities Company has used these notes as collateral for loans made by it. On June 4, 1907, the Metropolitan Street Railway approved a plan of construction which would cost, it was estimated, $4,000,000, and the New York City Railway and its receivers have paid and incurred the sum of $8,000,000 on behalf of the improvements of the Metropolitan Street Railway. For this they have received no consideration, except the agreement of the Metropolitan Securities Company to pay $8,000,000 to the New York City Railway. Of this $8,000,000 the New York City Railway paid $2,834,483 up to April 30, 1907, and on account of its agreement the Metropolitan Securities Company paid to the New York City Railway $3,036,000, for which no acknowledgment was received. The receivers, on Oct. 10, 1907, asked that the Metropolitan Securities Company pay them a further sum of $1,245,754. The securities company refused to do so on the ground that both the New York City Railway and the Metropolitan Street Railway were insolvent.

Between May 1, 1907, and Sept. 24, 1907, the New York City Railway paid to the Metropolitan Street Railway further sums to the extent of $1,922,629, which brought its payments on the original agreement up to $4,757,113.

At the time of the trial, says Judge Ward, there also existed necessary capital expenditures to the extent of $1,733,325. Further immediate construction needs of the Metropolitan Street Railway under the lease brought the amount up to $3,326,797, which, with the payments on account of the contract on April 30, 1906, of $5,675,481, make a total of $9,002,278. The court also considered the fund of $814,921 deposited by the Metropolitan Street Railway in the Morton Trust Company as a special construction fund in connection with the Central Crosstown Railroad. Of this $500,000 was loaned to the Metropolitan Securities Company, which, when it was repaid, was treated by the Metropolitan Street Railway as money borrowed by itself on the note of the Central Crosstown Railroad. When Messrs. Joline and Robinson were appointed receivers of the New York City

Railway the securities company paid $800,000 to the Metropolitan Street Railway to make good this special construction fund of the Central Crosstown Railroad, and $503,833 of the amount so deposited forms part of the $1,550,774 floating indebtedness of the Metropolitan Street Railway. Judge Ward finds that this payment on the part of the Metropolitan Securities Company was without the knowledge or consent of the New York City Railway or its receivers.

Carbondale (Pa.) Railway.—Governor Stuart, of Pennsylvania, has approved a bill providing for the consolidation of the Blakeley & Dickson Traction Company, capital, $36,000, and the Carbondale Railway, capital, $450,000, as the Carbondale Railway with a capital of $486,000 and these officers: J. J. Sullivan, president; H. J. Crowley, vice-president; C. L. S. Tingley, secretary and treasurer; W. W. Perkins, assistant secretary and treasurer. J. J. Sullivan, W. F. Harrity, W. H. Shelmerdine, E. C. Miller, C. L. S. Tingley, H. J. Crowley and W. W. Perkins, directors. The line of the Blakeley & Dickson Traction Company, which connects Blakeley and Dickson City, has been operated under lease by the Scranton & Carbondale Traction Company, while the Scranton Railway has leased the Carbondale Railway.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—It cost $176,258.61 to complete the Chicago & Milwaukee Electric Railroad inside the city limits of Milwaukee, according to the report of the receivers for 1908, which came before Judge Tarrant at Milwaukee on Jan. 21 on a motion for approval. The report covers the period dating from the appointment of the receivers, in May, 1908, until Dec. 30, 1908. The question of the compensation of the receivers will come before the court later for adjustment.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—At the annual meeting of the Cleveland, Southwestern & Columbus Railway, F. T. Pomeroy retired as president because of sickness and F. E. Myers, Ashland, Ohio, was chosen to succeed him. A. E. Akins was elected first vice-president. P. A. Myers, a brother of F. E. Myers, and L. J. Wolfe, president of the Aurora, Elgin & Chicago Railroad, were elected directors to succeed George N. Chandler and J. F. Harper. Mr. Wolfe was also made second vice-president of the company.

Danbury & Harlem Traction Company, Danbury, Conn.—J. Hector McNeal, New York, representing the bondholders, purchased the property of the Danbury & Harlem Traction Company at foreclosure on Jan. 23 for $22,000. The company owns an electric railway partly constructed between Harlem, N. Y., and Danbury, Conn.

Detroit (Mich.) United Railways.—The Detroit United Railways is reported to be negotiating with Coates & Company, London, England, for the sale of part of the $2,500,000 of consolidated mortgage 5 per cent bonds still in the treasury of the company. On March 1, $1,000,000 of 3-year 5 per cent notes of the Detroit United Railways mature and it is said that if a satisfactory price cannot be obtained for the treasury bonds, they will be used as collateral for a bank loan to provide for retiring the notes.

Interstate Railways Company, Philadelphia, Pa.—E. B. Smith & Company, Philadelphia, bankers, have engaged the Stone & Webster Engineering Corporation, with the approval of the directors of the Interstate Railways Company, to report on the physical and operating conditions of each of the underlying properties of the Interstate Railways Company, and to make recommendations for improvements. The Interstate Railways Company controls through The United Power & Transportation Company the electric railway properties entering Philadelphia, and others in Reading, Wilkesbarre, Trenton, Chester, Wilmington and several smaller cities. There are in this group 15 railway companies which operate approximately 800 cars over 525 miles of track. In addition to this there are four electric lighting companies.

Lehigh Valley Transit Company, Allentown, Pa.—At the annual meeting of the stockholders of the Lehigh Valley Transit Company on Jan. 11, R. P. Stevens was re-elected president; John C. Dawson, Philadelphia, vice-president, and Charles N. Wagner, Allentown, secretary and treasurer. The annual report of the company for the year ended Nov. 30, 1908, showed gross earnings of $910,574.20, a loss over 1907 of $16,225.05, which was attributed to the business depression.

Massachusetts Electric Companies, Boston, Mass.—The Massachusetts Electric Companies has sold $1,096,000 of 6 per cent preferred stock of the Boston & Northern Street Railway and the Old Colony Street Railway to Hayden, Stone & Company, Curtis & Sanger and Parkinson & Burr.

Mexico (Mex.) Tramways.—At the meetings of the stockholders of the Mexico Tramways and the Mexico Light & Power Company, held in London on Jan. 16, an agreement was ratified by which the stock of the Mexico Light & Power Company will be exchanged for the stock of the Mexico Tramways on the basis of 14 shares of stock of the Mexico Light & Power Company for 8 shares of the stock of the Mexico Tramways Company. The Mexico Light & Power Company has outstanding $13,600,000 of common stock, $2,400,000 of preferred stock and $12,000,000 of bonds. The Mexico Tramways has $6,000,000 of stock and $7,000,000 of bonds outstanding. Its authorized capital stock is $15,000,000 and it has authorized $15,000,000 of bonds.

Northern Ohio Traction & Light Company, Akron, Ohio.—At the annual meeting of the stockholders of the Northern Ohio Traction & Light Company, Fred S. Borton, Cleveland, was chosen to succeed Chauncey Eldridge, Boston, as a director. P. L. Saltonstall is the only representative of the Boston interests on the board now. C. J. McCuaiy represents the Canadian interests. The board organized by re-electing the officers.

Philadelphia (Pa.) Rapid Transit Company.—Charging that Mayor Reyburn, Clarence Wolf and William H. Carpenter are unlawfully acting as directors of the Philadelphia Rapid Transit Company as representatives of the city, Roy Franklin Brode, a stockholder, has filed a petition for a writ of quo warranto in Common Pleas Court to have them removed from the office. Messrs. Reyburn, Wolf and Carpenter entered the directorate of the company in accordance with the terms of the agreement entered into recently between the city and the company.

Port Jervis Electric Light, Power, Gas & Railroad Company, Port Jervis, N. Y.—The bondholders of the Port Jervis Electric Light, Power, Gas & Railroad Company have ratified the action of the bondholders' protective committee and authorized the committee to bid for the property at the foreclosure sale to be held at Port Jervis on Jan. 27.

Rhode Island Company, Providence, R. I.—The Rhode Island Company has been added as a defendant to the suit brought by United States District Attorney French on behalf of the Government in which he cites the New York, New Haven & Hartford Railroad, the Boston & Maine Railroad, the Providence Securities Company and the Consolidated Railway of Connecticut as defendants, and charges them with violation of the Sherman anti-trust law in the merging of railroad and railway interests. The Rhode Island Company was not mentioned at first, but the amendment alleges that this company, which operates and owns practically all the urban and interurban railways in Rhode Island, in June, 1907, transferred to the Providence Securities Company all its holdings in the Providence & Burrillville Street Railway, Columbian Street Railway, and the Woonsocket Street Railway. The Providence Securities Company transferred control of these properties to the New York, New Haven & Hartford Railroad on Jan. 31, 1908, it is alleged by Mr. French.

Rochester (N. Y.) Railway.—The stockholders of the Rochester Railway, the Rochester & Sodus Bay Railway and the Rochester & Eastern Rapid Railway have voted in favor of the proposed merger of the three companies into the New York State Railways, which is designed to take over as a holding corporation all the electric railways in New York State controlled by the Central Railway Syndicate, as announced on page 45 of the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1909.

Toledo Railways & Light Company, Toledo, Ohio.—At the annual meeting of the Toledo Railways & Light Company, at Toledo, on Jan. 21, the following directors were elected: Spencer D. Carr, Jay K. Secor, W. J. Walding, Irving B. Hiett, John J. Barker, Albion E. Lang and L. E. Beilstein, all of Toledo; W. E. Hutton, Cincinnati; Dr. J. F. Demers, Quebec; Barton Smith, Toledo; E. W. Moore, Cleveland, and R. B. Van Courtland, New York, retired. The directors organized by re-electing the old officers, as follows: Albion E. Lang, president; L. E. Beilstein, vice-president and general manager; H. S. Swift, secretary; Spencer D. Carr, treasurer. The directors authorized the issuance of universal transfers on the payment of a cash fare of 5 cents. Heretofore transfers have not been exchanged between the old Toledo Traction lines and the Robison lines. A contract between the Toledo Railways & Light Company and the Toledo, Fostoria & Findlay Railway was ratified, by which the Toledo, Fostoria & Findlay Railway secures entrance into the business section of the city. The subsidiary companies of the Toledo Railways & Light Company were almost self-sustaining last year, notwithstanding the financial stringency and business depression.

Traffic and Transportation

Hearing by Massachusetts Railroad Commission on 6-Cent Fares in Northampton

On Jan. 22 the Massachusetts Railroad Commission heard the petition of the Mayor and City Solicitor of Northampton protesting against a 6-cent fare on the Northampton Street Railway. Briefs were presented by J. C. Hammond, president, and N. D. Winter, treasurer of the company. An abstract of each brief follows:

President Hammond reviewed the history of the company as printed in the Electric Railway Journal of Jan. 23, page 162, pointing out that for the past 16½ years the average rate of dividend has been slightly more than 7.5 per cent, or an average of 5.5 per cent since the road has been in operation. The only question now being considered is whether a 6-cent unit of fare is reasonable or excessive. President Hammond said he was prepared to maintain that the unit of fare at 5 cents has always been too low for street railways situated like the Northampton; almost all the travel is suburban. He added:

"This fact has not been fully recognized by myself because the extent to which depreciation goes on and the rise in the expense of everything incident to operation has not until recently been realized. Probably the convenience of using the nickel had much to do with the establishment of this fare. Since this fare was established in general practice the laws of the State have required railways to do more for the comfort of passengers. Cars must now be heated and lighted by electricity. Again, the use of double-truck cars increases beyond proportion the expense of operation. These are samples only of the many other ways by which the cost of operation has increased. A greater investment in money is now requisite for a given mileage of street railway than was counted upon 10 or 15 years ago. Since 1901, with no further addition to the trackage, the investment has increased about $56,500. On this sum interest must be paid. Thereby almost $1 on each share of stock is devoted to paying interest.

"Unless this street railway can have much more net income its power to pay dividends is at an end. It is not desirable to secure this end by diminished service; nor is it practical. The public constantly protests against any reduction in service. We feel sure that good service and 6 cents as the fare are acceptable to patrons who understand the situation. Increase in the cost of everything incident to the expense of operation has far outrun any increase of business. The popular statement of this same thing is that 6 cents has not the purchasing power that 5 cents had 8 or 10 years ago. These things are all so well known to this board that I hesitate to note or suggest the items, except in the briefest way. Wages, coal and supplies cost the company a third more than 10 years ago.

"For the year ended Sept. 30, 1901, the car miles run were 773,782, with a power-house cost of $13,350. For the year ended Sept. 30, 1908, the car mileage was 803,369, and the power plant operating cost was $21,775, an increase of $7,424, with a very slight increase in traffic.

"The time has arrived when it must be an established policy to charge annually a reasonable sum for depreciation, especially on tracks, rolling stock and power-house machinery. A comparison of these accounts as they stand on the books with the recent appraisal of E. K. Turner, consulting engineer for the Railroad Commission, is as follows:

	Books.	Mr. Turner's estimate.
Tracks	$214,501.31	$168,843.00
Rolling stock	178,159.99	91,415.00
Power plant	104,114.00	76,005.00

"The boilers in the power house have to be run year by year with a diminished pressure to comply with wise State laws, and during 1909, or at least in 1910, they will have to be replaced by new ones, and the book value of these will have to be charged off as a loss. It is probable that within the next five years the wooden car sheds will have to be torn down—charged off as a loss—and replaced by brick sheds in the interest of safety. This charging off to profit and loss ought to be so apportioned over a number of years as to permit year by year the payment of a reasonable dividend. If dividends are passed the company cannot get its stockholders to take up the remaining 750 shares of stock authorized to be issued. The present stockholders hold only a little more than half the issue of 1000 shares, completed Jan. 1. If dividends were to be passed an insurmountable barrier to the placing of the stock would be encountered. A non-dividend paying road is not entitled to borrow money from savings banks. Where shall we borrow the money?"

Regarding the suggestion of the petitioners that a book of tickets without transfers might be sold at a reduced rate, and the company still derive adequate revenue, it was stated that the limitation without transfer would not affect 90 per cent and more of the traffic, because the transfers constitute only 8 per cent of the fares paid. The experience of the company just before the 6-cent fare went into operation showed that all who could availed themselves of the opportunity to buy tickets; in fact, patrons bought books at the rate of $1,000 per day until the supply was exhausted. Patrons who, from lack of foresight or money, did not purchase a book of tickets felt that they had been discriminated against. President Hammond concluded with the request that the commission permit the company to continue to operate at a 6-cent fare during 1909.

N. D. Winter, treasurer of the company, presented tables showing the earnings, expenses, fixed charges, capitalization, traffic, car mileage and unit costs for the 14-year period from 1895 to 1908 inclusive, to prove that the company's operating expenses are reasonable; that the increase in expense is normal and incidental to the increase in the age of the road; that the cost of operation has increased much faster than has the income, and that the service required cannot be maintained in the future without a 6-cent fare. Car-mile results and costs per passenger follow:

	Gross receipts.	Operating expenses.	Taxes and interest.	Cost per pass. div. excluded.
1895	$0.2108	$0.1167	$0.0148	$0.0302
1896	.1909	.1163	.0123	.0345
1897	.2041	.1229	.....	.0384
1898	.1894	.1182	.0198	.0376
1899	.2012	.1209	.0186	.0358
1900	.18388	.11594	.02318	.0441
1901	.17244	.11385	.02348	.0408
1902	.18877	.12709	.03495	.0441
1903	.19212	.12777	.03814	.0444
1904	.18906	.13937	.03840	.0485
1905	.19390	.13312	.03600	.0449
1906	.20702	.13942	.03606	.0436
1907	.21593	.16143	.03920	.0476
1908	.21340	.14993	.04133	.0459
Per cent of increase.	Less than			
1895 to 1908.	½%	28%	178%	50%

In 1895 the company had $300,000 capital and $60,000 debt, making an investment of $360,000. Everything being new, and the demand of the public not so insistent as at present, the operating expense was 11.67 cents per car mile, with a total expense of 13.15 cents exclusive of dividends. The operating expenses have since increased steadily to a maximum of 16.1 cents in 1907. The 1908 figure is 28 per cent higher than in 1895. The total expenses, exclusive of dividends, increased 45 per cent, or to 19.12 cents per car mile in 1908. In 1895 the company paid 7.5 per cent dividends and carried to surplus $9,000, or practically 2.5 per cent on the investment, which, on a 40 years' basis, cannot be considered too much to cover depreciation. Mr. Winter said:

"We know better now; but it seemed enough at that time. Fares were established on the false premise that the profit on the increase of traffic would care for the increased costs and requirements. Time has proved that the company was much mistaken, and the present unfortunate condition of the street railway business in Massachusetts suggests that nearly all the other companies made the same mistake, and the situation has been made worse in Northampton on account of the fact that the fares have had to be reduced twice since that time. It was emphasized that the company now knows that not only does the operating expense of a street railway increase at a rapid rate after the first five years, but that no company can keep its equipment and service up to the proper standards without adding to its investment every year that it operates. In each of the 14 years recorded the company has invested more money in order to serve the public. During this period the investment has increased from $360,000 to $750,000, and while the stockholders have put this $400,000 into equipment for the public's use (the public being charged with the interest only) the amount received from the stockholders has steadily decreased from $30,000 to $18,000, and the company is now on a $15,000 basis. With a reasonable charge for depreciation the company would have shown considerably less than nothing. During the 14 years of steady increase in cost the company has borrowed about $450,000, or 1½ times its capital.

"This borrowing would strain any credit, and therefore the commission granted us the right to issue 1750 shares of stock at $110 a share. We waited until the money market was easy and asked for subscriptions for 1000 shares. Our stockholders subscribed for only 550 shares. We then canvassed Northampton to secure subscribers for the balance, but were unable to place a share. Finally, however, we succeeded in placing the stock through the personal influence of the officers of the company. I refer to this to show that our stockholders very naturally refuse to invest the money that is necessary yearly for the proper maintenance of a road unless they may expect a fair return

upon their present investment. The question at this time is: Can the company maintain safe and satisfactory service in the future on a 5-cent fare?"

In reply to the objection that the company paid out too much money in dividends, Mr. Winter referred to the total investment necessary, and the relation of the dividends paid to this. To the objection that the expenses are high because of accidents, he reiterated that the cost per car mile is only 15 cents, and the average expense for accidents in the past 10 years has been 3 per cent of the gross receipts, the maximum being 9.5 per cent, and the minimum 0.4 per cent. In answer to the possible criticism that the total investment has been expended injudiciously, the recent inventory by the engineer of the commission showed that there has been no serious mistake, especially since the company discarded a horse railway at the beginning.

Regarding the claim that the increase is due to the recent panic, Mr. Winter stated that the gain in receipts in 1906 and 1907 was very unusual, being double that of almost any other year, and in 1908 the receipts were within 2 per cent of 1907, the company's most prosperous year. The company operates through a wealthy community that rides a great deal, and is not subject to the vicissitudes of manufacturing cities. The main trouble has been that the expense has grown faster than the income. The question is, whether a road 15 years old, whose total receipts are 21.34 cents per car-mile, and whose average cost, not including anything for dividends and depreciation, is 19.12 cents, can keep up, through a term of years, the standard of service and improvement that will be satisfactory to the community and the commission. Mr. Winter said, in the course of his remarks:

"Can we expect our stockholders to furnish the money necessary for improvements if they cannot receive as much interest on their present stock as they can get in many safer investments? Am I right in stating it, as a business truth, that in the broad view it is absolutely necessary to the best interests of a community that the stockholders of a street railway receive a reasonable interest in order to maintain proper safety and service? It will be impossible for the Northampton Street Railway to maintain such service and safety as you would have it for the next 5 or 10 years on a 5-cent fare, and only by the closest attention and strictest economy can the company do so on a 6-cent fare. Personally, I think that within a few years it will be necessary for suburban companies to receive a fare equal to 1.5 or 2 cents per mile.

"If we were required to sell 5-cent books the increase would not be sufficient to relieve the situation much. In fact, with a straight 6-cent fare it is doubtful if the company will be able to pay any dividend for a year or two. We estimate that a 6-cent fare will increase our income about $10,000 per year."

The following table of daily average car receipts for the first 15 days of January, 1908 and 1909, with the 5 and 6-cent fares in force, respectively, was then presented by Mr. Winter:

	1908		1909	
	Passengers.	Car receipts.	Passengers.	Car receipts.
Bay State line....	1,173	$58.42	834	$50.85
Williamsburg line.	2,275	105.54	2,336	120.43
Easthampton line.	2,258	112.51	2,022	120.23
Holyoke line.....	2,165	107.00	1,928	112.96
Total.....	7,871	$383.47	7,120	$404.57

Decrease in passengers, 751, or 10 per cent.
Increase in receipts, $21.10.

Concluding, Mr. Winter said: "Our case differs here from most companies. We serve a public where a greater proportion are in a position to buy tickets than any other community in Massachusetts, perhaps, save one. To illustrate, on the last three days of December we sold 4000 books, or one to every voter in the city, in anticipation of the increased fare. The parties suggesting that we sell 5-cent books recognize that in our city such a policy would not result in sufficient increase in our receipts to relieve the situation, and therefore suggest that we take the transfer privilege from such tickets.

"In 1908 we registered 3,711,726 fares. The transfers on the whole road were 311,268, practically 8 per cent. Taking transfer privileges from these tickets, in our opinion, would work a loss both to the public and the company. Transfers are the best legitimate and successful method of inducing traffic; besides, there is a clause in our location that requires the giving of transfers. While the members of the city government have felt, perhaps properly, that it was advisable to have the commission pass upon the matter, the public we serve are generally convinced that a flat 6-cent fare is just and necessary to maintain the service desired."

Press clippings were cited in which it was stated that there was a local sentiment that the company is giving more than it can afford; that no one wants a street railway which is not prosperous; and that fair dividends should be received by all corporations which serve the public as well as the Northampton Street Railway. It was then pointed out that the company is not on any line able to pick up two loads at one trip, and should therefore not be required to carry for the same fare as in densely populated cities. In the last five years the population of Northampton has increased 1.5 per cent per year. In its final summary the brief of Mr. Winter contended that the company is giving good service to the public; that it has operated economically and with reasonably good judgment; that the increased cost of operation is normal and proper, sure to continue, and has now reached a point where the future welfare of the community, as well as the company, and the exercise of sound business judgment, necessitate an increased fare. The community, on its part, does not desire action that will impair service or curtail the yearly improvements that are necessary for convenience and safety.

In taking the question under advisement the commission stated, through Chairman Hall, that this case presents some features that distinguish it from other fare problems that have come before the board, the principal point of interest being the fact that the company has paid 6 per cent dividends, or better, for a series of years. Chairman Hall said that without prejudice to the commission's investigation and subsequent decision, the question of proper financing is one of great importance in this case, and will be given the closest consideration by the commission.

Buffet Service Discontinued by Ft. Wayne & Wabash Valley Traction Company.—The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., has discontinued the buffet service on its Indianapolis-Ft. Wayne limited cars and will establish lunch stands in the depots of all the principal towns along the lines.

Petition for Reduced Fare in Massachusetts.—The Mayor and the City Solicitor of Marlboro, Mass., have petitioned the Railroad Commission of Massachusetts for a reduction in fare from 6 cents to 5 cents over the Hudson, Southboro and crosstown lines of the Boston & Worcester Street Railway. The main line is not affected by the petition.

Offices of Toledo Urban & Interurban Railway at Findlay.—The general freight offices of the Toledo Urban & Interurban Railway were moved from Bowling Green to Findlay on Jan. 20, thus centering all the department offices. H. A. Stevenson, who will become traffic manager of the company on Feb. 1, will also make his headquarters at Findlay.

St. Louis Sues for Passenger Tax.—The city of St. Louis has begun suit against the United Railways Company and the St. Louis Transit Company to recover a claim against the companies based upon the tax of one mill per passenger, imposed upon them recently. The injunction secured by the companies to prevent the city from collecting the tax was dissolved recently.

Bumps to Deter Fast Automobiling at Crossings.—The Long Island Railroad has had plans prepared for a series of "bumps" 5½ in. high, rising and falling within 8 ft., to be installed as an experiment at several grade crossings on the Long Island Railroad on Eastern Long Island, to determine their efficiency in deterring automobilists from driving recklessly at crossings.

Report to be Made of Traffic Conditions in Pittsburg.—Stone & Webster, Boston, Mass., have been retained by the Pennsylvania Railroad Commission to examine and report on the street railway service in Pittsburg. The Commission has asked for an investigation of the situation from an engineering and an operating standpoint, with due regard to various factors of economy, safety and practicability.

Service from Brooklyn Over the Williamsburg Bridge.—The Public Service Commission of the First District of New York has ordered a hearing for Jan. 29 to inquire into the compliance by the Brooklyn Rapid Transit Company with the terms of Final Order 706 in regard to service on the Williamsburg Bridge local cars. The order has been complied with from 5:30 p. m. to 7 p. m., but is said not to be up to the requirements of the commission at other hours.

More Pay-Within Cars in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has placed pay-within cars in service on its South Seventeenth Street-South Eighteenth Street line. In the interest of the public small illustrated folders showing the proper way to board and leave the cars and emphasizing the importance of having the exact fare ready have been hung in each car for general distribution. Pay-within cars are now being operated by the company on the Twelfth Street-Sixteenth Street line, the South Nineteenth-South Twentieth Street line and the South Seventeenth-South Eighteenth Street line.

Personal Mention

Mr. C. W. Ricker, electrical engineer of the Cleveland Construction Company, Cleveland, Ohio, has been appointed engineering assistant to the receivers of the Municipal Traction Company, Cleveland, Ohio. The heads of the motor power, distribution and return, and mechanical departments will all report to Mr. Ricker.

Mr. H. A. Robbins, formerly assistant electrical engineer of the Brooklyn (N. Y.) Rapid Transit Company, has been appointed superintendent of power of the company to succeed Mr. S. A. Spaulding, resigned. Mr. Robbins has been connected with the Brooklyn Rapid Transit Company since graduating from the Pennsylvania State College in 1901.

Mr. S. A. Spaulding, for the last two years superintendent of power of the Brooklyn (N. Y.) Rapid Transit Company, has resigned to become connected with the electrical department of the Pennsylvania Railroad at New York. Mr. Spaulding will be succeeded as superintendent of power of the Brooklyn Rapid Transit Company by Mr. H. A. Robbins, formerly assistant electrical engineer of the Brooklyn Rapid Transit Company.

Mr. R. M. Searle, who has been general manager of the Rochester Railway & Light Company, Rochester, N. Y., has been elected vice-president of the company. Mr. Searle was formerly general manager of the Westchester Lighting, Power & Gas Company, New York, and at one time was connected with the Georgia Railway & Electric Company. Mr. Searle's election in no way affects the organization of the Rochester Railway, the stock of which is owned by the Rochester Railway & Light Company.

Mr. J. T. Hutchings, assistant general manager of the Rochester Railway & Light Company, Rochester, N. Y., has been appointed general manager of the company, to succeed Mr. R. M. Searle, who has been elected vice-president. Mr. Hutchings was graduated from the Massachusetts Agricultural College at Amherst in 1889. Shortly thereafter he became connected with the Thomson-Houston Company, for which he did considerable construction work. Subsequently he became assistant superintendent of the West End Electric Company, Philadelphia. Later he was appointed superintendent of the company, and remained in that position until the Philadelphia Electric Company was organized in 1897, when he was appointed electrical engineer of the company. In 1904 Mr. Hutchings was appointed superintendent of the electrical department of the Rochester Railway & Light Company and was appointed assistant general manager in 1906.

Mr. E. T. Munger, who recently resigned as superintendent of motive power and equipment of the Metropolitan West Side Elevated Railway, Chicago, Ill., was given a testimonial dinner at the Hoffman House, New York, on Jan. 22 on the occasion of his becoming general superintendent of the Hudson & Manhattan Railroad, New York. The party was composed of leading railroad men and manufacturers' representatives in and about New York and was the occasion for much praise for the Chicago railroad men who had gone East to assume important duties. Among the guests were Mr. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company; Mr. J. S. Doyle, superintendent of car equipment of the Interborough Rapid Transit Company; Mr. L. B. Stillwell, electrical director of the Interborough Rapid Transit Company; Mr. W. S. Menden, assistant general manager and chief engineer of the Brooklyn Rapid Transit Company; Mr. W. G. Gove, superintendent of equipment of the Brooklyn Rapid Transit Company; Mr. Chas. Remelius, superintendent of rolling equipment of the Public Service Railway, and Mr. W. O. Wood, general manager of the New York & Queens County Railway.

Mr. Charles H. Smith has resigned as secretary of the Lebanon Valley Railway, Lebanon, Pa. Mr. Smith began his railroad career on Feb. 3, 1873, when he entered the employ of the Reading Railroad, at Harrisburg, Pa., as telegrapher. On Dec. 8, 1879, he was transferred to Philadelphia and served in the same capacity in the office of the general traffic manager and later in the office of the general superintendent of the New York Division. On Aug. 1, 1881, Mr. Smith accepted a position in the office of the general manager of the company and in July, 1887, was appointed general agent at Camden, N. J. From April, 1888, until May, 1893, Mr. Smith served as clerk for the Reading Railroad, having charge of the Pennsylvania Avenue, Willow Street and Washington Avenue stations of the company in Philadelphia. In May, 1893, he became superintendent of the Lebanon & Annville Street Railway. After a few months of hard work, Mr. Smith reduced the expenses of the company about $1,200 per month, and so managed the property that it was soon placed on a dividend paying basis. During 1899, the United Power & Transportation Company took over the local street railway lines at Lebanon and made several extensions and improvements. Mr. Smith is secretary of the Pennsylvania Street Railway Association. Mr. Smith has not yet made his plans for the future, but expects to remain in the electric railway field.

Mr. L. B. Stillwell has been nominated as president of the American Institute of Electrical Engineers, by a number of members of that association. In a circular, with 30 signatures, issued Jan. 22, the qualifications of Mr. Stillwell are given as follows: "As the time is approaching when the members of the American Institute of Electrical Engineers must cast their nomination ballots for the various offices to be filled, we, the undersigned, deem it an appropriate time to suggest that Mr. Lewis B. Stillwell, of New York, is eminently qualified for the office of president of the institute. As is well known, Mr. Stillwell's reputation as a consulting electrical engineer is of the highest type. He is responsible for much of the most important and progressive work done in this country in electric traction, steam and hydro-electric power generation in large plants, the standardization of practice and the industrial use of electric power on a large scale. Mr. Stillwell has been intimately associated with the Institute work, not only as a notable contributor of papers and discussions, but as manager, vice-president, member of the board of examiners, member of the committee on standardization, the committee of code of ethics, the international electrochemical commission and an active member of the building fund committee. At the solicitation of many of his friends Mr. Stillwell has consented to become a candidate for the presidency. We trust that you will be able to vote for his nomination and election and further will use your good offices with others with whom you come in contact."

Mr. Ernest Gonzenbach, vice-president and general manager of the Sheboygan Light, Power & Railway Company, Sheboygan, Wis., was elected president of the Northwestern Electrical Association at the annual convention of that body, held at the Hotel Pfister, Milwaukee, Wis., on Jan. 20 and 21, 1909. Although Mr. Gonzenbach's reputation has been largely made in the electric railway field, he has demonstrated since taking hold of the Sheboygan Light, Power & Railway Company, his ability also to handle electric lighting problems in a broad way, and is one of the few managers who combine well the ability and willingness to give attention to details of both railway and lighting work. Mr. Gonzenbach is Swiss by birth and education, but came to this country immediately after leaving school. After an electrical experience in power-house work in Chicago he completed the Thomson-Houston expert course at Lynn, Mass. In 1895, as electrical engineer in St. Johnsbury, Vt., he constructed several electric light and transmission plants in that vicinity. In 1898 he entered the employ of the Westinghouse Electric & Manufacturing Company, and in 1900 became electrical engineer of the Albany & Hudson Railroad, one of the early third-rail roads. Subsequently he accepted a similar position with the Aurora, Elgin & Chicago Railroad, then under construction. He has been at Sheboygan as general manager since Jan. 1, 1905. Mr. Gonzenbach has always taken an active interest in the affairs of the American Street Railway Association and its successor, the American Street & Interurban Railway Association, and at the meeting of the American Street & Interurban Railway Transportation & Traffic Association last October presented a paper entitled "How Can the Small Road Best Promote Traffic and Increase its Revenue?"



E. Gonzenbach

OBITUARY

Lucius T. Gibbs, electrical engineer of the Baltimore & Ohio Railroad, Baltimore, Md., died on Jan. 22 at his home in Green Spring Valley, Pa., of pneumonia. Mr. Gibbs was born in New York in 1869. He served as an apprentice in the machine shop of the Otis Elevator Company and was assistant to the mechanical engineer of the Chicago, Milwaukee & St. Paul Railway. He was graduated at Cornell University in 1891, and afterward made electrical engineer of the Milwaukee Electric Railway & Light Company. He was also vice-president and chief engineer of the Gibbs Electric Company, Milwaukee.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Montana Rapid Transit Company, Wilmington, Del.**—This company has been incorporated in Delaware to construct and operate electric railways. Capital stock, $5,000,000.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—Incorporated in Illinois to construct an electric railway from Waukegan to Woodstock, Marengo, Rockford, Belvidere, Elgin, Antioch and Milburn. Principal office, Waukegan. Capital stock, $1,500,000. Incorporators: Robert D. Wynn, Clair C. Edwards, John D. Pope, Fred Bairstow and Dr. John C. Foley, all of Waukegan. [E. R. J., Jan. 16, '09.]

***Missouri & Cameron Railway, Kansas City, Mo.**—This company has been chartered in Missouri to construct a road from the Missouri River in Platte County through Kirksville and Smithville to Lathrop, a distance of 35 miles. Capital stock, $350,000. Incorporators: William W. Lewis, Charles O. French, William A. Medill, Fred. M. Titus and N. S. G. Peabody, all of Kansas City.

***Traction Development Company, Elizabeth, N. J.**—This company has been incorporated in New Jersey for the purpose of securing franchises, rights of way and engineering plans for the Elizabeth & Amboy Traction Company, which proposes to operate an electric railway between Elizabeth and Perth Amboy. Capital stock, $100,000. Incorporators: Richard F. Pettigrew, Richard M. Montgomery, Dr. H. B. Hoagland, W. J. Lansley, C. A. Trimble and P. A. Peterson. Percival E. Jones, 27 Pine Street, New York, N. Y., general counsel.

***Cobourg, Port Hope & Havelock Electric Railway, Cobourg, Ont.**—Application has been made to the Ontario Legislature by G. H. A. Ward for a charter for this company to build a road connecting Port Hope and Cobourg, extending across the country to Warkworth and Campbellford, and on to Havelock, thus connecting the lake front towns with the Canadian Pacific Railway. A branch line will also be built from Cobourg to Gore's Landing.

FRANCHISES

***Globe, Ariz.**—A petition has been presented to the Globe City Council asking that a franchise be granted to N. L. Amster for the building of a street railway in Globe.

Wallace, Idaho.—W. J. Hall, representing the Spokane-Wallace Electric Railway, has asked the City Council to re-enact the franchise granted the company two years ago and which was forfeited in January, 1908. The company plans to build an electric railway radiating from Wallace to Burke, Mulla, Kellogg and eventually to Spokane.

Bloomington, Ill.—The Bloomington & Normal Railway & Light Company has petitioned the City Council for a franchise to build a number of new lines in Bloomington. The Bloomington & Normal Company is owned and operated by the Illinois Traction System.

Cedar Rapids, Ia.—The Cedar Rapids & Marion City Railway has presented three ordinances to the City Council which will provide for the construction of a number of new lines in Cedar Rapids. The first ordinance presented gives the company the right to build a double track commencing at its present terminal at O Avenue and Seventh Street West, thence along Eighth Street West, through the Ellis addition as now platted to Ellis Park. There is a provision for a 15-minute service between the dates of May 15 and Oct. 15. The second ordinance gives the company authority to build a double track from the intersection of Second Street and Third Avenue West, along Third Avenue to a point 200 ft. west of the West line of North Fifteenth Street West, with a "Y" extending north into said North Fifteenth Street for a distance not to exceed 200 ft. The third ordinance gives the company authority to make several extensions and improvements of its existing lines.

Cherokee, Kan.—The Joplin & Pittsburg Electric Railway has been granted a franchise by the City Council of Cherokee for the construction of its line into that town. The franchise calls for the completion of the road from Weir Junction into Cherokee, a distance of 5 miles, inside of six months.

Bangor, Maine.—An offer has been made to the City Council whereby the Bangor Railway & Electric Company, in exchange for a 50-years' extension of franchise, agrees to build two steel spans in the Bangor-Brewer bridge and to put the piers and abutments in proper condition, also to transport free all gravel and other material used on the city streets.

St. Louis, Mo.—The St. Louis, Creve Cœur & Western Railway, Clayton, Mo., has been granted a 50-year franchise by the County Court. The road will run from the city limits at Etzel Avenue to Creve Cœur Lake. It will run over a private right-of-way to Studt's Park. The stockholders of the St. Louis, Fern Ridge & Western Railway, which obtained a franchise over the same route three years ago, filed a statement waiving all further right to the franchise. [E. R. J., Jan. 23, '09.]

Springfield, Mo.—A bill has been introduced in the City Council granting the Springfield Traction Company a franchise to extend its line to the State Normal school.

Great Falls, Mont.—The City Council has adopted the proposed franchise to G. Calvin Bower and associates for the construction and operation of an electric railway into and through the city of Great Falls and has called a special election for Feb. 15 at which time it will be submitted to the freeholders of the city. [E. R. J., Aug. 29, '08.]

Camden, N. J.—An ordinance will be introduced in the Camden City Council on Jan. 28, granting the Camden & Delaware Tunnel Company a franchise for the construction of its tunnel under the Delaware River, extending from Philadelphia to Camden.

Morristown, N. J.—The Morris County Traction Company has been granted an extension of time of one year in which to complete the new line between Milburn and Maplewood. The company has cars in operation on a single track between the two towns.

Brooklyn, N. Y.—The Board of Estimate & Apportionment has granted the Brooklyn Heights Railroad a franchise to build a street railway on Livonia Avenue.

Elmira, N. Y.—The Ashland Town Board and the Wellsburg Valley Board have granted the Elmira, Corning & Waverly Traction Company a 60-year franchise for the construction of its line through these towns. In return for the franchises the company agrees to rebuild and maintain the Narrows highway east of Wellsburg. The village and town concede the 25-cent fare for round trip from Wellsburg to Elmira, with one transfer on the round-trip ticket or two transfers if the 15-cent one-way fare is paid by the passenger. It is also agreed that the road shall be completed and in operation not later than Dec. 1, 1909. The company has only about 3½ miles of track to lay in order to open the road to traffic.

Forestville, N. Y.—The Buffalo & Lake Erie Traction Company has applied to the Town Council for a franchise to build a street railway in Forestville. It is stated that the company is formulating plans for the construction of an extension between Silver Creek and Forestville.

Salisbury, N. C.—The Rowan County Commissioners have granted the Piedmont-Carolina Railway a franchise for the building of an electric railway from Salisbury to China Grove and Landis, 9 miles south of Salisbury, and to Spencer, also to the Yadkin Valley fair grounds, 2 miles north. Work has already been begun on the road. [E. R. J., Aug. 29, '08.]

***Eugene, Ore.**—Application has been made to the County Court by George M. Miller, J. W. Zimmerman, Charles H. Fisher and Fred Fisk, all of Eugene, for a franchise to construct and operate an electric railway between Eugene and Florence.

Waynesburg, Pa.—F. P. Marr, representing the West Penn Railways, has applied to the City Council for a franchise for the company to construct a line over certain streets of the borough.

***Temple, Tex.**—Max Elser, New York, N. Y., has filed an application with the City Council for a franchise to construct and operate a street railway in Temple. The franchise is to extend for a period of 30 years.

Bellingham, Wash.—The City Council has granted A. J. Craven and J. W. Welch, representing the Nooksack Valley Traction Company, a 30-year franchise for the construction and operation of an electric railway in Bellingham. [E. R. J., Nov. 21, '08.]

Cle Elum, Wash.—The City Council of Cle Elum has granted Frank S. Farquhar, Tacoma, a franchise for a period of 30 years to operate an electric railroad within the limits of Cle Elum. The name of the company that will operate the line is the Cle Elum-Roslyn Electric Railway & Power Company. The electric road is proposed to connect with the Milwaukee Railroad at South Cle Elum, and will enter Cle Elum on Oakes Avenue; a steel bridge will be erected at that point across the Yakima River and connect South Cle Elum and Cle Elum. The road will cover the principal streets of Cle Elum and leave the city

from First Street and follow the county road to Roslyn and operate on the streets of Roslyn and leaving the city on the north, following the county road to Ronald, and Jonesville, and then on up to the head of Cle Elum Lake, a distance of 10 miles from Roslyn. [E. R. J., Dec. 26, '08.]

TRACK AND ROADWAY

Sheffield (Ala.) Company.—Announcement is made that this company has a plan under consideration for the extension of its railway system to the Florence University, in East Florence, a distance of about 2 miles north of Florence.

***Yellville, Ark.**—It is stated that the Commercial Club of Yellville is interested in the construction of a street railway from the city square to the depot. A committee consisting of W. E. Layton, S. W. Woods and A. W. Estes has been appointed to draft an ordinance to be presented to the City Council for passage.

Carlyle & St. Louis Electric Railroad, Carlyle, Ill.—Announcement is made that the directors of this company have decided to start at once the work of obtaining the right-of-way for the electric railway which is to extend from Carlyle to Lebanon and through the cities of Beckemeyer, Breese, Aviston, Trenton and Summerfield. Surveys have already been made and the franchises secured in all the towns through which the road will pass. [S. R. J., Oct. 19, '07.]

Du Page Railroad, Naperville, Ill.—It is stated that this company expects to build during this year an electric railway from Wheaton to Naperville and Plainfield. Capital stock, $25,000. Officers: Asa M. Royce, president; Alvin Scott, vice-president; W. F. Keeney, secretary and treasurer, all of Naperville.

Murphysboro (Ill.) Street Railway.—This company announces that it will award contracts during the next two months for the construction of three-quarters of a mile of new track.

Woodstock & Sycamore Traction Company, Woodstock, Ill.—This company which is building an electric railway between the cities named in the title, has filed a trust deed in favor of the Metropolitan Trust & Savings Bank, Chicago, in compliance with a resolution adopted at a recent meeting authorizing a loan of $700,000 with which to complete the road. Charles A. Spenny, 1210 Tacoma Building, Chicago, secretary. [S. R. J., April 25, '08.]

Evansville, Suburban & Newburg Railway, Evansville, Ind.—At a meeting of people interested in the extension of this company's lines from Boonville through Lynnville to Oakland City, a committee was appointed to consult with the company. It is stated that Hart Township will vote a subsidy in order to have the line extended to that territory.

Burlington-Bonaparte Interurban Railway, Burlington, Ia.—E. E. Egan writes that plans are under way for the financing of this proposed interurban railway. It will connect Burlington, Augusta, Denmark and Ft. Madison. J. A. Johnson, Bonaparte, president; J. Bland, Burlington, vice-president; E. E. Egan, Burlington, secretary and treasurer. [S. R. J., June 29, '07.]

Des Moines, Winterset & Creston Electric Railway, Des Moines, Ia.—L. H. Hixson writes that this company will commence work during this year on its proposed electric road, which is to extend from Des Moines to Winterset, Macksburg and Creston, Ia. It will be 60 miles in length. The company expects to furnish power for lighting. Headquarters, Iowa Loan & Trust Building, Des Moines. Officers: W. D. Skinner, Des Moines, president; E. B. Steere, Des Moines, vice-president; Milo Ward, Des Moines, secretary; S. D. Alexander, Winterset, treasurer; L. H. Hixson, Des Moines, general manager.

Kentucky Central Traction Railroad, Louisville, Ky.—G. J. Lampton, Louisville, president and general manager of this company, writes that it has not yet been decided when contracts will be let for the construction of this 40-mile electric road, which is to connect West Point, Elizabethtown, Howard, Vine Grove and Hogdonville. Capital stock authorized, $500,000.

New Orleans Railway & Light Company, New Orleans, La.—This company has begun the construction of a new line to be known as the Orleans railway extension. It will consist of 1½ miles of double track on Broad Street from Laherpe Avenue to St. Bernard Avenue, and on St. Bernard Avenue from Broad Street to Villere Street, laid with 80-lb. T-rail. The Orleans Railroad, one of the subsidiary companies of the New Orleans Railway & Light Company, is the owner of the franchise, and the work will be done by the New Orleans Railway & Light Company.

Twin City General Electric Company, Ironwood, Mich.—This company will shortly place contracts for material to be used in the construction of a 7-mile extension from Ironwood to Bessemer, Mich.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company expects to place contracts during the next three weeks for the construction of 5.7 miles of track and for the necessary overhead material.

Kansas City & Olathe Electric Railway, Kansas City, Mo.—This company which operates an interurban line from Rosedale to Merriam and Shawnee, has begun the work of grading on another mile of the road west of Shawnee.

Kansas City & Southeastern Traction Company, Kansas City, Mo.—This company is reported to have completed the final survey for the proposed electric road between Kansas City and Lone Jack. It is one of the several divisions to be built which will result in a through line from Kansas City to Jefferson City, with two or three branch lines. The main line will pass through Kansas City through Leeds, Raytown, Little Blue, Lee's Summit, Lone Jack, Warrensburg and Sedalia to Jefferson City, 125 miles. There will be a branch line 15 miles long from Lee's Summit to Greenwood, Pleasant Hill and Harrisonville. Another branch will run from Pittsville through Holden, 24 miles to Clinton. The proposed system has been divided. The first division includes the line from Kansas City to Lone Jack, 30 miles. This is to be built first. In this division are the branch lines from Lee's Summit to Harrisonville, and the one from Pittsville to Clinton. The second division includes that part of the line from Lone Jack to Warrensburg, 24 miles. The third division is from Warrensburg to Sedalia, 30 miles, and the fourth division from Sedalia to Jefferson City, 60 miles. It is said that the project has been financed. Officers: Charles A. Sims, president; C. G. Minturn, secretary; B. F. Shouse, treasurer; J. C. Herring, chief engineer. [E. R. J., Oct. 3, '08.]

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.—This company, which plans to construct a 25-mile electric railway to connect Mexico and Perry, is understood to be desirous of arranging with an engineering and contracting firm for the completion of its project. R. E. Race, auditor.

Missoula & Bitter Root Traction Company, Hamilton, Mont.—E. O. Lewis advises that construction will be started this summer on the electric railway projected by this company between Missoula, Florence, Stevensville, Corvallis and Hamilton, a distance of 42 miles. Capital stock authorized, $20,000; issued, $10,000. Officers: J. L. Humble, Corvallis, president; D. R. Beck, Missoula, vice-president; E. O. Lewis, Stevensville, secretary and treasurer. [S. R. J., Jan. 4, '08.]

Hornell, Bath & Lake Keuka Railway, Hornell, N. Y.—The Court of Appeals has handed down a decision permitting this company to have a rehearing before the Public Service Commission, of the Second District, on its application for authority to construct an electric railway from Hornell to Bath, a distance of 46 miles.

Syracuse (N. Y.) Rapid Transit Railway.—It is reported that this company will build a new line through Green Street and Robinson Street and Shuart Avenue. It is said that the company has set aside the sum of $160,000 for this improvement.

Swananoa Valley Company, Asheville, N. C.—J. M. Chiles writes that arrangements have been made whereby this company will shortly place a proposition before some capitalists for the financing of an electric road which is to be constructed between Biltmore and Montreat. It is expected that construction will be started this spring. Officers: F. T. Merriwether, president; W. R. Whitson, vice-president; J. M. Chiles, secretary and treasurer, all of Asheville, N. C. [S. R. J., Dec. 5, '08.]

Oberlin & Lorain Railway, Oberlin, Ohio.—The Electric Railway Journal is advised that it is the plan of this company to begin the costruction this year of a gasoline motor operated line between Oberlin, North Amherst, South Amherst and Lorain. Office, 7 South Main Street, Oberlin. Officers: W. F. Stanley, Conneaut, Ohio, president; C. R. Summers, Oberlin, secretary; George C. W. Westervelt, Oberlin, treasurer.

Wooster & Mansfield Electric Railway, Mansfield, Ohio.—David Collier writes that this company contemplates the construction of an electric road, 41.5 miles in length, connecting Wooster, Shreve, Big Prairie, Lakeville, Londonville, Perrysville, Lucas and Mansfield. Catenary construction will be used. The power plant will be erected at Londonville. The company expects to furnish power for lighting. Odell's Lake, an amusement resort, will be reached by the road. Capital stock authorized, $30,000; issued, $10,000. Bonds authorized, $1,000,000. Officers: B. L. Chase, Mansfield, president; David Collier, Plimpton,

vice-president and general manager; D. M. Graven, Londonville, secretary; Charles Brumfield, Mansfield, treasurer.

Central Crawford Traction Company, Blooming Valley, Pa.—Announcement is made that this company is planning to begin the construction of its proposed electric road this spring. It will be about 28 miles in length, connecting Meadville and Titusville. Officers: Dennis Smith, Guy Mills, Pa., president; Henry Dewey, Blooming Valley, Pa., vice-president; J. W. Heard, Blooming Valley, secretary and treasurer. [S. R. J., Jan. 25, '08.]

Easton & South Bethlehem Transit Company, Easton, Pa.—Gov. Stuart has approved of the extension of this road from Lower Saucon Township to Northumberland Heights, part of the new line being over the tracks of the Lehigh Valley Transit Company on Fourth Street, Northampton Heights from Bessemer Street to Anthracite Street. The new line will be 6493 ft. long. The Lehigh Valley Transit Company has consented to the use of this portion of its system, subject to all reservations in agreement made Dec. 12, 1908.

New Castle & Beaver Falls Street Railway, Beaver Falls, Pa.—Jordan Johnston, one of the promoters of this proposed electric railway, states that construction will be started this spring. Nearly all of the right of way has been secured. The road will be 22 miles in length, extending from Beaver Falls to Kopple, Wampum, West Pittsburg and New Castle. It will also reach Rock Point, Cascade and Morado Parks. C. Strohecker, Zelienople, general manager. Headquarters, Suite 410, Magee Building, Pittsburg, Pa. [E. R. J., Dec. 5, '08.]

Philadelphia & Garrettford Street Railway, Philadelphia, Pa.—This company, which is a subsidiary company of the Philadelphia & West Chester Traction Company, has filed an extension of its chartered route, with the Secretary of State, connecting the borough of Lansdowne with the present tracks leading to the Sixty-ninth Street terminal station and the Market Street elevated line of the Philadelphia Rapid Transit Company.

Bryan, Tex.—Hon. W. C. Davis, Brazos, has introduced a measure in the Texas legislature to provide for the construction of an electric railway by the State between Bryan and the State College near that city. [E. R. J., Sept. 26, '08.]

Rutland Railway, Light & Power Company, Rutland, Vt.—This company is in the market for 5000 6-in. x 6-in. 8-ft. oak ties.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The Wisconsin Railroad Commission has given this company a certificate of necessity and convenience, authorizing the proposed north extension of the line from Wauwatosa to Oconomowoc, via Elm Grove and the northern shores of the Oconomowoc lakes. It is stated that the construction of the line will be commenced next summer. The road will pass through Elm Grove, Brookfield, Duplainville, Pewaukee, Hartland, Nashotah, Nagowicka, Giffords and thence to the city of Oconomowoc.

SHOPS AND BUILDINGS

Terre Haute, Indianapolis Eastern Traction Company, Richmond, Ind.—This company announces that it has selected a site in the north part of Richmond and plans are being made for the construction of a modern freight depot.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company will soon award contracts for the erection of a small car house, in which will also be located an office and transformer station. The company will also build a new battery house.

Rutland Railway, Light & Power Company, Rutland, Vt.—This company announces that it will purchase woodworking machinery within the next few weeks.

POWER HOUSES AND SUBSTATIONS

Twin City Electric Company, Ironwood, Mich.—Announcement is made that this company will repair its transmission line and install new machinery in its power plant. A contract will be placed during the next 30 days for one 150-kw, 2300-600 volt, three-phase generator, also one 200-hp, 500-volt a.c. to d.c. motor generator.

Warren (Pa.) Street Railway.—This company has recently awarded a contract for one 730-hp horizontal, double-acting Westinghouse gas engine, direct connected to a 500-kw a.c. Westinghouse generator.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Announcement is made that this company will build a small power plant between Parkersburg and Marietta on the Ohio side of the Ohio River to take care of increasing business.

Manufactures & Supplies

ROLLING STOCK

Cheyenne (Wyo.) Street Railway has purchased one double-truck car from Arthur S. Partridge, St. Louis, Mo.

Galveston Electric Company, Galveston, Tex., may be in the market for new equipment in 1909, although no definite plans have been formulated as yet.

Albany & Hudson Railroad Company, Hudson, N. Y., is in the market for nine interurban cars. Specifications will be furnished by R. H. Smith, general manager.

Edmonton Radial Railway, Edmonton, Alberta, Can., has ordered one double-truck snow sweeper from the McGuire-Cummings Manufacturing Company, Chicago.

Southwestern Wisconsin Railway, Madison, Wis., will soon order one sample car for early delivery, and will later purchase several additional cars built on the specifications made for the sample car.

Ohio & Michigan Southern Railroad, Chicago, Ill., is planning to purchase electric cars early in the spring. Curtis W. Steudel, Chicago, Ill., is superintendent of construction of this new road.

Illinois Traction System will purchase 20 or 25 cars for operation on its line entering the St. Louis terminal and on the bridge which is being built by the company over the Mississippi River at St. Louis.

Stone & Webster Engineering Corporation, Boston, Mass., is drawing specifications for 50 new cars to be used on the various traction lines which the corporation controls. These cars will be of various types, suited to the needs of the different lines.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y., is drawing specifications for four double-truck and four single-truck cars. Bids will be asked for these within a few weeks. The general manager of the line is W. C. Gray, Seneca Falls, N. Y.

Omaha & Council Bluffs Street Railway, Omaha, Neb., is preparing specifications for 25 large cars, which will be constructed in the company's shops. This is following out the announced policy, referred to in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1908, of building 25 cars annually.

Aurora, Elgin & Chicago Railway, Chicago, Ill., will receive early in February 25 trucks built by the Pullman Company. This order was noted in the ELECTRIC RAILWAY JOURNAL Sept. 19, 1908. The center plates for these trucks will be the T. H. Symington Company ball-bearing type.

Buffalo, Lockport & Rochester Railway, Buffalo, N. Y., which was referred to in the ELECTRIC RAILWAY JOURNAL as being in the market for cars, has ordered 15 cars from the Cincinnati Car Company for interurban service. The cars will be equipped with Baldwin trucks and Westinghouse air brakes.

Buffalo Southern Railway Company, Gardensville, N. Y., a line that reaches Erie County Fair Grounds and Lein's Park, Buffalo, will soon be in the market for eight open cars of large size. It is said that the specifications for these cars have been prepared, but the company has not yet asked for bids.

Rochester (N. Y.) Railway will close within a few days the contract for the four interurban cars which were referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 16, 1909, and also a contract for 25 city cars, specifications for which were issued last week. The city cars will be built with the pay-as-you-enter platforms.

Illinois Traction System, Champaign, Ill., is rebuilding all of its drop platform through service cars by extending the car floors and sills and raising their platforms so that the vertical plane type of couplers may be used. The bumpers of the cars will be built out to a radius of 4 ft. 10 in. to accommodate the installation of radial draw bars. End doors will be provided on all of the passenger cars to facilitate train operation. The cars that are being rebuilt include 10 passenger, 10 motor express and 6 trail express cars.

Chicago Railways Company, Chicago, Ill., has received from the Pullman Company 250 of the original order of 600 cars. The work of building the remaining 350 cars is progressing rapidly, and delivery will be made as fast as possible. It is reported that the railway company's engineers are working out the details of specifications under which an additional 550 cars will be built, though, it is said, the order for these equipments will not be placed until the 50 steel cars, which are being built by the Pressed Steel Car Company, are received and tried out.

TRADE NOTES

G. A. Dentzell, Philadelphia, Pa., a pioneer manufacturer of carousels and other amusement devices, died at his home in Philadelphia on Jan. 21.

Col. Giles S. Allison, New York, N. Y., has recently secured the sales agency for Dossert & Company, New York, who manufacture the well-known Dossert cable joints, taps and specialties.

Henry F. Kellogg, who for many years was connected with the railway department of the Frank Ridlon Company, Boston, Mass., died on Jan. 16. Mr. Kellogg was well known among the railway and supply men in the East.

Bureau of Manufactures, Washington, D. C., has received an inquiry from a Latin-American city concerning the electrification of its horse-car lines. Information concerning this application will be furnished on application to the bureau.

Buda Foundry & Manufacturing Company, Chicago, Ill., announces that F. E. Place, formerly general superintendent of the company, has been appointed general manager, and will have charge of the selling and manufacturing departments.

American Bridge Company, New York, N. Y., announces the removal of its New Orleans office from the Hennen Building to the Maison Blanche Building on Feb. 1. The general offices of the company in New York are in the Hudson Terminal Building, 30 Church Street.

American Specialty Company, Chicago, Ill.—A paragraph in the Electric Railway Journal for Jan. 16 erroneously announced that Warren Webster & Company, of Camden, N. J., had taken over the business of the American Supply Company, Chicago. The company taken over was the American Engineering Specialty Company.

Dossert & Company, New York City, report the receipt of orders from the Chicago City Railway Company for 200 solderless connectors for 1,000,000 circ. mil feeder cable, also cable taps for the Winona Railway & Light Company, Winona, Minn., and Dossert feed-in taps for overhead trolley lines from the City Railway Company of Jackson, Miss.

Cherry River Boom & Lumber Company, Richwood, W. Va., advises that it furnished 4000 Cherry River poles to the Pittsburg, Harmony, Butler & New Castle Railway. A description of this road was given in the Electric Railway Journal of Jan. 16. Some of these poles are shown in the illustrations published in connection with the article referred to.

Mathias Klein & Sons, Chicago, Ill., have shown at the Chicago Electrical Show during the past two weeks a full line of Klein products for electric transmission line and railway construction and maintenance work, as well as tools of general utility for the use of electric light and electric railway men. This company claims to be the pioneer manufacturer of this class of tools.

United States Brake Shoe Company, Corry, Pa., has applied for a charter in Pennsylvania. The new company has a capital of $100,000 and will manufacture brake shoes for steam and electric railway cars. The officers are Louis Strueber, Erie, Pa., president; J. F. Austin, Corry, Pa., secretary and treasurer; J. J. Ressler, Corry, Pa., general manager. The company's plant will be erected either in Corry or Erie, Pa.

Dearborn Drug & Chemical Company, Chicago, Ill., announces that Edward C. Brown, manager of its Hawaiian office, 42 Queen Street, Honolulu, is making an extensive Oriental trip of three or four months, during which he will visit Japan, the important sea coast cities of China, Australia, the Philippines, Java and other important islands in the Pacific Ocean. Mr. Brown has successfully handled the Dearborn company's business in the Hawaiian Islands since that department was opened, some 10 years ago.

Sherwin-Williams Company, Cleveland, Ohio.—At a recent meeting of the directors of this company William H. Cottingham was elected president, succeeding H. A. Sherwin, who remains with the company in the capacity of chairman of the board of directors. Mr. Cottingham has been actively associated with the Sherwin-Williams Company for 20 years. For a time he had charge of the Canadian branch, but for the past 10 years he has been general manager, with headquarters at Cleveland. Mr. Cottingham is the author of a well-known book for the information and instruction of salesmen. At present he is in Europe on business for the company.

Wagner Electric Manufacturing Company, St. Louis, Mo., has opened a sales office in the Trust Building, Charlotte, N. C., to assist in caring for its rapidly growing Southern business. The Wagner Company's other office in the South is in Atlanta, Ga. The factory and main office, as is well known, are in St. Louis. E. W. Goldschmidt, New York manager of the company, and formerly of Chicago, sailed from Antwerp on Jan. 16 for the United States, after a four months' vacation. Mr. Goldschmidt, after spending about two months in Southern Italy, toured the Continent by automobile. Fortunately, he left Italy before the recent earthquake.

Massachusetts Chemical Company, Walpole, Mass., announces that Frederick J. Gleason, vice-president and general superintendent of the company, which owns and operates the Walpole Rubber Works, has made an important invention in the rubber goods line. Patent No. 910,307, issued Jan. 19 to Mr. Gleason, reveals this process, which is the forming of hollow rubber goods having a fixed mechanical strength over a core which fuses at the temperature at which rubber vulcanizes. By Mr. Gleason's method, automobile tires, hot-water bottles, etc., may now be formed to any desired thickness and strength over a solid core, and subjected to any pressure, and after vulcanizing the core is removed in the form of liquid metal.

H. A. Goode, secretary, Hudson & Bowring Company, Ltd., Manchester, England, who is on another visit to this country, reports that notwithstanding the business depression, and the fact that the output of cars was quite small in all the car building works in England, his company had the best year in its history. A large number of foreign orders were filled, indicating that there is a demand for the H-B wheel guard all over the world. While in this country, Mr. Goode will make his headquarters at the offices of Wonham & Magor, 29 Broadway, New York City, who have the American rights for the manufacture and sale of the H-B wheel guard. A description of the wheel guard appeared in the Electric Railway Journal of Dec. 26, 1908.

ADVERTISING LITERATURE

Railway Equipment Company, Portland, Oregon.—This company is sending a large business calendar to the trade.

The Deming Company, Salem, Ohio.—A new catalog of spray pumps and appliances made by this company is ready for distribution.

Blake Signal & Manufacturing Company, 246 Summer Street, Boston, Mass.—This company has just issued a new folder devoted to soldering flux, and quoting a new scale of prices which went into effect Jan. 15, 1909.

Pacific Electric Heating Company, Ontario, Cal.—The January number of this company's monthly bulletin *Hot Points,* explains the advantages of electric flatirons at home and in the tailoring shop.

The Nichols-Lintern Company, Cleveland, Ohio.—The company has issued a catalog which describes its pneumatic sanding devices and gives instructions for using them. An insert describes the Jewett anti-telescoping cast steel drawhead and bumper plate.

National Tube Company, Pittsburg, Pa.—A new illustrated catalog of this company describes the processes of making Shelby hot- and cold-drawn seamless steel tubes. A feature of this catalog is a list of over 700 uses to which the product described has been put in manufactures.

Crane Company, Chicago, Ill.—*Valve World* for December, which is issued by this company, contains a number of articles on modern foundry processes. The concluding article by R. Crane, on "Some Fallacies of Education," is devoted to a discussion of agricultural colleges and experimental stations.

Keystone Lubricating Company, Philadelphia, Pa.—"Grease Versus Oil" is the title of a booklet by this company containing instructive comparisons of the efficiency of two types of lubricants, with particular reference to Keystone grease. An account is given of some tests made of this product by William Cramp & Sons, Philadelphia.

The Pettingell-Andrews Company, Boston, Mass.—The February issue of this company's house organ, *Juice,* describes the new D. & W. service switches and boxes, boulevard and parkway lighting fixtures, Wheeler tungsten lamp fixtures, the tungstometer for measuring the output of tungsten lamps, the "O. K." ground clamp and Sprague steel outlet boxes.

The J. G. Brill Company, Philadelphia, Pa.—*Brill's Magazine* for January contains the first of a series of articles on conditions governing the type of car for city service, Philadelphia being the first city chosen. Other articles in this issue describe cars of the East St. Louis & Suburban Railway; several variations of the company's semi-convertible window system as applied on cars for the New York City Interborough Railway Company and for the Gulfport & Mississippi Coast Traction Company; interurban cars for the Houghton County Traction Company, and steam cars of several types for the Eastern British Columbia Railway.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, FEBRUARY 6, 1909 No. 6

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9500 copies are printed.*

The Size of Steam Pipes

All successful and economical power house engineering is more or less of a compromise of conflicting factors. For example, it is conducive to economy to carry full boiler pressure initially on the engine pistons, but it is also conducive to economy to minimize the heat radiating surfaces of the steam pipes. There must be some diameter of steam pipe and some loss of boiler pressure which are conjointly better than a large pipe and a small loss of pressure or than a small pipe and a great loss of pressure. The probability is that the main steam pipes installed in power stations are usually too large and costly. It is often claimed that rapid flow of steam in a pipe results in loss in efficiency, and that small pipes are therefore to be avoided. The truth of this claim is very doubtful. Even if correct as to a bare pipe, its application to a properly covered pipe is open to serious question. It is of doubtful advisability, then, to provide large and costly pipes and valves so that full boiler pressure may be maintained right up to the engine throttle valve. It is especially uneconomical to install pipes of ample size to care for the peak loads in traction power houses where the peaks are of comparatively short duration and the mean load factor is anywhere from 20 to 80 per cent. Pipes large enough to carry the peak load with maximum economy are from 500 to 125 per cent too large for the mean load. For 18 or 20 hours per day the excess radiating surfaces of the large pipes are condensing steam, and the excess of first cost is accumulating an interest charge in order that occasional peaks of load may be momentarily economical.

Comparison of Costs by Foremen

The plan of furnishing to foremen and other responsible employees detailed comparative statements of labor and material costs on all divisions is comparatively new, but the pioneers in this practice already can point to some very definite and valuable results. Most of the companies which follow this practice do so through communications from the manager to the men, but others have also provided the valuable element of personal intercourse between all the individuals directly concerned in the figures given out through monthly meetings of the manager with the heads of departments or at meetings of the foremen of inspection and repair shops.

When these conferences include the sub-foremen as well they have demonstrated anew the value of competition in sharpening endeavor. When Jones boasts in open meeting that he gets more life from a trolley wheel than Smith, the latter would be very non-human if he did not try to get the laugh on his side by the time the next meeting came around. Competition in reducing trolley wheel costs may be more prosaic than striving to lower the time for the Marathon distance, but in both cases the greatest spur is the desire to excel previous records. The wise manager should not overlook such a chance as this for instilling a spirit of emulation that will counteract the indifference sometimes bred by the daily grind.

One of the first consequences of giving personal publicity to maintenance costs is the impulse awakened to learn how the leaders obtain their results. On the one hand, these inquiries bring out the various economies which have been

derived by the more successful men; on the other, they lead to the discovery that some costs are high because of troubles beyond the direct control of the car maintenance forces. For instance, excessive trolley pole and wheel cost may arise from poor line maintenance, and an abundance of broken flanges and bent axles may be due to low joints and bad switches. Even grids hung at too great leverage in the car-builder's shops have been found to give serious trouble to foremen who had to maintain the cars which carried them. It is well that all such unusual conditions should be exposed for the dual purpose of placing comparisons between divisions on an equitable basis and enabling the management to determine quickly those defects in other departments which when corrected will stop greater leaks in the car house and shop.

An Indiana Decision on Paving

A recent decision defining the liabilities of a street railway company under a city ordinance is of interest. The City of Columbus, in Indiana, sued the Columbus Street Railway & Light Company to recover the expense incurred by the city in paving a part of a certain street and based the claim on a certain ordinance which had been accepted by the person for whose benefit it had been made and assigned by him to the company which assumed its obligations. This ordinance provided that "the portion between the tracks and on the outside thereof to the limit of 2 ft. shall be kept in as good repair and condition, considering the nature of the use, as other parts of said streets are kept by said city." The city recovered judgment. On appeal it was held (86 Northeastern Reporter, page 83) that the right to recover depended upon the meaning of that part of the ordinance which we have quoted above. When the ordinance was enacted the street in question was graded and graveled, but subsequent to the assignment it was paved in certain parts. The company refused to pave any part of the street or to pay therefor and notified the city that it would not do so. The Appellate Court of Indiana in affirming the judgment, said:

> If the contract—the ordinance being a contract upon its acceptance—merely stipulates for the repair of the street, as counsel for the company assume in argument, then the obligation to pave was not created, and the city cannot recover. The agreement is not only to keep that portion of the street designated in good repair, but also to keep it in as good condition as other parts of the street are kept by the city. The phrase "good repair" does not necessarily mean good condition. A dirt road might be in good repair and yet be in poor condition to bear the increased traffic of a modern city. The presumption is that the word "condition" meant something, and it must be regarded. The purpose for which streets are established and improved is well known, and the parties must be considered as contracting in view of such purpose. * * * It must also be remembered "that such charter is to be strictly construed against the railway company, and that it has no doubtful rights under the charter, for where there are doubts they were construed against the grantee and in favor of the city." The contract, therefore, required that the space designated be paved by the railway company when it was necessary to do so in order to keep the same in as good condition as the rest of the street is kept by the city.

The decision is particularly interesting as showing the tendencies of the courts to continue the so-called "strict constructions" of a city ordinance against railway companies, the reiteration of the statement that the franchise is a contract, and as furnishing a further precedent on the law of paving. As regards the latter, it has been a well-recognized rule that the grant of a street railway franchise imposes upon the company the duty to construct and maintain its roadbed, with reference to the street surface, in such condition that the street shall not become unfit for the usual travel because of the company's tracks. But in the absence of an expressed obligation, it has never been required to keep in repair, pave and improve generally the streets through which the cars run, nor to maintain the portion of the street between its tracks in the same condition as the remainder of the thoroughfare. Many adjudications in the Federal courts and the leading jurisdictions of New York, Indiana, Massachusetts, Iowa, Pennsylvania and Missouri support this general proposition. One of them (Western Paving, etc., Company versus Citizens' Street Railway Company, 123 Ind., 525) is cited in the Columbus decision mentioned above.

Of course, the Legislature in granting the franchise may reserve the power to impose additional burdens as to street improvements and this is sometimes done; however, the Pennsylvania courts have held that a charter provision that the company shall be subject to city ordinances regulating the running of passenger railway cars does not enable the city to impose on it the duty to pave any portion of the street and that a provision of that company shall be subject to such regulations as might be made by the municipality "in regard to paving, repaving," etc., does not permit the city to impose on the company the duty of paving any portion of the street. The provisions of the franchise or charter, of course, determine the extent of the duty of the company to pave or otherwise improve the streets. Thus it has been held that the duty to keep a certain part of the street "well paved" might require the construction of a pavement where one did not exist.

It would seem to be the rule, then, particularly in view of this recent Indiana decision, that the obligation to keep a part of the street repaired will require the company, where such portion has been paved, to replace such portion with a better pavement to correspond with a change made in the paving of the street by the city. Indeed, a precedent for the recent Indiana decision is found in a Florida case which held that the duty to keep a certain portion of the street in "as good condition" as the city kept the remainder of the street required the railway company, in the first instance, to pave such portion of the street, when the balance was paved by the city. In such a case, also, it is safe to say that the city is the judge of the necessity of paving and repaving, as well as of the character of materials to be used. Again, the company's liability to lay only a particular kind of paving cannot be premised on the fact that at the time of issue of the franchise that particular kind of paving was used, but it may be forced to pave with improved materials. Finally, as to the enforcement of liability, it remains only to note that where performance of its obligation to repair is refused by the company, the city may make the necessary repairs and recover from the company their reasonable cost. Mandamus will, of course, lie to compel the performance of the company's duty regarding repairs and paving of streets.

Association Meetings of the Week

The meetings of the various committees of the American Street & Interurban Railway Association and its affiliated organizations, which occurred last week in New York, were very largely attended, and a spirit of interest and enthusiasm in the work prevailed which augurs well for the meeting next autumn. Not that this spirit has been absent before, but there were more committees in attendance this year than at any other mid-winter meeting, more delegates from distant points were present and more subjects were considered. Moreover, the topics under discussion this year by the American Association are probably of more vital interest to the member companies than those which have come up previously in its history, and the increase in membership and in prestige during another year of successful history were also factors in the enthusiasm manifested last week.

There was no meeting of the executive committee of the Engineering Association, as that had been held last November, but meetings of the executive committees of each of the other affiliated associations were held, as were also meetings of the committees on subjects, revision of dues, Interstate Commerce Commission affairs, municipal ownership and public relations, and that on suggestions contained in the address of President Goodrich.

An account of the proceedings is given elsewhere in this issue, but three points in connection with them will be mentioned here. The first is the important increase in membership, both active and associate, reported by the president. The active membership is now 294, and President Shaw announced that three of the largest companies in the country, which had hitherto not been members, have now joined the association. The associate membership has now increased to 527, or more than double that at the time of the Atlantic City convention.

The second point of great interest was the selection of some city west of the Mississippi River as the place of meeting in October. An intimation that this might be done was given in the article by Mr. Shaw on the "Future of the Association," published in our issue of Jan. 9. We heartily indorse the suggestion, and believe that if the special committee which will be appointed by the president to take up the subject shall find that the conditions for a meeting are satisfactory in a city even so far west as Denver, no mistake will be made in selecting that city for the coming convention.

Finally, the resignation of Mr. Swenson as secretary of the association was made public. We feel that this announcement will be received with regret by all who have become acquainted with Mr. Swenson personally and through his work while he has administered the duties of secretary. Having been the only secretary of the reorganized association, he entered into the duties of his office at a time when nothing except the general plan had been decided upon, when the organization to carry on the secretary's work had to be created, and when the possibilities of the office were uncertain. He has carried out the duties which devolved upon him conscientiously and with enthusiasm, has energetically pursued the policies laid down by the executive committee, and has had a great deal to do with bringing the work of the association and of the secretary's office to its present high standard of efficiency. Mr. Swenson will continue as secretary until his successor is chosen, and perhaps until the next convention.

Rapid Transit Conditions in Boston

The conservative discussion by Mr. Sergeant of the conditions which have developed in Boston, published elsewhere in this issue, is of much greater than strictly local interest; this will be appreciated by all who have a clear understanding of the serious nature of the real financial problems which are now confronting the electric railway companies in many of the large cities in this country.

Given a capitalization representing the cost of the property, a public utilities corporation furnishing a necessary service in a large community should, if well managed, be self-supporting. It should be able to provide good service and should receive enough in return to enable it to meet all expenses and taxes and pay a reasonable return on the investment. We believe that the fair-minded part of the public will admit the justice of this contention. This premise admitted, the question becomes one on which the corporation and the public are agreed as to the end desired. But the details of how the result is to be accomplished involve many points on which there must be negotiation and adjustment, if sight is not to be lost of the ultimate ends which are to be attained.

In his examination of the development of the transportation system in Boston during the last 20 years, the author discusses the prospects of providing, under the existing conditions, (a) the service which is demanded and needed by the community; (b) the taxation or compensation for the franchise, and (c) a reasonable return upon the public and private capital invested.

When the service of an existing system of urban railway is under consideration, the adequacy of the facilities should be viewed from the standpoint of the advantage of the entire public. To care properly for the transportation of passengers in the metropolitan district of Boston, the Elevated Railway Company of that city has constructed a comprehensive system of street railways, including subway, surface and elevated lines. All of this work has been done under the strict supervision of municipal and State boards, and largely at their instance, and the physical end sought has been reached. Important extensions have been built and many improvements have been installed, and with them have come a tremendous increase in car service, a great reduction in the time required by passengers in transportation, and the extension of a practically universal fare over the entire system. But so far as the public is concerned, sight has been lost of the effect of these changes upon the property itself, viewed as a commercial undertaking.

The benefits cited have been secured only at enormous cost. Thus much of the improvement in running time has been due to the construction, within the city, of subways, whose carrying charges the company has had to pay. In magnitude of subway construction, Bostonians have enjoyed a luxury possessed by the residents of no other cities in this country than New York and Philadelphia, and abroad only by those of London, Paris and Berlin. Moreover, in none of these cities have the conditions of subway construction been so arduous as in Boston, with the pos-

sible exception of New York, but there the traffic is extremely heavy because it is forced along arterial lines in a way which does not occur in a fan-shaped city like Boston. Again, in none of the cities mentioned, except Boston, are the benefits of surface, elevated and subway lines provided for a single fare.

But whether payment of one, two or three 5-cent fares is made for a ride, the expenditures of a company must be viewed in the light of receipts. If the latter are not sufficient to meet the three requirements postulated above, then the public should be apprised of the fact. This Mr. Sergeant has done in so clear a manner that there should no longer be any misapprehension as to the exact conditions of the Boston transit situation. Hence we believe that all who read this article carefully and study the figures contained in it will agree with the author's conclusions, namely: "It is very evident from the past experience of the company and from a careful consideration of all the facts in the case, that the undertakings to which the company is already committed represent all and more than is justified by the traffic obtainable unless the conditions of fare, transfers, and so forth, are to be materially changed."

Instructing Motormen

Part of the routine training of candidates for the position of motorman on most electric railway systems consists of a course of from one to three weeks of road experience under the guidance of an old and experienced employee. Instruction in the rudiments of the work in the schoolroom, if one is maintained, is a valuable preliminary to that on the road, but only actual service in handling a car can qualify a candidate to be put in responsible charge of one. The selection of competent instructing motormen is quite as important as the choice of those employed in the schoolroom, for they are largely responsible for the early formation of the habits of the students. Much of the routine operation of a car is a matter of habit. Once a bad habit is formed in handling the air brakes or the controller, it is next to impossible to correct it by further instruction. The motormen chosen for this important work of breaking in the new men should not be selected simply on the strength of a clean record, or as a reward for long and faithful service. Their proficiency and skill in running a car and their ability to impart this knowledge to the students assigned to them are the first requisites.

Unfortunately, the superintendent who usually selects the road instructors does not always appreciate the importance of these qualifications. The chief instructor in the schoolroom does, however. So also does the mechanical department, which has to repair the equipment when it is abused by incompetent motormen. The chief instructor and a representative of the mechanical department ought to have some voice in the selection of road instructors. One way would be to create a higher grade in the service, with higher regular pay and a distinctive uniform, and to promote to this grade only after a thorough competitive examination. The higher wages paid, as well as the honor of belonging to this small corps, would be a strong incentive for the good men in the service to endeavor to join the body. A board of examiners consisting of the heads of the operating and mechanical departments and the chief instructor might conduct these examinations whenever vacancies occurred in the higher grade. In this way a candidate's past record, his skill in handling equipment and his ability to intelligently impart his knowledge to others could be fairly judged and weighed. Men promoted to the grade of instructor would still remain under the jurisdiction of the operating department, and would be available at all times for regular runs when not engaged in breaking in new men. Violation of rules would carry with it reduction of the man to the ranks, as would incompetency.

Fenders and Wheelguards

Elsewhere in this issue will be found an abstract of the report of the fender and wheelguard tests conducted last fall at Schenectady and East Pittsburg by the Public Service Commission of New York, First District. At the time they were being made these tests attracted much attention from manufacturers of devices and railway managers not only in the United States, but in foreign countries as well, and the full report, made public last week, will no doubt have wide circulation. It is certainly deserving of the most careful study and consideration, for nothing approaching these tests in the matter of reproduction of operating conditions and thoroughness has ever been attempted by any commission or railway company in an effort to find practical and efficient life-saving devices.

Some features of the report, perhaps, need explanation to make clear the purposes and methods of the commission in carrying out the tests and in rating the efficiency of the many devices submitted. Their purpose was to determine by actual trial with lay figures the essential and necessary features of operation and construction of life-saving devices suitable for application to cars operating under the conditions obtaining in the city of New York. While the ratings given to the devices named in the report are to some extent an indication of their general efficiency based on their performances under test, the commission does not necessarily condemn the devices tested which did not attain a mark of over 75 per cent, nor does it imply that only the apparatus named in its preferred list will be considered in the future for possible use in New York. Some of the devices included in the preferred list are, in fact, considered by the commission to be unsuitable for application to cars operating under the conditions met with in New York. In case the commission should promulgate an order requiring the surface lines within its jurisdiction to adopt fenders and wheelguards, in accordance with the recommendations contained in the report, the companies will be allowed the widest possible choice in adopting any particular type. The commission has also defined its position with regard to including in its preferred list devices which failed to meet the requirements in the tests conducted last fall or types which were not submitted for test. On an application involving this point the commission has declined to conduct other tests at its own expense or at the expense of inventors or manufacturers, purely for experimental purposes. If the manufacturer of a device which meets with the approval of any of the railway companies in New York City will have a device applied to

one of the company's cars, an inspector of the commission will pass upon it, and if it meets the general requirements, opportunity will be afforded for conducting a test under conditions exactly similar to those of the Schenectady tests. The expense of these tests, however, must be borne by the manufacturers. If a device successfully passes such a test, it will be included on the preferred list. As a result of its experience, the commission is now in a position to know what is required of a fender and wheelguard, and can probably judge fairly well whether or not a device would meet the requirements merely by an inspection; at least, no great amount of time will be wasted on utterly worthless apparatus.

It may be well to outline briefly here the methods employed by the commission in determining the ratings of the devices tested. No reference to this work is made in the body of the report published elsewhere. Each test of a fender or wheelguard was marked on a scale of unit points, ranging from four for a perfect pick-up to zero for a complete failure. The total number of points made by a fender in all of the trials to which it was submitted were reduced to a percentage of the total points possible to be made in these tests. This percentage was averaged for both kinds of pavement and both speeds for each of the 50-lb., 120-lb. and 170-lb. dummies. The average percentage of efficiency was obtained by adding to the average percentage made with the boy and man dummies twice the percentage obtained with the woman dummy, and dividing the sum by three. This figure represents the relative efficiency or life-saving qualities of the various devices, based on the actual number of tests made with them, and not on their performance as gaged by a perfect performance in the entire series of tests required. It may be argued that many of the devices were subjected to only a few trials, while others were given nearly all of the trials included in the program. Many of the devices became inoperative after a few trials with the 50-lb. dummy. Time would not permit their repair or the substitution of other apparatus of the same type for continuing the tests. In general, failure to stand up for more than a few trials is reflected in the rating factor of maintenance which enters into the determination of the final ratings given in the report.

The calculation of the final ratings involved consideration of the percentages of efficiency, maintenance, material, number of parts and weight of the devices. The rating factors for maintenance, material, number of parts and weight were determined by comparing each device with an assumed standard of 100 per cent based on a careful study of the average properties of a number of standard life-saving devices in general use by street railways in all parts of the United States.

The percentage factor of efficiency was multiplied by four, maintenance by three, the material factor by one, the number-of-parts factor by one, and the weight factor by one, and the sum of these five products was divided by ten to obtain the final rating. It will be seen from this that the efficiency and maintenance factors were the controlling elements in determining the final rating.

The commission believes that the many trials made have given it definite and conclusive data on the question of efficiency. Almost equally important, in the opinion of the commission, is the question of maintenance of these devices. This point is clearly brought out in the body of the report. Life-saving devices are of little or no value unless maintained in perfect operating condition at all times. The result of negligence in this particular is too often a costly damage suit, which might have been prevented, or at least the amount of damages greatly reduced, had the life-saving device on the car been in perfect operating condition. It is true that many of the fenders on the market are expensive to maintain and are easily put out of operation, but this fact ought to be understood by the manager before he buys such devices. The report under consideration brings out strongly the importance of maintenance. It says: "It should be fully understood that the effectiveness of the recommendations [with regard to the installation of fenders and wheelguards on cars] is wholly dependent upon the maintenance of the devices in a thoroughly operative and life-saving condition."

In studying the details of the tests contained in the report it may be well to throw out a word of caution about comparing the merits of the several devices one with the other. The devices tested represented a great many radically different types and forms of construction. Some which showed efficiency in the tests were totally unsuited for application in New York. Railway managers outside of New York who may be interested in these tests should bear in mind that the consideration of such devices requires close study of their suitability for the peculiar local conditions under which they are to be used. Some of the devices, for example, are held normally only about 1 in. above the rail. For single-truck cars or cars operating over roughly paved streets such devices would be out of the question. In general, it may be said that pick-up efficiency is roughly proportionate to the height at which the device is carried above the track when striking a prostrate body.

The report contains no information whatever about the details of each individual test. The story, however, has been preserved in pictorial form by means of a series of over 1800 photographs showing the position of the dummies after each test. These photographs are the best evidence of what the devices tested will actually accomplish. The commission was perhaps justified in not including these details in its report. The publication of all of the photographs would have been very costly, and would, perhaps have been the cause of much unfair and unwarranted criticism on the part of sponsors of devices which proved unsuccessful in the tests. Just what disposition the commission will make of this mine of information which has been obtained in the shape of these photographs and other data has not yet been decided, but it is to be hoped that the commission will take a broad and humanitarian stand, and permit interested persons, either inventors or managers of railway companies, to avail themselves of the experience gained in the tests through a study of the photographs and data if they so desire. In conclusion, it may be said that the tests cannot help but prove a strong incentive to the development of more perfect life-saving devices for electric cars and their more general adoption by street railway companies.

FINANCIAL PROBLEMS CONFRONTING THE BOSTON ELEVATED RAILWAY COMPANY

BY C. S. SERGEANT, VICE-PRESIDENT, BOSTON ELEVATED RAILWAY COMPANY

In Boston the recent opening of the Washington Street tunnel to the train service of the Boston Elevated Railway Company, together with the announcement by that company of a new issue of capital stock to provide funds for the construction of the Cambridge subway, mark an important stage in the development of the elevated company's rapid-transit system. Some consideration of the financial aspects of that development is opportune.

This system has been created and is operated under stringent laws and the supervision of public-service boards. So far as the system consists of subways and tunnels, capital has hitherto been provided by the municipality, thus illustrating a case of public ownership of property privately operated under public regulation. The capital for the surface and elevated lines has been provided by private individuals under the conservative laws of the State, which effectively prevent stock watering.

We have therefore an example of a transit system in which the capital invested represents actual money, free from water or fictitious profits of any sort. The fare, regulated by statute at 5 cents, with most liberal transfer provisions, effectively covers the territory served. The rentals provided for the city owned properties care for both interest and sinking funds. Still further, the community is a partner in any excess of dividends which may be paid over 6 per cent. In this embodiment of so many of the ideals of the civic reformer there should be success from the point of view of the investor and from that of the general public unless those ideals are in fact impracticable.

Let us examine the development and results of the past 20 years and from them draw some light as to the feasibility under such conditions of providing:

a. Service demanded and needed by the community.

b. Taxation or compensation for franchise.

c. A reasonable return upon the public and private capital invested.

THE SYSTEM AS COMPARED WITH THAT OF OTHER CITIES

Considering, first, the matter of service, some description of the system and comparison with that of other cities are necessary to a clear understanding of the subject. In 1887 the five horse railway companies which furnished the Boston service were consolidated by a special act of the Legislature under the name of the West End Street Railway Company. This company developed and electrified the surface lines, took from the city a lease of the Tremont Street subway and was subsequently leased to the Boston Elevated Railway Company, which, since Dec. 30, 1897, has operated the property. That company constructed an elevated line from the north to the south of the city, extending about 2½ miles from the center in either direction, having through the center of the city one route via the Tremont Street subway and one via the water front, and has operated its elevated lines in complete connection with and as a part of the general street railway system.

The general plan of the street railway system in Boston is radial, resembling an opened fan. The desire of nearly all passengers to reach the converging point of these radial lines (the heart of the city) led many years ago to great congestion of traffic in the center. Measures for relief of the streets were found necessary, the first being the construction of the Tremont Street subway, the second of the elevated system, and the third of the Washington Street tunnel, all of which had in view the relief of the streets as well as the improvement in rapidity of transit which necessarily followed the provision of new channels for the congested car traffic. Most of the surface lines in the heart of the city are operated in the Tremont Street subway. The Washington Street tunnel now provides a separate route and a convenient extended city terminal for the elevated line, which is fed at its suburban terminals by converging lines of surface cars and has therefore removed from the streets along its route very large numbers of cars which would otherwise move at a snail's pace through that district, if indeed the necessary service could be operated there at all. Throughout the length of the elevated lines a sufficient local service is rendered by street cars and transfers are exchanged between them and the elevated lines at all stations, thus affording local convenience combined with a saving of time.

A tunnel is also in operation from the heart of the financial district in the city under the harbor to East Boston.

Throughout this whole system a 5-cent fare prevails for a continuous ride in one direction, which ride is afforded by means of a great variety of circuitous routes and by a very extended system of free transfers.

Let us contrast these conditions with those of other large cities.

On Manhattan Island the main movement of traffic is north and south with transverse lines to accommodate the cross-town business. The different classes of properties, elevated, subway and surface lines, exact separate fares and no transfers from one class to the other are given. Even the surface lines, which granted universal transfers when under one management, are in process of disintegration and various parts have been segregated until there are now several distinct systems with others still in prospect. Portions of Greater New York beyond Manhattan Island have their own companies and systems, charging a separate fare. Probably in no place in the world is there so large a volume of traffic that is served by so few miles of track as on Manhattan Island.

In Chicago the four elevated roads owned by different companies have in the Union Loop a physical connection, but for each of the districts of the city which they serve a separate fare is charged. There is no common ownership of the surface and the elevated roads.

Philadelphia now has in addition to its surface lines a combined subway and elevated road. This road is controlled by the company that owns the other transit facilities furnishing urban service to the people of Philadelphia. On some of the routes transfers are given for a single fare of 5 cents. On others a fare of 8 cents is charged for the two rides.

ADEQUACY OF 5-CENT FARE

In contrast with these other cities it is evident that the control of all the facilities in Boston by one company makes inevitable a full trial of the adequacy of a single fare of 5 cents to meet the costs of operation, of taxes and of interest upon the capital invested on an extended mileage in 12 different municipalities densely populated only in part, but all within a radius from the center of the city of Boston of not exceeding approximately 9 miles.

Boston was fortunate in avoiding the expense of installing and later condemning a costly cable system.

ADVANTAGES OF ELECTRIC SERVICE

The routes formerly in operation have been greatly extended. In 1888 almost the entire operation of street cars was between outlying terminals and the center of Boston. In that year there were 25 outlying terminals and the average length of the routes traversed by the cars was 4.8 miles, whereas in 1908 there were 31 outlying terminals and the average length of the routes from the center of the city was 6.37 miles. As the cars were operated, however, the average length of the half-trip (that is, the distance from the outlying terminus to the center) was in 1888 3.625 miles, whereas for 1908 it was 4.65 miles. To this figure should be added for a just comparison about 2.5 miles of work now performed by the elevated trains for the large proportion of trips reaching elevated terminals, so that in this manner the average length of the half-trip is computed to be about 5.72 miles.

In addition many new connecting branch and cross-town lines have been constructed, the total mileage of single track now being (1908) 474 miles, as compared with 231 miles in 1888. The elevated line as now operated across the city for a distance of about 5 miles performs a journey in 18 minutes which formerly required from 40 to 45 minutes by electric cars and still longer by horse cars. East Boston, formerly reached from Boston proper by means of the ferry, required about 22 minutes for the journey from Adams Square, in Boston, to Central Square, East Boston, whereas the time now required is 8½ minutes. These figures are given as illustrative of improvements in speed and some idea of the advantages gained to the public by the electrification of the street railway service and by the subsequent introduction of rapid transit service may be obtained by examining the accompanying table, showing the saving in time on some of the typical routes.

In 1888 a 5-cent fare usually provided for a ride from the suburbs to the center of the city only. There were a few 8- and 10-cent fares for such rides and in general a ride across the city from one suburb to another was supplied by an exchange check for the price of 8 cents.

PUBLIC GAINS FROM DEVELOPMENT OF SYSTEM

The practical gains to the public from the development of the Boston system may best be summarized as follows:

1. The investment of about $55,000,000 (exclusive of the Washington Street tunnel) in the extension of lines, equipment with electric power and improvement of facilities by subway, tunnel and elevated system.

2. The great improvement in speed of electric cars over horse cars and consequent saving of time to passengers.

3. The still further improved speed due to the use of elevated lines, tunnel and subways.

4. The removal from the streets in the heart of the city of hundreds of cars, the movement of which was so congested as to be impracticable.

5. The great increase in car service rendered. In 1888 the car-miles run per mile of track operated were 66,735. In 1908 they were 108,914, an increase of 63 per cent.

6. The extension of a practically universal fare over this entire system so enlarged and in 12 different municipalities.

TAXATION

An act of the Legislature passed in 1897 prescribes for the Boston Elevated Railway Company a method of taxation so far as it applies to a special compensation tax and the division of dividends above 6 per cent. It also establishes a 5-cent fare and provides for a liberal system of transfers.

Those provisions of the act which embrace these matters are as given below:

Statutes 1897, Chapter 500, Section 10

AN ACT TO PROMOTE RAPID TRANSIT IN THE CITY OF BOSTON AND VICINITY

Be it enacted, etc., as follows:

Section 10. Said corporation may establish and take a toll or fare which shall not exceed the sum of 5 cents for a single continuous passage in the same general direction upon the roads owned, leased or operated by it; and this sum shall not be reduced by the Legislature during the period of 25 years from and after the passage of this act; provided, however, that the Board of Railroad Commissioners may, upon the petition of the Board of Aldermen of a city, selectmen of a town, or 50 legal voters of a city or town, in which any of the lines owned, leased or operated by said corporation are located, after due notice and hearing the parties interested, reduce such toll or fare, but such toll or fare shall not, without the consent of said corporation, be so reduced as to yield, with all other earnings and incomes of said corporation, except the income of the funds deposited with the treasurer of the Commonwealth as required by this act and said Chapter 548, a net divisible income, after paying all expenses of operation, interest, taxes, rentals and other lawful charges and after charging off a reasonable amount for depreciation, of less than 8 per cent per annum on the outstanding capital stock of said corporation actually paid in in cash. The report of the board shall be final and conclusive for one year.

During said period of 25 years no taxes or excises not at present in fact imposed upon street railways shall be imposed in respect of the lines owned, leased or operated by said corporation other than such as may have been in fact imposed upon the lines hereafter leased or operated by it at the date of such operating contract or of such lease or agreement hereafter made therefor nor any other burden, duty or obligation which is not at the same time imposed by general law on all street railway companies; provided, however, that said corporation shall be annually assessed and shall pay taxes now or hereafter imposed by

SAVING BY ELECTRIC CAR SERVICE.

Routes.	Time by horse cars.	Time by electric cars.
North Point-Adams Square-Broadway Extension	41 min.	37 min.
City Point-Post Office Square-Federal Street..	30 min.	22 min.
Neponset-Franklin Street-via Dorch. Avenue...	52 min.	32 min.
Milton-Franklin Street-via Dorch. Avenue.....	59 min.	35 min.
Mt. Auburn-Bowdoin Square.....	48 min.	28 min.
Newton-Bowdoin Square.....	70 min.	40 min.
Arlington-Bowdoin Square.....	51 min.	35 min.

SAVING BY ELECTRIC CAR SERVICE, SUBWAYS AND TUNNEL

Routes.	Time by horse cars.	Time by electric car service.	Time by electric car service, subway and tunnel.
Franklin Park to Tremont House or Park Street	40 min.	35 min.	28 min.
Jamaica Plain to Tremont House or Park Street	46 min.	36 min.	28 min.
Cypress Street, Brookline, to Tremont House or Park Street.....	37 min.	29 min.	22 min.
Park Street, Brookline, to Tremont House or Park Street.....	37 min.	29 min.	22 min.
Coolidge Corner to Tremont House or Park Street, Longwood.....	34 min.	24 min.	18 min.
Orient Heights to Roxbury Crossing.....	76 min.	55 min.	36 min.
Orient Heights to Dudley Street.....	76 min.	55 min.	24 min.
Jamaica Plain to North Station.....	56 min.	46 min.	32 min.

SAVING IN TIME BY ELECTRIC CAR SERVICE, ELEVATED TRAINS AND TUNNEL.

Routes.	horse cars.	Time by car service.	Time by electric car service, elevated and tunnel.
Milton-Franklin Street, via Washington Street	65 min.	40 min.	35 min.
Neponset-Franklin St., via Washington Street	62 min.	40 min.	35 min.
Franklin Park-Franklin Street, via Washington Street.....	48 min.	28 min.	20 min.
Dudley Street-Franklin Street, via Washington Street.....	24 min.	17½ min.	8 min.
Medford Square-Adams Square.....	60 min.	32 min.	24 min.
Malden Square-Adams Square.....	60 min.	32 min.	25 min.
Dudley Street-North Station.....	35 min.	27 min.	12 min.
Sullivan Square-Summer Street.....	24 min.	18 min.	10 min.
Meeting House Hill-Franklin Street, via Washington Street.....	49 min.	28 min.	23 min.

general law in the same manner as though it were a street railway company and shall, in addition, as compensation for the privileges herein granted and for the use and occupation of the public streets, squares and places by the lines of elevated and surface railroad owned, leased and operated by it, pay to the Commonwealth, on or before the last day of November in each year during said period of 25 years, an annual sum, the amount of which shall, in each year ending the last day of September, be determined by the amount of the annual dividend paid in that year by said corporation in the following manner:

If the annual dividend paid is 6 per cent or less or if no dividend is paid the sum payable that year shall be a sum equal to ⅞ of 1 per cent of the gross earnings of all the lines of elevated or surface railroads owned, leased or operated by said corporation; if said dividend exceeds 6 per cent then a sum equal to the excess of the dividends over 6 per cent in addition to said ⅞ of 1 per cent of said gross earnings. The above sum shall be paid into the treasury of the Commonwealth and distributed among the different cities and towns in proportion to the mileage of elevated and surface main track, reckoned as single track, which is owned, leased or operated by said corporation and located therein. Said corporation shall also provide free transfer from elevated to surface and from surface to elevated cars at all stations of the elevated lines reached by surface lines and from one elevated car or train to another at junction points entitling a passenger to a continuous ride in the same general direction and such further free transfers on all the surface lines of railway owned, leased or operated by it as may be satisfactory to or required by the Board of Railroad Commissioners.

The usual corporation tax as applied to street railways in Massachusetts is levied on the market value of the capital stock on May 1 of each year, and from the valuation thus obtained is deducted the valuation of real estate and machinery on which the company is taxed in whatever municipality the real estate and machinery may be located. Besides that tax, this company also has to pay a tax of ⅞ of 1 per cent on its gross earnings and it also has to meet heavy expenses not only for original paving of tracks, but for extensive renewals of paving and for the removal of snow, which make a large cost for indirect taxation. There are very heavy obligations for rental of subways and tunnels. The Tremont Street subway is owned by the city of Boston and the rental paid is 4⅞ per cent per annum, which is deemed sufficient to provide for interest and the sinking fund for retirement of the bonds issued to provide funds for construction of the subway. For the East Boston tunnel a rental is paid of ⅜ of 1 per cent of the gross earnings of the company on *all of its lines* and a toll of 1 cent for each passenger using the tunnel is collected and paid to the city. For the Washington Street tunnel, which with its approaches will cost between $9,000,000 and $10,000,000, the rental to be paid is 4½ per cent upon the cost.

One of the strong points made by civic reformers is the taxation of, or payment for franchises granted to public-service corporations. In Massachusetts the value of franchises cannot be capitalized. If as a result of investment and operation under Massachusetts laws it appears that no value exists under such franchises other than the possibility of earning a low rate of interest upon the money invested or perhaps being unable to earn even a low rate of interest, it is difficult to perceive the equity of franchise taxation. Those who clamor for taxes to be assessed upon street railways should bear in mind that the ability of a corporation to render service to the public is reduced to the same extent that unusual or extraordinary burdens of taxa-

STATISTICS OF OPERATION OF BOSTON ELEVATED RAILWAY COMPANY AT FIVE-YEAR INTERVALS FOR 20 YEARS FROM 1888-1908.

	1888	1893	1898	1903	1908
Miles single track operated	231	268	316	437	474
Capital invested including leased lines, subways and tunnels	$11,669,711.97	$22,487,528.99	$31,535,545.33	$47,823,459.21	*$66,829,739.00
Gross earnings	$4,887,737.62	$6,692,578.07	$9,257,252.94	$12,019,371.26	$14,074,696.51
Ratio of capital to gross earnings	2.3875	3.3601	3.4065	3.9788	4.7482
Revenue passengers	97,039,269	133,863,618	181,321,295	233,563,578	273,132,584
Car-miles run	15,415,802	18,669,809	32,209,150	47,476,702	51,625,143
Earnings per car-mile	*a* 31.7	*a* 35.8	*b* 28.7	*b* 25.3	*b* 27.3
Free passengers	.....	11,204,752	28,618,600	130,000,000	159,514,502
Free passengers—per cent of revenue passengers	.....	8.37	15.78	55.65	58.40
Average fare per revenue passenger carried	4.96	4.94	4.95	4.99	4.99
Average fare per total passenger carried	.....	4.55	4.27	3.21	3.15
Operating expenses	$3,830,326.67	$4,550,734.68	$6,566,584.16	$8,259,860.49	$9,454,385.83
Maintenance	$665,103.06	$1,039,699.07	$1,763,978.94	$1,583,177.28	$2,286,915.90
Taxes	$133,269.22	$321,501.68	$602,227.27	$917,019.44	$985,318.90
Dividends, including West End	$473,321.67	$1,329,650.00	$1,260,450.00	$1,961,848.75	$2,068,840.96
Interest on bonds	$196,079.89	$356,288.08	$498,600.00	$644,615.76	$1,016,417.34
†Rentals of subways, tunnels, depreciation, etc.	$8,415.00	$11,989.08	$115,314.35	$207,072.24	$507,669.74
Owners of invested capital of all kinds, thus receive of gross earnings	$677,816.56	$1,697,927.16	$1,874,364.35	$2,813,536.75	$3,592,928.04
Maintenance—per cent of gross earnings	13.61	15.68	19.05	13.17	16.24
Other operating expenses—per cent of gross earnings	64.76	52.46	51.88	55.54	50.92
Taxes—per cent of gross earnings	3.11	4.80	6.50	7.63	7.00
Dividends—per cent of gross earnings	9.68	19.86	13.61	16.32	14.69
Interest on bonds—per cent of gross earnings	4.01	5.32	5.38	5.36	7.22
Rentals, depreciation, etc.—per cent of gross earnings	.17	.18	1.24	1.72	3.67
Surplus	4.66	1.70	2.34	.26	.26

* Does not include the Washington Street tunnel, as the figures are for fiscal years to Sept. 30, and that tunnel was not opened until Nov. 30, 1908.

† Does not include rental of West End Railway.

a Surface cars only.

b Surface and elevated cars.

tion are levied upon the business. Where the city is a partner in the division of the surplus it would seem that any unusual taxation is unwise.

RETURN UPON THE CAPITAL INVESTED

The accompanying table shows in condensed form substantially all the principal changes affecting the results of construction and operation of the Boston system in the last 20 years. The statistics exhibit the status and results of operations at the end of six fiscal years separated by five-year periods. For the sake of clearness these figures include the capital invested, dividends and interest of the West End Street Railway in the same total sums as the Boston Elevated Railway so that there is shown the real fixed investment of the property under operation, including subways and tunnels.

The figures for 1888 show the first year of operation by the West End Street Railway of the consolidated horse railways of Boston.

The second period, 1893, shows the results at a time when 76 per cent of the car-mileage was operated electrically.

The third period, 1898, was the first year of the operation of the West End Street Railway lines by the Boston Elevated Railway Company, at which time no elevated lines were open. The elevated line was opened on June 10, 1901.

Attention is directed to the increase in capital investment and especially to the five-year period ended Sept. 30, 1908, when the great increase for the great improvements in the system for rapid transit took place. The total investment includes, in addition to the sum realized from the par values of securities, premiums amounting to $4,300,000 received from the sale of bonds and stock above par.

It is desirable to make a careful analysis of the figures given in this table if the actual financial results are to be fully comprehended.

Noteworthy among the statistics are those which show changes in the ratio of capital to gross earnings. In the fiscal year 1888 this ratio was 2.3875 and this ratio has increased until in the year ended Sept. 30, 1908, the ratio was 4.7482. Further improvements already made or contemplated, it is estimated, will increase the capital by the end of the next five years in the sum of $40,000,000, and if the same ratio of capital to gross earnings is to be maintained there would be required at the end of that time a gross income of $22,500,000 to yield a proper return upon the investment on the present basis of expenses. This is substantially an increase of 58 per cent in the five years, whereas the annual increase of earnings in the last five years has averaged but 3.4 per cent.

Attention is directed to the earnings per car-mile. These were for the year 1888, 31.7 cents, all of the mileage being that of the ordinary 16-ft. horse car with its complementary open cars. The earnings per car-mile in 1908 were 27.3 cents and no allowance is made in the computation for the increase in size of the cars. Several hundred of the surface cars and all of the elevated cars are approximately 46 ft. in body length and the great majority of the surface cars are 25 ft. in body length. This serious decrease in earnings per car-mile is to be accounted for partly by the extension of lines into thinly populated territory, but mainly by the increased service per track-mile necessitated in part by the modern demands for better service, but largely for the transportation of passengers upon free transfers.

INCREASE OF TRANSFERS

It will be noted that whereas in 1888 there were substantially no free transfers, in 1908 the number of free transfer passengers is computed at 159,514,502. These figures are based upon careful estimates of those transfers which are made without voucher between the surface and elevated lines and the statistics of free transfers honored.

The transfer system which exists in Boston is probably more liberal than that found in any other large city. While it is not absolutely universal, transfer between surface cars is established at 60 different points, in addition to those transfers which are possible at all elevated stations between elevated trains and surface cars. The general effect of the transfer system is an opportunity to the public to travel for one fare not only from one end of the lines of the company to the other, but also from one part of the system to another. The system affords 5-cent rides by the most direct routes of approximately 20 miles from northwest to southeast and 15 miles from northeast to southwest. There

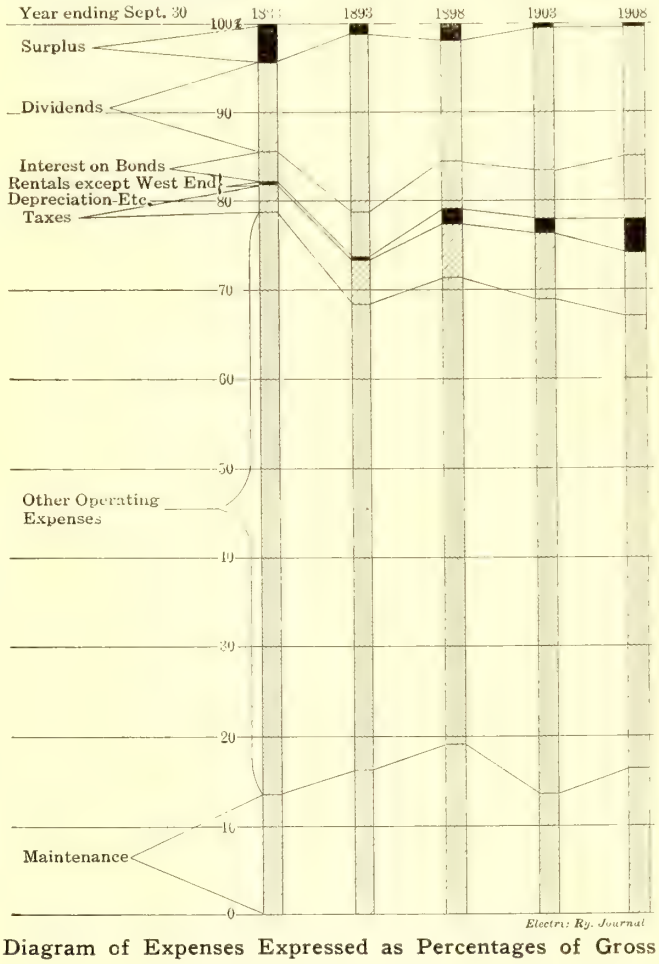


Diagram of Expenses Expressed as Percentages of Gross Income from 1888 to 1908

is no separate fare for separate cities and but little restriction as to the number of transfers (transfer upon transfer) which passengers may receive. The number of revenue passengers is only 63 per cent of the total number of passengers carried as computed. The result of the large increase in transfer passenger traffic is indicated by the estimate that the average fare per total passenger carried was 3.15 cents in the last fiscal year. This is a reduction of 0.06 cent in five years and a material reduction from the figures of 10 to 15 years ago.

The totals of operating and maintenance expenses and the percentage of gross revenue applied to maintenance and expenses other than maintenance are given. The maintenance expenditures have extended in the period of 20 years, as shown by the figures contained in the table, from about 13 to 19 per cent of gross revenue, while the other

expenses of operation have ranged from about 50 to 64 per cent. There have been many changes in the costs of labor and materials in the period under review which have affected the results of operation. The wages of men on the cars have risen from $2 to $2.50 a day and the cost of ordinary labor has increased from $1.50 to $1.75 a day, while $2 a day is now paid for the higher class labor. The cost of shop labor has increased since 1901 as much as 20 per cent, although these figures cannot be given in detail or with any useful approach to accuracy for the entire period.

The chart published on page 225 shows the disposition of the gross receipts in percentages for each of the periods. Only a casual reference to this chart is necessary to show the material reduction since 1893 in the proportion of receipts applied to dividends and in the surplus as well as the reduction in operating expenses other than those due to maintenance.

The statistics of operating expenses show that a reasonable maintenance has been provided and that important reductions have been made in the other expenses of operation. It is believed that reasonable economy has been practiced and yet the results, especially those of recent years, have not shown those additions to surplus which are necessary to cover the contingencies attendant upon operation of a property of this magnitude.

FURTHER IMPROVEMENTS OF THE SYSTEM

Further improvements of the system, interest upon which was not included in the fixed charges for 1908, are estimated to require an expenditure of capital within the next five years as follows:

Forest Hills extension, estimated cost	$1,550,000
Washington Street tunnel with approaches, necessary connections, etc., estimated cost... (This adds less than 3 miles of single track to the system.)	10,000,000
Subway between Park Street and Cambridge bridge with the necessary connections, estimated cost	1,750,000
Cambridge subway, estimated cost	7,500,000
Elevated extension between North station and East Cambridge, estimated cost	3,960,000
Elevated extension between Sullivan Square, Everett and Malden, estimated cost	3,500,000
Riverbank subway, estimated cost	3,000,000
Additions to surface system	5,000,000

Power stations, equipment, etc., to operate the above will cost several million dollars more, making a total sum of approximately $40,000,000, on which additional interest must be earned.

These improvements will provide still further for the relief of the congested portions of the city and for the extension of rapid transit over a wider area.

The Washington Street tunnel, which was opened to the public on Nov. 30, 1908, serves with its numerous stations as a complete terminal for the business, financial and amusement center of the city, connecting with this center the very large population to the north and to the south, and is so constructed as to provide ample accommodation for the traffic of a distant future.

The extensions to Forest Hills and to Malden will provide rapid transit by elevated or tunnel line for a length of approximately 10½ miles through what is in the main a densely populated district.

The Cambridge subway will furnish rapid transit of the highest class from Harvard Square, Cambridge, to Boston, and thus not only benefit Cambridge, but greatly improve the facilities of the towns lying beyond that city.

The elevated extension to East Cambridge will provide a desirable extension to the subway for the relief of traffic in a district oftentimes almost impassable for cars on account of the narrowness and inadequacy of the streets and the large amount of teaming traffic therein.

The Riverbank subway will afford a new connection from the west intended to facilitate the movement of the traffic in that rapidly growing section.

EFFECTS OF IMPROVEMENTS UPON THE RAILWAY COMPANY'S FINANCES

A study of the foregoing figures shows clearly that under the present system of fare and transfers the company is rendering a greater service than it can afford for the compensation received.

The tremendous increase in the number of free transfers is a serious burden upon the expenses without a corresponding revenue. The extent of this is perhaps better appreciated if the statement is made that had the company received in the last year 1 cent for each transfer its gross earnings would have been increased $1,595,000.

The indirect taxes to which the company is annually subjected in municipal requirements for improved paving, regrading of streets, expenses connected with construction of sewers and the removal of snow, all constitute a heavy burden forming no proper part of the business of conducting an electric railway and from which charges its revenue should be relieved.

Undoubtedly to some extent the introduction of the improved transit system will tend, although it so greatly increases fixed charges, to a reduction in the working expenses, but it is very evident from the past experience of the company and from a careful consideration of all the facts in the case, that the undertakings to which the company is already committed represent all and more than is justified by the traffic obtainable unless the conditions of fare, transfers and so forth are to be materially changed. The consideration by the company, therefore, of additional subways or costly new transit schemes for other portions of its system must necessarily await the developments of the more distant future.

PROPOSED PUBLIC UTILITIES COMMISSION FOR CONNECTICUT

A commission appointed by the last General Assembly of Connecticut to consider the relations of the State with public service corporations has made a report to the Legislature, now in session, recommending the enactment of a law creating a permanent public utilities commission. The report recommends the following powers and duties be vested in a permanent commission:

1. To grant franchises to public service corporations.
2. To supervise the condemnation of land and construction of fixtures by these corporations in so far as the same affect the public safety or interest.
3. To supervise the capitalization of these corporations.
4. To ascertain the facts relating to the financial conditions of these corporations; the physical condition of their plants and equipments and the cause of accidents resulting from their operation.
5. To supervise their operation in so far as the same substantially affects the public safety.
6. To fix the rates chargeable when existing rates are unreasonable.

A bill now being promoted by the London County Council proposes the expenditure of $5,450,000 on tramway extensions to towns in the vicinity of London.

HOW BENT IRON SIDE POLES WERE MADE STRAIGHT WITHOUT REMOVAL IN SAN FRANCISCO

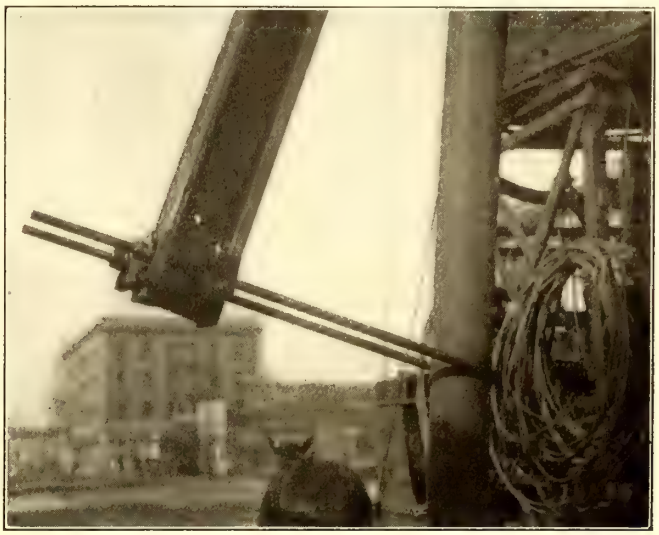
BY S. L. FOSTER, CHIEF ELECTRICIAN, UNITED RAILROADS OF SAN FRANCISCO

After the San Francisco fire, the United Railroads of San Francisco found that many of its iron poles were badly bent. In some cases this condition had been caused as the result of brick chimneys or walls of masonry falling on the poles; in other instances it could be attributed only to the great heat of the conflagration. At the time the exigencies of the moment made it necessary for the company to use everything which was serviceable, but later the appearance of these bent iron poles provoked criticism, and it was clear that things would have to be improved.

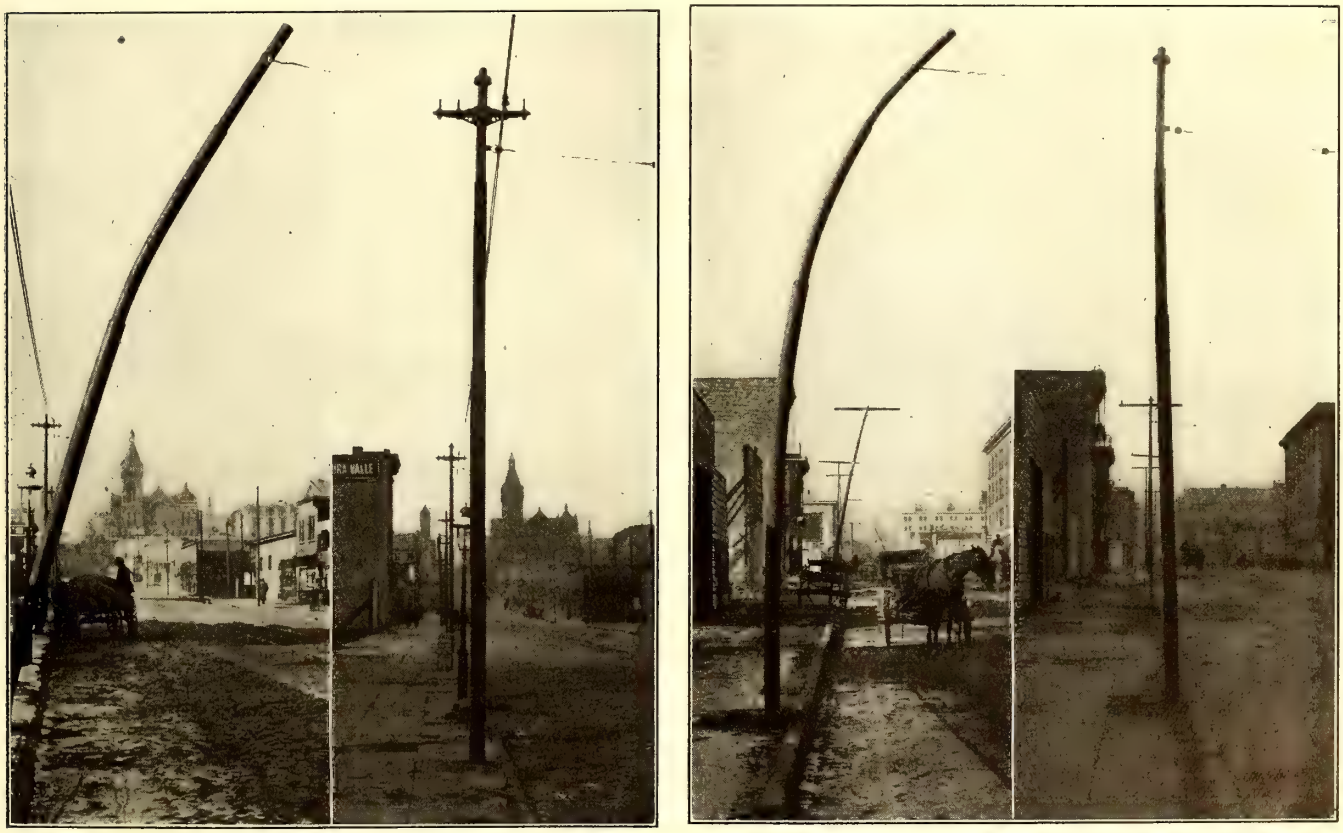
One person in authority said, "Take them out and have the best of them straightened." Another said, "Replace them with straight poles." The suggestion by the author to straighten them without removal was received with a smile. Many wise ones prophesied that in doing so the elastic limit of the fibers of the metal would be so far exceeded that the poles would be ultimately broken off, unless large gasoline torches or something similar were used to heat and soften the metal at points of extreme fiber strain.

The illustrations tell the story. A simple adaptation of the principle of the lever was devised, consisting roughly of two U-bolts, a 10-ft. piece of 7-in., 107-lb. Trilby rail and a wooden fulcrum block whose location could be varied along the rail. As the strain would naturally tend to pull the limbs of the U-bolts into a position where they would be at right angles to the pole, there was danger that the threads on the U-bolts' limbs would be abraided by the sides of the holes in the cross-bar back of the rail, especially since the sides of these holes made an angle with the bolts varying with the curvature of the pole. To obviate this, hemispherical washers working in hemispherical-shaped countersinks in the cross-bars were devised, which, with copious lubrication, have preserved the threads on the U-bolt limbs intact.

The moment of inertia of this unusually heavy 7-in. I-beam, weighing 36 lb. to the foot, was several times that of the small poles which constituted the bulk of those bent, and by intelligently and carefully working up and down and around the pole, all cases have been successfully handled so far. The secret of the success of the straightening device is the fact that, as a rule, all the deflection was not due to a bend at one point, but the total was made up of many small bends, none exceeding the ultimate strength of the fibers of the iron. It seems hardly neces-



Pole-Straightening Device Used in San Francisco



Bent Iron Trolley Poles in San Francisco—Before and After Straightening

sary to add that the operation of the device is produced by two men using 12-in. screw wrenches on the nuts of the limps of the long U-bolt, and that in some cases it was found necessary to use the device in a reverse condition from that shown in the photograph.

No illustrations would do justice to some of the corkscrew shapes that took the longest time to restore. Most of the bent poles were old and on narrow streets, and had been built into cellar walls. If they had been removed they would have been useless elsewhere, and probably would have been condemned. As scrap many of them would have had no value, as having been made of light tubing originally, with "rust" joints, there would have been little for the junk man to recover. To replace them with modern standard pipe poles, repair cellar walls, sidewalks, etc., would have cost about $40 each, whereas to straighten them with the device shown and do all necessary line work has averaged so far $3.54 each, although high-priced linemen were used to do the work.



View of Pole Straightening Device in Position for Use

The usefulness of several hundred iron poles will be preserved and their good appearance restored by the use of this straightening device.

The views are of poles in a district formerly devoted to residences near the western edge of the burned area, that has been rebuilt but little yet.

The report of the Ohio Railroad Commission for December gives the following statistics of fatalities on electric roads of the State during the month: Trespassers, 2; travelers on highway, none; employees, 2; passengers, none. The number of persons killed by steam roads in the State during the month are as follows: Trespassers, 38; travelers on highways, 5; employees, 17; passengers, none.

CONTROL OF MASSACHUSETTS STREET RAILWAYS BY STEAM LINES

The Board of Railroad Commissioners of Massachusetts has made a report to the State Senate in response to an order adopted on June 12, 1908, requesting the board to consider the expediency of the purchase of the franchise and property of the Bennington & North Adams Street Railway by the Berkshire Street Railway; the holding of stock of the Berkshire Street Railway by a railroad corporation, and the relations between railroad corporations and street railway companies.

The report shows that the steam railroad was promoted and constructed in an era of competition. Following this period came an era of railroad consolidation, as a result of which three principal corporations now control 96.82 per cent of the total steam railroad mileage of the Commonwealth.

The five largest street railway companies now operate 57.32 per cent of the total street railway mileage of the Commonwealth. The board says:

While it is true that many miles of street railway constructed in an era of rapid development has proved unremunerative to investors, the general law which has permitted the consolidation of these lines with stronger companies has secured to the traveling public in almost every case an improved and more efficient service and the statute affords ample opportunity for future consolidations of street railway companies with each other in this Commonwealth whenever occasion arises.

Nothing is found in the act providing by general law for the construction of electric railroads, so-called, or in subsequent legislation authorizing the consolidation of such properties.

In three recent instances the General Court has found occasion, in view of peculiar and special conditions, to permit by special enactment a closer relation between the railroad corporations and street railways. After reviewing the pending litigation respecting the relations of railroad corporations to the State and to each other, the report continues:

A careful study and comparison of systems of street railways in Massachusetts and elsewhere show no grounds for serious criticism of the service rendered in this Commonwealth. The street railway companies here are fulfilling their functions quite as well as any similar utility elsewhere. In neighboring States, where street railways are operated by agencies directly or indirectly in control of the steam railroads, no better service is found. In this State, where certain street railways have been recently operated by similar agencies, a comparison of service with other companies is not unfavorable to the companies operated independently of railroad control.

It is thought by many that the street railway, with respect to additions and extensions, has reached its maximum of development in this State. If this is true an equal field of enterprise exists here as with the steam railroad in the direction of improvements by way of extra trackage and equipment.

Statutes recently enacted provide that street railway companies may act as common carriers. The consequent development of the express and freight business upon street railway lines is yet in its experimental stage, but the activity of companies in availing themselves of this law inclines us to the opinion that it may ultimately result in a new series of practical value to the public and in substantial financial return to the companies.

The electric railroad presents an unexplored field of enterprise in Massachusetts. The board has twice found occasion to recognize its merits as well adapted to existing local conditions. This type of transportation affords an opportunity for large movements of capital, which if directed in these channels may result in a high grade of

rapid service, combining the physical properties of the railroad with the motive power of the street railway.

The board states that in its opinion the electrification of steam railroads in Boston and its suburbs "must come quite independently of the consolidation of railroad corporations and street railway companies. Smoke conditions and the demands of suburban service are vital factors making for the electrification of steam lines and will exercise, in the opinion of the board, more influence in obtaining it than any other forces."

In discussing the policy of the Commonwealth with respect to monopoly and competition in public utilities the board says:

The Board of Railroad Commissioners, since its creation in 1869, has constantly directed its attention to the several phases of monopoly and competition, and its comments with reference thereto are to be found in many of its annual reports. Its conclusions may be summarized in the one statement that within certain limits consolidation may be beneficial to the public, but also that there is a limit beyond which it ought not to go. It has never made any declaration that competition between distinct types of transportation is detrimental to the traveling public, but has recognized and now recognizes that when competitive wastefulness, any special or peculiar condition burdensome to the public, or other sufficient cause exists, an occasion may well be presented for the General Court to consider the facts and circumstances of each case to the end that special legislation may be enacted that will relieve the people of burdens sustained as a result of monopoly or competition.

We are fully apprised of the tendency of great enterprises to consolidate, but are of opinion that no sound demand exists in Massachusetts for legislation permitting all its transportation interests to become vested ultimately in the hands of a single corporate agency. Massachusetts, in our opinion, is not prepared at this time for a policy that results in this method of control. Experience repeatedly demonstrates that in the field of transportation as well as in other fields of public service competition, when not wasteful, may be wise.

The report then discusses the transportation facilities in western Massachusetts and several possible routes of connection between Berkshire County and eastern Massachusetts. On the important questions of control and consolidation the board says in part:

A careful re-examination of existing transportation conditions in Massachusetts and a survey of the whole field of prospective service, giving due consideration to the demands of the traveling public for the immediate future, convinces us that the established policy of the Commonwealth with respect to keeping separate and distinct the railroad corporations and street railway companies is a system of official administration entirely consistent with the public interest.

The board is therefore of opinion that no general legislation is now necessary to change or modify the existing laws as to the relations between these two classes of public servants.

Under a wise governmental policy the transportation facilities of this State have been developed and are being constantly improved. A prudent conservatism may well refrain from a radical departure from this policy.

There is no occasion for legislation prohibiting any railroad corporation chartered under the laws of this Commonwealth to become or continue a stockholder in the Berkshire Street Railway, for the reason that no authority now exists by law therefor. The board is of opinion that no occasion exists for enacting special legislation to permit it.

The situation in western Massachusetts differs entirely from that in any of the cases where special enactments of the General Court have permitted a closer association between railroad corporations and street railways and presents little that differentiates it from that obtaining generally in the Commonwealth. The Berkshire Street Railway affords a line for travel nearly the entire width of the State, competing with three steam railroads and one street railway. It is not exclusively a feeder for any of these companies, but is a competitor of all of them.

In our opinion the enactment of legislation permitting this company to be acquired in any form of holding by a steam railroad would not be an exception to, but a violation of, the general policy of the Commonwealth.

Private capital can be secured for the construction of additions to and extensions of street railway or other lines in Massachusetts when sound and reasonable public demands exist. The past experience of Berkshire County has confirmed this view.

A policy that would legalize the control by a steam railroad of this street railway solely upon the ground that it would make available superior financial resources would also, if carried to its logical conclusion, result in the control of all street railway mileage in the Commonwealth by steam railroad corporations.

The General Court has repeatedly, by special enactments, permitted the consolidation of a railroad corporation of this State with one of an adjoining State and the acquisition of its property and franchises. Special enactments have been passed in several cases authorizing leases between street railway companies in this Commonwealth and street railway companies in adjoining States. If it should appear that such authority is insufficient to secure a corporate alliance consistent with the public interests between the Berkshire Street Railway and the Bennington & North Adams Street Railway we see no valid reason why the Berkshire Street Railway should not be permitted by special enactment of the General Court to purchase the property and franchises of the Bennington & North Adams Street Railway, a connecting line over which it now operates its cars.

This authority, however, should be conferred only after fully safeguarding the interests of Massachusetts.

Complete opportunity should be afforded, not only to this, but to every other street railway company serving the territory between the Connecticut River and the New York boundary, to develop this section of the Commonwealth, and no arbitrary line of State boundary or fear of interstate control should prevent development of permanent through lines of transit.

Under the provisions of a wise and conservative body of laws a comprehensive and efficient railroad and railway service has been created in this Commonwealth. These two systems of transportation in healthful competition are fulfilling their functions as public servants of our people. Each within its distinct field of service should receive the most favorable consideration of the General Court. Neither, however, should absorb the other, in whole or in part, until experience has completely demonstrated that only by the adoption of such a policy can Massachusetts continue to secure the full benefits of two great public utilities.

The difficulties associated with the construction of an electric railway in Shanghai by a British firm are referred to by the United States consul, as follows: "It is doubtful if any other city in the world presents such a conglomerate street traffic on such a large scale as does Shanghai. During the busy hours of any week day upon the main thoroughfares may be seen heavy handcarts loaded with a ton or more of merchandise, each drawn by 10 or 12 coolies; wheelbarrows heavily laden with freight or passengers—sometimes as many as 12 persons ride on one wheelbarrow—dodging hither and thither in an effort to avoid collisions with faster vehicles; numberless rickshaws running pell-mell; bicycles and motorcycles, with bells ringing, and motor cars and public and private carriages endeavoring to pass everything on the street. When to this surging mass of people, horses and every kind of vehicle is added a double-track street railway, running down the middle of the streets that in some places are less than 20 ft. in width, one is able to realize something of the difficulties encountered."

THE PROBLEM OF REDUCING ACCIDENT DAMAGES—V.

BY FREDERICK W. JOHNSON, ASSISTANT GENERAL CLAIM AGENT, PHILADELPHIA RAPID TRANSIT COMPANY

Of the two methods available for imparting instruction to conductors and motormen in connection with accident work, that of oral instruction unquestionably possesses greater possibilities as a ground-gainer than does that of printed instruction.

But the fact should also be recognized that under certain conditions oral instruction develops defects of a character which seriously lessen its value. Instruction given in this way at long intervals, for example, without provision being made for sustaining interest in the subject in the interim between classes will accomplish but little improvement of a permanent nature; it serves merely to act as a temporary stimulant, the invigorating effects of which soon disappear. Likewise, class instruction given at too frequent intervals, or in a manner uninteresting to the men, or under conditions clearly unfavorable for such work, in time inevitably will deaden interest in the subject, and will preclude the possibility of as great a measure of success attending the efforts of a company in work of this character as rightfully should be the case.

In considering the question of the respective merits of the two methods, distinction should be made, of course, between companies of considerable size and those of smaller proportions. With respect to the former, the holding of classes at frequent intervals amounts practically to an impossibility. With the latter class of roads, on the other hand, the task of gathering employees together with greater frequency is not so difficult a proposition. Hence it may be said that the value of and the necessity for printed instruction in work of this character advances in proportion to the size of a company as measured by the number of employees, and diminishes in like ratio as the size of a road decreases.

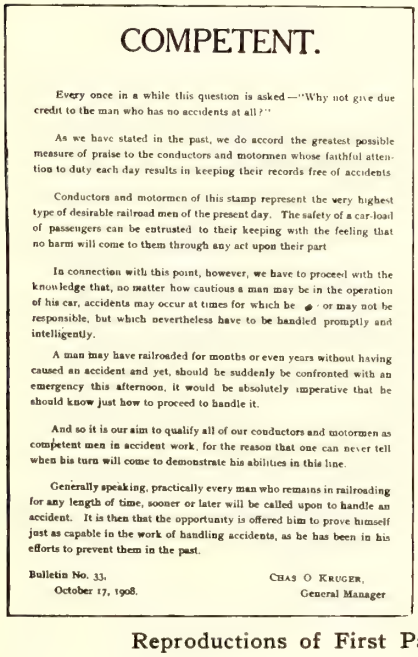
In thus directing attention to certain weaknesses in oral instruction, there is no intention to detract in any way from its value as an active agent for good in accident work; it is done rather with a view to correcting its defects by making them known in advance in order that steps may be taken to eradicate them in so far as may be possible. On smaller roads we have seen that this matter of support so essential to permanency may readily be supplied through the medium of holding classes with somewhat greater frequency than would be feasible or even possible upon larger systems.

COMBINATION OF ORAL AND PRINTED INSTRUCTION

Here it is, then, that a reasonable combination of both oral and printed instruction provides an easy and natural way of solving this perplexing obstacle to instruction work among the employees of large systems. Each method supplies what the other lacks. One affords a means of injecting life and spirit into the work; the other provides abundant opportunity for keeping in close touch at all times with those upon whom depends the success or failure of the project. One drives facts home to the minds of the men; the other assists in holding them there. Through the medium of oral instruction it is possible to guide attention into any desired channel; by means of printed matter used in conjunction with oral instruction, it is possible not only to continue to direct attention in that direction, but also to enlarge upon, or to restrict, or to specialize upon any particular point or points, as well as to bring up new subjects at short notice; or to give advance warning of conditions likely to prove productive of mishaps. It is, furthermore, a comparatively simple matter in preparing material of this sort to repeatedly focus attention upon a single topic for a sufficient length of time to enable practically every man upon the system to grasp and to thoroughly understand the principle involved, without incurring the risk of becoming monotonous.

Oral instruction may be likened somewhat unto a body of cavalry which charges across open country, routing the enemy and gaining a distinct advantage for the time being. But in order to hold the ground so gained something further is required. And so infantry and artillery are at once ordered forward as support. Printed material in connection with accident work corresponds somewhat in character to these latter arms of the service. It is not so inspiriting as oral instruction, but it has a solid, substantial way of accomplishing results that is very comforting.

In the preparation of printed matter some little judgment and discretion must necessarily be exercised in the



COMPETENT.

Every once in a while this question is asked—"Why not give due credit to the man who has no accidents at all?"

As we have stated in the past, we do accord the greatest possible measure of praise to the conductors and motormen whose faithful attention to duty each day results in keeping their records free of accidents

Conductors and motormen of this stamp represent the very highest type of desirable railroad men of the present day. The safety of a car-load of passengers can be entrusted to their keeping with the feeling that no harm will come to them through any act upon their part

In connection with this point, however, we have to proceed with the knowledge that, no matter how cautious a man may be in the operation of his car, accidents may occur at times for which he may or may not be responsible, but which nevertheless have to be handled promptly and intelligently.

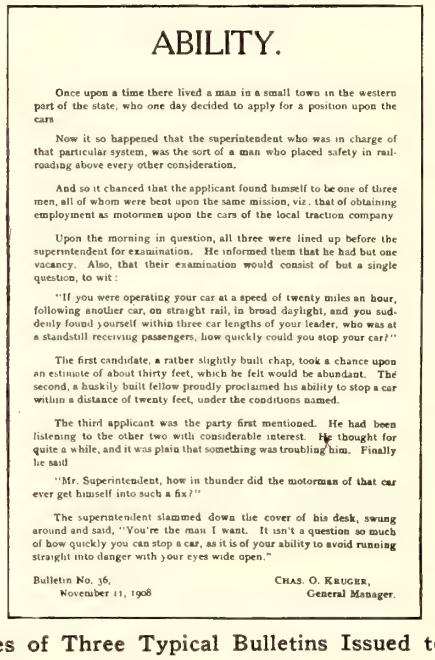
A man may have railroaded for months or even years without having caused an accident and yet, should he suddenly be confronted with an emergency this afternoon, it would be absolutely imperative that he should know just how to proceed to handle it.

And so it is our aim to qualify all of our conductors and motormen as competent men in accident work, for the reason that one can never tell when his turn will come to demonstrate his abilities in this line.

Generally speaking, practically every man who remains in railroading for any length of time, sooner or later will be called upon to handle an accident. It is then that the opportunity is offered him to prove himself just as capable in the work of handling accidents, as he has been in his efforts to prevent them in the past.

Bulletin No. 33. October 17, 1908.

CHAS O KRUGER, General Manager



ABILITY.

Once upon a time there lived a man in a small town in the western part of the state, who one day decided to apply for a position upon the cars

Now it so happened that the superintendent who was in charge of that particular system, was the sort of a man who placed safety in railroading above every other consideration.

And so it chanced that the applicant found himself to be one of three men, all of whom were bent upon the same mission, viz., that of obtaining employment as motormen upon the cars of the local traction company

Upon the morning in question, all three were lined up before the superintendent for examination. He informed them that he had but one vacancy. Also, that their examination would consist of but a single question, to wit:

"If you were operating your car at a speed of twenty miles an hour, following another car, on straight rail, in broad daylight, and you suddenly found yourself within three car lengths of your leader, who was at a standstill receiving passengers, how quickly could you stop your car?"

The first candidate, a rather slightly built chap, took a chance upon an estimate of about thirty feet, which he felt would be abundant. The second, a huskily built fellow proudly proclaimed his ability to stop a car within a distance of twenty feet, under the conditions named.

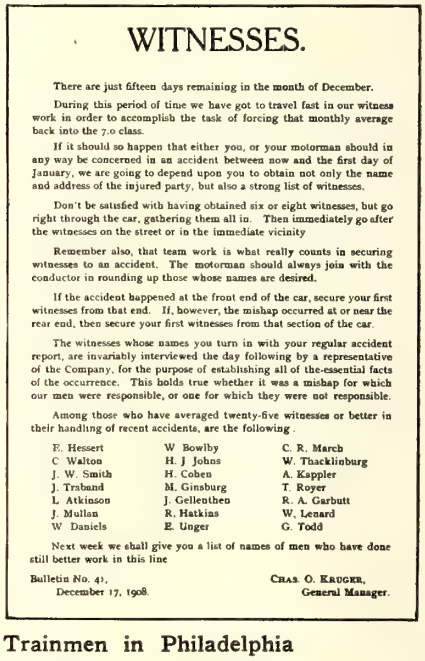
The third applicant was the party first mentioned. He had been listening to the other two with considerable interest. He thought for quite a while, and it was plain that something was troubling him. Finally he said

"Mr. Superintendent, how in thunder did the motorman of that car ever get himself into such a fix?"

The superintendent slammed down the cover of his desk, swung around and said, "You're the man I want. It isn't a question so much of how quickly you can stop a car, as it is of your ability to avoid running straight into danger with your eyes wide open."

Bulletin No. 36, November 11, 1908

CHAS. O. KRUGER, General Manager.



WITNESSES.

There are just fifteen days remaining in the month of December.

During this period of time we have got to travel fast in our witness work in order to accomplish the task of forcing that monthly average back into the 7.0 class.

If it should so happen that either you, or your motorman should in any way be concerned in an accident between now and the first day of January, we are going to depend upon you to obtain not only the name and address of the injured party, but also a strong list of witnesses.

Don't be satisfied with having obtained six or eight witnesses, but go right through the car, gathering them all in. Then immediately go after the witnesses on the street or in the immediate vicinity

Remember also, that team work is what really counts in securing witnesses to an accident. The motorman should always join with the conductor in rounding up those whose names are desired.

If the accident happened at the front end of the car, secure your first witnesses from that end. If, however, the mishap occurred at or near the rear end, then secure your first witnesses from that section of the car.

The witnesses whose names you turn in with your regular accident report, are invariably interviewed the day following by a representative of the Company, for the purpose of establishing all of the essential facts of the occurrence. This holds true whether it was a mishap for which our men were responsible, or one for which they were not responsible.

Among those who have averaged twenty-five witnesses or better in their handling of recent accidents, are the following.

E. Hessert	W Bowlby	C. R. March
C Walton	H. J Johns	W. Thacklinburg
J. W. Smith	H. Cohen	A. Kappler
J. Traband	M. Ginsburg	T. Royer
L. Atkinson	J. Gellenthen	R. A. Garbutt
J. Mullan	R. Hatkins	W. Lenard
W Daniels	E. Unger	G. Todd

Next week we shall give you a list of names of men who have done still better work in this line

Bulletin No. 41, December 17, 1908.

CHAS. O. KRUGER, General Manager.

Reproductions of First Pages of Three Typical Bulletins Issued to Trainmen in Philadelphia

selection and treatment of subjects. Matter of this sort should be prepared with the knowledge that much of it doubtless will be subjected to the scrutiny of others than those employed upon the company's cars as conductors and motormen.

To be more explicit, certain subjects can be handled practically without reserve, and certain subjects cannot. Little or no harm can arise, for example, out of a frank, open-hearted discussion of such topics as the matter of promptly reporting the occurrence of accidents; likewise, the "unreported accident" problem; the necessity for obtaining adequate lists of witnesses to accidents, together with suggestions designed to assist the men in this portion of their duties; the subject of colliding cars, and other features similar in character. On the other hand, however, in treating of types of accidents wherein the question of responsibility may be more closely drawn, a greater degree of caution will be found in every way advisable, for reasons which are obvious.

The method or style to be followed in thus making use of printed material in connection with accident work is, of course, a matter for the determination of each individual company. There are ample opportunities for the employment of original ideas in working out the problem of accident damages; and especially true is this of that portion of the work which forms the subject of this paper.

COMMON SENSE.

We reproduce herewith a photograph taken some months ago of the vicinity of Twelfth and Chestnut Streets, Philadelphia.



This bird's-eye view gives you at a glance just the situation that we have in mind when discussing right-angle collisions of cars with you. You will note, by referring to the cut, that two cars have arrived within the immediate vicinity of the intersecting crossing at about the same moment, one being bound south, the other east.

As viewed, the situation seems to be about as simple as anything in this life can be. Certainly both cars cannot pass over the intersecting crossing simultaneously. One necessarily has got to hold up until the other has safely cleared.

And yet this very combination has proven productive of some most unfortunate collisions of cars in years past. Invariably the causes have been pretty much the same in character: carelessness, disregard of regulations, misunderstanding of signals, inattention to duty, as well as too high a rate of speed in approaching intersecting crossings.

To guard against mishaps of this character, and to afford protection to the passengers of our cars, requires nothing really complex or difficult upon our part. Simply the exercise of a little common sense, a goodly portion of cautiousness, a reasonable knowledge of Company regulations, and a willingness to abide by them.

We should recollect that we are all working for the same Company, and that our interests are the same, though we may not all be personally acquainted one with another, or operate from the same Barn. In other words, if we are to be successful in our efforts to prevent collisions of cars, we have got to work together, in harmony, and as a unit.

Let every individual motorman give heed to the warnings which we are sounding with regard to right-angle collisions of cars. It requires, you know, but three seconds stupid work upon the part of one or two careless motormen to offset the good work of several score careful ones.

And the question at once arises—to which body of men do you personally belong? Are you doing your level best, as a good railroad man, to guard against collisions of cars, or are you simply drifting along, giving little or no thought meanwhile to the dangers of the subject now under consideration?

Reproduction of Inside Pages of one of the Bulletins, Discussing Accidents at Intersecting Street Crossings

WEEKLY ACCIDENT BULLETINS

Mention has hereinbefore been made of the Accident Bulletins which are being used at the present time by the Rapid Transit Company in connection with its instruction work among conductors and motormen. These bulletins are issued weekly, a copy being handed personally to each man with his pay check. They measure 5½ in. in width by 8½ in. in length, and are printed upon a good quality of white paper, with the headlines in red. Several of the recent issues of these bulletins are reproduced herewith.

Special bulletins are issued from time to time, that of Feb. 2, for example, being somewhat more complete in detail than the average issue. This consisted of three photographic reproductions illustrative of the subject under discussion, as well as five pages of descriptive matter.

An article dealing with the subject of Accident Bulletins appeared in the columns of the STREET RAILWAY JOURNAL of Oct. 6, 1906. For the convenience of those who may be interested in the subject, we quote below a number of suggestions which were offered at that time relative to the issuing of bulletins:

In composing bulletins avoid sermons, sarcasm, ridicule, offensive personalities and dry-rot.

Your chief object should be to secure the interest and friendship of your men, so that they will work with you, and not against you.

Make the bulletins ever optimistic in tone, always working for a better showing next month. If one division is doing poorly, compare it with some other which is doing well. Don't be afraid to show enthusiasm in your work. It may prove infectious.

Be versatile in your subjects and original in your manner of handling them.

Use the bulletins to arouse a spirit of friendly rivalry between different barns or divisions in their efforts to give satisfactory results.

Watch the returns carefully and don't be backward in giving credit through the bulletin to men who are excelling in the good work.

Experience has shown that a good word in the bulletin to a man who has had hard luck in his work helps wonderfully in getting him back onto his feet.

Drive a single point home solidly, rather than confuse the minds of your readers with a number.

Bulletins should be of such length as to enable the average man to read them through in from three to five minutes.

Use the bulletin to call attention to serious mishaps upon other roads throughout the country—then follow right up strongly with your cautioning.

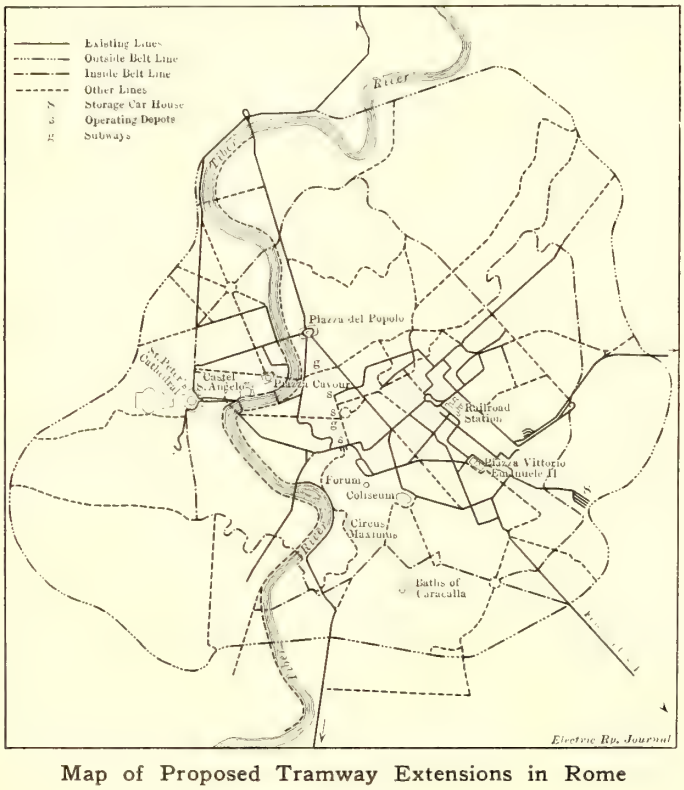
Issue bulletins prior to holidays or heavy riding days, calling attention to the expected increase in business and asking for particularly careful work upon these days.

Adopt the practice of using a single word as a headline. Make it short, sharp and energetic. Have the type of a clear-cut, distinct letter.

The opening paragraphs should be of sufficient interest to arrest the attention of the reader, or he may not stop to go through the entire bulletin.

PROPOSED IMPROVEMENTS IN ROME, ITALY

Under the administration of the present mayor of Rome, Ernesto Nathan, elaborate plans for the enlargement and beautification of the capital of Italy are being projected, and the development and extension of the tramway system in Rome form an essential part of the general scheme. The improvements contemplated are described in a report on the subject recently presented to the Common Council of the



Map of Proposed Tramway Extensions in Rome

city by Edmondo Sanjust di Teulada, civil engineer, Milan. It is estimated that at the present rate of increase in population Rome will have at least 1,000,000 inhabitants in 25 years, and all arrangements projected, described in Mr. di Teulada's report, are based upon providing for this increase. From an advance copy of this report sent by the mayor to Dr. W. H. Tolman, of the Museum of Safety, it is evident that an important feature of the general plan is the construction of a large boulevard encircling the city and the installation on this boulevard of electric railway tracks. The accompanying map is reproduced from this report. Within this outside belt line is another belt line partly projected and partly made up of existing sections of track, while radiating lines will connect the two encircling roads. The tramways of the city will therefore take the form, roughly, of two spoked wheels, one within the other. This plan is not unusual in the older European cities, to which it is especially adapted, because one of the boulevards, usually the "inner ring," can be laid on the site of the ancient city walls. Another improvement is the proposed establishment of passenger stations at three points in the city, Piazza Venezia, Nuovo Piazza and Piazza San Silvestro.

ELECTRIFICATION OF SPIEZ-FRUTIGEN RAILWAY

The Berner Alpenbahn-Gesellschaft has decided on the electrification of its full-gage line Spiez-Frutigen and has ordered three motor cars, one locomotive and the overhead equipment from Elektrische Bahnen, Zurich, the Swiss agency for the Machinenfabrik Oerlikon and Siemens-Schuckert Works for full-gage electric railways in Switzerland. The system will be the same as adopted by the Oerlikon Company for the Seebach-Wettingen line and is also similar to that to be used for the Wiesental Railway, an order for the electrical equipment of which has recently been placed by the State Railways of Baden.

The Spiez-Frutigen line will be operated by single-phase, 15-cycle current at a line potential of 15,000 volts. Current will be supplied by the Vereinigten Kander and Hagneckwerke, and for this purpose two additional generating sets of 3200 hp each will be installed in the power station at Spiez. Each set will consist of a turbine direct coupled to a single-phase generator for a pressure of 16,000 volts.

The trolley wire will be supported by a catenary in the center of the track at a height of approximately 21 ft. above the rails and the current will be conveyed to the motor cars and locomotives by bow collectors. The motor cars will be provided with two trucks. They will be about 65 ft. long and provide seating capacity for 64 passengers, third class.

The maximum grade on the Spiez-Frutigen line is 1.55 per cent, but the maximum grade on the Loetschberg Railway, which forms the continuation of the former line, is as high as 2.7 per cent. The motor cars will therefore be so designed that they can accommodate four single-phase motors of an aggregate output of 880 hp. As long, however, as electric operation is confined to the Spiez-Frutigen section only two motors will be provided. The weight of the fully equipped motor car will be 55 tons and the capacity of the motors is sufficient to haul a train of a total weight of 160 tons up a gradient of 2.7 per cent at a speed of 28 m.p.h. or a train weighing 240 tons up a gradient of 1.5 per cent at the same speed.

The locomotive will have a total motor capacity of 2000 hp and will be capable of hauling trains of 310 tons and 500 tons up the gradients of 2.7 per cent and 1.55 per cent, respectively, at a speed of 25 m.p.h. Each of the two trucks is provided with a 1000-hp, single-phase motor, which drives the three axles by means of gearing and coupling rods. These motors will be the largest single-phase commutator motors yet built. The whole weight of the locomotive (approximately 86 tons) will be utilized for adhesion.

The motor cars and locomotive will be equipped with transformers for reducing the line voltage of 15,000 volts

to the variable voltage required for the motors when running at different speeds. The maximum speed for the motor cars and the locomotive has been fixed at 43½ m.p.h. The motor cars are intended for regular service on the Spiez-Frutigen section, while the locomotives are primarily intended for experimental purposes in view of the adoption of electric traction on the main line later on.

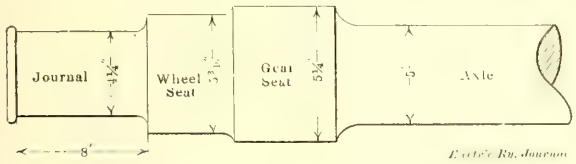
The work in connection with the electrification is being directed by the consulting engineer, Mr. Thormann, in Bern.

PRESSING ON SPLIT GEARS

An interesting practice with regard to the use of split gears is followed by Frank Dudley, master mechanic of the Toledo Urban & Interurban Railway Company, Bowling Green, Ohio. This scheme overcomes the necessity of frequent removals experienced by users of solid gears and steel wheels. It also utilizes to the utmost the good points of both solid and split gears and eliminates to a great extent the undesirable features of both. A special axle, as shown in the drawing, has been designed with the gear seat turned slightly larger than the straight center portion. The following are the controlling dimensions of this axle:

Journal	4¼ in. x 8 in.
Wheel seat	5 3/16 in.
Gear seat	5¼ in.
Center	5 in.

Split gears are used, but instead of applying these in the ordinary way they are first bolted tightly together and pressed on to the seats. To withstand the high pressing



Finished Dimensions of Axle for Pressing on Split Gear

stresses, ordinary bolts are replaced by 1-in. bolts, the bolt holes having first been reamed to accommodate the large bolts. Each of these large bolts is provided with a nut and lock washer. A hole is bored through the bolt and the nut so that a split key may be inserted, thus locking the nut after it has been set up tightly. This keying of the nut eliminates the possibility of the lock washer becoming loose.

After the split gear with its bolting arrangement, so strengthened, has been securely clamped together and the nut carefully locked, the gear is pressed on the axle as though it were solid. This operation is done, of course, with no wheels on the axles. In cases where it is necessary to remove a wornout gear and apply a new one, and when there is no occasion for removing the wheels, the bolts of the old split gear which originally had been pressed on, may be taken out and the gear removed without interfering with the wheels. A new gear is then fitted around the center of the axle, the bolts are tightened securely as earlier stated, and the gear is pressed on the seat from the inside.

This method of mounting the gear will eliminate the necessity for removing wheels from the axles when the gear is replaced. The practice is especially economical where steel-tired wheels are used, because the centers of these wheels can be re-tired without removing them from the axle.

FENDER AND WHEELGUARD TESTS OF THE PUBLIC SERVICE COMMISSION OF NEW YORK, FIRST DISTRICT

At a closed meeting of the Public Service Commission of New York, First District, held Dec. 29, 1908, Commissioner Maltbie presented to the commission for action the report of the sub-committee on safety devices and accident prevention measures covering the results of the tests conducted for the commission at Schenectady, N. Y., Sept. 15 to Oct. 3, and at East Pittsburg, Pa., Oct. 20 to Nov. 12, 1908. In presenting the report, Commissioner Maltbie said in part:

The tests conducted by the committee attracted attention not only in the United States and Canada, but in European cities as well. Probably no series of tests has ever been made with such thoroughness and with such close approximation to actual conditions. * * * With proper fenders and wheelguards, the number of fatalities due to the operation of street cars in New York can be considerably reduced. While financial considerations are not the principal ones to be considered, it is to be noted that the expense of carrying out the recommendations made by the sub-committee will not exceed $300,000. As the companies operating surface cars in New York City incurred expenditures for injuries, damages and legal expenses during the year 1906-7 amounting to over $3,500,000, and as it is admitted that a considerable portion of this sum would be saved to the companies by the introduction of proper fenders and wheelguards, it is apparent that the companies would gain financially by equipping their cars properly. It is possible that the total expenditure for new equipment might be saved in one year; but whether or not this is true, proper regard for humanity demands that fenders and wheelguards be placed upon all cars operated upon the surface lines in Greater New York.

On motion the report was accepted and was ordered to be printed. The commission set Feb. 4 and 5 as days on which hearings would be held, in order to give the companies operating surface lines within the jurisdiction of the commission an opportunity to state whether there are any reasons why the recommendations included in the report should not be carried out.

An abstract of the report which was made public last week follows:

In the report are given an analysis of the different classes of these devices that were submitted to test, and a tabulation showing the merits of the various devices; also a view of each device installed upon the car in operating position before being tested; also views showing the general arrangement of the testing grounds.

QUALITIES REQUIRED

Besides efficiency in life-saving qualities, i. e., the picking up or removal of a body from the path of a car, shown by these fenders and wheelguards, there has been considered the estimated cost of maintenance, weight of device, number of parts and material used in construction. These points are important in the selection of car fenders or wheelguards, for, if the maintenance is too high, the railway company will neglect to maintain them in an efficient condition; and they should be as light as possible without sacrificing durability, so as to reduce the dead weight which the car must carry. Then, again, the material should be of such kind as will withstand the service for which it is to be used. One of the most important factors is that the device should have as few parts as possible, be simple of operation, easy of inspection and economical of maintenance.

Some of the devices tested had merit as life-savers when in new and perfectly normal operating condition, but they were complicated and made of material that would make it a serious matter for the railway companies to maintain them in a reliable life-saving condition. Devices of that

kind could not be recommended for use within the jurisdiction of this commission. The following recommendations are offered:

RECOMMENDATIONS

Every fender and wheelguard to be used in accordance with the following recommendations should be of a design approved by this commission.

All cars in service under the jurisdiction of this commission should be supplied with two automatic (mechanical drop) wheelguards, which must be attached to the trucks of all types of cars, this apparatus to be always maintained in a normal operative and life-saving condition, the tripping gate to be carried at a height of not more than 5 in. and the apron of the wheelguard not more than 4 in. above the rails.

All cars in service under the jurisdiction of this commission in the boroughs of the Bronx, Queens and Richmond, should also be equipped with a projecting type of fender always carried in a normal operating position with the outer edge of apron not more than 6 in. above the rails, and maintained in a thoroughly operative and life-saving condition.

All cars in service in Brooklyn should also be equipped with projecting fenders and should carry them in a normal operating position with the outer edge of the apron not more than 6 in. above the rails, except that such fender should be lifted up into a folded position by the motorman without the latter leaving the platform when cars are operated in the following streets:

Fulton Street, west of Putnam Avenue.

Court Street, north of Atlantic Avenue.

Boerum Place and Adams Street, north of Livingston Street.

Washington and Adams Streets, between Fulton and Sands Streets.

Smith Street line, north of Livingston Street.

Williamsburg Bridge, lines west of Havemeyer Street or Broadway.

The reason for the recommendation that all cars be equipped with automatically operated wheelguards, and only certain of the cars under the jurisdiction of the commission be also supplied with a projecting type of fender (either automatic or manually operated) is that it is not considered that any one device will be sufficient when a car is being operated at high speed.

Cars operating at the low speed necessary in congested districts are sufficiently guarded by automatically operated wheelguards, but cars operated through localities where congestion is not sufficient to prevent high speed should be equipped with both projecting fenders and wheelguards.

Even though an automatically dropped fender is used, experience proves that it must be carried at least 6 in. above the pavement, and this height will not always permit it, when tripped, to drop to the pavement quickly enough to get under a body in a prostrate position. The manually operated type of projecting fender must also be carried at the same height above the pavement as the automatic, so that if the motorman does not drop the fender to the pavement before reaching the victim, it also will pass over him allowing him to go under the wheels of the car if they are not protected by a wheelguard; but both the automatic projecting fender and the manually operated fender are efficient for catching a person struck in an upright position. Therefore it is considered essential that the cars should be equipped with both wheelguards and fenders wherever local conditions do not interfere with the use of fenders.

Finally, it should be fully understood that the effectiveness of the foregoing recommendations is wholly dependent upon the maintenance of the devices in a thoroughly operative and life-saving condition. If such requirements are not exacted of the operating railway companies the results which the commission desires to accomplish cannot be obtained.

DESCRIPTION OF TESTS

Arrangements were consummated with the General Electric Company at Schenectady, N. Y., and also with the Westinghouse Electric & Manufacturing Company at East Pittsburg, Pa., to afford facilities at their respective works for the Public Service Commission for the First District to conduct car-fender tests. Sept. 15, 1908, was set for the beginning of the tests at Schenectady, and Oct. 20, 1908, for those to be held at East Pittsburg.

The arrangements for making the tests included 100 ft. of track paved with cobble stones and 100 ft. paved with asphalt, these two forms of pavement comprising those predominating in Greater New York. A single-truck car and also a double-truck car were rebuilt and arranged so as to give platform dimensions as found upon the cars in New York City. The tests were made at speeds of 8 miles and 15 miles per hour upon each of the two forms of pavement. These speeds fairly represent the average operating conditions in Greater New York, and were calculated to bring out the relative merits of the devices for use within the First District, which was the principal aim of the tests.

A complete set of rules was prepared, classifying and standardizing the trials to which each device with similar characteristics should be submitted in order that a fair and comprehensive opinion might be formed as to the efficiency and other qualities which the device should have. To demonstrate as nearly as possible the qualities of each device for picking up or removing a human body from the track, dummies or lay figures were used, which would stand alone and which had joints and other characteristics resembling as nearly as possible the human body. These were of three sizes—a boy weighing 50 lb., a woman, 120 lb., and a man, 170 lb., all clothed and of a height corresponding to their weight. The rules which governed the tests throughout were published in the Electric Railway Journal for Aug. 22, page 513.

LIST OF FENDERS AND WHEELGUARDS WHICH OBTAINED AT LEAST 75 PER CENT IN THE TESTS HELD AT SCHENECTADY, N. Y., AND EAST PITTSBURG, PA., 1908

	Per cent
Projecting fenders—automatic (drop)	
J. O'Leary	79.1
G. H. Bolduc	77.7
W. T. Watson	77.3
Jenkins Automatic Fender Company	75.0
Projecting fenders—automatic (rotative)	
Worcester Railway Supply Company	80.2
Projecting fenders—automatic (air auxiliaries)	
American Automatic Fender Company	80.3
W. H. Quin	78.2
Projecting fenders—platform trip	
G. A. Parmenter	80.2
Consolidated Car Fender Company	78.2
American Fender Company	77.7
Sterling-Meaker Company (Berg)	76.8
Pittsburgh Car Fender Company	75.6
C. D. B. Fiske	75.5
C. N. Wood (Pfingst)	75.2
Projecting fenders—non-automatic	
Eclipse Railway Supply Co	80.6
Wheelguards—automatic—mechanical drop	
Hudson & Bowring	86.9
G. A. Parmenter	83.6
W. T. Watson	80.6
American Fender Company	76.0
Wheelguards—automatic—gravity drop	
Sterling-Meaker No. 7	79.8
Wheelguards—automatic shearing—mechanical drop	
Sterling Equipment Company	82.5
Wheelguards—automatic shearing—gravity drop	
J. H. Caliga	75.3
Wheelguards—non-automatic—platform trip	
W. Martin	75.6

Great interest was manifested in the tests, not only in this country, but in Europe. Devices from England were tested at Schenectady and East Pittsburg. Unfortunately, one entered by a German firm for the East Pittsburg test was lost in transit. There were 191 applications for test, and 92 devices were submitted, some of them so apparently impractical that they were disqualified without a demonstration being considered necessary to show their lack of merit for further consideration.

In all 38 fenders of the projecting type and 29 wheelguards, making 67 life-saving devices, were tested. Upon these 67 different devices, 1801 separate and distinct tests

were made. The exhaustive trials to which they were submitted, while not proving that any particular fender or wheelguard had reached a point of efficiency to warrant its preference over all others, have, without question, demonstrated that there are several available fenders and wheelguards far superior in actual operative merit to most of the contrivances used at present, and less expensive to maintain in a life-saving condition.

IMPORTANCE OF MAINTENANCE

Until recently managers of most railway companies have considered fenders and wheelguards an evil forced upon them by municipal authorities and have believed that there was no device worthy of serious consideration as a life-saver, and that there was unnecessarily imposed upon the company a very great maintenance expense. The railway companies themselves were very largely to blame for the inefficiency of many of these devices as life-savers, for they were seldom maintained in the condition in which they were designed to be kept to be operative as life-savers. The feeling among the officials of the railway companies that these devices were useless was naturally shared by the conductors, motormen and others responsible for the good condition and upkeep of these devices, so that one could see almost everywhere where fenders and wheelguards were used that they were not maintained in sufficiently good condition to be of much value if called upon to save life.

It is only recently that the great increase of street-car accidents has brought home to the management of railways, principally through the claim department, the necessity of using a fender and giving to it the same care and consideration as is given to other parts of the car equipment. When the companies shall have instilled into their employees' minds the idea that these forms of safety devices should not be carelessly handled, but should be maintained in as efficient operative condition as the controller, circuit breaker and other essential parts, they will undoubtedly have accomplished a great deal toward reducing the amount of damage claims which are yearly brought against them. Besides, the claim departments of companies have had it impressed upon them that if their companies operate cars without the best devices their defense in suits brought against them is weakened. In other words, the proof of contributory negligence by the claimant is much more difficult in a case where imperfect protection is shown than in one where the company could not be attacked on that ground. Therefore from the company's standpoint it would appear that fenders and wheelguards should be used upon all cars in service, and, furthermore, used carefully, continuously tested and maintained in a thoroughly operative and normal condition.

It is safe to say that none of the surface-car companies in Greater New York, and very few anywhere, have ever submitted their devices to a practical test before purchasing them of their life-saving qualities. In many instances the only consideration given the question has been that of least maintenance, without any thought of its value to the claim department. The railway companies should, so far as possible, protect the public from serious or fatal injuries by equipping their cars with the most efficient life-saving devices and carefully maintaining them in operative condition.

FAULTY DEVICES

While some of the devices tested had merit, they lacked the development which would make them suitable for use upon the surface cars in Greater New York. Some devices were of such poor workmanship and improper material that practically no true result of their pick-up qualities could be obtained. Others had an impossible number of working parts, such as sliding contacts and joints, which would require lubrication and protection from the weather, and thus increase the care necessary to keep them operative. Again, others were built with a large number of spiral springs which it would be impossible to maintain in a normal condition. Most of such devices were the result of ideas gained from witnessing accidents by people who did not have any conception of the requirements of a fender or wheelguard for practical railway use. It was therefore not surprising that the devices which withstood the hard usage given by the tests and made the best percentage of pick-ups were those of manufacturers who have long been in the business and had developed their apparatus along the lines required by railway companies.

The practice upon some of the surface railways of Europe of carrying fenders and wheelguards attached to the trucks of the car in a fixed position and sufficiently close to the track to be efficient as life-savers is made possible by the better street pavements, permanent way and other favorable conditions. In this country long experience has shown that climate, speed, street pavement and other influencing factors prohibit, on account of excessive cost, the use of any wheelguard or fender which is to be carried close to the track in a fixed position attached to either truck or car body.

Wheelguards and fenders with aprons made up entirely of fingers pressed to the pavement when in action did not give the results anticipated by inventors of devices of this class, as the fingers, when dropped upon cobble or other uneven pavement, invariably struck the dummy on the rebound and either pushed it along or mangled it among the fingers, tending to reduce greatly its ability to get the victim onto the apron.

GENERAL CONSIDERATIONS

The material used in the construction of the device bears directly on its ability to withstand the rough usage caused by continuous service and largely influences its capability as a life-saver. Malleable iron should be used for all fittings, hangers and every part possible, as it will withstand a severe blow without bending, to which fittings of steel and iron prove themselves subject. The aprons of wheelguards that gave the best results were those formed of steel with wood slats and those comprising thin strap steel and malleable iron braces. The slats and straps are so placed that when broken they can be readily and cheaply replaced without removing the apron from the car.

It developed during the tests with the 120-lb. woman figure that the wearing apparel was often the cause of failure of the devices either to pick up the dummy or to remove it from the track. When the fender hit the figure and pushed it along the track the clothing sometimes trailed on the pavement and got under the front of the device with the result that in a number of cases the body was drawn under the fender. This brought out the fact that any successful wheelguard needs to be pressed to the pavement by a pressure of not less than 100 lb. at the time it is intended to pick up an object. Devices that were operated by springs, instead of depending upon gravity, demonstrated this by making successful pick-ups where the others failed.

It is desirable also to keep the apron of both fender and wheelguard as narrow as possible because of the shaking which takes place when a car goes over special track work or faulty joints, as the device is suspended only at the back. Its tendency to shake is, of course, proportionate to its width, and is undesirable for the reason that it loosens the parts thereby causing a rattle and noise and deranges the mechanism, shortening the life of the entire apparatus.

As it is found essential that a device should be forced to the track and held there by a compression spring, those depending only upon their weight being practically useless, it is desirable that the apron of either fender or wheelguard, when in normal operating position, should be pressed upward against a spring in order to retain it as far as possible in a rigid position and to obviate the shaking effect referred to above.

The tests developed the fact that, with a projecting fender, the transverse width of an apron is a very important point, and, in order to catch and retain a person struck by it, the width must be proportionate to the car's speed.

Very few of the projecting fenders tested had adequate bumper or dash protection to prevent the victim receiving serious injury by coming in contact with these parts. Only in the case of a very limited number of those that had dash and bumper protection was it apparent that an effort had been made to prevent the well-known throwing-out effect. A number of roads have decreased the width of aprons to a minimum to reduce the possibility of damage by collision in crowded districts, or from striking people when cars are rounding a short curve at a street corner without testing to ascertain if they were reducing the efficiency of the fender as a life-saver. The tendency of a

body falling on an apron of from 20 in. to 26 in. in width is to roll off on the pavement, whereas an apron of 30 in. to 36 in. wide proved its ability to hold a body falling on it, even at a speed of 17 miles per hour, and we believe it would do so at a considerable increase of speed.

Another point in connection with the apron of most projecting fenders, as well as wheelguards, is that a straight apron must be wider than one of scoop shape in order to retain a body.

The automatically operated "shearing" wheelguard, of which a number were tried, is normally held as high above the track as the characteristics of the permanent way require, and, being held up against the strong compression springs which push it to the track when released, is free from the shaking or other damaging movements occurring to pick-up types of wheelguards when the car passes over special work, faulty joints or other obstacles which will jolt the car. The very severe usage a person must undergo when being picked up by a wheel-guard, after having been knocked down by the car, is certainly prospective of serious injury, even though, after receiving this blow he should be completely picked up. The tests did not demonstrate that any wheelguard would always completely pick up the object. On the contrary, it was often pushed or dragged along the pavement until the car was brought to a standstill.

A person who is removed from the track by a "shearing" wheelguard receives a glancing blow from the guard (unless he is struck squarely by the peak of the device) and is then pushed along or shoved out of the path of the car. This is also rough treatment, and it is absolutely problematical what the results will be to the victim.

In the selection of a fender or wheelguard the railway manager must give consideration to the practicability of the device he adopts to suit the operating conditions governing his road, such as pavement, track, grades, short curves and curves that pass close to the sidewalk at corners where it is likely that a projecting fender would catch pedestrians. Also snow and ice must enter largely into his consideration, especially in the selection of a projecting fender or pick-up type of wheelguard.

The height that the device was to be carried above the track in the tests was not fixed by the committee, but was left to the option of the participant. Therefore the railway manager must give consideration to the distance each device was carried above the track to secure the efficiency marks obtained. In a number of cases the devices undoubtedly were placed lower than permissible on many roads by reason of the condition of the permanent way. The height above the rail should be governed by the local conditions prevailing in each individual case, and the pick-up efficiency, as shown in these tests, must be considered proportionate to the height at which the device was carried above the track.

The tests could not prove altogether the ability of the devices to withstand the rough usage of continuous car service, nor in many instances the picking-up qualities of those which, after a few trials, were damaged so as to be inoperative and had to be withdrawn.

The tests, successful as they were, unfortunately proved no one fender superior in all its parts to the others.

TERMS DEFINED

On account of the variety of devices submitted for test projecting fenders and wheelguards have been separated with the following sub-divisions:

PROJECTING FENDERS

Non-Automatic.—A fender carried in a fixed position at a height above the track predetermined, according to the characteristics of the permanent way.

Automatic.—A fender carried as close to the track as the characteristics of the permanent way will allow and dropped to the track by a projecting piece in front of the fender coming in contact with the object to be picked up. This actuates a trip which may be either mechanically or air operated.

Platform Trip.—A fender carried normally as close to the track as the permanent-way conditions will permit and dropped to the track by the motorman actuating from the platform a mechanism which drops the fender (ready to pick up an object).

Shearing—Projecting Type.—A fender carried in a fixed position above the track at a height predetermined, according to the characteristics of the permanent way. This type of fender embodies the characteristics of the steam locomotive pilot with the triangular frame, the sides of which are intended to shear the object clear of the track.

WHEELGUARDS

Automatic (Mechanical Drop).—A wheelguard, the apron of which is carried as close to the track as the characteristics of the permanent way will allow, and which is forced to the track by a compression spring or other mechanical device, being released by the object to be picked up coming in contact with a trip.

Automatic Gravity Drop.—The characteristics of this type of wheelguard are the same as those of the automatic mechanical drop, with the exception that the apron, on being released, drops to the track by gravity.

Platform Trip.—A wheelguard the apron of which is carried as close to the track as the characteristics of the permanent way will allow and dropped to the track by the manual operation of a platform-actuated mechanism including the compression spring effect, as well as a platform re-setting feature. This method of operation is usually supplemental to the automatic feature of this type.

Shearing Automatic (Mechanical Drop).—A wheelguard the triangular frame of which embodies the characteristics of the steam locomotive pilot. The frame is carried on the pilot board or car sills, at a pre-determined height above the track dependent upon the characteristics of the permanent way, and is forced to the track by a compression spring or other mechanical device upon being released by the automatic tripping mechanism coming in contact with the object to be removed from between the rails.

Shearing Automatic (Gravity Drop).—The characteristics of this wheelguard are similar to those of the shearing automatic (mechanical drop) with the exception that the frame on being released drops to the track by gravity.

Shearing Non-Automatic.—The characteristics of this wheelguard are similar to those combining the automatic features, with the exception that in this case the frame is carried in a fixed position from the pilot board at a predetermined height above the track dependent upon the characteristics of the permanent way.

FENDERS

There were several fenders submitted which were intended as a combination of fender and wheelguard, or primary and secondary fender arranged to operate so that if the front or primary fender passes over a person, or fails to pick up, the wheelguard or secondary fender will have been dropped ready to receive the person by the lifting action of the front fender. This principle is certainly worthy of the time, attention and effort being given to it, as we believe the future will demand this form of safety device for use upon cars for city service. None of the devices of this character was sufficiently developed to warrant its use.

We are of the opinion that it would not be wise to attempt the use of automatic projecting fenders at present in Greater New York.

The platform-operated fender, i.e., one dropped by the motorman by pressing a plunger with his foot or pulling a lever, is a type which has long been in service, and therefore has reached the highest point of development. We believe it will gradually be superseded as the automatic type of fender becomes more fully developed, but only upon roads whose cars do not operate in districts which are too congested. A wheelguard should be used upon all cars in service, whether or not supplied with a fender.

WHEELGUARDS

In the opinion of your sub-committee, all types of wheelguards, either upon single or double-truck cars, must be suspended from the truck to attain proper results. Your sub-committee is also of the opinion that a manually operated wheelguard is not efficient, and that all wheelguards must be automatically operated.

The report is signed by A. W. McLimont, electrical engineer for the commission, who acted as chairman of the subcommittee; D. L. Turner, chief of the transit inspection bureau, and George F. Daggett, chief of the accident bureau.

ADVERTISING IN CHICAGO

On Feb. 7 the Chicago City Railway Company will present a full-page advertisement in one of the daily papers of Chicago. This advertisement is to contain so many salient features regarding the relations existing between the city of Chicago and the traction companies that its message is repeated here in full.

THE CHICAGO CITY RAILWAY COMPANY

A Municipal Organization

ONLY artificial barriers and legal fictions distinguish the manager of a street railway company from a public officer. Both deal with the public, both are charged with public duties and both are responsible to the public for their stewardship. Their rewards and punishments are similar, and there is no essential difference between the conditions which make for their success or point their failure.

¶ The management of the Chicago City Railway Company conceives its function to be that of a trustee for private interests, transacting the business of a public office. The Company, recognizing that good service involves reciprocal duties and obligations as between itself and the general public, earnestly solicits the active co-operation of every citizen who believes in Chicago and who takes pride in its public works.

¶ There is no duty which the Chicago City Railway Company is required to discharge that is incompatible or inconsistent with the public good. Financially, the Company is no more interested in collecting nickels from its patrons than is the City of Chicago in collecting taxes, licenses, fees and fines. Likewise, the Company is as much interested in preventing accidents on its car lines as is the City of Chicago in preventing accidents on its bridges, its streets, and its sidewalks. A defective car equipment and a broken sidewalk are liabilities of the same denomination. One means loss to the Company, the other loss to the City. A change that street railway companies extract profits from a dangerous rail or a careless motorman has no more basis in fact than a structure on city officials for willful neglect of sidewalk repairs because of pecuniary profit to the municipality.

¶ The assets and liabilities of the Company are the assets and liabilities of the city, and it is for this reason that the management of the Company solicits the co-operation which inevitably will increase the assets and reduce the liabilities of both principals.

¶ Taxpayers who would complain of inadequate water supply could be relied upon to give prompt aid to such public authorities as might be engaged in improving it; the injunction to "boil the water" is not an indictment of Lake Michigan as a source of water supply; the abuse of fireworks or firearms arouses protest, but it inspires good citizens to co-operate with the municipality in the adoption of corrective measures. Each situation demands earnest co-operation on the part of all persons whose interest and assistance spell relief.

¶ The Chicago City Railway Company does not seek immunity from criticism, nor does it chafe under reasonable or contractual municipal restraints; it merely asks the public to consider its cars in the same general category with sidewalks, streets, bridges, sewers, water-works, the city fire, police and health departments, and, in short, all other public works and agencies whose chief function is public service.

¶ Rapid transit in a great city covering 190 square miles is a municipal necessity. The difference between bad service and the best service is the difference between bad management without co-operation and good management with it. First-class service enhances the value of real estate, increases the credit of the city as a municipal corporation, facilitates business and expands the volume of trade; it enables the employe in the mill, the factory, the office and on the street to go to and come from his place of employment punctually, speedily, safely and with comfort. No city can progress whose inhabitants, before starting down-town, contemplate the journey as men going to war. Mental composure at the beginning of a day's work in a city where competition is keen and analysis close is a municipal as well as a personal asset.

¶ There is under construction in Chicago the best street railway system in the world. The contractor is a partnership. The partners are the Chicago City Railway Company and the City of Chicago. Under its ordinance of Feb. 11, 1907, the partnership has constructed or reconstructed more than 100 miles of single track, it has added to its equipment new cars, car-houses, electrical substations and machinery; it has vastly improved and proposes still further to improve its service. Will you help?

"Good Service Is the Best Policy"

Text of Full-Page Advertisement to be Inserted in Chicago Newspapers by the Chicago City Railway Company

MELBOURNE ELECTRIFICATION DEFERRED

The Victorian Railway Commissioners after a careful study of the report made by Charles Merz on the proposed electrification of the Melbourne steam suburban tramways have concluded against taking up electrification at the present time. The commissioners state, however, that the financial advantages of operating the Melbourne lines by electricity should be reviewed at reasonable intervals, special attention being given to the likelihood of increased competition from the street railways. They also suggest that future recommendations which provide for additional tracks, stations, turntables, etc., construction of rolling stock should be made with the possibility of ultimate electrification in mind. The commissioners consider Mr. Merz's figures to be too favorable, but they accept his conclusion that, provided the conversion be undertaken at once, the best system to adopt would be a protected third-rail supplying 800-volt current for multiple-unit trains. Mr. Merz's report was published in the ELECTRIC RAILWAY JOURNAL of Oct. 3, 1908.

A report from Constantinople, Turkey, says that the Gurham Company, of London, has applied for a 50-year concession for constructing and operating electric railways in the suburbs of Constantinople.

RECOMMENDATIONS OF GOVERNORS TO THE LEGISLATURES

Additional recommendations of Governors to the Legislatures are appended to supplement those published in the ELECTRIC RAILWAY JOURNAL of Jan. 16 and Jan. 23. In the cases of the Governors of Massachusetts, Ohio, South Carolina and several other States no recommendations were made which affect the railway interests directly, while in a number of States, among them Georgia, Florida, Kentucky and Mississippi, sessions are not held until 1910.

GOVERNOR DAVIDSON, OF WISCONSIN

In order not to interfere with the right of the owners of capital to receive reasonable profits on their investments, the Legislature of 1907 enacted a very comprehensive statute, vesting the Railroad Commission with the power and jurisdiction to regulate every public utility furnishing telephone service, heat, light, water or water power, directly or indirectly, for the use of the public. This statute placed much additional work upon the commission, which has been prosecuted with vigor and industry. The progress thus far made has demonstrated that the work of the Legislature was well done and that the act is one of unquestioned benefit to the people of the State.

There are now under the jurisdiction of the commission 54 steam railroads, 25 street and interurban railroads, 52 gas, 230 electric light and power, 141 water, 569 telephone and 13 heating companies.

The work of the commission under the act has revealed no very serious defects in its provisions. However, some things have developed in working under the law which may properly receive consideration at your hands, the more important of which I call to your attention.

The time within which a corporation may surrender its permit, license or franchise to the municipality granting it is limited by the act to July 1, 1908. There seems to be no legitimate reason why this limitation should be continued. I think the statute should be amended so as to permit all corporations organized before the act took effect and subject to its provisions, to surrender their franchises at any time, and receive in lieu thereof an indeterminate permit.

The statute gives the commission jurisdiction over and control of railroad crossings made by railroad companies after the passage of the act, and then only at points outside the limits of incorporated cities. The right to regulate the crossings of highways, other than railroad tracks, is not vested in the commission. It has been found that in dealing with this statute it is impossible to proceed along uniform lines in the solution of crossing problems on account of conflicting jurisdiction within and without cities, and for other reasons. It seems desirable that all crossings—steam railroads with one another, steam and electric railroads, steam and electric roads and highways—be all placed under the jurisdiction of the commission, both within and without cities.

That part of the act providing for a declaration from the commission that public convenience and necessity require a second public utility where there is already one engaged in a similar service, before a license, permit, or franchise shall be granted, should be amended so as to permit the commission to consider the financial ability of the applicants as well as to allow a modification of the declaration after it is made, if circumstances arise making it necessary so to do.

GOVERNOR DENEEN, OF ILLINOIS

In my judgment a statute should be enacted specifically providing that interurban railroads are to be considered railroads within the meaning of the statute, and that all laws applicable to railroads shall be applicable to interurban roads (so-called) whether operated by steam or any other motive power.

The Railroad & Warehouse Commission should be given power to prescribe by rules and regulations the method of installing telegraph and telephone wires, and more especially trolley wires, and the conditions of their crossing over each other and over the railroad tracks. The high voltage

carried by some of these wires is a constant menace to life if not properly protected. The supervision ought also to be extended to wires carrying power for commercial purposes.

The commission should have authority to establish joint through rates for the movement of freight over two or more railroads. The present method of charging the sum of the local rate for each of the railroads involved makes, in many cases, an exorbitant charge. All railroad companies should also be compelled by law to file their tariffs with the Railroad & Warehouse Commission, and no increase of rates be permitted to become effective in less than 30 days from the date of filing notice of such increase with the commission.

GOVERNOR JOHNSON, OF MINNESOTA

Minnesota is one of the States that have not yet taken up the subject of State regulation of public utility corporations, like street and suburban electric railways, telephone, telegraph, power and lighting companies. We have a railway and warehouse commission for the supervision of railroads and elevators; but the time has come in the State's development when the supervision of street and suburban electric railways, and of telephone and telegraph companies is likewise of prime importance, both in the interests of the general public, which receives the service, the State and municipality, which grants the franchises for the use of the public streets and highways, and the stockholders and other investors. New York, Massachusetts and other progressive Atlantic States exercise public supervision over public utility corporations. Ohio requires every such company to file its reports with the State, the same as a railroad or State bank; while the excellent work achieved in the public interests under the laws and public utilities commission of our neighboring State of Wisconsin is familiar to us all. There is no question that a public utility law like that of Wisconsin would be of great service to this State and to its municipalities in securing efficient service and just rates, as well as in settling disputes and grievances, and adding to the security and attractiveness of investments in such enterprises; and I trust this Legislature will give this subject its early and earnest attention.

GOVERNOR SPRY, OF UTAH

Intelligent investigation of combinations and public-service corporations will greatly aid the people of Utah and tend to establish just and fair dealing. Whatever action is taken by the Legislature regarding the regulation of these corporations should be in the spirit of conservatism and fairness to both individuals and corporate interests, such as has characterized the past history of the State, and which will make for the public good. For the attainment of this end I recommend the creation of a public-service commission to be composed of citizens of ability to deal with matters of such weighty importance; the commission to be clothed with ample powers to make regulations necessary to conserve the public welfare in this regard. Such a commission should be entirely accessible to all of the people upon all of the subjects within its jurisdiction, and the law sufficiently broad to include every public utility operating within the State. The prompt adjustment upon an equitable and inexpensive basis of the many difficulties and complaints arising in this class of business should be provided for in creating a commission of this character, which thus would be beneficial to every interest involved. In fairness to all the people of this State the creation of a public-service commission should not be longer delayed.

GOVERNOR WARNER, OF MICHIGAN

Over-capitalization and stock-watering manipulations by corporations are evils which disastrously affect the general public. The railroad companies have been the greatest offenders in this respect. * * * To the end that the public may be protected, all issues of stocks and bonds of public-service corporations at least should, in my opinion, be required to have the approval of some competent State authority.

GOVERNOR HADLEY, OF MISSOURI, IN INAUGURAL ADDRESS

I think all who have given any thought and study to this question are convinced that the regulation of the business of public-service corporations can be most satisfactorily and successfully accomplished by a commission composed of men trained and experienced by study and investigation and qualified by natural ability for such work. The chances of securing such a board to deal with the question of the regulation of the charges and the conduct of the business of public-service corporations are much better, in my opinion, if the board is made appointive instead of elective. I will endeavor, during the course of the session, to give you my views upon these questions more at length.

Before leaving this subject of the regulation of the charges or the conduct of the business of public-service corporations I wish to urge upon you the necessity of conservatism in the consideration and enactment of such legislation. While it is both the right and the duty of the State to regulate public-service corporations in such a way as to secure fair rates and a proper service for the people, such laws should not be enacted merely because the power exists to pass and to enforce them. And the right of business enterprises to be free from the burden and the expense of State regulation and control should be recognized and respected unless the conditions therein clearly justify the State in the supervision or regulation thereof. And it is never fair or advisable to exercise this right unless it is reasonably certain that the act of regulation will not deprive the owners of the property of a reasonable return upon the value of their investment.

GOVERNOR NORRIS, OF MONTANA

I think that the time is opportune to put in operation the principle of regulating by law the charges made by public-service corporations and providing a public-service commission for such purpose. For the present this service could be performed by the State Railroad Commission and no additional expense incurred.

The advisability of public ownership of public utilities is now almost generally recognized and such actual ownership is rapidly becoming more extensive. That municipal ownership of public utilities may be encouraged, laws providing therefor should be made plain, specific and easily executed. No municipal corporation should be permitted to grant a franchise for private ownership of a public utility for a longer period than 25 years. It is a well-known fact that many perpetual or long-time franchises have heretofore been granted. A law should be passed providing that such franchises should expire in 1930 unless sooner expiring under the terms of the franchise. I also recommend the giving to city councils the authority and power to regulate by ordinance or commission the rates for water and light and street-car fares.

GOVERNOR BRADY, OF IDAHO

I have been urged to recommend the creation of a railroad commission and have given the subject earnest and careful consideration. I do not feel at this time that conditions warrant the State in going to the great expense which will necessarily be incurred by the passage of such a law. Neither do I believe that any one public or quasi-public corporation should be singled out in the provisions of such a bill when it comes to the regulation of our public service corporations.

Our State has now developed to a point where it has enough public service corporations to warrant the commonwealth in assuming a reasonable supervision over all of them, and I believe that this supervision should extend to railroads, both steam and electric, power and light companies, gas companies, telephone companies, express companies, sleeping car companies, telegraph companies and water supply companies.

It seems to me that a law embodying the splendid features set out in the message of Governor Hughes would be sufficient to fully protect the interests of the people of this State. This is a subject of profound importance and far reaching effect, and as it has not been touched upon in the platform of our party, I feel that I should leave the matter in your hands for that careful thought and consideration which I know you will give to it, with the full assurance that I will co-operate with you in your efforts to secure just and fair legislation that will be of the greatest possible benefit to the people of the whole State.

GOVERNOR MEADE, OF WASHINGTON

The manner of handling and regulating our public service corporations is of the first importance, and one of the most difficult problems confronting the different States of the national government. The reason for having these corporations governed and controlled by a special commission is that such a commission is, or soon should be, an expert body, better qualified by special study and by the time such a commission can devote to the questions than are either the courts or the Legislature.

If you should conclude that such a tribunal, if created, should possess judicial power, it will probably be necessary to have the constitution of the State amended so as to directly authorize the Legislature to clothe such commission or commissions with judicial functions. I submit the matter to your careful consideration.

GOVERNOR SHALLENBERGER, OF NEBRASKA

The railroad commission should be authorized and empowered to appraise the physical value of the public-service corporations of the State and to control their debt-making power. If they have that power now, as some maintain, the Legislature should provide the means with which to pay the cost of such an appraisement. A determination of the actual value of the property of these corporations must be the starting point of any effective attempt at rate regulation. I believe that adequate funds can be provided for this purpose by requiring all corporations doing business within the State to pay a small annual license fee into the State Treasury. The right to incorporate and operate under our laws is a valuable consideration and the power and protection given entitle the State to a proper report as to the conditions of such corporations, together with a fee commensurate with the privileges granted.

POWER STATION IMPROVEMENTS AT KANSAS CITY

The Kansas City Railway & Light Company has in progress several improvements to its generating station. The new work includes the installation of a turbine, additional coal-handling apparatus, boilers, an auxiliary bus and exciter equipment. The present equipment of this large station in main generating units is three 3000-kw G. E. flywheel generators driven by E. P. Allis vertical cross-compound engines, and two 5000-kw Curtis turbines, one with two Wheeler and one with two Alberger condensers. Each engine has one Wheeler condenser. An order has been placed with the Westinghouse Machine Company for a 10,000-kva Westinghouse-Parsons horizontal double-flow turbine to be delivered in April and a Wheeler condensing equipment. An option has been purchased on a duplicate of this turbine unit for future delivery. The facilities for furnishing exciting current to the turbine generators will be increased by the addition of a high-pressure 125-volt d.c. turbine, which will feed into a common exciter bus across which will float a storage battery, and two motor-generator sets. The exhaust from the exciter turbine will be used to heat the feedwater. The present improvements in the power house center around the installation of these new turbines and the necessary increase in boiler and generating capacity which the growing load demands.

With the completion of the new improvements at the power station the boiler plant will include 30 578-hp and four 512-hp B. & W. boilers arranged on two floors and all designed for 100 deg. superheat. Thirty of these boilers are equipped with Green stokers and four are arranged for burning crude oil. The boiler house is of sufficient size to accommodate six additional boilers. The present coal-handling facilities are being doubled by the installation of an 820-ft. McCaslin conveyor and a large structural steel tower containing elevating apparatus and hoppers so that the coal may be fed to the conveying system from either of two railroad tracks, one about 25 ft. higher than the other. An ash-receiving hopper, 30 ft. high and 20 ft. in diameter, lined with firebrick, has been completed and is so supported in the steel coal-handling tower that cinders may be dropped direct from the hopper to cars on the steam track at the end of the power plant.

A shop and storeroom addition is being built at the rear of the power station on a level with the engine room floor, which level is about 25 ft. above that of the ground outside. This shop and storeroom addition is supported on a structural framework and the walls and roof are being built of Ferroinclave plastered to a thickness of about 1½ in. with concrete in which brick dust has been mixed. This method of construction is said to be very economical and permanent. The brick dust mixed with the cement gives the outside of the addition a color which harmonizes with that of the brick power station.

The improvements of the electrical side of the power station include the addition of a duplicate busbar compartment and set of 6600-volt buses. The new busbar compartments are built against the existing set, which is well sectionalized, and the new set will be used only as an auxiliary and to increase the flexibility of the switching apparatus.

Experiments are now being made with washed coal. This coal is purchased from the Cherokee mines and is washed before being shipped. The washing process is said to remove nearly 25 per cent of the original weight of the coal mixture, the impurities washed out comprising dirt and slate. In testing this coal, which, of course, must be purchased at a higher price, and comparing it with the unwashed coal from the same mines, the entire capacity of the Kansas City Railway & Light Company's Kaw River power plant will be used. This plant has units aggregating 4500 kw and by using here this unwashed coal for one month it will be possible to get an accurate comparison of the commercial efficiency as against the same coal unwashed which heretofore has been used. It is expected that considerable economy will be shown because of the lesser cost for handling the washed coal at the power station and the elimination of freight cost on the dirt and slate which the washing process removes from the coal and which also must be handled through the coal-conveying apparatus and furnaces.

A system of half-fares for school children was inaugurated in Manchester, England, last October by the municipal railways of that city. The regulations are as follows: All boys and girls not exceeding 15 years of age are entitled to travel to and from the schools at half ordinary fares. The children must fill up an application form, obtainable from any of the local tramway officers, which, when countersigned by the principal of the school, must then be presented at a tramway office for registration, and on payment of 4 cents a card is issued entitling the holder to purchase special tickets in books of 20 each, viz., 20 2-cent scholar's tickets for 20 cents, 20 3-cent scholar's tickets for 30 cents. The tickets are tendered to the conductors in payment of the fare, and ordinary tickets are issued in exchange for them, just as when coin is tendered to the conductor by ordinary passengers. Neither the registration cards nor the tickets are transferable, and this condition is strictly enforced. The number of scholars registered as entitled to these privileges in November, 1907, was 1878, while in November, 1908, it stood 3304, and the average weekly receipts from scholars' tickets have increased from $132.85 to $170.32.

ANNUAL MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The third annual meeting of the Central Electric Railway Association was held at Indianapolis on Jan. 28. There were about 100 members and guests in attendance and the papers read before the association brought forth interesting discussions on several timely subjects. The retiring president, F. D. Carpenter, general manager, Western Ohio Railway Company, presided.

MORNING SESSION

After reading the minutes of the previous meeting Secretary A. L. Neereamer presented a communication from R. M. Hemming, assistant superintendent and electrical engineer, Ohio & Southern Traction Company, criticising the use of the letters "M. C. B." when referring to material for use on electric railroads unless such material would fully meet the requirements and tests of the Master Car Builders' Association. This matter had been presented to the association before, but the standardization committee, to which it had been referred, could not unanimously agree with Mr. Hemming's suggestion that the letters M. T. C. B. (master traction car builders) be used. Because of this division of opinion the standardization committee was instructed to reconsider the matter and report later.

In discussing the matter of standards C. D. Emmons, general manager, Fort Wayne & Wabash Valley Traction Company, emphasized the need for standard couplers that would withstand the severe service conditions of electric railway trail-car operation. It was urged that the standardization committee to be appointed by the incoming president should be instructed to consider recommendations for a uniform type of coupler.

The secretary read the names of nine applicants who were elected to membership. A second letter was read from Mr. Hemming, of the Ohio & Southern Traction Company, recommending that all supply dealers publish pamphlets, catalogs and other advertising matter in uniform size so that they could more easily be filed and classified in the electric railway offices. The association referred this communication to a committee of five to be chosen from the Central Electric Railway Supply Men's Association.

Secretary Neereamer announced that at a meeting of the executive committee it had been decided to admit as associate members of the Central Electric Railway Association members of other electric railway associations. The dues of associate members would be $3 a year. The executive committee also had ruled that members of engineering firms would be classed as eligible to the Supply Men's Association. President Carpenter explained that in the reorganization of the Central Electric Railway Association and the limiting of membership to operating railroad companies no provision had been made for those officials of railway companies outside of the central territory who might desire to be benefited by attending the meetings, and therefore the decision had been made to invite such men to become associate members.

The president appointed the following committee to make recommendations regarding the exchange of free transportation among the department heads of member companies: George H. Whysall, Columbus, Delaware & Marion; W. S. Whitney, Ohio Electric Railway; H. A. Nicholl, Indiana Union Traction Company; F. W. Brown, Michigan United Railways Company; J. O. Wilson, Cleveland, Southwestern & Columbus. It was suggested to this committee that it might be found advisable to arrange for the exchange of courtesies according to the mileages of the roads interested.

Secretary Neereamer then presented to the association his first annual report as chairman of the Central Electric Traffic Association. This report will be found elsewhere in this issue in the proceedings of that association.

ARC HEADLIGHTS

Following a report of the proceedings of the meeting of the Traffic Association on the previous day, a paper, entitled "The Luminous Arc Headlight," was presented by W. S. Culver, engineer, General Electric Company, Cincinnati, Ohio. (This paper was published in the Electric Railway Journal for Jan. 30, page 198.) Mr. Culver exhibited during the reading of the paper two of the new headlights in operation with measuring instruments in the circuits to show the current characteristics under different operating conditions.

It was explained that the cost for renewal of electrodes for one year, assuming that the lamp burned 2200 hours, should be about $3.20. When this type of lamp was first put on the market there were some complaints that it would not start on low voltage and also that the solenoids burned out. These troubles were found to be due to wrong installation, the lamps having been connected on the positive side of the resistance, a potential of 400 volts thereby occurring between the lamp and the case. Mr. Culver stated that within the last three months the solenoid used in the feeding mechanism of the luminous arc headlight had been redesigned so that the lamp would adjust satisfactorily on a wider range of voltage. Also it was explained that if the trolley voltage varied greatly, say, from 200 volts to 600 volts, on different parts of a road proper adjustment of the lamp for the low voltage could be obtained by using a switch to cut out a part of the resistance while the car was running on parts of the line where the distribution system did not give more than 350 volts.

George H. Whysall, Columbus, Delaware & Marion, criticised arc headlights in general as not having sufficiently permanent electrical connections to the cars on which they are carried. The most frequent failures of headlights are brought about by accidents to the plugs or cords which make the feeding connection, and therefore Mr. Whysall suggested that arc-lamp designers should endeavor to supply some more rugged method of connecting the lamps to the car circuits.

When questioned Mr. Culver stated that if the glass in the front of the headlight was broken so that the wind had free access to the arc the lamp would not operate. With the new solenoid the lamps could be adjusted to operate on from 200 volts to 250 volts and also the solenoid was so well designed that the current flowing at 650 volts would not damage the spool. The amount of current fed through the lamp had little effect on the arc. The glass in the front of the headlight was fitted very tightly because it had been found that better service was had when almost all the air was kept out of the case. Formerly a hole had been made in the bottom of the case so that there would be a draft of air passing the arc from bottom to top, which would carry off the fumes. This draft hole in the bottom of the case had been found unnecessary and without it the arc was less liable to be influenced by the air. Regarding the question of headlight connections Mr. Culver said that inasmuch as electric railways had no standard location for headlights and no standard location for the positive con-

nection it had been necessary for the manufacturers to fit each lamp with a cable long enough to reach almost any receptacle.

J. B. Crawford, Lexington & Interurban Railways, stated that his company had adopted the luminous arc headlight as standard and had 12 in use. While there had been trouble on account of voltage conditions when these lamps were first installed the manufacturer had studied the local problem and now the headlights were giving very satisfactory service. Mr. Crawford called attention to the fact that in these lamps there were no inner globes to become broken. The only possible criticism that might be offered was with regard to the breaking of the front glass. Mr. Culver suggested, however, that it might be possible to place a thicker cushion in the frame holding the glass.

The question of the advisability of carrying the headlight on top of a car rather than on the bumper was discussed. One member held that this location might be found satisfactory for single-end operation, but the lamp so placed would be exposed to damage from the trolley pole and also would be difficult of access for adjustment on the road.

C. N. Wilcoxon, Cleveland, Southwestern & Columbus, suggested that arc headlights were pieces of apparatus requiring careful attention and that they sometimes had been blamed for faults which would not have appeared had the lamps been given the proper care.

H. A. Nicholl, Indiana Union Traction Company, described the installation of a headlight on the top of one of his fast cars. This lamp had been so mounted that it could be adjusted from within the car and the classification lights had been lowered so that they would not be interfered with by the light of the arc lamp. A headlight placed on top of the car illuminated the track at a greater distance and after a six months' trial he was satisfied that this was the best place for a lamp.

AFTERNOON SESSION—SHOP PRACTICE

W. E. Rolston, superintendent of power and shops, Cleveland, Southwestern & Columbus Railway, Elyria, Ohio, presented a paper on "The Proper Inspection of Equipment." This paper will be found elsewhere. During the reading of the paper Mr. Rolston amplified several of the statements made and discussed several of the principles laid down. In his estimation it was not economical with steel wheels in interurban service to turn off more than ⅜ in. of the tread in order to build up the flange. Frequently wheels were kept in service as long as the contour of the flange would permit and without regard to the loss in economy occasioned by such over-worn flanges requiring that the tread be wasted when the flange was again built up.

In Mr. Rolston's estimation it was not good practice to attempt to remove flat spots from commutators by sanding. Such repairs were only makeshifts which would give but few days' additional running of the armature. Meanwhile the flat spot would rapidly enlarge and might cause severe flashing over when the car was running down hill with the current on. This flashing in turn might result in burned brush holders and damaged facing and commutator leads. When flat spots were found it was far better to remove the armature at once and turn off the spots before the damage magnified itself. The question should not be how long can the commutator run after a flat spot appears, but rather how soon can the defect be corrected; thus the greatest economy would result. With the split-frame type of motor installed on the trucks so that the lower half could be let down with a jack and the armature thus easily removed the task of removal was not a troublesome one. Under such conditions the cost of making the repair ought not to exceed $1.25 for labor. If the flat spot was not removed there was a risk of having to spend $50 in repairing the armature.

Mr. Rolston stated that great care should be used in apportioning the inspection work among the men. The best man available should be put in charge of each particular kind of work because after he had handled this work for some time this man would become acquainted with the characteristics of the various equipments and could locate or forestall defects much more accurately than could a man who was switched from job to job. Inspectors should be impressed with the great value of the equipment which they had in charge and should be taught to remember that it is far cheaper to make small repairs in time than to replace parts later on.

While reading his paper Mr. Rolston amplified the statements with regard to adjusting and inspecting circuit breakers. He called attention to the fact that the circuit breaker was the safety valve of the car and that in steam-boiler practice only licensed engineers were permitted to have charge of the equipment. Of course, on the electric car no life was endangered if the circuit breaker failed to operate, but the property value jeopardized was equally as valuable as that protected by the safety valve on the steam boiler. Mr. Rolston had found bad grounds on armatures undoubtedly brought about by the failure of a circuit breaker to operate as it should. Unless properly inspected and adjusted circuit breakers that should open with the passage of 400 amp or 500 amp might not operate until the load reached 1500 amp and thus the car equipment would be in danger. In time of trouble if the circuit breaker operated on the load for which it was supposed to be set the repairs necessary to a damaged equipment might require but little more than an hour, while should the circuit breaker stick it might mean the rewinding of an armature.

Attention was called to the frequent lax use of car defect and inspection report blanks. The master mechanic in charge should always make sure that the inspectors do not slight any parts of their equipment. Also he should at all times be in touch with the work so that he can feel sure that the men are working properly and efficiently. To do this it will be necessary for him to visit the pits, both day and night, spend some time on the cars, converse with the motormen, test the hand brakes and lead and instruct the men, impressing them with the value of good work as a means of advancement. It would be wise to make a rule that the hand brakes should be inspected every time a car is set over a pit. Hand brakes are exposed to mud and water and frequently are so clogged as to be inoperative. At a small cost the gearing could be encased in a sheet-iron cover held in place by two thumb screws.

After the reading of Mr. Rolston's paper a general discussion of some of the subjects introduced took place. When questioned Mr. Rolston said that about five inspectors would be required to take care of 10 or 12 cars in regular interurban service. Ten per cent more labor was necessary in caring for multiple-unit control equipment than for inspecting and repairing the K or L type controllers. He described the report blank used by the men inspecting the cars of the Cleveland, Southwestern & Columbus. The principle of this blank is that it requires the inspectors to write out fully all that they do rather than just check printed items. He had tried to use a system with all the parts named on the blank, but found that the

men became lax and sometimes marked "O. K." opposite items which had not been inspected. Requiring fully itemized reports had a good moral effect on the men responsible for the work.

E. C. Carpenter, Indiana Union Traction Company, emphasized the value to the claim department of having available records showing the condition of all parts of the equipment at all times so that there might be evidence of those parts which were perfect as well as of those which had needed repairing.

When questioned regarding the wheels used, Mr. Rolston said that he obtained 50,000 miles with the Schoen wheel before the first turning. This wheel was standard with the Cleveland, Southwestern & Columbus. It had been found that after the first turning a mileage of from 40,000 to 45,000 was possible between turnings. The life of the wheel was sufficient for four or five turnings with an average mileage of from 200,000 miles to 240,000 miles. The treads when finally discarded had been turned down to a thickness of 1 in. The cars weighed about 35 tons light. The wheels when new were 37 in. in diameter with treads 3⅛ in. thick, flanges 15/16 in. high and 1¼ in. thick at the throat. The mileages above mentioned had been exceeded with a Standard Steel Works steel-tired wheel, but the steel in this tire was 20 per cent harder than that of the rolled-steel wheels.

G. H. Kelsay, Indiana Union Traction, suggested a most simple method of testing circuit breakers for adjustment. He had installed a short piece of trolley wire parallel to the regular wire in a car house so that the trolley wheel of a car could be placed on this short section of wire and a load be put on the car circuit breaker by means of a water-barrel rheostat in series with a master breaker. Thus an adjustment of the car breaker could be made without removing it from its position.

George H. Whysall, Columbus, Delaware & Marion, said that the ill-effect of a choked inlet to an air compressor was not generally recognized. If the intake screen was so choked as to reduce the pressure within the intake pipe to 1 lb. below atmospheric pressure, then the capacity of the pump was reduced one-fifteenth. If the inlet for the air compressor was extended to the roof the longer intake pipe would have a partial choking effect and therefore care should be taken in such an installation to make the pipe amply large.

LIGHT AND POWER FROM RAILWAY CIRCUITS

A paper with this title was next presented by G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind. This paper will be found elsewhere in this issue.

In introducing the discussion President Carpenter said that the Western Ohio Railway was lighting streets with current taken from the 33,000-volt railway transmission circuit; also arc lamps were operated satisfactorily on 25-cycle current.

Mr. Kelsay stated that the arrangement of apparatus and connections as shown in Fig. 3 of his paper, which apparatus received three-phase current from the railway transmission circuit, reduced the voltage and distributed the current over a three-wire circuit with a grounded neutral, was used to light a large important building near Indianapolis and at the end of the transmission system. While there were excessive fluctuations of load on this transmission system, the distribution from the low-tension side of the transformers was made at a far more even and steady voltage than that ordinarily given by isolated plants in small towns.

With regard to the rates to be charged for current taken from railway transmission circuits it should be remembered that the charge, if current was taken off a feeder circuit between substations most distant from the power station, should include interest and depreciation on the investment for all parts of the transmission system between the distribution point and the power house. If the current was taken from a circuit near the power plant the fixed charges would, of course, not have to be so great, and therefore the rate could be lower.

T. F. Grover, Terre Haute, Indianapolis & Eastern, said that the Terre Haute division, of which he has charge, handles a considerable lighting and power load from its 60-cycle transmission circuits. He had found no trouble with the railway rotary converters on these circuits and it was the practice in building substations to provide for equipment with which to furnish current for lighting adjacent districts. The company now lighted three cities from the railway transmission system with variations in voltage at the distribution points of not more than 3 per cent.

George H. Whysall said that 25 per cent of the peak load of the power station of the Columbus, Delaware & Marion Railway was sold to lighting and power consumers. In winter the output of the station on account of the nature of this load was larger than in summer. Current is generated at 25 cycles and converted to 60 cycles, being distributed as single-phase current for lighting service and three-phase current for motor service. The regulation is excellent and charts from recording voltmeters indicate an almost uniform voltage. To accomplish this regulation a Tirrell regulator is installed at the distribution station.

BUSINESS AND ELECTION

Secretary A. L. Neereamer next read his annual report as secretary of the Central Electric Railway Association. The report shows that there are now listed in the membership 43 railways representing 3401 miles of track and 60 members among the supply men. The first six months of the past year were utilized by the secretary in reorganizing the association on a sound financial basis and also in organizing the Central Electric Traffic Association. The finances of the Central Electric Railway Association were said to be in good shape. A claim index bureau has been established, but the full benefit from this bureau has not yet been realized on account of a lack of co-operation on the part of the members. W. F. Milholland, treasurer of the association, certified to the financial statement included in the secretary's report.

President Carpenter stated that the association now had work in hand of such importance in the development and operation of electric railway service that no road could afford to remain outside the membership. President Carpenter then presented his annual address, which was published in the Electric Railway Journal of Jan. 30, page 197.

It was announced that the executive committee had recommended that the offices of secretary and treasurer be united. Later A. L. Neereamer was appointed to this office. The nominating committee also recommended that instead of appointing five men from Ohio and five from Indiana as members of the executive committee, four men should be chosen from each of these States and one from Kentucky and one from Michigan. The following list of officers was then put in nomination and unanimously elected to serve one year:

President, A. A. Anderson, general manager, Indianapolis, Columbus & Southern.

First vice-president, George H. Whysall, general manager, Columbus, Delaware & Marion.

Second vice-president, Arthur W. Brady, president, Indiana Union Traction Company.

Secretary and treasurer, A. L. Neereamer.

Executive committee as follows: H. A. Nicholl, Indiana Union Traction Company; C. D. Emmons, Fort Wayne & Wabash Valley; J. A. Crall, Terre Haute, Indianapolis & Eastern; Fletcher M. Durbin, Evansville & Southern Indiana; F. D. Carpenter, Western Ohio; C. M. Paxton, Dayton & Troy; W. S. Whitney, Ohio Electric; C. N. Wilcoxon, Cleveland, Southwestern & Columbus; F. W. Brown, Michigan United; J. B. Crawford, Lexington & Interurban.

It was announced that the next meeting of the association would be held at the Hollenden Hotel, Cleveland, March 25. The next meeting of the Traffic Association will be held at Lima, Ohio, on Feb. 12 and 13.

CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The annual meeting of the Central Electric Traffic Association was held at Indianapolis, Ind., on Jan. 27. The principal business of the meeting was the checking of the new interline tariff now being formulated and the election of officers for the coming year.

A. L. Neereamer was re-elected chairman of the Central Electric Traffic Association and J. T. Brittson was reappointed secretary. At the meeting, Mr. Neereamer as chairman, presented the first annual report of the association, which was as follows:

The organization of a traffic association was undertaken on March 26, 1908, and on April 12 your chairman assumed charge of his duties. The completion of the organization was a difficult task. It was first necessary to properly reorganize the Central Electric Railway Association upon a financial basis sufficient to take care of all the expenses of the traffic association. This consumed a period of about six months, during which time the chairman and president visited the managers of most of the traction lines in Indiana and Ohio. After a sound basis was assured in the Central Electric Railway Association the first object was to complete and place on the market an interchangeable mileage ticket. This was done, and after the ticket was printed there was some delay in printing the tariff while securing proper power of attorney and concurrences. A tariff was finally issued, effective Jan. 10, 1909, and the ticket is now on sale. In connection with this tariff the chairman would suggest that the selling rate be taken under careful consideration by all of the traffic men for the reason that this rate is higher than the local rates on the majority of the lines and therefore prevents some of our members from becoming party thereto.

We are now in the midst of the construction of a selling and basing fare sheet and this has been progressing as rapidly as possible and we hope to have it completed at an early date. In the construction of this tariff it has been and will be necessary to have numerous meetings for the purpose of checking the compilation of rates and assigning proper routing to each, thereby giving every line, party to the tariff, a proper representation. It is unnecessary for the chairman to dwell upon the time consumed in the construction of this tariff as those who have attended the meetings know the enormous amount of work that is yet to be done before the tariff can be completed. We feel that when this is completed a great work will have been done toward increasing through traffic on interurban lines and the result will more than justify the trouble and expense.

After this work is completed there still will be an open field for the labors of the traffic association. Freight traffic is not placed upon the basis which it should occupy and there is a large amount of work necessary to bring this to a standard which the traffic men of the various roads that are members desire. The chairman would recommend to the association for future consideration the compilation of a joint party fare sheet, the district minimum freight rate sheets and a mode of securing and filing of the official classification with the traffic association, title page and binding.

At the close of the business session the representatives of the traffic departments of the electric roads in the central territory spent several hours in checking rates to the basing points as selected and announced at the Lima meeting held on Nov. 18, 1908, which meeting was reported in the ELECTRIC RAILWAY JOURNAL of Nov. 28, 1908, page 1453.

The next meeting of the Central Electric Traffic Association will be held at the Lima House, Lima, Ohio, on Feb. 12 and 13.

PROPER INSPECTION OF EQUIPMENT*

BY W. C. ROLSTON, SUPERINTENDENT OF POWER AND SHOPS, CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY COMPANY

In organizing a force of men for inspecting equipment too much care cannot be given to selecting the individuals with due regard to their honesty, sobriety and experience—men who will take hold and push their work along with the one idea in view that things must be kept in first-class shape, each man working shoulder to shoulder with his neighbor, trying to do his work to-day better than he did it yesterday. Such a force properly organized and working systematically will have an important bearing on the returns paid on the investment in the railway property.

Every well regulated car shop and barn should have a foreman who, in a general way, lays out the work to be done, and each department, regardless of the number of men employed, should have a foreman or working head who is held responsible for the quantity and quality of work turned out by his department.

The inspection and cleaning of cars should come under one head and he should be held responsible for the operating condition, as well as the general appearance, both inside and outside, of the cars. This chief inspector, as he might be termed, should have direct charge of all help employed in inspecting and cleaning of the equipment, and he should be provided with blank forms, covering all work done by his force on the inspection and cleaning pits. The individual make-up of this force should consist of one or more men capable of taking care of circuit breakers, controllers, control circuit and lighting; one or more men to take care of brakes, both hand and air; also condition of trucks as regards loose bolts, defective springs, gaging wheels, condition of axle and journal bearings; one or more men to inspect armatures for clearance, brushes, brush-holders and brush-holder springs, condition of commutators, fields and terminals; one or more men to clean and examine air compressors, governor and engineer's valve, also hot water heating system, if such a system is used; one or more men to clean and wash all outside portion of car body and also take care of toilet room.

The best way to clean cars is to use plenty of good, clean water, with some good type of brush. The use of various kinds of car cleaners has in many cases shortened the life of the varnish and paint on the cars. For cleaning the interior of the car I have found women to be best adapted for this work. They seem to have a knack of getting dirt out of the corners and cleaning wood-work and glass that far surpasses work done by the male sex. Clean, warm water with sponges should be used on all varnished woodwork, and suds made from some good grade of soft soap used for floor cleaning. For cleaning seat cushions the vacuum process is without question the most economical method to use, as it not only does the work well, but increases the life of the seats and the car body, for it is a well-known fact that the accumulation of dirt is largely responsible for the rapid deterioration of car bodies.

*Abstract of a paper read at the January meeting of the Central Electric Railway Association, Indianapolis, Ind., Jan. 28, 1909.

The efficiency of the inspection force bears an important relation to the cost of maintenance of equipment, and no master mechanic can afford to employ careless and incompetent help in any department.

The condition of the car equipment of any electric railway speaks volumes either for good or bad in the eyes of the travelling public. If good, the public appreciates it, and will patronize your road; if, on the other hand, your cars have the appearance of being neglected, pull-offs are frequent, cars run late on their schedule, due to the failure of some part or parts of the machinery under the car, the result is dissatisfaction of your patrons and a falling off in receipts.

What part does failure of car equipment play in the accident and claim department? This point is often overlooked by master mechanics, and if a careful survey was made of the accidents that happen on every road during the year, and the cause directly or indirectly sifted to the bottom, I venture the predication that many of our mechanical men would be very much surprised. How many passengers do you injure more or less seriously during one year's operation? Bad brakes, defective controllers, circuit breaker out of order, failure of air equipment, in many cases compelling the motorman to use the reverse, are some of the details that should be solved by the mechanical department, and they can be if the proper effort is applied.

Circuit breakers should be tested once a month by being removed from the car and placed on a switchboard equipped with a main switch from feeder line, ammeter and voltmeter, the load being applied by means of a water rheostat having two movable plate terminals. The adjustment should be such that the breaker will open when just the proper amount of current is passing. Controllers should be blown out with air at frequent intervals, cable terminals inspected, insulated parts cleaned off and a liberal supply of shellac used. A small amount of lubrication is required to reduce friction on moving parts. For this purpose I have found sperm oil far superior to vaseline or machine oil. Brake valves should be removed once in two months, thoroughly cleaned and put on a test rack. If found in a leaking condition they should be ground to true surface on a plate provided for this purpose.

Air pumps located, as is the general practice, under the car body, receive a great deal of abuse, due to the rapid accumulation of dirt, especially if the road operates a considerable distance over paved streets. A big improvement can be made in the operation of the air compressor by carrying the free air supply pipe up into the vestibule or to the top of the car whenever practicable. The writer has investigated cases where the crank shaft was broken, caused by an excessive amount of dirt accumulating in the oil chamber and churning around until the boxes were worn to a dangerous point. I find it good practice to dismantle the air compressor and thoroughly clean all parts and refill with fresh oil each time the car is shopped for overhauling of trucks, on a mileage basis of about 50,000 miles.

Since it has become standard practice to equip trucks with either solid steel or steel-tired wheels, the question of flange wear becomes a serious one. A number of bad accidents have happened where trucks have split switches when running at a high rate of speed. It is false economy to try to wear steel flanges thin and sharp at the point. The large amount of metal to be turned off the wheel tread in order to build up a new flange means an extravagant waste of material. The condition of the wheel flanges is an important point that your inspectors should keep in mind at all times. Each inspection shed should be provided with a wheel gage which should be used at frequent intervals.

Flat spots on commutators is a trouble that exists on every road operating d.c. motors. Many explanations have been offered as to why this occurs, and remedies have been suggested as to how to overcome it. During the past three years I have watched the results obtained by grooving the mica on commutators, and am satisfied that 50 per cent. of the troubles can be eliminated by grooving. The inspection of commutators, brush and motor clearance requires the exercise of good judgment on the part of the man in charge of this work. Commutators with flat spots will not run long without causing serious damage to either brush-holders, commutators or armature coils, and frequently all three, which in turn means a corresponding increase in maintenance cost.

In conclusion I wish to emphasize the necessity of carefully selecting men for the inspection of equipment and giving them instruction, as often as opportunity presents itself, to the end that you may maintain the equipment in your charge in good condition at the lowest cost possible.

PRACTICABILITY OF LIGHT AND POWER FROM ELECTRIC RAILWAY TRANSMISSION CIRCUITS*

BY G. H. KELSAY, SUPERINTENDENT OF POWER, INDIANA UNION TRACTION COMPANY

Many interurban railways have done considerable power and lighting work from their transmission circuits. But the field of this source of revenue is comparatively undeveloped. There are two types of cities to be considered in a discussion of the subject of this paper. One is a city of such size as to make it a profitable proposition for capital to invest in a local lighting and power plant. The other is the smaller city which has not the population to warrant an investment in a local lighting plant. There have been many enthusiastic promoters of small lighting properties who have had the sad experience of finding after investing that they have fallen far short of getting the returns anticipated. The small city, however, can be profitably supplied with light and power if the overhead station costs are relatively small. A traction company can give this class of service, and if properly handled and developed can make of it a profitable source of revenue.

Definite and reliable data on detailed costs which enter into the production and delivery of power to consumers in small towns are very hard to obtain. There are only a few small properties where much more can be obtained than figures of yearly coal bill, wages, repairs and receipts from business, and it is difficult to classify and estimate the various unit costs entering into their operation.

To obtain revenue from freight and express service all of the investment and all of the office and other expenses required for conducting passenger service are taxed in practically a direct ratio to the amount of work done. In other words, for every dollar received from freight and express business a portion must go to pay part of the fixed charges and operating costs of every department in the organization of the railway. It is not possible to earn a cent from freight without adding some load to the power station, transmission system and distribution system, adding wear and cost of maintenance to the roadway, adding maintenance to the rolling stock, adding some to the labor and hence the cost of station agents and the auditing department, adding to the cost of the transportation department and adding danger to the safety of passenger car service. This is not the case with money earned from conducting a lighting business. A dollar earned from the sale of current for power and lighting does not add a cent to the cost of some of the heaviest investments which make up the cost of traction lines. It adds only to the fixed and operating costs of the power station and transmission system, and a small expense to the auditing department and management, representing approximately only 15 to 20 per cent of the total operating charges on interurban railways.

To regulate the power demands on a light and power station so as to give a maximum revenue for a minimum station cost, the central station manager does everything possible to keep his load factor high, eliminating the high peak loads which require idle investment so many hours each day. A carefully managed power and lighting load may be added to the average interurban railway load in such a way that any investment which may be required will be very profitable.

The maximum demands on interurban railway power plants occur in the summer time. The maximum demands on lighting plants occur in the winter time. The evening peak load on a lighting plant is on but a short time until the average interurban railway load will begin to lessen. The

*Abstract of a paper read at the January meeting of the Central Electric Railway Association, Indianapolis, Ind., Jan. 28, 1909.

moonlight and all-night schedule of arc lamp loads would be beneficial in helping the night load on the average interurban plant. Sundays and Saturday afternoons and legal holidays are times of peak load on railway plants, but are ordinarily times of a minimum power load. Any all-day power load added to a railway plant should be sufficiently profitable to warrant such additional investment as is required. Such power load need not necessarily be taken on at a very low rate, as is sometimes done by central stations, as off-peak business may be taken many times by a central station at such low rates as would not be so profit-

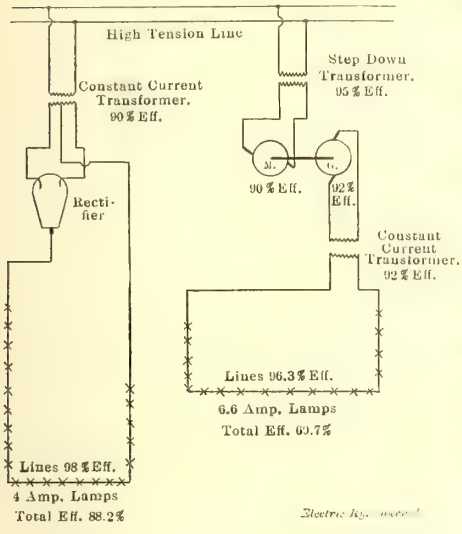


Fig. 1

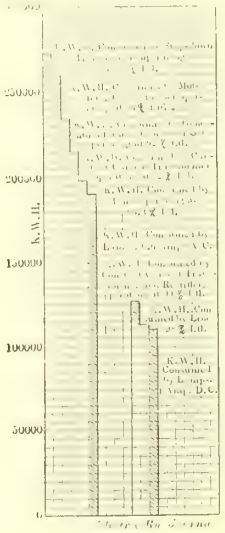


Fig. 2

able to a railway company. The average interurban railway plant with sufficient capacity to safely and economically handle its usual heavy business through the entire summer should be in a position, however, to earn some very handsome dividends by selling current for power and light.

There are many refinements in design and operation which would add greatly to the short peak load efficiency of power stations. The adoption of steam turbines using either exhaust steam or high-pressure steam, the installation of stokers and furnaces capable of high overload duty for short periods, or the installation of double stoker equipments to boilers for short periods of operation might prove very beneficial.

The transmission circuit, being one of the most important factors in making possible the sale of power, deserves special consideration. This circuit as usually constructed is composed of two parts when considered from the standpoint of fixed charges, the poles and cross-arms, which have a very high rate of depreciation, and the insulators and wire, which have a very low rate of depreciation. Railway transmission pole lines are usually not very heavily loaded, and could very easily be made to carry more transmission copper, and as copper has a very low rate of depreciation, it is the most efficient investment that could be made from the standpoint of fixed charges, whereas the poles and arms are possibly the most inefficient. Therefore, any increased revenue from transmission pole lines without any increased cost of poles and arms will assist very materially in overbalancing the greater cost of maintenance. The question then arises, how shall energy appropriate for light and power be obtained from railway transmission circuits? These lines, with a few exceptions, carry three-phase, 25-cycle circuits and a voltage usually of from 15,000 to 30,000.

Considering first the small city of such size as not to be able to support a local lighting plant, and where it would be quite essential to keep the investment and maintenance cost low; in such small cities there are three classes of service usually demanded and capable of development. These are lighting residences and business rooms, lighting the streets and supplying power for motors. The lighting of residences and business rooms may be accomplished from the secondary side of a transformer, the primary of which connects directly with the high-tension line. The transformer may be wound to give 110-volt, two-wire, or 220-volt, three-wire distribution, and it will usually be more economical from the standpoint of copper efficiency and safety to supply current from a 220-volt, three-wire circuit with a grounded neutral. For incandescent lighting 25-cycle current will give very satisfactory service and will work quite well with either carbon or tungsten filament lamps. However, lower voltage for the operation of lamps would be somewhat preferable, and especially for tungsten lamps; that is, 54-volt lamps will give somewhat better service than 110-volt lamps, and if the service is to be of the very highest class, the distance of secondary distribution very short and the load moderate, the investment in copper will not be prohibitive.

Street lighting may be successfully accomplished by various means. Incandescent tungsten lamps will give very satisfactory service for street lighting when controlled by an independent circuit, operated either in parallel or in series on a constant current circuit supplied by a constant current transformer; or they may be connected in series on a constant potential circuit, each lamp being in parallel with shunt coils. Inclosed d.c. series-arc lamps may be successfully operated from the trolley feeder, with five to six lamps on each local circuit when the voltage of the feeder is such as to give fair regulation. There is on the market a type of arc lamp which is much more efficient than any other, being a d.c. 4-amp, 272-watt lamp, known by one manufacturer as a metallic flaming arc and by another manufacturer as a magnetite arc. This lamp is supplied with current through the medium of a constant current transformer and mercury vapor rectifier, and current may be taken directly from the high-tension line, transformed and delivered to the arc lamp circuit at approximately 90 per cent efficiency. Fig. 1 is a diagrammatic outline of the equipment and connections required for lamps of this type. This type of arc lamp gives much greater candle-power than is furnished by the usual type of a.c. or d.c. inclosed arc lamps, and is in other respects more economical.

The metallic flaming arc lamp apparatus converts energy directly from the high-tension line through one transformer and mercury vapor rectifier to the lamp circuit, whereas 60-cycle constant current arc lamps require current to be transformed first from high tension to low tension through a static transformer, then from 25-cycle to 60-cycle current through a frequency changer, and then from 60-cycle constant potential to 60-cycle constant current through a transformer. The efficiency of the two systems would be about as follows: The 4-amp d.c. metallic flaming arc lamp, 88.2 per cent, and the 60-cycle constant current arc lamp about 69.7 per cent. Fig. 2 shows the

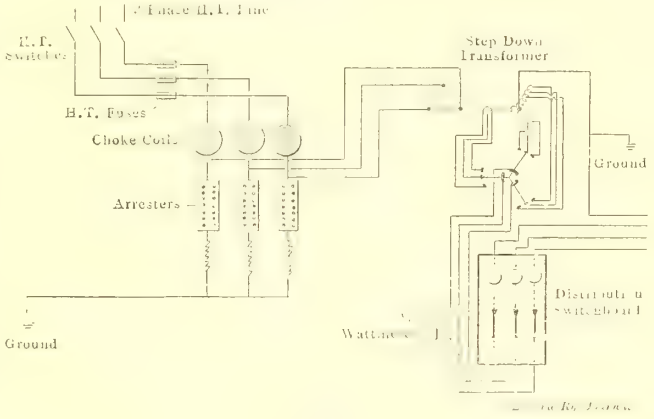


Fig. 3

estimated power consumption for 100 lamps of each system. It will be seen that the 6.6-amp a.c. lamp requires somewhat more than twice the power consumption from transmission circuits than does the 4-amp d.c. lamp. By the use of this latter type of lamp the railway transmission circuit becomes a very efficient source of energy.

The power requirements of a small town consist principally of such motors as are required in grain elevators, flouring mills, planing mills, machine shops, printing offices and other miscellaneous power service. Such power may be readily and efficiently obtained from railway trans-

mission circuits by step-down transformers and distribution at 400 volts as 25-cycle three-phase current.

It will be seen from the description of the above classes of service which can be supplied from high-tension railway transmission lines that such service may be given with minimum station operating costs and fixed charges. It is entirely possible for such service to be supplied from apparatus which is absolutely static in its operation; that is, having no moving parts, and thus will require very infrequent attention. The distributing substation should be a fireproof building, with dimensions of possibly not over 10 ft. x 15 ft. of floor space, for a city of 1000 or 2000 population. The station equipment should be very simple in design. In the high-tension circuit the high-tension switches should be of the knife-switch type, which may be opened or closed with power on the transmission line. In the same circuit the fuses should be of such a size as to protect the high-tension line from accidental grounds. There should also be installed choke coils and lightning arresters, and from these lightning arresters the high-tension current should pass into the primary side of step-down transformers. These transformers should be built and furnished under very rigid specifications from a standpoint of insulation, and as it probably would be desired to furnish service at all hours during which power is on the transmission circuit, the iron losses of the transformer should be kept as low as possible to give a very high all-day operating efficiency. From the low-tension side of the transformers the current can be conducted to a switchboard of very simple design, containing only such instruments as are needed to determine the conditions of operation and containing in all cases a wattmeter which would measure the total output of the station. With such a sta-

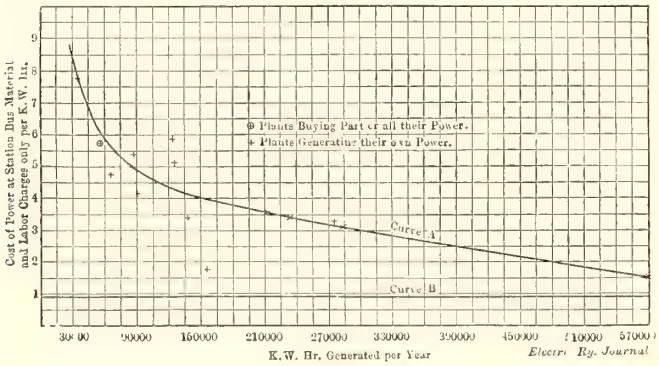


Fig. 4

tion the cost of attendance would be a minimum. To make the investment show best returns, the same principles of obtaining business should be exercised as are now practised by central stations of large capacity; that is, all power loads, when possible, should be contracted for as off-peak business. All heavy motor loads should be on only when the lighting load is sufficiently light, so as to not overload the station apparatus. Usually this can be readily accomplished and the equipment made to earn a maximum amount of revenue with a minimum first cost. It would usually be advisable in all cases to install a spare transformer so as to safeguard any accidents which might occur to the transformers which are in service. The design of such a station contemplates the installation of three transformers, delta connected on the high-tension side and star connected on the low-tension side, so as to give current of a voltage appropriate for three classes of service, 440 volts three-phase current for heavy motor service, 190 volts or 220 volts three-phase current for small motor service, and 220 volts with grounded neutral for lighting service. The scheme of wiring of such a station is shown in Fig. 3.

For the operation of the metallic flaming arc lamps mentioned above, a single-phase, constant current transformer appropriate for this service may be installed in the same fireproof building. This arc light circuit will require manual manipulation when starting the arcs, but could be shut off by an operator at a distance or by an automatic clock arrangement which would operate at some predetermined hour.

For supplying power in larger cities the same general scheme of station installation can be carried out as in small cities, except for a refinement of station equipment and attendance somewhat in a direct proportion to the amount and variety of business done. If it is essential to furnish 60-cycle current, this necessarily involves the installation of motor generator sets, which in turn require station attendants. No doubt 60-cycle current would be demanded in many large cities having from 15,000 to 30,000 population, as much of the commercial equipment which would be installed by consumers would require 60-cycle current. If it is not essential to furnish 60-cycle current, 25-cycle distribution is more desirable from the standpoint of the traction company, as it can be furnished at a much higher efficiency than 60-cycle current.

An analysis of some of the factors entering into the cost of power as now supplied by the small, isolated lighting station will illustrate somewhat more plainly the reason why the traction lines should be able to furnish this power more efficiently. There are lighting companies now operating in the territory covered by railway transmission lines whose revenues are not sufficient to regularly meet the payrolls of the men operating them or to keep sufficient coal on hand for reliable operation. Such a condition of affairs is certainly very discouraging, and there is little prospect of such a lighting property ever proving profitable to the investor.

It has been shown from statistics that there is a considerable difference in the amount of lighting business procurable in towns of equal population. In a small city located in an agricultural district, where the population is largely composed of retired farmers, the lighting business is usually much less than that obtainable in a town of the same size where the population is made up largely of people engaged in manufacturing and similar industires.

Most lighting plants which have short hours of operation, with peak loads, demanding a large investment in equipment, usually make the cost per kw-hour for production so close to the revenue per kw-hour sold, that the profits have been extremely small. The final solution for making such properties pay has been definitely proved to be through the development of a day service, or in effect raising the load factor of the station, such day service being obtained from motors or cooking utensils of various kinds. From the analysis of 14 lighting stations operating in cities of 10,000 population and less, made to determine the cost of power per kw-hour at station bus, including labor and material charges, it was found that the cost of power varies through quite a wide range. Some stations show a moderate cost, whereas others show very high costs. Reference to curve *A*, Fig. 4, will show costs per kw-hour plotted against total kilowatt-hours generated per year.

If the manufacturing cost of power, interest, taxes and depreciation be added, the total power cost will be very high, and it is against this total cost that a railway company must make its estimates when fixing rates.

Since the fixed charges (interest, depreciation and taxes) would be more for a local lighting company than for a traction company, on account of the greater cost per kilowatt capacity for a small station, it would be more than conservative when estimating rates for selling power from railway transmission circuits to compare simply manufacturing costs of the power required when taken from a local generating station or from transmission circuits. The manufacturing cost of a kilowatt-hour delivered from a transmission circuit would be something more than the cost of a kilowatt-hour at the busbar of the generating station on account of the loss in transmission and transformation. Assuming an average step-up transformer efficiency of 94 per cent, transmission efficiency of 95 per cent, and step-down transformer efficiency of 90 per cent, we have the cost of power ready for distribution equal to the cost at generating bus multiplied by 1.24. Therefore a station which is generating power for 7.5 mills at the busbar can furnish it, assuming the efficiency as above, ready for distribution to a small city for lighting at a net manufacturing cost, not including line maintenance, of approximately 9.3 mills. Referring again to Fig. 4, curve *B* shows the esti-

mated cost of power from transmission circuit, from which it is quite evident that there is a great difference of cost between the two systems. The operation of a local generating plant is very much less efficient than obtaining power from a transmission circuit. The lighting of small cities should, and will if carefully developed, result in very profitable revenue to the traction companies.

A. S. & I. R. A. COMMITTEE MEETINGS IN NEW YORK

On Thursday, Friday and Saturday, Jan. 28-30, a number of committee meetings of the American Street & Interurban Railway Association and its affiliated associations were held at the association headquarters, 29 West Thirty-ninth Street, New York. Arrangements had been made by which the use was secured of eight committee rooms, most of them on the seventh floor of that building, so that they were en suite with the main office of the association. This arrangement added very much to the convenience of the delegates.

The committees which met on Jan. 28 were those on subjects, the revision of dues, Interstate Commerce Commission affairs, municipal ownership and public relations, and the committee on the suggestions contained in the address of President Goodrich.

Of the members of the committee on subjects the following were present: Mr. McCarter, chairman; Messrs. Kruger, House, Wallis, Winsor, Hardin and Allen. There was a full attendance of the committee on revision of dues, which consisted of Messrs, Brady, chairman; Grant, Storrs, Shaw and Swenson. Of the committee on Interstate Commerce Commission affairs, Messrs. Ford, Brady and Sergeant were present. The committee on municipal ownership and public relations met with General Bancroft, chairman, and Messrs. Ely, Foster and Black in attendance. The entire committee to whom were referred the suggestions contained in the address of President Goodrich was present. It consisted of Mr. Shaw, chairman, and Messrs. Goodrich, Ely, Brady, Allen, Wallis, Lang and Rogers.

Those in attendance at the executive committee of the Transportation & Traffic Association were Messrs. Allen, Todd, Radcliffe, Parker, Page and Bolen.

The members of the executive committee of the Claim Agents' Association present were: Messrs. Hardin, Ryan, Davis, Reynolds, Drown and Ex-President Goshorn.

All of these committees discussed the different matters coming under their jurisdiction; work was laid out for the coming year and plans were formulated for the 1909 convention. The committee to consider the suggestions of President Goodrich completed its work, and has drawn up a report, which will be printed and sent out to the member companies at an early date. The committee on revision of dues reported to the executive committee that at the present time it advises no change to be made in the dues of active members.

FRIDAY, JAN. 29

Jan. 29 was given up to the annual meeting of the executive committee of the American Association, which held two sessions, one in the morning and one in the afternoon, and to a meeting of the executive committee of the Manufacturers' Association. Those in attendance were Messrs. Shaw, Brady, McCarter, Black, Wallis, Winsor, Hardin and Allen. According to the constitution, ex-presidents of the association are also members of the committee, though without vote, and those present during part or all of the sessions were Messrs. Littell, Vreeland, Sergeant, Ely and Lang.

One of the most important topics considered by the American Association was the selection of a meeting place for the 1909 convention. The relative merits of different Eastern and Western cities were considered, and the committee finally passed a resolution that the 1909 convention should be held in some city west of the Mississippi River. The selection of the city and the time will be determined by a special committee to be appointed by the president.

At the close of the morning session Mr. Swenson, secretary of the association, announced to the executive committee that inasmuch as the association had now demonstrated its value and usefulness to the member companies and was in a prosperous condition financially, he desired to accept an attractive opening which had been offered to him in the electric railway business. He consequently tendered his resignation, to take effect Jan. 29, or at such future time as may seem advisable to the committee. This matter was referred to a special committee for adjustment with the understanding that Mr. Swenson would continue as secretary and treasurer of the association, devoting such of his time as may be necessary to give the work general supervision until his successor is appointed. The following resolutions were then voted by the committee:

The executive committee of the American Street & Interurban Railway Association having received and accepted with regret the resignation of B. V. Swenson as secretary and treasurer of the association, desires to place on record its appreciation of his services. For the past three and one-half years and during the formative period of the reorganized association, Mr. Swenson has diligently and assiduously performed the duties of his office. Of necessity, for the greater portion of the year the secretary of the association is the association itself, as through his office all the detail work of the association is performed and the member companies kept in touch with its progress. So successful have been his efforts that the association is now on a safe basis and its future seems assured. We are indeed sorry to lose him, but we congratulate him upon his advancement. His position with the association will be difficult to fill.

It is ordered that this minute of appreciation be spread upon the records of the executive committee.

It is understood that Mr. Swenson has received an offer to become associated with Barron G. Collier, of New York, in the street railway advertising business, but that no immediate change is considered, and it seems probable that he will continue to act as secretary and treasurer of the association until the close of the 1909 convention.

MEETING OF EXECUTIVE COMMITTEE OF ACCOUNTANTS' ASSOCIATION

The executive committee of the American Street & Interurban Railway Accountants' Association met at the Engineering Societies' Building, New York, on Jan. 30. The president, Robert N. Wallis, treasurer Fitchburg & Leominster Street Railway, presided over the meeting, and the following other members were present: H. S. Swift, Toledo; S. L. Reichert, Duluth; H. E. Weeks, Davenport, Ia.; Charles N. Lahr, Akron; W. J. Kehl, Norfolk, Va., and W. B. Brockway, ex-president of the association.

Several matters which had been referred to the committee at the meeting of the association in October, 1908, and various subjects relating to the work of the current year and the next convention were discussed. The advisability of holding the 1909 convention at a time and city different from those selected by the other associations was also considered from three standpoints, as follows:

(1) Whether it would be advisable to try the experiment one year in order to learn whether separate meetings would result in a larger attendance at the annual meetings; (2) what places in the Central West and what time of the year and month would best suit the majority of members, if it should be considered advisable for the Accountants' Association to experiment with the plan of a separate meeting; (3) the various arguments for or against a change from the existing policy. After discussion of the suggestion from these different points of view action was postponed.

The action of the association at the 1908 convention respecting the appointment of joint committees with other affiliated associations—the Engineering, Claim Agents' and Transportation & Traffic—was brought up for consideration. It was finally decided to ask President Wallis to confer with the presidents of the other affiliated associations on this subject and to appoint the members of the committees if it was found desirable.

On the subject of associate members, it was thought by the committee that the reasons which made it advisable for the Engineering, the American and the Transportation & Traffic Associations to have a large associate membership did not exist with the Accountants' Association.

THE BANQUET

The annual banquet extended by the American Street & Interurban Railway Manufacturers' Association to the executive committee of the American Street & Interurban Railway Association, and the members of the committees of that association and of the affiliated associations meeting in New York at the same time as the executive committee, was held at the Knickerbocker Hotel on the evening of Jan. 29. About 60 were present.

An interesting feature of the banquet, which was a very successful one, was the presentation to Mr. Shaw and to the ex-presidents of the American Association of souvenir badges. Charles C. Peirce, of the Manufacturers' Association, who made the presentation address, explained that similar badges had been prepared for all of the living ex-presidents of the association and one would be sent to each who was not in attendance. Those present were H. H. Littell, H. H. Vreeland, A. E. Lang, C. S. Sergeant, W. Caryl Ely and C. G. Goodrich. The badge is of gold and consists of a medallion supported on a bar upon which the name of the president and the date of his term of office appear in blue enamel. The medallion is surmounted by an American eagle, typical of North America, and is flanked by flags of the United States, Canada and Mexico. In the center is an emblematic figure of Power, who is holding lightning in one hand and is standing on a gear wheel, typifying the application of power to electric railway transportation. The figure is surrounded by the name of the association and the date of its organization. On the outside of the medallion was a representation of a laurel wreath.

The speakers of the evening were Messrs Peirce, Shaw, Littell, Vreeland, Stanley, Hedley, McGraw, Brady, Ross and Ely. Mr. Shaw acted as toastmaster, and in his initial address he referred to the appreciation of the badges by the presidents and described the early history of the association. He then announced that applications for active membership in the association had been received within the last few days from the Interborough Rapid Transit Company, of New York, the Brooklyn Rapid Transit Company and the Pittsburg Railways Company among others. He continued:

It must be gratifying to all of us to consider the growth of the association in membership and to realize that the work of the association is appealing so strongly to the support of those interested in the industry. Our present membership consists of 294 companies and 527 associate members, the associate membership plan having been created at the time of the reorganization in 1905. This increased membership has been due largely to the efforts of the various membership committees, and while we feel under obligations to the committees of previous years, I want especially to thank the members of the committees which have done such splendid work during the four months in which I have been president of this association. During this period our membership has been increased by 31 new member companies and 274 new associate members, and it is my sincere hope that these committees will continue their efforts to the end that at the next convention we may be able to show an active membership in good standing of 325 and an associate membership of 1000. In considering the increase in associate membership, I also want to thank the members of our allied association, the American Street & Interurban Railway Manufacturers' Association, for the enthusiasm they have shown in this membership campaign, fully appreciating the many additional members they have added to our rolls.

A word at this time as to the work of the affiliated associations is probably in order, though it is unnecessary to detail or enlarge upon the value which we know the work of each one of the associations contains. The Accountants' Association in its work on classification and its conferences with the Interstate Commerce Commission, etc., needs no indorsement from me. We all have a due appreciation of the immense amount of work performed during the past few years by the Engineering Association and its numerous committees, and the time given up by the members thereof as well as the further work they have set out to do. The Claim Agents' Association, in its detection of accident fakers and unscrupulous physicians and lawyers, can well be proud of its work, and the newly formed Transportation & Traffic Association in the first year of its existence did an amount of work which makes us feel proud of the men selected to start the machinery of this organization.

As a whole, the work of these allied associations has been fully as productive of good results as that of the parent association, but the important work of general policy and publicity is in the hands of the American Association, the committee on municipal ownership and public relations of which has a highly important duty to perform. The plans of this committee, however, are in the hands of strong, representative men, and the results of its work should be such as to redound to the good of all those interested in our field of effort in creating a feeling between street railway corporations and the public of a somewhat different nature to that existing to-day. The articles appearing in the technical press which refer especially to conditions existing between corporations of this character and the public should be disseminated through the local newspapers and in every other way possible to reach the eye and thought of the public. The headquarters of the association are now making efforts to see that this distribution of information is brought about.

The matter of finances is, of course, an ever open subject of discussion, and I should like to call your attention to the condition of the association at this time. At the close of the fiscal year 1908 there was a balance of some $3,400, as against a balance in the beginning of said year of $6,100, showing a net loss during the year of some $2,700. It was determined, if the association was to continue the work, the financial conditions must be improved, and to this end the vigorous campaign for membership spoken of above was decided upon, with the result that our bank balance at this date, with practically the same expenditures as a year ago, is some $7,300, as against a balance of $4,800 at this time a year ago; thus practically making up at this time the loss which was entailed during the year 1908, and it is expected that the end of the year will find the association in a position firmly established so far as the matter of finances goes.

NEW LIMITED CAR FOR THE INDIANA UNION TRACTION COMPANY

The Indiana Union Traction Company has recently rebuilt, at its Anderson shops, a very handsome parlor car, which will be used on the run of the Marion "Flyer," one of the longest and fastest interurban runs in the Middle West. The Marion "Flyer" service is operated between Marion and Indianapolis, with two trips each way a day. The distance is 72 miles, and the running time is 2 hours and 25 minutes southbound and 2 hours and 35 minutes northbound. The "Flyer" makes five station stops between Marion and Anderson, a distance of 32 miles, and then runs from Anderson to Indianapolis, 40 miles, without stop. No additional fare above that required on other limited cars operated by this company is charged.

The new car for this service as rebuilt is 62 ft. long, and is divided into a baggage compartment, 8 ft. 9 in. long, a smoking compartment, 13 ft. 8 in. long, containing 12 separate chairs, and a passenger compartment 27 ft. 6 in. long, with a seating capacity of 38. The car was originally built by the Cincinnati Car Company, but, as already mentioned, it has been lengthened to 62 ft. and completely redesigned and redecorated inside. The general color scheme of the decoration is royal blue and gold, with the seats upholstered in royal blue figured plush. The window draperies are royal blue and gold silk, and the floor covering is also in figured blue to match the other finish. Inlaid mahogany is used in the interior woodwork, and the ceiling is painted cream color and decorated with gold leaf. White enamel with gold leaf decoration is used



Interior of Indiana Union Traction Company's Limited Car

for the toilet rooms. The decoration of the smoking compartment is the same as that of the passenger compartment, except that the chairs are of mahogany with leather seats and backs. The rear platform is of the semi-vestibule type and the ceiling is finished with the same head lining and lighting scheme as in the body of the car. Edwards balanced trap door fixtures cover the rear steps.

The baggage compartment is finished in natural oak, varnished. In this compartment is located a No. 4 Cooper heater of special design. The heater is built low enough so as not to obstruct the view of passengers in the smoking compartment looking toward the front of the car. As will be seen from the accompanying illustration of the interior of the car, an unobstructed view is obtained from



New Limited Car for Indiana Union Traction Company

the front to the rear. The patrons of the company have expressed themselves as being very well pleased with this feature of the new car.

The electric lighting fixtures are arranged in seven clusters of five lamps each in the center of the ceiling, attached to ornamental brass bases. In the baggage compartment is located a switchboard, on which are mounted the switches and fuses controlling all of the electric lighting circuits of the car, including the tail lights, classification lights, headlight and air compressor. Lockers in the baggage compartment also contain the necessary accessories of the car's equipment, including lanterns, flags, extra fuses, incandescent lamps, extra headlight carbons, motormen's tools, line pick-ups, 12 camp stools, 2 card tables, broom and feather duster, a telephone for receiving train orders, to which is attached a Nicholl duplicator for recording train orders, and a box for company mail. Underneath the car is hung a large box containing emergency tools, oil and grease. The car also carries on the roof two extra trolley poles with harps and wheels complete.

The car is mounted on two Baldwin heavy interurban trucks, which carry four Westinghouse 85 motors. The car is equipped with Westinghouse air brakes, Christensen air compressor, General Electric headlight and Holland trolley base.

The design and decoration of the car were made at the suggestion of H. A. Nicholl, general manager of the Indiana Union Traction Company, and the work was carried out under the supervision of R. C. Taylor, superintendent of motive power.

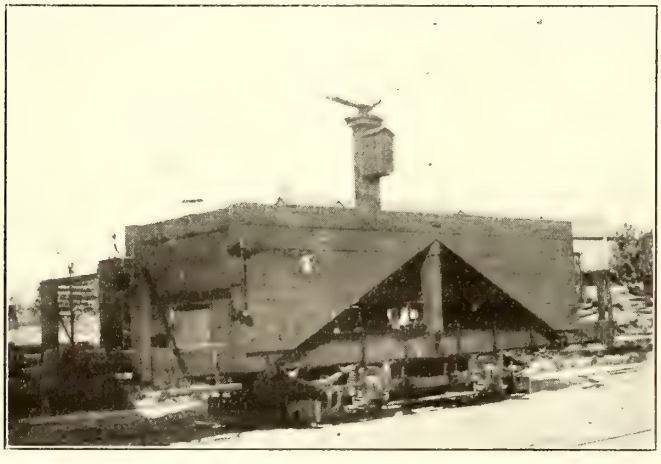
A holiday card just received from the officers of the tramway department of the New South Wales Government Tramways shows that the Government is now operating 223 miles of track and that in the last fiscal year 17,521,410 car-miles were run and a total of 172,020,932 passengers were carried.

HOME-MADE BALLAST CARS AT HANOVER, PA.

The accompanying illustration shows one of two stone cars built in the shops of the Hanover & McSherrystown Street Railway Company, and designed by Robert E. Manley, the general manager. These cars were used to ballast the line built to Littlestown last summer, and on account of their very satisfactory and economical operation Mr. Manley has kindly given the following details of their equipment and construction.

The capacity of each car is 12 tons of stone, and the weight of the body, trucks and electrical equipment approximately 7 tons, a total loaded weight of 19 tons. This weight was easily handled by two 30-hp GE-81 motors, with 14-tooth pinions and 30-in. wheels. The average haul was 4½ miles, with grades of 2 per cent, and not a moment's trouble was given in four months' continuous operation.

The load is self-dumping and falls between the rails, where it is leveled off by the life board. As the car has only one door in each end, it is necessary to do a little shoveling to get out all the stone, but the company proposes to put in two doors on each end to permit all of the stone to slide out. The life board will also be changed to a V-shape somewhat similar to a snow plow shear, in order to push some of the stone outside the rails. The



Ballast Car, Hanover & McSherrystown Street Railway

incline is lined with sheet steel so that the stones will roll more easily. The box shown on the trolley column contains the circuit breaker, and the resistances are under the peak at the center post. The truck is a Brill 21-E, 6 ft. 6 in. wheel base, and gave no trouble except that the cushion springs under the journal boxes would crush under the excessive load. The sills are 4 in. x 8 in. oak reinforced with a 4½-in. girder rail the full length on each side, except the platforms. The corner and center posts are 6 in. x 6 in. oak. A 2-in. tongued and grooved yellow pine floor is nailed to the 4-in. x 8-in. inclined girders. The sides are of the same material, the top board being full length for strength. Each side has two ⅞-in. steel truss rods. The inside dimensions of the body are 6 ft. 6 in. wide by 18 ft. long by 4 ft. 6 in. high. Only one-half of this space is used for stone.

This type of car for ballasting is very advantageous where motor cars are used, principally on account of its lightness and its operation with small motors. It can be run over bad track, and as it takes a comparatively small amount of current it can be operated for long distances over new lines under construction where the trolley wire alone has been strung without feeders.

COMMUNICATIONS

INDIFFERENCE TO "STANDARDS"

The T. H. Symington Company,
Baltimore, Md., Jan. 29, 1909.

To the Editors:

The standardization committee of 1907, whose recommended standards for the more important detail parts of electric trucks were unanimously adopted by the American Street & Interurban Railway Association during the convention of that year, will no doubt be surprised to know of the indifference existing among many members of the association who are responsible for truck specifications as to the introduction of these standards. Many manufacturers of electric truck parts can substantiate this statement. It would, therefore, seem to the writer an important function of the present committee on standards to aim to sustain general interest in the adoption of standards on all new equipment by systematic canvass by the secretary of the association, to be carried out somewhat on the following plan:

It is generally known that when a traction company is in the market for new car or truck equipment the fact is usually published in the Electric Railway Journal. This progressive journal, which has itself been a large factor in the adoption of the present existing standards, would, no doubt, cheerfully furnish to the secretary of the American Street & Interurban Railway Association as soon as possible, and in advance of the regular publication, all news items of this character. Upon receipt of this information a printed form could be mailed to the particular officer of the traction company who has charge of the preparation of specifications for the new rolling stock, asking whether due consideration had been given the advisability of specifying standards and urging their adoption because of the various benefits to be derived therefrom. Each communication of this character should be accompanied by sheets showing the standards or referring to the standardization sheets as they are printed in the proceedings.

It is only in this way that real progress can be made in the general adoption of standard parts such as are recommended by the American Street & Interurban Railway Association. Many truck manufacturers are indifferent, and some, in fact, are opposed, to the general adoption of association standards, because it involves some change in their own peculiar truck construction, and hence the abandonment of certain patterns or dies heretofore used. The writer recalls that while he was connected with the mechanical department of a railroad company it was necessary to buy from time to time certain repair parts for a patented steam heating system for cars. As these parts could be secured only from the owners and manufacturers of this particular system, the price paid for each part was very much in excess of a figure which would net a fair profit on the manufacturing cost. Possibly some of our American electric truck builders, in their apparent strict avoidance of association standards and retention of their own peculiar designs to the smallest detail, have in mind a similar situation in connection with truck repairs.

There are many obstacles in the way of introducing "standards" on old equipment, and very often their introduction cannot be accomplished. In other cases the expense involved would not justify it. There seems, however, no valid reason why American Street & Interurban

Railway standards could not have been adopted on all electric trucks, since the publication of these standards, especially with trucks of the so-called M.C.B. type. There are, of course, existing types of trucks on which the use of recommended standards throughout is not possible, but there seems no good reason why such standard parts as brake shoes, axles, journal bearings and keys should not be used on any style of truck on the market, and investigation will show that where such parts are not used it is owing to the indifference of those who are responsible for truck specifications. Up to the present time the truck builders have not been especially interested in standards, and they will not be until the standards come into more general use through the efforts of all members of the American Street & Interurban Railway Association who have anything to do with the purchase of new rolling stock or preparation of specifications for same.

There are to-day on the market numerous varieties of the Master Car Builders' arch bar freight truck, but all such designs include as a matter of course the use of M.C.B. axles, wheels, journal boxes, journal bearings and keys, and would receive but scant consideration if they did not. Similar practice does not, however, obtain among the builders of electric trucks in so far as A. S. & I. Ry. A. standards are concerned, and will not until the officers of all, or the majority, of traction companies insist upon it.

A. H. Weston, Associate Member,
American Street & Interurban Ry. Association.

[Mr. Weston calls attention to a very important matter. We should be very glad to co-operate in the way suggested.—Eds.]

INCREASE IN FARES IN MASSACHUSETTS

Oak Bluffs Street Railway,
Newton, Mass., Jan. 16, 1909.

To the Editors:

I have read your series of articles on the fare situation, and living, as I do in the winter, on the lines of the Boston Suburban Electric Companies, this subject is of especial interest to me.

The action on the part of the Boston Suburban Electric Companies in the direction of increasing the fare unit is, I think, a signal for similar action throughout the country. At the time of the introduction of electricity as a motive power, it was believed that the greater economy of this method over the previous methods would bring good returns on a 5-cent fare basis. This standard has become so firmly established that any alteration in the unit is established with difficulty. The originators of this unit evidently did not take into consideration that motors and other equipment must wear out and be renewed in time. This and the necessity of providing new rolling stock have affected the street railways so seriously that in many cases something must be done in the way of increasing the net revenue. This can be accomplished in three ways: Some method of greater economy while maintaining the present service; a reduction of service; or an increase in unit.

Our present system of management of standard lines has reached such a state that greater economy is hardly possible. A reduction of service would be of great inconvenience to the public, resulting in overcrowded, infrequent cars. Therefore it seems that the logical alternative is the increase of the fare unit. This increase is, of course, a difficult thing to establish, for the public has to be convinced of the necessity of it. The only proper course to follow is to take the public into your confidence as Mr. Brush did in the case of the Newton companies. No fair-minded citizen expects a corporation to operate at a loss, and when he sees the facts he is ready to pay his extra cent.

The transfer question is one which deserves considerable attention. Consolidation has been carried to such a degree that, notwithstanding increased traffic, receipts have dropped off with the establishment of new transfer points. It must be understood that when two roads are merged and transfers are issued the receipts from all through passengers on the two roads are cut approximately in half, for in traveling the same distance the passenger pays one fare where he paid two before.

In this process of consolidation the street railways have sacrificed to the public. Now it is time for the public to co-operate with the car lines and help bear the burdens of increased accommodations. One and 3-cent transfers have been issued by certain lines and there is no reason whatever why this system should not be adopted more generally. The transfer right is sorely abused by people everywhere and one may easily take advantage of the right. For instance, on the Boston Elevated Railway a person can take an all-morning ride, going through portions of Newton, Watertown, Cambridge, Somerville, Charlestown, Boston, Roxbury, Dorchester and Brookline for a single 5-cent fare. This is simply an example of the effect of the consolidation of lines in and about a large city and the possibilities for abuse of the transfer privilege.

Turning to our line, the Oak Bluffs Street Railway, it may be said that while last year's report to the Board of Railroad Commissioners shows a better financial condition than preceding years, there was still a deficit, which we hope will not be the condition next year. Some people think that our present 10-cent fare for 4.3 miles is exorbitant, but by a comparison of receipts and expenditures it is seen that this unit is necessary in order to continue operations. We have been asked by practical railway men why we do not increase the unit. This we shall not do until compelled; but the necessity of extensive repairs to the roadbed, which is washed out frequently by high water, and the fact that the road is simply a summer road, operating less than three months, make it evident that a high-fare unit must be maintained.

From this letter the main points which I wish to bring out are:

First—That an investor's money should be protected.

Second—That street railways should establish a unit of fare that would give sufficient surplus over the expense account to pay a sensible and reasonable dividend to the stockholders.

Third—That transfers be abolished as nearly as possible.

These views which I hold will perhaps appear to some as radical, but the trolley systems have come to a pretty difficult obstacle and radical measures must be taken before any relief is to be found.

Clarence A. Stewart,
Superintendent.

A recent report from Consul Joseph G. Stephens, stationed at Plymouth, Eng., says that after a lapse of 18 years roller skating has again become popular throughout England and is spreading in all the other towns and cities. An American company associated with a firm of roller skate manufacturers in the United States has opened large rinks in 17 cities.

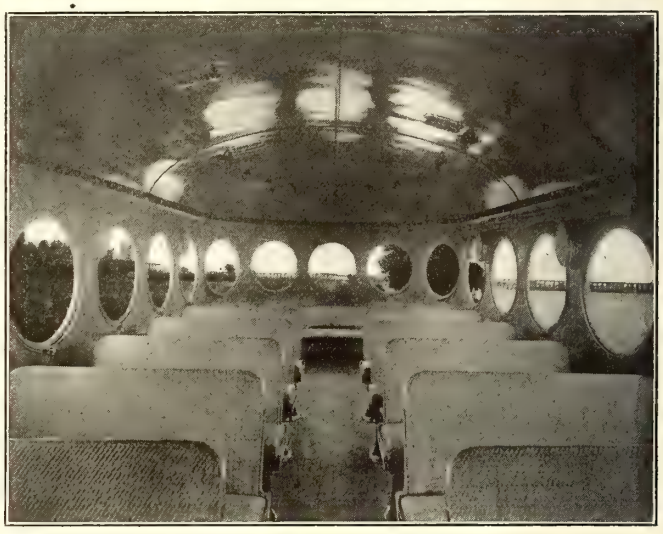
THE McKEEN MOTOR CAR FOR INTERURBAN SERVICE

Self-propelled motor cars are receiving considerable attention in the United States and foreign countries, and investigation shows that the field occupied by the self-propelled car is much greater in Europe than in America, although there is little doubt that there is on this continent a very extensive demand for motor coaches. Many electric roads are compelled to provide transportation facilities at hours when traffic is light, and only a limited number of cars are required to furnish the necessary service, although many of the expenses are the same as though the entire quota of equipment was in service and earning revenue. It is for this particular requirement that the single-unit car can become a valuable asset of the important electric lines, because with self-propelled units available the electric cars can be abandoned during the light traffic hours and the "owl service" inaugurated with the self-contained car at a minimum cost. By reducing the number of hours of continuous operation of power plants, electrical appliances, etc., the depreciation will also be considerably reduced.

The amount of money required to build electric interurban lines frequently is too great to permit of opening roads in many thinly settled districts. In this connection the self-contained equipment offers a means of transportation which enables the promoters of such projects to realize a great economy, as the self-propelled car carries its own power plant, so that only a fairly well constructed roadbed and light rails are necessary to install strictly modern and up-to-date service. The saving in this respect can be more readily appreciated when taking into consideration the fact that the cost of the motor coach is practically no more than the high-class electric car or Pullman car.

A type of self-propelled car is now being manufactured on a commercial basis by the McKeen Motor Car Company, Omaha, Neb. These cars were originally designed and built at the Omaha shops of the Union Pacific Railroad Company under the direct supervision of William R. McKeen, Jr., formerly superintendent of motive power and machinery. When the motor car business was segregated from the railroad Mr. McKeen resigned to become president and general manager of the motor car company.

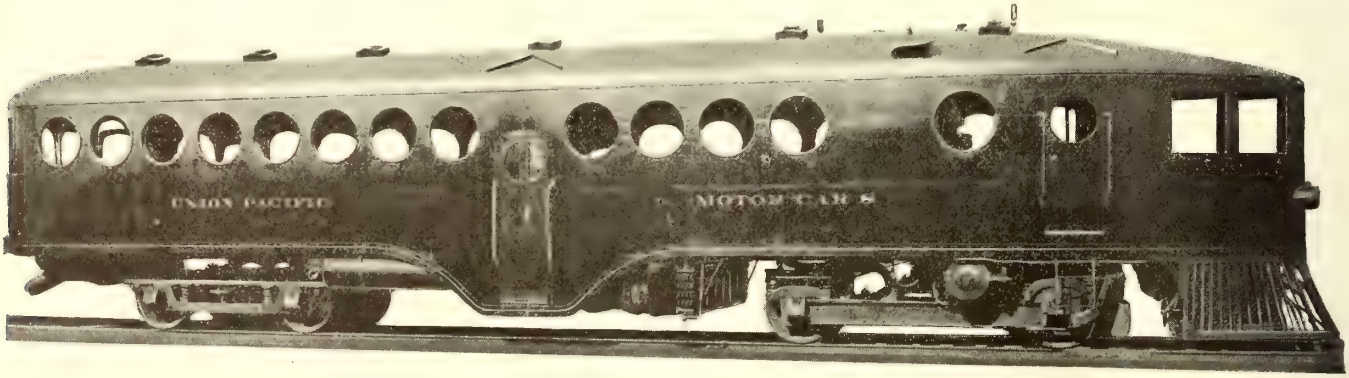
In the McKeen motor car there are several distinct features. The round windows give an almost unobstructed panoramic view from the inside and enable the sides of the car to be used as a girder in car framing, thus affording over 8 ft. between the top and bottom chord. While these round windows permit an increase in the strength of the car side, they are particularly appreciated by the traveling public on account of being tight when closed. The tapered front end, decreasing the wind resistance and facilitating the acceleration and high speed of the car, is an economical feature of operation, as it reduces the wind resistance to be overcome by the engine. The roof is lower than in the ordinary steam car, the inside dimensions are much wider and the improved ventilating system affords a change of atmosphere every four minutes if so desired. All of these features, together with the safety to the passengers in case of an accident, are obtained by the use of steel in the construction of the cars. Additional features are steady riding qualities, the strength and lessened weight of the car structure and the fact that there is no waste of floor space in the engine room or operator's compartment.



Interior of McKeen Motor Car

The engine for driving these cars is carried on the front truck. It is not a constant-speed engine, but is flexible, so that the car speed can be controlled by the engine speed. The engine is rated at 200 hp at 350 r.p.m. On brake tests it has developed as high as 250 hp. The power is transmitted from the six 10-in. x 12-in. cylinders to the main driving axle by a Morse silent chain and a friction clutch, giving a power transmission efficiency of 96 per cent. The engine is reversible and can drive the car at 60 m.p.h. In fact, speeds of 70 and 75 m.p.h. have been attained on level track. The vibration and noise from the engine have been so minimized as to be imperceptible to passengers. The exhaust is muffled and the burnt gases escape at the rear. The car is braked on all eight wheels by the straight-air system. The engine is started with compressed air by means of a sliding cam shaft, three of the cylinders being converted momentarily into a 2-cycle air engine, taking air from an emergency brake storage tank in the engine room.

Thirty-five of these McKeen motor cars have been built to date, all of which are in successful operation.



McKeen Gasoline Motor Car for the Union Pacific Railroad

London Letter

[From Our Regular Correspondent.]

The London County Council is promoting a bill in Parliament by which it proposes to spend over a million pounds on the extension of its tramway system in the London area. The bill deals with new lines in almost all districts of London, and includes also provision for the purchase of the Highgate Hill tramways, an old cable system still being operated on narrow gage. The work of reconstructing the Highgate Hill tramways, which extend about ¾ mile from the old Archway Tavern to the top of Highgate Hill will be commenced about March. It is announced that some arrangement for the alteration of the G. B. surface-contact system of tramways for 1 mile on the Bow road is about to be undertaken. The track changes will be simple, but important alterations will be made in the cars as the magnets which operate on the studs will be changed to enable them to act more efficiently and prevent their picking up scrap. The Council has recently completed the laying of an overhead tramway across Putney Bridge, whereby another effective link is made between the north and south of London. This line is a continuation of the route opened last summer between Willesden and Hammersmith and by which the recent Franco-British Exhibition was served. An interesting statement regarding the London trams has been made by the chairman of the Council. Though a Moderate and in opposition to much of the splendid work done in previous years by the Progressives, he admitted that the tramways were now paying their way.

That it is difficult to make tramways pay in London with the severe competition from other sources is shown by the report just issued by the London United Tramways Company, which operates a very large system of tramways in the west of London. The preferred stockholders of this company have had to accept a considerably reduced dividend, though it is hoped that this will be made up later. Gross receipts seem to increase as also the number of passengers carried, but expenses increase in greater proportion. The common stockholders have received nothing. Sir Clifton Robinson, the managing director of this company, is not easily disheartened, however, and has a bill before Parliament for a great linking-up scheme between the systems of the London United Tramways Company and the London County Council, and evidently is endeavoring to procure rights to run over portions of the Council's system. At the moment the London County Council is inclined to look at such a proposition in holy horror, but it is quite probable that some plan will be reached in the same way as amicable arrangements have been made between municipalities and outlying companies in the provinces.

The Board of Trade seems to have made a most astounding mistake in its annual statement of the tramways of Great Britain in reckoning the difference between gross receipts and expenses as net profit. This difference amounts to £3,286,713. The net profit might more reasonably be stated to be the paltry £300,000 which has been applied to the relief of rates on various systems. The Board of Trade seems to consider the question of interest, sinking fund, operation and other expenses quite unworthy of its consideration in the matter of net profits.

It would appear that the introduction of trackless tramways is not to be so easy as expected. It was thought that Manchester was to be the first city to be equipped, as various Continental tramways had been visited by members of the Manchester Committee, and a bill was to be promoted to obtain powers to enable them to equip certain outlying sections of the city. Unexpected opposition, however, developed as the Manchester Rate Payers' Association decided to oppose the scheme. The chief objections were the capital expenditure necessary for the system, the fact that the bill granted facilities for parcel carrying by the Corporation, and that the merits of motor buses had not received considerate attention. It was also contended that not one of the large cities in Germany would touch it, as it is only to be seen in comparatively small towns. The proposition has now been definitely defeated at a recent town meeting. Dundee, also, has not yet decided the matter. Liverpool has been dallying with the trackless trolley in connection with a boulevard which it proposes to construct round the city, but the proposal has met with vigorous opposition by the Liverpool Cartowners' Association, and is not likely to go through.

The London Bridge to Victoria electrification which has been going on for several years under the advice of Philip Dawson, is now nearing completion. The Brighton Railway will be the second railway to employ the single-phase system in England, although it was the first to accept it. The total length of the route from Victoria to London Bridge is only about 9 miles, but it passes through some of the densest suburbs of London. The work has been carried on while the steam trains were in daily operation and practically all of the overhead equipment is special for the purpose. Experimental runs already have been made, but it is not considered that the change-over will be made for a month or two to make sure that everything is in working order. Five tracks have been electrically equipped at London Bridge Station and seven at Victoria. At present repair shops are being erected at Peckham Rye for the maintenance and repair of the rolling stock, and until these are completed it would be useless to commence operations.

Shorter and more frequently operated trains will be used than those under the present steam regime. Eight trains of three cars each are now ready for work. Two coaches of each train are motor cars. The cars are divided into compartments as in the old-fashioned English trains, with side doors, but differ in having a side corridor to connect all compartments. It is proposed to run a 10-minute service between Victoria and London Bridge, with a reduction in time from 36 minutes to 25 minutes.

The power-supply question of London appears settled with the passage of the "linking-up" bill, by which the various companies will interconnect their various lines. This bill has passed successfully through the House of Commons and the House of Lords, and has now received the Royal Assent.

The London & North Western Railway some little time ago successfully promoted a bill for the construction of an electric railway from its main station at Euston to the town of Watford, about 17 miles distant on its main line. Work, however, has now been commenced on the 6 miles of the route between Willesden and Harrow, and it is to be hoped that it will be vigorously pushed to a finish. The road is to run alongside the main line, but on the approach to London from Willesden Junction inward it is to be constructed underneath the main line.

The Board of Trade has issued a circular to the electric railways, recommending them to fit a certain proportion of the cars on their system, with speed indicators, to enable motormen to be trained in judging speeds. It is stated that it appears from the circumstances of certain accidents occurring on tramways, and from other evidences, that the maximum speeds fixed by the Board's regulations are frequently exceeded in practice. In view of certain difficulties connected with the introduction of speed indicators, the Board does not at present consider it advisable to require them to be fitted to all cars.

A. C. S.

Continuance of Syndicate of Continental Manufacturers Announced

Considerable prominence was recently given in technical and trade journals, both here and abroad to the fact that the price protection agreement of the syndicate of leading electrical firms was not brought into operation in connection with the competition for the provision of a transformer installation for the principal railway station at Frankfort-on-the-Main. The statement was made on the authority of the management of the syndicate, but in consequence of an error in the communication of the report to the newspapers, it was assumed that the syndicate was no longer in existence. The syndicate, however, corrected the mistake, and it is now announced that it continues without any change whatever. The constituents as hitherto are the Siemens-Schuckert Works, the Allgemeine Elektricitäts Gesellschaft and the Felten & Guilleaume-Lahmeyer Works Company. The application of price protection has been diminished, probably owing to the general alterations in the circumstances, declarations of contractors and the accentuation of competition, and decisions are arrived at in each individual case, and not without previous understanding. It was formerly possible to employ the system of price protection in about 8 per cent of all the public contracts, but only 2 per cent of the business is now said to be handled in this manner. The result is that in orders representing 98 per cent the agreement does not come into play, and its importance to the interested firms has thereby become diminished.

According to statistics published in the January *Zeitschrift für Kleinbahnen*, the light railway mileage of Belgium at the end of the year 1907 consisted of 2980 km (1847.6 miles) by steam, 5 km (3.1 miles) by horses and 71 km (44 miles) by electricity. Most of the lines are of meter (39.37 m.) gage, and only 40 km are of American standard gage. The electric railways had 406 passenger cars, of which 218 were motor cars.

News of Electric Railways

Fares Increased in Cleveland

On Jan. 27 Judge Tayler of the United States Circuit Court announced that beginning on Feb. 1 the receivers of the Cleveland Railway Company would charge the maximum fares allowed in the contracts of the constituent companies with the city. When negotiations for a new contract were begun with the city Judge Tayler said that his order increasing the fares would be delayed pending the result of the negotiations, but the prospects for immediate settlement being somewhat remote, Judge Tayler decided that it would be inadvisable further to burden the property with the deficit that would be incurred by continuing the low fares in force.

Under the new arrangement a 5-cent fare pays for a ride to any point reached by the 5-cent lines. An extra charge of 2 cents is made on the 3-cent lines to those desiring to reach the suburbs over the low fare lines. The charge to the suburbs is thus made the same in all cases. The lines on which 5 cents is charged, with free transfers, are as follows: Euclid, Superior, Wade Park, St. Clair, Payne, Scovill, Scranton, Abbey, Brooklyn, Cedar, part of Clifton Boulevard, Clark, East Fifty-fifth, East 105th, Fairfield, Union, West Fourteenth and West Twenty-fifth. Cardboard tickets are used on these lines, the same as under the management of the Cleveland Electric Railway. Three-cent fares are charged on the following: Bridge, Central-Quincy, Denison, Detroit, Lorain, Kinsman, Lake from Detroit to the Boulevard, Madison, Woodland, West Madison and West Thirty-eighth. Single transfers are given on East Fifty-fifth Street and double transfers on East 105th Street, both crosstown lines. The Superior-Detroit, Payne-Bridge and Denison-Central lines split at the Public Square. In the case of the first two, one portion comes under the 5-cent fare and the other under the 3-cent fare. In the other it is considered necessary to make the change.

There has been no disagreement among the members of the peace committee regarding the principles incorporated in the plan suggested by Judge Tayler in his letters to the receivers some time ago, but the many points that arise are consuming much more time than was expected. While Mayor Johnson is said to have given up his plan for another holding company, it is reported that he insists upon the insertion in the franchise of a clause that would allow either the city or persons designated by the city to take over the properties of the Cleveland Railway Company at any time at a figure to be fixed at the outset, presumably $110 a share for the stock.

On Jan. 29 Judge Tayler heard arguments on the intervening petition filed by City Solicitor Baker, asking that consideration be given the claim of the city that the old franchises on Woodland Avenue and the West Side lines had expired and that only a 3-cent fare could be charged on them. The judge said: "I have heard arguments in this case, including a written brief by S. H. Tolles, in which my position was assailed. But I would not be dealing justly with myself in this case where a change of fares is to be made on Feb. 1 if I did not make my decision at once. I decide that for the purpose of the change in the fare on Feb. 1 the franchise on Woodland Avenue has expired. It is the duty of this court to put into effect rates of fare that will produce the largest results."

Owing to the contest made by friends of the Municipal Traction Company for proxies and the inexperience of some of the stockholders of the Forest City Railway the annual meeting of stockholders of the Cleveland Railway Company, held in the small offices of the company in the Electric Building on Jan. 27, resulted in so much disorder that the police had to be called to restore quiet. Later an adjournment was taken to the assembly room of the Hollenden Hotel.

Although the Johnson interests had been busy for some weeks endeavoring to secure proxies, and S. T. Everett had also made every effort to secure all he could, it was found that 122,000 shares of the 146,756 shares of stock were in the hands of Horace E. Andrews, president of the company, as the representative of those now in control of the property. About 15,000 shares were voted by D. C. Westenhaver and 4579 shares by S. T. Everett. It seems that the Johnson interests were about 3000 shares short of the strength of the Forest City Railway, which is represented by an issue of 18,056 shares of Cleveland Railway. Combining their strength, Messrs. Westenhaver and Everett were entitled to one member of the board. A resolution offered by Mr. Andrews was adopted to the effect that the board should be increased from 9 to 10 members, and Mr. Everett was elected as the new member. The old members of the board were all re-elected, as follows: Horace E. Andrews, J. H. Wade, R. R. Rhodes, John J. Stanley, L. C. Hanna, C. F. Emery, H. P. McIntosh, R. A. Harman and Samuel Mather. On Jan. 28 the directors organized as follows: Horace E. Andrews, president; J. J. Stanley and C. F. Emery, vice-presidents; Henry J. Davies, secretary and treasurer. An executive committee, consisting of Horace E. Andrews, J. J. Stanley, C. F. Emery, L. C. Hanna, Samuel Mather, R. A. Harman and H. P. McIntosh, was selected. All important matters will probably be referred to this committee for action.

Statistics prepared by Henry J. Davies, secretary of the Cleveland Railway Company, show that the Municipal Traction Company carried 2½ per cent more passengers from July, 1908, to October, 1908, inclusive, than were carried by the Cleveland Electric Railway and the Forest City Railway during the same period the previous year, when the 5-cent fare was charged. With the improved service the number of passengers carried in December, 1908, showed a gain of 13.8 per cent over December, 1907. Mr. Davies concludes that good service is as essential as the low fare to stimulate travel appreciably. In preparing his figures, Mr. Davies omitted May and June because these months were affected by the strike. A summary of the results follows:

	1907.	1908.	Increase or decrease.	Per cent.
January to April, inclusive.	†114,245,052	‡111,157,222	3,087,830	2.70
July to October, inclusive.	‡47,748,153	*48,949,165	1,201,012	2.50
December	‡10,809,558	*12,301,335	1,491,777	13.80

†Seven tickets for 25 cents.
‡Eleven tickets for 50 cents.
*Three-cent fare.

History of the Twin City Rapid Transit Company

Throughout January the Twin City Rapid Transit Company published full-page advertisements in the daily newspapers of Minneapolis giving in detail the history of the company's officers throughout the 35 years of its existence. The first 16 instalments of this history have been presented in abstract in preceding issues of the Electric Railway Journal. The seventeenth full-page advertisement describes the water power plants, the steam generating plant and the distribution system of the company. The equipment of this steam station has been described in the Electric Railway Journal.

The instalment of the history following the description of the power stations explains in simple language how power is transmitted, converted, distributed and utilized, and traces the path of the current from the generating station to the cars. The company now has 137 miles of heavy underground cable, 69 miles of overhead feeders and 156 miles of trolley wire. Three large engravings illustrate the description of shops of the company. These shops were the subject of an illustrated article in the Electric Railway Review for Oct. 14, 1907, page 465. They are conceded to represent the highest type of a manufacturing plant. The service given by the company's fleet of express boats on Lake Minnetonka, which is reached from Minneapolis by a fast double-track line, is reviewed. A chart illustrates the evolution of the loop tracks in the business district of Minneapolis, and a discussion of local interest to those who might criticise the number of tracks in this district is presented.

The twenty-second and twenty-third sections of the history detail the increase in the cost of material and wages and the increase in carrying power of a 5-cent piece. The following table was presented to show the increases in per cent in the costs of material and labor for the 10 years from 1895 to 1905:

	1895.	1905.	Increase, per cent.
Structural steel, per ton	$24.00	$30.00	25
Steel rails, per ton	22.50	41.60	84
Ties, each	.32	.72	125
Iron poles, each	9.50	19.00	100
Copper, per lb	.12½	.24	92
Lumber, per 1000 ft	10.85	18.18	67½
Labor, per day (on construction)	1.50	2.00	33⅓

In 1875 the drivers of the horse cars were paid $35 a month for 16 hours' work per day. Now all wages are paid on an hourly basis and a graduated scale provides for successive increases in hourly rate until the maximum is reached at the end of five years' service. While in 1875 the trainman received $35 per month, he now receives $85. In 1875 the company gave the passenger a ride of about 2 miles in a cold, dark, damp, uncomfortable horse car for the same fare that he now pays to ride a maximum distance of 13.5 miles in a comfortable, well-heated, modern electric

car. With regard to steam railroad competition between Minneapolis and St. Paul, the rate of fare was 30 cents each way in 1891, and the passenger was compelled to pay a carfare in order to get to the steam railroad station. It is now possible by means of the Twin City lines for the passenger to travel between the two cities at a maximum expenditure of 20 cents. Approximately 35 per cent of the total travel between Minneapolis and St. Paul is on transfers. With the use of transfers the 10-cent cash fare between the cities is said to be less than one-half of the legal rate for steam railroad transportation for an equal distance. Diagrams show the following maximum distances one could travel for a 5-cent fare at different periods: In 1875, 2 miles; in 1890, 6 miles; in 1908, 13.5 miles. Another diagram shows the following maximum distances one could travel in 30 minutes at different periods: In 1875, 2.5 miles; in 1890, 4 miles; in 1908, 6 miles.

Electrification of Japanese Government Railways

There appears to be very little foundation in fact for the sensational announcements made in New York recently regarding the placing through a Japanese importing house of an order for $7,000,000 worth of electric railway apparatus for use on the Imperial Japanese Railways.

A Japanese engineer who was interviewed by a representative of the ELECTRIC RAILWAY JOURNAL said in reference to the proposed electrification of the Japanese Railways: "The Imperial Engineering Corps has recently completed a report upon the practicability and economy of electrifying all the railways of the Empire. The work to be done in eliminating steam as motive power in the zone of Tokio is to be begun at once; other sections will be electrified as soon as the money can be obtained. Japan is mountainous and has many rivers and streams that can be made to yield energy for hydro-electric power at very low cost. For large electric units and for many kinds of power machinery and apparatus Japan is a good market. Plants for the construction of heavy machinery of this kind have not yet been built in Japan. Many establishments are making small motors, but we have to go outside for our large installations."

Speaking of the report that an order for $7,000,000 worth of apparatus has been placed, an official of the General Electric Company said: "I have no doubt that this story refers to some recent sales which the General Electric Company has made in Japan. N. A. Oudin of our company has returned from an extended stay in Japan, where he made sales of considerable large apparatus to the Imperial Government. They amounted, however, to nothing like the figure mentioned in the public statement. I take it that this story is only an exaggeration of our sales. It is true that the Japanese Government contemplates extensive electrification, and it may order a considerable amount of apparatus in the near future, but I am positive that no such contract has been let, as we have paid particular attention to the Japanese trade."

New Member of Central Electric Railway Association.—The Indianapolis & Cincinnati Traction Company, operating between Indianapolis, Rushville and Connersville and between Indianapolis, Shelbyville and Greensburg, has become a member of the Central Electric Railway Association and the Central Electric Traffic Association.

Another Tunnel Under the Hudson River.—The shields of the tunnel of the Hudson & Manhattan Railroad between the company's terminal building at Church and Cortlandt Streets, New York, and New Jersey, met on Jan. 27 some 4500 ft. from the New Jersey shore and 1500 ft. from where the tracks enter the terminal building in New York. The company announces that it expects to place the line in operation on July 1, 1909.

More Equipment for Indiana Motor Line.—The St. Joseph Valley Traction Company, Lagrange, Ind., has recently placed in service its fourth gasoline motor car. The car has a seating capacity of 25 passengers and is equipped with a 6-cylinder gasoline engine manufactured by the Stover Motor Car Company, Freeport, Ill. The other gasoline cars of the company are equipped with 4-cylinder engines. Construction work is progressing on the extension of the company's line between Orland and Angolia.

Machine for Vending Newspapers on Surface Cars.—The Chicago News Distributing Company, which manufactures a newspaper vending machine, is endeavoring to arrange with the surface railways in Chicago to install the machine on all street cars. When the papers in the machine have all been sold a sign informs the customer and when the change for 5-cent pieces is exhausted the slot for receiving the coins is made smaller automatically so that only pennies can be used. Since the advent of the pay-as-you-enter cars in Chicago, newsboys have not been permitted to enter the cars.

Proposed Electrification of Salt Lake & Ogden Railway.—The Salt Lake & Ogden Railway, Salt Lake City, Utah, announces that final arrangements are being made for electrifying the road, and that contracts are now being closed for material and equipment for use in connection with the change of motive power. The road will be equipped with the overhead trolley, and high-speed interurban cars will be run hourly between Salt Lake City and Ogden. H. A. Strauss, 201 Stock Exchange Building, Chicago, Ill., is consulting engineer of the company and is preparing specifications for the equipment.

Member Companies of the A. S. & I. R. A.—In the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909, a list of new member companies of the American Street & Interurban Railway Association was published for the period between Jan. 12 and Jan. 25, 1909. To this list should be added these five new member companies: Trans-St. Mary's Traction Company, Sault Ste. Marie, Ont.; the Peoria (Ill.) Railway Terminal Company; Interborough Rapid Transit Company, New York; Brooklyn (N. Y.) Rapid Transit Company; Pittsburg (Pa.) Railways. This makes five new member companies obtained between Jan. 12 and 30, 1909, and 26 between Oct. 1, 1908, and Jan. 11, 1909, making a total of 31 new member companies since Oct. 1, 1908.

Indiana Union Traction Company Benefit Association.—The employees of the mechanical and power departments of the Indiana Union Traction Company, Anderson, Ind., met on Jan. 8 and formed the Motive Power Employees' Association, to aid its members in sickness and in case of accident and to pay $150 to the beneficiary upon the death of a member. The initiation fee is $1 and the dues are 50 cents a month. When sick or injured, members are to receive $1 a day after the first seven days. No member, however, is to receive more than $100 in any one year. The officers elected were: E. E. Jones, president; M. S. Webb, secretary and treasurer; A. Newhouse, William Comer, George Showers, C. E. McCormack, and Harrison Wetzel, finance committee.

Arbitration Board Reports on Question of Wages.—The arbitration board appointed to decide the question of wages for motormen and conductors of the Boston & Northern Street Railway reported as follows on Jan. 28: "During the first year of employment, 21 cents per hour; second year, 22 cents; third, fourth and fifth years, 23 cents; sixth and seventh years, 24 cents; eighth and all subsequent years, 25 cents." The previous scale was: First six months, 20 cents; second six months, 21 cents; second, third and fourth years, 22 cents; fifth, sixth and seventh years, 23 cents; eighth and ninth years, 24 cents; tenth year and after, 25 cents. The board recommended that the new wage schedule should go into effect on Jan. 31.

Electrical Committee of Underwriters' National Electric Association.—The annual meeting of the electrical committee of the Underwriters' National Electric Association will be held in March, 1909, in New York City. The date and place of the meeting will be announced later. As usual, the provisions of the National Electrical Code as they now exist will be the principal matter for consideration, and it is requested that any desired change in, or addition to, the Code be forwarded to E. W. Goddard, 141 Milk Street, Boston, Mass., the secretary of the association. Final action on suggestions not received in season for consideration by the committee before the meeting can only be taken by unanimous consent. The secretary also states that, as heretofore, the meeting will be open to all interested, and such persons will not only be welcome, but are urged to be present and give the committee the advantage of their experience and advice.

Detroit's Mayor on Street Railway Question.—In his message to the Council, Wm. B. Thompson, Mayor of Detroit, said in regard to the question of street railway franchise renewals and the relations between the city and the Detroit United Railways: "To the end that we may approach the street railway question intelligently I have called in to assist in investigating the question a committee of citizens in whom I believe the whole city will have confidence. We should have, through the labors of this body of representative men, such information that a smaller committee, acting with a committee from your honorable body, may intelligently open negotiations with the Detroit United Railways or a new company for an agreement in settlement of the whole question. That the results of such negotiations must be submitted to the people for their approval is happily assured no less by the new fundamental

law of the State than by the sacred pledge which you and I have given the people of the city. This submission should be within the first half of the present year, so that we may pass upon the question by itself and apart from any bias of party politics."

History of the Omaha & Council Bluffs Street Railway.—A history of the Omaha & Council Bluffs Street Railway is appearing over the signature of G. W. Wattles, president, in the Sunday newspapers of Omaha. The articles, which are in the form of a full-page advertisement, give an outline of the development, operation and finances of the company, and are presented with the belief that with a knowledge of the facts regarding the operation plans and policies of its public service corporations "our citizens will better understand and act with greater freedom on such questions as from time to time are presented to them concerning the railway corporation." The first article, which appeared on Jan. 24, outlined the formation of the Omaha Horse Railway. This company was given a 50-year franchise in Omaha by the Territorial Legislature on Feb. 28, 1867, a provision of the charter being that within two years the company should build 1 mile of single track. The names of the original incorporators and the holders of the first issues of stock are given. The trying experiences of the horse-car period were described in the second installment.

Rapid Transit for Cincinnati.—James A. Stewart delivered an address before the Engineers' Club of Cincinnati recently on "The Rapid Transit Railway or Schmidlapp Elevated," explaining that the necessity for a rapid transit railway in Cincinnati had arisen in order that the interurban railways might reach the business section of the city without using the right-of-way of the local lines. Six lines enter Cincinnati, but for 6 or 8 miles they have to operate over the tracks of the Cincinnati Traction Company, which requires about 45 minutes, whereas over an elevated railway they could make the same distance in about 15 minutes. A law exists which permits the construction of elevated railways in cities. The cost would be from $2,000,000 to $3,000,000. At first only a double track would be necessary, but as the business increased other tracks could be added. Mr. Stewart said he did not know anything about financing the road as yet. The topography of Cincinnati would preclude the construction of a subway on account of the cost. Beginning at Third Street and Walnut Street, the route would lie through Walnut Hills, Avondale, West Norwood, Bond Hill and thence to the intersection of Norwood Avenue and Montgomery Pike, a distance of 6½ miles. Of this 1¾ miles would be elevated, 4 miles open cut and a half mile subway.

Preparing for the Alaska-Yukon-Pacific Exposition.—The Seattle (Wash.) Electric Company is expending $1,750,000 in improvements to its railway and lighting system, preparatory to the opening of the Alaska-Yukon-Pacific Exposition. Four double-track lines, each between 5 miles and 6 miles long, with loop terminals at the exposition, will be operated to the grounds, where a handsome terminal building and a substation will be installed. The company expects to be able to deliver passengers at the fair grounds at the rate of two or three cars a minute, or about 14,000 per hour. The additional power necessary for these lines will be furnished from the water-power plant at Electron, on the Puyallup River, and the steam plant at Georgetown at 13,000 volts and will be stepped down at the substation on the exposition grounds. The company has the contract for lighting the exposition. All wires within the grounds will be laid under ground, thus eliminating poles and overhead wires. The water front on Lake Washington, the terraced hillsides overlooking the lake and the wide avenue between the exposition and the shore will all be lighted, and the night scene from the water promises to be very effective.

Contract for Use of Grand Central Station.—The New York, New Haven & Hartford Railroad has concluded a perpetual lease with the New York Central & Hudson River Railroad for the use of the Grand Central terminal in New York and the Mott Haven yards. The important feature of the agreement is that the payments to be made by the New York, New Haven & Hartford Railroad for the terminal rights and the use of the Mott Haven yards are based upon the ratio of the number of cars and locomotives of the company entering the terminal to the whole number of cars and locomotives using the terminal. The right to use the Mott Haven yard can be discontinued by the New York, New Haven & Hartford Railroad on 12 months' notice, but in the event of the conclusion of the agreement to use the Mott Haven yard, the New York Central & Hudson River Railroad is to arrange with the New York, New Haven & Hartford Railroad for the use of the Port Morris branch. A terminal manager, who is to have entire charge of maintenance and the management of the terminal is to be appointed jointly by the president of the New York, New Haven & Hartford Railroad and the president of the New York Central & Hudson River Railroad. In case new connections are made by either company with the terminal, affecting its business, there must be a readjustment of compensation with arbitration if necessary.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—Feb. 11 has been fixed by both houses as the last day for receiving new business. Representative Chandler, who was appointed House chairman of the committee on railroads, says he will resign as chairman of the citizens' electric railway committee, which advocates the construction of the Hartford-Middletown Electric Railway, because as chairman of the citizens' committee he might be placed in the peculiar position of appearing before himself as House chairman of the committee on railroads. The Hartford & Springfield Street Railway has petitioned for an amendment to its charter to increase the number of directors and the Norwich & Westerly Railway has petitioned to sell power in the towns through which it operates.

Indiana.—Governor Marshall objects to printing the report of the Railroad Commission on the ground that in his opinion the commission is illegal in that the members are serving under appointment made according to the Act of 1905, which created the commission, while the Act of 1905 was repealed by an amendment passed at the 1907 session. If the amendment did not repeal the Act of 1905, then, according to the Governor, the services performed by the commission under the amendment were illegal, and the report of the last year's work should not be published. The public utilities bill of Representative Garrard, greatly increasing the jurisdiction of the Railroad Commission, has been introduced. The proposed measure to make trespassing on the right-of-way of steam and electric railways a misdemeanor has also been introduced. It provides for a fine of not less than $5 nor more than $100 or imprisonment for not less than 5 days nor more than 30 days, or both. Another measure, for which the Railroad Commission is indirectly responsible, gives the commission authority to recommend such changes at grade crossings as the commission may deem advisable. Other bills provide that 10 cents additional shall be charged by the conductor when fares are paid on the train; that interurban and steam railroads shall not charge passengers more than half fare in case a seat is not provided, and that it be made unlawful for railroad companies to take out indemnity insurance against damages in case of loss of life or injury to employees.

Massachusetts.—Boston's new charter bill introduced by Representative Fay provides that the Boston transit commission be abolished and its duties turned over to the street commissioners. The latter are specifically charged with completing and carrying out the various projects already authorized by the statutes to be undertaken by the transit commission. The committee on street railways gave a hearing on Jan. 28 on the bill to require street railways to equip their cars with lifting jacks, fenders and wheel guards. B. W. Warren appeared for the Massachusetts Street Railway Association in opposition. He pointed out that the Railroad Commission has ample authority to compel the equipment of street cars with all necessary appliances. Lifting jacks would be of no use without the timbers, etc., which cannot be carried on cars. J. Otis Wardwell, of the Boston Elevated Railway, stated that the company would equip its cars with any practicable life-saving devices, but it feels that no thoroughly practicable fender has yet been produced.

Michigan.—It is not known at this time whether or not any action will be taken at this session on the recommendation of Governor Warner that all increases in stock of public service corporations shall first be submitted to the State for approval. Perhaps the most significant action so far is the appointment of Louis C. Cramton, Lapeer, as chairman of the House committee on railroads. Mr. Cramton was secretary of the Railroad Commission for two years. Representative Austin, of Detroit, who is a street car conductor, has introduced a bill to compel street railway companies to provide aisles in all cars and to prohibit running boards on street cars.

Minnesota.—A bill has been introduced which provides that the gross earnings of street railway companies shall be taxed. Another measure gives county boards authority to grant electric railways the use of the 5 miles of public roads in any other township. It is provided that the railway shall be built so as not to impair the value of the road for vehicular traffic.

Missouri.—A bill has been prepared at the instance of the St. Joseph Railway, Light, Heat & Power Company and the Business Men's League of St. Joseph, for introduction in the Legislature which authorizes street railway companies to purchase, lease or consolidate with interurban railways or effect operating arrangements with them. Its purpose is to provide means for the company to carry out plans for building between St. Joseph and Savannah. It is expected that the bill will be passed not as a general measure, but as a specific one giving the privilege of consolidation to the St. Joseph Railway, Light, Heat & Power Company and the company to be organized by interests identified with it for building the proposed new road.

New Hampshire.—Records were broken on Jan. 26 when 286 bills and 24 joint resolutions were formally introduced and sent to committees. The act authorizing street railways to carry freight and express was referred to the committee on railroads of the House, as was also the act requiring street railways to sprinkle streets. The act abolishing the Railroad Commissioner and establishing a public service commission was referred to the committee on judiciary of the House.

New Jersey.—Assemblyman Martin has introduced his measure which places all the public service corporations under State control and delegates rate-making powers to the controlling body. The Governor has sent to the Senate the appointment of Frank H. Sommer as a member of the Railroad Commission to succeed Edmund Wilson, resigned.

New York.—The subject receiving most attention at this time is the probable successors to John C. Eustis as a member of the Public Service Commission of the First District and of James E. Sague as a member of the Public Service Commission of the Second District, whose terms of office expired on Jan. 31. It is thought that both Mr. Eustis and Mr. Sague will be reappointed for a full term of 5 years, but Governor Hughes has not yet sent their reappointments to the Legislature for confirmation. The following bills have recently been introduced: To provide for a 5-cent fare on the New York Central & Hudson River Railroad within the limits of New York City; requiring elevated, subway and surface railroads in New York City to provide every passenger with a transfer good on every other road in the city; requiring street railways in Kings and Queens Counties to inclose the front platforms of their cars on at least one side in addition to the front as required at present; providing that the Public Service Commission of the First District of New York be requested to investigate the legality and duration of the franchises of public service corporations operating in New York City.

Ohio.—The action of the Senate in referring the appointment of John Sullivan, Hamilton, as a railroad commissioner, to the committee on railroads and telegraph, indicates that a contest is likely to result. Mr. Sullivan is 49 years of age and is a native of Oil City, Pa. His first railroad service was on the Dayton, Fort Wayne & Chicago Railroad. Twenty years ago he became an engineer on the Indianapolis division of the Cincinnati, Hamilton & Dayton Railroad, a position he held until two years ago when he was appointed road foreman of engineers. Mr. Sullivan is a member of the Brotherhood of Locomotive Engineers.

Pennsylvania.—Both branches of the Legislature reconvened on Jan. 18, after a recess of two weeks, during which the presiding officers have been at work on the committees. W. H. Keyser, of Philadelphia, is announced as a member of the House committee on passenger railways, and Edgar R. Keiss, Lycoming, as a member of the House committee on railroads. The regular Republican organization and the Elkins-Griest-McClaim faction of the party have united forces to secure the passage of a bill giving the right of eminent domain to electric light and power companies. The move is said to be specifically in the interest of the McCall Ferry Dam Company, whose works are below Columbia on the Susquehanna River. The Railroad Commission has replied to the State Grange that it will take up with that body at the coming meeting of the Grange in Altoona the question of dealing with franchises and charters of which no use is made, with the idea of recommending to the Legislature a measure which shall provide for the reversion of unused trolley franchises to the State. The Chamber of Commerce of Pittsburg is preparing to introduce a bill empowering the city of Pittsburg to build and lease rapid transit lines within its limits. These bills have been introduced: To require suburban street railways to provide suitable waiting rooms at terminals and equip cars with toilets under penalty of $100 fine; to require front platforms on all street cars to be closed during winter months and prohibiting the use of outside running boards on electric railway cars under penalty of $500 fine.

Financial and Corporate

New York Stock and Money Markets

February 2, 1909.

After a week of fractional ups and downs the stock market to-day was somewhat stronger, but trading remains remarkably light. For weeks the condition in the Street has been one of apathy. The big traders are apparently out of the market, the little traders are timid and the public is seemingly content not to buy. The agitation of the tariff, the tardiness in the return of business, the weak copper market and the possible disagreement between the anthracite coal miners and the operators are all mentioned as reasons for the depression, and while they do contribute to the depression, the real reason for the dull market is that outsiders are not participating. For several days during the week there has been an evident attempt on the part of many small operators to seek lower price levels. This effort was neither strong enough nor persistent enough to attract the attention of the great interests behind the market, nor was it of sufficient power to develop any serious break. To-day, without any particular reason, the element that had been bearish for some time began to buy moderately and the gains were small on a very light business.

Among the tractions, Brooklyn Rapid Transit continues to be the most active and also continues to be the most prolific source of rumors in the Street. The question of a probable dividend has see-sawed the stock up and down for weeks and the matter is still in doubt. The activity that prevailed in Interborough and in Metropolitan stock a few weeks ago has disappeared. Recently these issues have remained steady, but inactive; in fact, they have been comparatively dull at times. Other tractions are almost out of the market.

In the money market, borrowing is light and terms are easy. In spite of some shipments of gold to Argentina and withdrawals by the United States Treasury, bank reserves continue to accumulate. Rates for money to-day were: on call, 1¾ to 2½ per cent; 90 days, 2½ per cent.

Other Markets

Although general trading in the Boston market has been more active than usual during the last week there has been very little doing in tractions. Boston Suburban has been in the market to some extent, the common selling for 18 and the preferred for 72½. Massachusetts Electric preferred has shown some activity at from 64 to 65.

In the Chicago market, Chicago Railways stocks of Series 1, 2 and 3 continue to be traded in, but the price changes are fractional. Kansas City Railway & Light has been traded in to some extent, and Chicago Subway has continued to be active.

Philadelphia Rapid Transit continues to be the most active issue in the Philadelphia market. Prices are a trifle lower than those recorded a week ago. Union Traction is also traded in to a limited extent and small lots of Philadelphia Company, both common and preferred, are being offered.

In the Baltimore market, some of the bonds of the Norfolk Railway & Light Company have been sold, but the principal dealing continues to be in United Railways bonds. In these the 4s are quoted at 84⅛ and the incomes at 51.

Quotations of various traction securities as compared with last week follow:

	Jan. 26.	Feb. 2.
American Railways Company, Philadelphia	45	*45
Boston Elevated Railway	128	126
Brooklyn Rapid Transit Company	70⅞	70⅞
Chicago City Railway	185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	*a75	a74
Consolidated Traction Company of New Jersey, 5 per cent bonds	*105½	a106
Detroit United Railway	*56	56½
Interborough-Metropolitan Company	15½	15⅜
Interborough-Metropolitan Company (preferred)	43½	41¾
Manhattan Railway	151½	*151½
Massachusetts Electric Companies (common)	12¾	13⅝
Massachusetts Electric Companies (preferred)	63	65
Metropolitan West Side Elevated Railway, Chicago (common)	16	*16
Metropolitan West Side Elevated Railway, Chicago (preferred)	48	*48
Metropolitan Street Railway	*42	*42
North American Company	82½	80¾
Philadelphia Company, Pittsburg (common)	42	42
Philadelphia Company, Pittsburg (preferred)	44	44
Philadelphia Rapid Transit Company	28¼	27¾
Philadelphia Traction Company	93	*93
Public Service Corporation, 5 per cent collateral notes	*99½	a100
Public Service Corporation certificates	*76½	a76
Twin City Rapid Transit Company, Minneapolis (common)	99½	99¼
Union Traction Company, Philadelphia	54¼	54¼

a Asked.
*Last sale.

Annual Report of Interborough Rapid Transit Company

An abstract of the annual report of the Interborough Rapid Transit Company of New York to the Public Service Commission, First District, covering the year ended June 30, 1908, has been made public. The figures include the physical statistics and results of operation of the Manhattan (Elevated) Railway.

Gross earnings from street railway operations for the year amounted to $24,699,505, an increase of $1,796,925, or 7.8 per cent. Total street railway operating expenses were $10,722,695, or 43.4 per cent of the gross earnings. This percentage compares with a corresponding expenditure in the previous year of 41.9 per cent of the gross earnings.

The expenditures for maintenance of way and structure and maintenance of equipment during the year ended June 30, 1908, aggregated $3,132,845, or 12.7 per cent of the gross revenue.

The income account, with a comparison, is as follows:

Year ended June 30.	1908.	1907.
Passenger revenue (including chartered cars)	$24,000,128.28	$22,303,633.10
Freight and other car earnings	59,171.12	60,169.23
Advertising and news privileges, etc	451,000.00	404,333.34
Rents	19,986.23	11,669.22
Sale of electric current	145,628.95	107,774.89
Telegraph privileges	15,000.00	15,000.00
Miscellaneous	8,590.67	.....
Total earnings, street railway operations	$24,699,505.25	$22,902,579.78
Maintenance of way and structures	1,334,509.25	1,169,164.85
Maintenance of equipment	1,798,336.29	1,515,431.10
Operation of power plant	2,167,510.43	1,983,329.20
Operation of cars	4,244,491.61	3,907,877.74
Damages (including legal expenses)	363,065.07	*202,534.67
General expenses	814,782.01	814,993.47
Total street railway operating expenses	$10,722,694.66	$9,593,331.03
Taxes accrued	1,586,466.31	1,377,965.37
Operating income (gross earnings less operating expenses and taxes)	$12,390,344.28	$11,931,283.38
Non-operating income	579,964.70	277,055.18
Gross income applicable to corporate and leased properties	$12,970,308.98	$12,208,338.56
Interest on funded debt	$1,250,000.00	$766,666.67
Other interest	.....	.....
Rentals: Interest	1,809,680.00	1,809,680.00
Dividends	4,200,000.00	4,116,000.00
City of New York	a1,991,984.95	1,789,548.19
Cash	10,000.00	10,000.00
Amortization of debt discount and expense	7,984.67	.....
Total charges to income	$9,269,649.62	$8,491,894.86
Surplus for year	3,700,659.36	3,716,443.70
Previous surplus	1,224,240.82	2,295,699.00
Total surplus	$4,924,900.18	$6,012,142.70
Dividends on stock	3,150,000.00	3,150,000.00
Credits to corporate surplus	56,842.81	b1,062,901.88
Surplus June 30	$1,831,742.99	c$1,799,240.82

*In 1907 the item "Legal expenses in connection with damages" was included in "Miscellaneous Legal Expenses" (under General Expenses).

a Measured by the interest and sinking fund on bonds issued by the City of New York for the construction of the Rapid Transit Railroad.

b Charges.

c The annual report of the company for 1907 shows a surplus of $1,799,240.82, while the 1908 report shows a surplus as of June 30, 1907, of $1,224,240.82. The difference, $575,000, represents discount on 5 per cent 3-year gold notes, which, at the instance of the commission, was written off.

The following statistics in relation to the system were published:

Year ended June 30.	1908.	1907.
Miles of first track owned and leased	62.31	59.80
Total track mileage owned and leased	197.30	190.53
Thereof elevated, electric (third rail)	134.02	134.02
Thereof subway, electric (third rail)	63.28	56.51
Cars—total number, all kinds	2,510	2,270
Passenger cars (exclusive of open cars)	2,392	2,152
Total seating capacity	120,824	....
Total number of trips made	1,783,452	....
Total (passenger) car miles run	108,589,822	98,792,770
Total number of (passengers) car hours	6,752,924	6,281,871
Passengers—Number of 5-cent fares	466,870,268	449,287,884
Passengers—Number of other paid fares (4c.)	16,415,372	
Passengers—Number of transfers collected	14,962,300	
Accidents—total number	3,132	....
Number of accidents causing personal injury	3,211	....
Number of persons killed	53	39
Number of persons injured	3,868	85
Number of officers and employees June 30	9,521	9,015
Number of motormen June 30	595	557
Number of conductors June 30	530	531
Total compensation of officers and employees	$6,610,722	$6,148,917

The statistics of traffic by months and lines were as follows:

PASSENGERS CARRIED.

BY MONTHS.

1907.	Total number.	Daily average.
July	34,247,071	1,104,757
August	34,007,461	1,097,015
September	35,424,663	1,180,822
October	42,925,194	1,384,684
November	41,131,899	1,371,063
December	42,548,192	1,372,522
1908.	Total number.	Daily average.
January	42,805,534	1,380,824
February	40,758,224	1,405,456
March	43,994,740	1,419,185
April	43,760,832	1,458,694
May	42,946,254	1,385,363
June	38,735,576	1,291,186
Total	483,285,640	1,320,453

BY LINES.

	Passengers.	Car-miles.
Second Avenue Elevated	45,189,264	9,900,261
Third Avenue Elevated	122,624,928	26,074,326
Sixth Avenue Elevated	84,054,338	16,343,768
Ninth Avenue Elevated	30,977,334	12,266,254
Subway Division	200,439,776	44,005,213
Total	483,285,640	108,589,822

An income statement for the quarter ended Sept. 30, 1908, is given, as follows:

QUARTER ENDED SEPT. 30, 1908.

	Manhattan Railway division.	Subway division.	Total.
Earnings from operation	$3,093,838.18	$2,235,049.45	$5,328,887.63
Operating expenses	1,587,198.59	1,088,511.11	2,675,709.70
Net earnings	$1,506,639.59	$1,146,538.34	$2,653,177.93
Other income	129,330.37	207,844.60	337,174.97
Gross income	$1,635,969.96	$1,354,382.94	$2,990,352.90
Deductions from income:			
Interest on funded debt	.....	$500,000.00	$500,000.00
Taxes: On property used in operation	30,000.00	15,000.00	45,000.00
Taxes: On earnings and capital stock	42,626.68	.....	42,626.68
Taxes: Other than above	310,000.00	.....	310,000.00
Rentals	1,462,655.75	*535,773.12	1,998,428.87
Amortization of debt discount and expense	.....	3,107.91	3,107.91
Total	$1,845,282.43	$1,053,881.03	$2,899,163.46
Net income	†209,312.47	300,501.91	91,189.44

*Rental due City of New York measured by interest and sinking fund on city bonds issued for construction of rapid transit railroad.

†Loss.

Annual Report of Eastern Pennsylvania Railways Company

Gross earnings of the Eastern Pennsylvania Railways Company for the year ended June 30, 1908, were $532,049, an increase of $33,863, or 6.80 per cent, over the previous year. Operating expenses and taxes were $335,846, leaving net earnings of $196,203. The gain in net earnings, as compared with the results of the preceding year, was $26,007, or 15.28 per cent. The report to the stockholders supplements these figures for the year by the following statement for the three months ended Sept. 30, 1908:

Gross earnings	$165,648
Operating expenses and taxes	91,546
Net earnings from operation	$74,102
Interest on bonds and rentals	49,386
Surplus	$24,716

P. G. Gossler, the president, writing on Oct. 26, 1908, made the following statement:

"Substantially all construction, reconstruction, railway, electric lighting and power extensions included in the original plan for the consolidation and rehabilitation of your company and its subsidiary companies have been carried out, with the exception of the proposed railway extension to Shenandoah, which will not be constructed by this company.

"The efforts made during the past year to secure new business, and the opening of the Tamaqua and Middleport division, have resulted in satisfactory returns, and we have reason to believe that by the continuation of an active business-getting campaign the results for the coming year will continue to show satisfactory increases. Commercial and industrial conditions generally in the territory served by your company were, and continue to be, affected very adversely by the partial suspension of coal mining and by the general business depression.

"With the return of general business prosperity and activity it is to be expected that the business of your company will show increasingly favorable results."

Annual Report of the Columbus Railway & Light Company

At the annual meeting of the Columbus Railway & Light Company, Columbus, Ohio, on Jan. 26, directors were re-elected as follows: Robert E. Sheldon, Edward K. Stewart, Clarence M. Clark, George W. Sinks, Theodore Rhoads, Carl J. Hoster and David E. Putnam. The new board organized by re-electing the following officers: R. E. Sheldon, president; E. K. Stewart, first vice-president and general manager; C. M. Clark, second vice-president; P. V. Bur-

rington, secretary and auditor; E. K. Stewart, treasurer, and L. G. White, general superintendent.

The statement of earnings for the year ended Dec. 31, 1908, submitted at the meeting shows a decrease in the net earnings and operating expenses, but owing to the fact that the statement includes the operation of the Columbus Light, Heat & Power Company for the six months from July 1 to Dec. 31, 1908, no comparative figures are given. The earnings follow:

Gross receipts	$2,300,745
Operating expenses	1,185,604
Net earnings	$1,115,141
Rentals, interest, dividends and taxes	894,053
Surplus	$221,088
Renewals, depreciation and interest on floating debt	73,965
Balance	$147,123
Accumulated surplus	232,214
Total surplus	$379,337
Dividends on Columbus Railway & Light stock	100,000
Balance to credit on Jan. 1, 1909	$279,337

Brooklyn (N. Y.) Rapid Transit Company.—At the annual meeting of the Brooklyn Rapid Transit Company on Jan. 29, Anthony N. Brady, E. H. Harriman and Walter G. Oakman were re-elected directors for three years, and James H. Wallace was elected to succeed Anson R. Flower, deceased, and George F. Porter was elected to succeed H. H. Porter, resigned. The directors will organize before Feb. 15.

Chicago (Ill.) City Railway.—The Chicago City Railway has declared an extra dividend of 3 per cent payable on Feb. 10 to stock of record on Feb. 1. This makes the total distribution for the year 9 per cent.

Chicago (Ill.) Consolidated Traction Company.—It is announced that Hans Winterfeldt, of Speyer & Company, New York, N. Y., and F. W. Upham have been elected members of the reorganization committee of the Chicago Consolidated Traction Company to succeed Chauncey Keep and Henry A. Blair, resigned.

Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.—The presence of J. E. Bleekman, New York, in Cincinnati recently resulted in talk about a plan to consolidate several of the interurban railways entering Cincinnati. B. H. Kroger, president of the Cincinnati, Milford & Loveland Traction Company, acknowledged that he had a conference with Mr. Bleekman relative to the development of the interurban properties. The Cincinnati, Milford & Loveland Traction Company, the Interurban Railway & Terminal Company and the Cincinnati & Columbus Traction Company are all mentioned in connection with the rumor.

Delaware & Hudson Company, Albany, N. Y.—The Delaware & Hudson Company has obtained a writ of certiorari from Justice Fitts of the Supreme Court for the review of the decision of the Public Service Commission of the Second District of New York denying the company permission to issue $4,665,295 in bonds to refund notes covering the purchase of the stock of the United Traction Company and $2,500,000 advanced to the Hudson Coal Company for the purchase of coal lands in Pennsylvania. The writ is returnable before the Appellate Division, which convenes in Albany on March 9.

Georgia Railway & Electric Company, Atlanta, Ga.—At the annual meeting of the stockholders of the Georgia Railway & Electric Company on Jan. 26, the retiring directors were all re-elected with the exception of Robert F. Maddox, resigned, who is succeeded by John E. Murphy. The stockholders authorized an issue of $20,000,000 of bonds for the purpose of refunding $11,255,000 of outstanding bonds and providing funds for the future needs of the company.

Illinois Traction System, Peoria, Ill.—The stockholders of the Illinois Traction System will vote on Feb. 6 to increase the preferred stock of the company from $4,000,000 to $5,000,000 to provide funds for acquisitions and extensions.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The report that New York capitalists, headed by S. J. Dill, of the Elmira Light & Railway Company, Elmira, N. Y., are negotiating for the purchase of the property of the Mahoning & Shenango Railway & Light Company seems to be premature. A member of the engineering firm of Sande·son & Porter, New York, who were instrumental in merging the properties into the present company, says that engineers for prospective purchasers have looked at the property, but so far there have been no negotiations involving prices.

Metropolitan Street Railway, New York, N. Y.—In the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909, mention was made of the final argument before Judge Lacombe in the United States Circuit Court on the motion of the Guaranty Trust Company to foreclose the mortgage for $12,500,000 on the property of the company. Judge Lacombe made his finding public on Jan. 28. He declared the mortgage defaulted and the principal due and payable by the mortgagor. Such payment failing, the property of the defendant is ordered to be sold within 20 days from the entry of the final decree. The court appointed Feb. 23 to hear argument as to the form of the decree.

Michigan United Railways, Lansing, Mich.—The stockholders of the Michigan United Railways Company will meet on March 1 to vote to increase the capital stock of the company from $5,000,000 to $7,000,000 and to execute a first and refunding mortgage to the Knickerbocker Trust Company, New York, N. Y., as trustee, to secure an issue of 30-year, 5 per cent gold bonds limited to $12,500,000 to acquire the property and franchises of the Lansing & Jackson Railway.

New York State Railways, Rochester, N. Y.—The New York State Railways, which is to take over as a holding company all the electric railways in New York State controlled by the Central Railway Syndicate, has organized as follows: Horace E. Andrews, Cleveland; William C. Brown, New York; John Carstensen, Scarsdale; Albert H. Harris, New York; Walter N. Kernan, Utica; Alexander M. Lindsay, Rochester; Edward V. M. Rossiter, New York; William K. Vanderbilt, Jr., Great Neck. Directors: Horace E. Andrews, president; William K. Vanderbilt, Jr., vice-president; J. C. Collins, secretary; Edward L. Rossiter, treasurer.

North American Company, New York, N. Y.—At the annual meeting of the directors of the North American Company on Jan. 27, John I. Beggs explained, following a notice given by him to the directors on Oct. 20, 1908, that the growth of the properties in which the North American Company is interested in Milwaukee and St. Louis, made it impossible for him to continue as president and manager of the companies in both cities. He, therefore, desired not to be re-elected as president and general manager of the United Railways Company of St. Louis, and the Union Electric Light & Power Company, but to continue as president and general manager of The Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, the growth of which properties required his undivided attention. He will retire from the St. Louis companies on April 1.

Port Jervis Electric Light, Power, Gas & Railroad Company, Port Jervis, N. Y.—In accordance with the plan of the bondholders of the Port Jervis Electric Light, Power, Gas & Railroad Company to purchase the property of the company at the foreclosure sale at Port Jervis on Jan. 27, the property was taken over on that date in their interests by Mr. Crowell, representing Wheeler, Curtis & Haight, New York, N. Y., for $275,000.

Susquehanna Railway, Light, Heat & Power Company, Lancaster, Pa.—The Susquehanna Railway, Light, Heat & Power Company has arranged to take over the Philadelphia, Coatesville & Lancaster Railway from the bondholders, who bid in the property at foreclosure on Dec. 30, 1908.

United Railways Company, St. Louis, Mo.—Two residents of St. Louis were added to the directorate of the United Railways Company and three to the directorate of the Union Electric Light & Power Company, both of which are controlled by the North American Company, at the annual meetings of the companies on Jan. 26. A majority of the members of both boards of directors are now residents of St. Louis. D. R. Francis, Jr., and A. B. Brown were elected directors of the United Railways Company to succeed George R. Sheldon and Christopher D. Smithers. John I. Beggs and C. W. Wetmore are now the only directors of the United Railways Company who do not reside in St. Louis. Samuel D. Capen, Horatio N. Davis and Henry Nicolaus were elected directors of the Union Electric Light & Power Company to succeed Charles Pfister, Robert Maloney and Arthur Williams. Officers of the United Railways Company will be elected on Feb. 17, and officers of the Union Electric Company about the same time. It is stated that Robert McCulloch, vice-president and general manager of the United Railways Company, will be elected president of the company to succeed Mr. Beggs and that Richard McCulloch, assistant general manager of the company, will be elected vice-president and general manager of the company.

Traffic and Transportation

Hearing Before Massachusetts Commission on Lawrence & Methuen Street Railway Fares

The Massachusetts Railroad Commission gave a hearing on Jan. 26 on the petition of residents of the Town Farm division of the Lawrence & Methuen Street Railway for the readjustment of fare on that portion of the company's lines. M. F. Emerson, Methuen, represented the petitioners, and David A. Belden, president of the Lawrence & Methuen Street Railway, the company. Regarding complaints about service, Mr. Belden stated that while certain readjustments may be necessary, the line is difficult to operate because traffic on one branch is at times very heavy. The nearest car house is 6 or 7 miles distant, and in cases of emergency it is difficult to make repairs. The line on which traffic is heavy extends from Methuen Junction to Canobie Lake Park, in Salem, N. H., via a junction at the State line with the Hudson, Pelham & Salem Street Railway. The Lawrence & Methuen Street Railway, the Hudson, Pelham & Salem Street Railway, the Haverhill & Southern New Hampshire Street Railway are under the management and control of the New Hampshire Electric Railways. An abstract of the brief presented by Mr. Belden upon the fare situation follows:

"The Lawrence & Methuen Street Railway is composed of three branches, all centering or having a common terminal in Lawrence at the intersection of Hampshire Street and Essex Street. One branch running northerly from the center of Lawrence joins the Haverhill & Southern New Hampshire Street Railway at the town and city line between Methuen and Haverhill, forming a through line operated as such between Lawrence and Haverhill, but it does not pass through the populous part of Methuen. Branching from this line about 0.5 mile from the Lawrence terminus is the Salem, N. H., or Canobie Lake line, which passes through the village portion of Methuen and thence through the country to a connection with the Hudson, Pelham & Salem Street Railway at the State line between Massachusetts and New Hampshire. A third branch, and the one which is concerned in the petition, extends from the Salem, Canobie Lake line about a mile west of Methuen Village, toward the west through a farming country to the State line, where it joins another branch of the Hudson, Pelham & Salem Street Railway, 1.5 miles west of the Salem branch. This is called the Town Farm line, and forms a short route or cut-off for through travel between Lowell and Lawrence or between Nashua and Lawrence, and as such shortens the distance over the route via Point A junction, so-called, in Salem, by 2.23 miles. When these lines were laid out in 1901 the line to Salem and Canobie Lake was not contemplated, and the Town Farm branch was to be used as part of the through route between Lowell, Nashua, Lawrence and Methuen. It was subsequently decided to build the Salem line, largely to connect Lawrence and Methuen with the park at Canobie Lake, and for a time it was doubtful whether the New Hampshire end of the Town Farm line would be built. The connection was finally made, the idea of the management then in charge of the property being to utilize the line for carrying freight. An unsuccessful appeal was made two years ago by the receiver of the Hudson, Pelham & Salem Street Railway for permission from the New Hampshire Legislature to take up and abandon the part of the Town Farm branch in New Hampshire. The reasons for abandoning this branch line, including the part in each State, for through service were due to the lack of through travel. The company was hopelessly handicapped in competing for Lowell and Lawrence travel as the route of the Boston & Northern Street Railway followed the Merrimac River between these points, and a trial of eight months in 1903-4 showed that although the company had the shortest and best route between Nashua and Lawrence, the through travel between those places yielded less than 5 cents per car-mile, and by carrying these through passengers to Point A junction upon through cars between Lawrence and Haverhill, in Salem, and there transferring them to the Salem-Lawrence cars, a large saving in car mileage was effected and duplicate service avoided. This arrangement proved to be the best for the majority of the company's patrons, but it left the Town Farm branch to be operated separately instead of as a part of a through line between cities, and thus it became dependent upon the local population along its track for business.

"Accordingly, a single car for regular service was installed, operating from Lawrence over the Salem line as far as the junction of that line with the Town Farm branch, and then over the Town Farm branch to the State line, giving hourly service summer and winter, with occasional extra service in the summer. A statement was presented showing the earnings of the cars on this branch from Lawrence to the State line for the year ending Sept. 30, 1908, together with the operating expenses. These figures showed that with the exception of the four months ending with September, the line was operated at a loss, while for the year there was a net loss of $1,357, with nothing figured for interest, taxes or depreciation. The car-mile earnings varied from 11.95 cents to 22.42 cents. In the period of eight months when the line was run at a loss, the car-mile earnings varied from 11.95 cents to 15.69 cents, and the operating expenses per car-mile from 16.70 cents to 25.16 cents. The loss in individual months varied from $69 to $689. For the year 73,538 car-miles were run, the gross earnings being $11,645, and the operating expenses, $13,002. For the year, the car-mile earnings on the Town Farm branch, including the Lawrence end with all figures, were 15.8 cents and the operating expenses were 17.7 cents. An important point in connection with these figures is the fact that the Town Farm car service also forms part of the service between Lawrence and Methuen over the Salem-Point A branch, as it operates between the Salem cars, splitting their schedules, and fully 62 per cent of the earnings come from the portion of the run not upon the Town Farm branch.

"Up to Nov. 1, 1908, a 5-cent fare was collected on this car for the entire distance from Essex Street to the State line, or 5.8 miles, yielding only 0.862 cent per passenger mile. The necessity for more revenue being very apparent, it was decided to make a new fare limit at Methuen Junction, so-called, where the Town Farm and the Salem lines separate, and charge a 3-cent fare for the balance of the run to the State line, 2.47 miles. The distance between the Lawrence end of the route and Methuen junction, where a 5-cent fare is charged, is 3.32 miles, yielding 1.5 cents per passenger mile, and the 3-cent fare for the Town Farm line yields 1.21 cents, so that no discrimination exists in the rate per mile against the petitioners. It was at first intended to install a full 5-cent fare for this end of the line in view of the sparse population. The company contended that this rate would have been justified, but in order that discrimination might not be charged, the additional fare was made 3 cents, and the general average passenger mile charge was preserved. The reason the company did not adhere to the single fare and make it 6 cents was its competition with the Boston & Northern Street Railway between Lawrence and Methuen, and any increase in fare would result on that end in more loss than gain."

The company met the objection that it is carrying passengers further on its two other branches for a single 5-cent fare as follows: "On the Haverhill line the company is again in competition with the Boston & Northern Street Railway, whose line is 1 mile shorter, and the same fare must of necessity be charged. As to the Salem line, the fare limit is 4.45 miles from Essex Street, and therefore yields 1.24 cents per passenger mile, but the fare limit is also the State line, and the connecting point with the Hudson, Pelham & Salem Street Railway, the earnings of which must be kept separate, and to save confusion of accounts, incident to placing the fare point, say 1 mile nearer Lawrence, it is allowed to remain at the logical place. The second fare distance, which is in New Hampshire, is only 2.54 miles long, over which a 6-cent fare is charged, and as most of the passengers riding beyond Methuen on this line also ride through the New Hampshire zone, the rate per passenger mile is equalized and becomes 1.57 cents, or more than is asked on the Town Farm line.

"The number of occupied houses along the Town Farm branch between Methuen Junction and the State line is 30, including those located within sight of the cars, giving a population of only 60 per mile of track. This branch can never become self-supporting, and if it had not been for the mistake of the original promoters in conceiving it to be a part of a through line between large cities, these people would have no service whatever. The company would gladly abandon the branch if it could."

The comparative statement of the company for the years 1905-8, inclusive, showed that the gross earnings increased $23,350, or 37 per cent in the period. Operating expenses increased $14,957, or 27 per cent, but practically all the increase in earnings came from Haverhill and the Salem branches, although the Town Farm branch gained $2,328 in 1908 over 1907, due to picnic and resort establishments over the New Hampshire line. The operating results of the entire road per car mile were:

	1905. Cents.	1906. Cents.	1907. Cents.	1908. Cents.
Gross receipts per car mile	17.98	21.29	21.91	23.36
Operating expenses per car mile	15.83	15.89	18.37	19.06
Passengers carried per mile	3.64	4.3	4.4	4.7

The statement of operating cost for the entire road for four years showed that maintenance has increased from $10,907 to $13,442; transportation from $35,861 to $41,157; general expenses from $8,782 to $9,908; and total operating expenses from $55,551 to $70,508. The cost of power, which is purchased, rose from 1.2 to 2 cents per kw-hour in the four years. Practically no tie renewals have yet been made on the Lawrence and Methuen lines, and it is estimated that at least $5,000 per year for the next four years will have to be expended for this purpose.

The following are the results of operation on the different branches of the system for 1908:

	Haverhill line. Cents.	Canobie Lake line. Cents.	Town Farm line. Cents.	Total. Cents.
Gross receipts per car mile	23.20	27.21	16.21	23.37
Operating expenses per car mile	19.06	19.06	19.06	19.06
Passengers per car mile	4.67	5.48	3.27	4.71

There is a loss of 2.85 cents per car mile on the Town Farm line, with nothing left for taxes, interest, and depreciation. For the year ending Sept. 30, 1907, there was a loss on this line of 5.2 cents per car mile. The percentage of car mileage on this branch to the mileage made on the whole system is 20; while the percentage of earnings is 13. Statements were given to show the results of the new fare arrangement for November and December, compared with the previous year. For November the loss in passengers over the same month of the previous year is 3476, and $16.64 in money, or 2 per cent. In December the loss in passengers was 2101, with a gain of $39.87 or over 5 per cent in the earnings.

EFFECT OF THREE-CENT ADDITIONAL FARE, TOWN FARM BRANCH

	November.		December.	
	1907.	1908.	1907.	1908.
Total passengers	15,863	12,387	15,219	13,028
Passenger receipts, total	$779	$763	$747	$787
Passenger receipts per car mile, cents	13.09	12.15	12.13	11.68
Three-cent fares collected	....	$143	....	$135
Five-cent fares (Lawrence-Methuen Jc.)	$746	$605	$714	$641

As the fare has not been disturbed for the people living between Lawrence and Methuen Junction, it is concluded that the loss in passenger earnings is due to the additional 3 cents now paid on the Town Farm branch and the usual irritation caused by fare advances.

Dividing the operating expenses of this service on a mileage basis and crediting each section or zone with its actual earnings, the November results show an operating loss of $16.44 in the 5-cent zone between Lawrence and Methuen Junction, and on the Town Farm section, or 3-cent zone, a loss of $394.57. In December the losses in the 5-cent zone are figured at $10.17 and in the 3-cent zone, $428.55.

In conclusion Mr. Belden said that the Lawrence & Methuen Street Railway has been in operation 6 years, and has not paid a dividend or accumulated a fund for depreciation or deferred maintenance. Its book surplus of $15,260 is more than due back in tie renewals, and this amount would not have accumulated if the power charge in previous years had not been tempered to its condition. Under these circumstances the road should not be asked to continue a service on the division in question, which is not only not self-sustaining, but a drag upon the balance of the system.

A rate of less than 1 cent per passenger mile is what the petitioners demand, and it is a well-settled fact that roads in such territory, operating large cars through sparse population, cannot live under any such tariff. The board took the case under advisement.

Favorable Decree in Action to Enforce Service on Sunday

Decision was rendered recently by Judge Anderson, sitting as United States Circuit Judge of the Seventh Circuit for the District of Indiana at Indianapolis, in the case of the Electrical Installation Company, Chicago, vs. The Winona Interurban Railway and others, mention of which was made on page 138 of the ELECTRIC RAILWAY JOURNAL of June 20, 1908.

The Winona Interurban Railway extends from Warsaw to Goshen, Ind., a distance of about 25 miles. It was promoted by the Winona Assembly and Summer Schools Association, a corporation conducting educational, religious and vacational enterprises at Winona Lake, 3 miles from Warsaw, the southern terminus of the road. In deference to the susceptibilities of many persons connected with the Winona organization, the directors of the Winona Interurban Railway have refused to run the road on Sunday.

The Electrical Installation Company built the Winona Interurban Railway, and as part consideration of its construction contract, received more than a majority of the bonds of the company issued for construction. In June, 1908, the Electrical Installation Company filed its bill in the United States Circuit Court for the District of Indiana. Among the more important allegations in the bill were that a public duty rested upon the defendant railway under its franchises from the State of Indiana, and as a quasi-public corporation, to operate its road every day in the week, and that failure to operate on Sunday was only in degree a less breach of its public duties than failure to operate at all. The bill also claimed that the directors of the railway had agreed before the construction contract was executed, and as a condition of its delivery, that the road should be run every day in the week.

A demurrer was filed by the defendants, The Winona Interurban Railway and the Winona Assembly and Summer Schools Association, denying the validity of the bill and claiming that, even if its allegations were true, the plaintiff had no standing in court. In other words, the point was raised that an obligation to operate its railroad on Sunday rested upon the defendant. The case was heard before Judge Anderson on Dec. 7. On Dec. 21 Judge Anderson handed down a decision overruling the demurrer and holding that the bill of complaint shows a good cause of action. The importance of the decision lies, perhaps, in the recognition of the usefulness of interurban lines in taking part in the orderly progress and development of the rural communities of the country. The question involved has not, so far as the court's decision is concerned, the slightest religious bearing, but it recognizes the need of the rural population for transportation accommodations on Sunday as well as during the rest of the week.

Accidents in New York

The Public Service Commission of the First District of New York has issued the reports of accidents on the railways within its jurisdiction for December and for the year ended with December. The report for December follows:

December.	1908.	1907.
Car collisions	98	216
Persons and vehicles struck by cars	1,007	947
Boarding	545	438
Alighting	485	435
Contact electricity	22	22
Other accidents	1,798	1,935
Total	3,955	3,993
Injuries:		
Passengers	1,464	1,113
Not passengers	459	461
Employees	439	363
Total	2,362	1,937
Serious injuries included in above:		
Killed	30	51
Fractured skulls	11	14
Amputated limbs	4	5
Broken limbs	27	36
Other serious	112	94
Total	184	200

The report for the year follows:

	Steam Lines.	Sub. and El. Lines.	Surface Lines.	Total.
Accidents	2,645	11,445	42,391	56,481
OF THE ABOVE THE FOLLOWING WERE INJURIES TO PERSONS:				
Passengers injured	361	5,829	15,528	21,718
Employees injured	1,327	996	3,938	6,261
Others injured	277	950	5,854	7,081
Total injured	1,965	7,775	25,320	35,060
SERIOUS INJURIES INCLUDED IN ABOVE:				
Killed	107	89	248	444
Fractured skulls	7	9	151	167
Amputated limbs	14	4	48	66
Broken limbs	19	39	361	419
Other serious injuries	119	161	1,215	1,495
Total	266	302	2,023	2,591

Pittsfield Electric Street Railway Given Freight Right.—The Pittsfield (Mass.) Electric Street Railway has been granted permission by the Council of Hinsdale to act as a common carrier in that town.

Service at Toledo, Ohio.—At the request of a member of the City Council, the Toledo Railways & Light Company has furnished the committee on railways a complete schedule of the operation of cars. Members of the committee have stated that they were surprised at the extent of the service on the 18 lines.

Increase in Service Ordered on Brooklyn Elevated Lines.—The Public Service Commission of the First District of New York has issued a final order directing an increase of service on the Fulton Street and Fifth Avenue elevated lines of the Brooklyn Rapid Transit Company. It is directed that in the rush hours on the Fulton Street line six-car trains be furnished on a schedule that provides for despatching 32 trains in 30 minutes upon all lines from Park Row.

Public Service Commission Asks About Spring Overhauling.—The Public Service Commission of the First District of New York has directed the secretary to write a letter to all street railway companies within its jurisdiction calling their attention to the approach of spring and the necessity for overhauling and repairing all open cars or other cars to be used during the summer months. The letter will ask each company to advise the commission what steps are being, or will be, taken toward thoroughly overhauling all rolling stock before the summer season opens.

Free Rides for School Children in Sheboygan.—Ernest Gonzenbach, treasurer and general manager of the Sheboygan Light, Power & Railway Company, Sheboygan, Wis., recently addressed a letter to H. F. Leverenz, superintendent of schools of Sheboygan, in which he said: "My own boy has informed me that there are a number of children going to school these mornings who are suffering and crying from the cold; these are children that are inadequately clothed. I want to advise you that, until further notice, I want to offer street car transportation free of charge to poor children in going to and from school on cold or stormy days."

Round-Trip Fare No Precedent for Intermediate Fare.—The Indiana Supreme Court holds that the sale of a reduced round-trip ticket from Crawfordsville to Indianapolis by a steam railroad in order to compete with the interurban railways does not make it obligatory for the railroad company to sell tickets at reduced rates from intermediate stations. In the case in question, the plaintiff was charged more for a ticket between New Ross to Indianapolis than he would have been charged for a ticket between Crawfordsville and Indianapolis, notwithstanding the fact that the distance between the latter cities is 12 miles less than that between New Ross and Indianapolis.

The Question of School Rates in New York.—Commissioner McCarroll, of the Public Service Commission of the First District of New York, has received a letter from Chairman Knapp of the Interstate Commerce Commission interpreting the ruling of that commission regarding school rates. The letter states that in the case of the Pennsylvania Railroad, which caused the discussion regarding the attitude assumed by the commission regarding school fares, the Commerce Commission objected only to those school rates given to special classes of pupils and excluding other classes from the privilege of the same rate. The same rate to all pupils, said Mr. Knapp, was not regarded as discriminatory.

Bonus to Employees of British Columbia Electric Railway.—The British Columbia Electric Railway, New Westminster, Vancouver and Victoria, B. C., recently announced that the bonus for the year to be given to the employees in accordance with the profit-sharing plan begun in 1903 will be $66.78 for each employee. This will involve a distribution of about $45,000. The amount divided among the men is one-third of the balance after 4 per cent has been paid on the common stock of the company. The previous payments to each employee were as follows: 1903, $25; 1904, $35; 1905, $40; 1906, $45; 1907, $63. In order to participate in the distribution, service in the employ of the company from July 1 of the previous year to the date of distribution is necessary.

Recommendations Affecting Elevated Operation in New York.—The Public Service Commission of the First District of New York has issued orders directing the Interborough Rapid Transit Company to construct a new double station, with side platforms, on the Third Avenue elevated line at 180th Street, and a new stairway for outlet at the north end of the 133d Street station on the same line. The new stairway will connect with 134th Street and will be for exit only. In regard to the third tracking of the Third Avenue line and the abolition of all island stations, Commissioner Eustis reported that the company's franchise called only for a two-track road, and that the Commission had no jurisdiction or power to compel the company to apply for additional franchises.

New Folder of Toledo & Chicago Interurban Railway.—An official timetable, effective Jan. 31, 1909, containing information of interest to passengers is being distributed by the Toledo & Chicago Interurban Railway, Kendallville, Ind. The pamphlet comprises eight pages printed on heavy blue-tinted stock with attractive cover designs. A map showing the connecting steam lines and a few paragraphs describing the freight and express service of the company accompany the timetable of the three divisions which comprise the road. General information relating to such matters as baggage, half fares, chartered cars, disputes with agents and conductors and mileage books is given. The names of the steam and interurban railways with which connections are made at the various cities served are printed on the back of the cover.

Orange County Traction Company Adopts Merit System.—For the purpose of encouraging motormen and conductors in the faithful performance of their duties the Orange County Traction Company, Newburgh, N. Y., proposes on Dec. 31, 1909, to distribute $500 in gold among employees with good records who have been in the service of the company more than six months. To measure the relative efficiency of the men, each conductor and motorman has been credited with 500 merit marks. Infraction of the rules of the company will occasion a fine against this credit. No employee having less than 400 credits will be permitted to share in the distribution of prizes, and the awards will be made in accordance with the respective standings of the men. Two hundred and fifty demerit marks will be deemed sufficient for discharge. On Christmas, 1908, the Orange County Traction Company gave every married employee a large turkey, and to each single employee it gave $2. In all, the company now has on its roll about 120 men.

Exit from Front in Richmond.—The following order was recently issued to the motormen and conductors of the Richmond Passenger & Power Company by C. B. Buchanan, superintendent of the railways of the company: "On and after Sunday, Jan. 10, the following regulations will be effective: The front gate of cars will be kept open for the purpose only of allowing passengers to leave cars from front. Passengers will be permitted to ride on front platforms only when there is not sufficient room inside or on rear platforms. Conductors must assist motormen in enforcing this rule. Motormen must not allow passengers to get on cars at front, and will notify all passengers who attempt to board in front to go to rear to get on cars. 'Exit Only' signs are being painted on the lookout timbers over the step at the front gate as notice to passengers that they are not allowed to enter from front. By carefully following and enforcing this regulation delays and accidents will be avoided, as passengers will soon become accustomed to leaving the cars from front, as well as rear, and will not attempt to get on in front. This will aid the conductor in handling his car and thereby assists the motorman in maintaining a good schedule."

Order Regarding Operation of Ottawa Electric Railway.—As a result of the inquiry conducted by the Railway Commission of Ontario into the accident on the Britannia line of the Ottawa Electric Railway on May 24, 1908, the commission has issued the following order to govern the operation of cars by the Ottawa Electric Railway: "1. That passengers be not allowed to stand on the front platform of cars. 2. That motormen be forbidden to engage in conversation with passengers or others, while the cars are in motion, or to turn from a forward view of the track, except where necessary in the proper operation of the car. 3. That a printed notice embodying the provisions of clauses 1 and 2 of this order be posted in a conspicuous place inside every car, at the front, and at each end of cars controlled from both ends. 4. That no car running between Holland Avenue, Hintonburg, and Britannia-on-the-Bay, on the company's Britannia line, approach within 600 ft. of an immediately preceding car or cars, while running on level track or ascending grades, nor within 1000 ft. of a preceding car or cars, while running on descending grades. 5. That cars carrying passengers shall always have both a motorman and conductor upon them while in operation."

Decision Favorable to Company in Philadelphia Suit.—Common Pleas Court No. 5, of Philadelphia, on Jan. 27 sustained the right of the Philadelphia Rapid Transit Company to charge a 5-cent fare in rendering its decision in the suit brought by the city against the company in which the city alleged that the charge of 5 cents was a violation of the agreement of the company with the city. The court accepted the view advanced by the company's attorneys that the giving of a transfer was a detail in the management of the street railway and being such was not within the purview of the agreement with the city. The court says: "The giving of a transfer is, in the opinion of the court, a regulation of the company, made from time to time in order to develop its business and to accommodate the public. In making and enforcing these regulations, the company may change its routes and again re-route them. The giving or withholding of such transfers is part of the managerial policy of the company in the developing and establishing of its business, which necessarily must change with the change of conditions in different localities. It is a detail of management, in which the city has a voice, through its representatives, as a part of the board of directors of the company. We cannot believe, if such a matter of management was deemed by the draughtsmen of the act to determine a rate of fare, that it would not have been recognized and particularized both in the ordinance and contract."

Personal Mention

Mr. Geo. B. Rice has been appointed chief draftsman of the Pacific Electric Railway, Los Angeles, Cal.

Mr. R. D. Voshall has been appointed master mechanic of the Tidewater Power Company, Wilmington, N. C., to succeed Mr. F. B. Culp, resigned.

Mr. J. Strang, heretofore general foreman of shops of the Pacific Electric Railway, Los Angeles, Cal., has been given the title of master mechanic.

Mr. F. F. Small, heretofore mechanical engineer of the Pacific Electric Railway, Los Angeles, Cal., has been given the title of superintendent of the mechanical department.

Mr. L. J. Delamarter, who for the last five years has been chief clerk of the Grand Rapids (Mich.) Railway, has been appointed assistant secretary of the company to succeed Mr. C. F. Stevens, Philadelphia, resigned.

Mr. Louis C. Fritch, assistant to president of Illinois Central Railroad, has been appointed consulting engineer of that road to supervise the preparation of plans for the electrification of its Chicago terminal.

Dr. H. M. Stine, Harrisburg, Pa., has been elected secretary of the Pennsylvania Street Railway Association and will maintain an office in Harrisburg where meetings of the State Executive Committee will be held.

Mr. James H. Ryan, who has been engaged in newspaper work for a number of years in various cities in the West, has been appointed publicity and advertising manager of the Illinois Traction System, with offices at Springfield, Ill.

Mr. Charles F. Conn, vice-president and general manager of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., announces the appointment of Mr. W. E. Higgins as assistant to the general manager, and Mr. J. H. Murray as superintendent of transportation.

Mr. Orson P. Arnold has resigned as chief inspector of the Utah Light & Railway Company, Salt Lake, Utah. Mr. Arnold has been connected with the street railways in Salt Lake since 1873, and at one time was general superintendent of the Utah Light & Railway Company.

Mr. Albert H. Stanley, general manager Underground Electric Railways Company, London, Eng., was tendered a farewell banquet on Jan. 28 at the Café des Beaux-Arts, New York, by some 20 of his friends. Mr. Stanley returned to London on Jan. 30.

Mr. Dennis J. Downing, chief clerk in the office of the Cincinnati (Ohio) Traction Company, has been appointed assistant secretary of the company to serve under Mr. Walter A. Draper, secretary. Mr. Downing has worked his way up from office boy through the positions of stenographer, clerk, and chief clerk.

Mr. H. C. Mitchell, of the accounting department of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., assumed the duties of auditor of the Indianapolis, Crawfordsville & Western Traction Company on Feb. 1. Mr. Mitchell has been connected with the Terre Haute, Indianapolis & Eastern Traction Company for four years.

Mr. C. S. White has been placed in charge of the school for the instruction of motormen maintained by the South Jersey Division of the Public Service Corporation of New Jersey at Camden, N. J., with the title of motor instructor. Mr. White was formerly a dispatcher on this division of the company, and before entering the employ of the Public Service Corporation was connected with interurban railways in the Middle West for 10 years.

Mr. Samuel Spaulding, on his retirement as superintendent of motive power of the Brooklyn (N. Y.) Rapid Transit Company to become assistant electrical engineer of the Pennsylvania Railroad, was tendered a dinner at the Clarendon Hotel, Brooklyn, by his associates and friends and was presented a handsome gold watch as a token of esteem. Later Mr. Spaulding was presented a diamond ring at his home in Flatbush by a committee representing the power house employees and others under his supervision.

Mr. C. E. Morgan, who for the last 3½ years has been superintendent of the Martinsville, Brazil and Danville divisions of the Terre Haute, Indianapolis & Eastern Traction Company at Indianapolis, Ind., assumed the duties of general manager of the Indianapolis, Crawfordsville & Western Traction Company with offices at Crawfordsville, Ind., on Feb. 1. Previous to his connection with the Terre Haute, Indianapolis & Eastern property, Mr. Morgan was affiliated with the Indianapolis & Eastern Railway in various capacities, serving with that company for six years.

Mr. A. G. Perry has been appointed local manager of the North Vancouver branch of the British Columbia Electric Railway, Vancouver, B. C. Mr. Perry was born in London, Eng., in 1865, and was educated in the public schools there. He followed commercial pursuits until 1889, when he went to Canada to engage in farming. Soon thereafter he entered the service of the British Columbia Electric Railway as a motorman, and continued in that and other positions until 1907, when he was appointed storekeeper of the company. It was from this position that he has been recently advanced to local manager of the North Vancouver branch of the company.

Mr. G. J. Eckhardt, purchasing agent of the International Railway, Buffalo, N. Y., has been appointed traffic agent of the company, with the title of purchasing and traffic agent. Mr. Eckhardt has been connected with the International Railway since February, 1903, when he accepted the position of chief clerk to Mr. J. E. Stephenson, who was then passenger and freight agent. In October, 1904, he was appointed freight agent of the company at Lockport, which position he filled until June, 1905, when he returned to Buffalo as assistant passenger and freight agent of the company. In March, 1906, Mr. Eckhardt was appointed secretary to Mr. Henry J. Pieree, formerly president of the company, and remained in that capacity until June, 1908, when he was appointed purchasing agent.

Mr. W. O. Wood, vice-president and general manager of the New York & Queens County Railway, Long Island City, N. Y., has been elected president of that company. Mr. Wood came east from Detroit in 1903 to accept the position of superintendent of the elevated lines of the Brooklyn (N. Y.) Rapid Transit Company, later becoming assistant general superintendent of the company. In 1907, he accepted the position of operating statistician of the Interborough-Metropolitan Company, New York, N. Y., which position he resigned a year later to become vice-president and general manager of the New York & Queens County Railway. While in Detroit, Mr. Wood was for three years superintendent of the Rapid Railway System of the Detroit United Railway, previous to which he was connected with the Illinois Central Railroad for 10 years as trainmaster and secretary to Mr. J. T. Harahan.

Mr. C. W. Ricker, the announcement of whose appointment as engineering assistant to the receivers of the Municipal Traction Company, Cleveland, Ohio, was made in the issue of the ELECTRIC RAILWAY JOURNAL of Jan. 30, has had a wide experience in electrical engineering and been connected with many prominent undertakings. After graduating from the Massachusetts Institute of Technology, in 1891, he entered the employ of the American Telegraph & Telephone Company, New York, and a year later took the student's course with the General Electric Company, at its Lynn works. In 1893 he opened an office as a consulting engineer in Buffalo, during which time he had charge of a great many important installations. In 1899 he accepted the position of electrical engineer of the United Electric Securities Company, Boston, and the following year became assistant to Mr. Theodore Stebbins, engineer of the Local Companies' Department of the General Electric Company. During this time he was appointed engineer in charge of the Lima Electric Railway & Light Company, Lima, Ohio, and upon completion of this work entered the employ of the Cleveland Construction Company, Akron, Ohio. While with this company he acted as supervising engineer of the Miami & Erie Canal Transportation Company, and as soon as the construction of this line was completed, he accepted a position as its electrical engineer. In 1904 he resigned from that company to enter the electrical engineering department of the New York Central & Hudson River Railroad, and in 1905 accepted the position of electrical superintendent of power stations of the Interborough Rapid Transit Company, New York. In 1907, he became electrical engineer of the Cleveland Construction Company, which has recently built the Youngstown & Ohio River Railroad and the Chicago, Lake Shore & South Bend Railway.

OBITUARY

Henry C. Bradley, of Henry C. Bradley & Company, Chicago, Ill., is dead. Mr. Bradley was formerly counsel for the Chicago Union Traction Company.

Albert Smithnight, secretary-treasurer of the Electric Railway Improvement Company, Cleveland, Ohio, is dead. Mr. Smithnight was born in Cleveland and after leaving high school was for some time connected with the banking firm of Everett & Waddell. Later he entered the drug business with his father and 20 years ago opened a store of his own on Cedar Avenue. Two years ago he retired from the drug business and was elected secretary-treasurer of the Electric Railway Improvement Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Oakland & Antioch Railway, San Francisco, Cal.—This company has been incorporated to construct an electric railway, estimated at 30 miles in length from Oakland to the town of Bay Point in Contra Costa County. The survey for the route has already been made. Principal office, San Francisco. Capital stock, $2,000,000, of which $30,000 has been subscribed. Directors: A. W. Maltby, Concord; S. L. Naphthaly, Allan Pollok, Walter Arnstein, F. W. Smith, San Francisco; F. S. Brooks, Alameda; H. A. Mitchell, Berkeley. [E. R. J., Aug. 29, '08.]

Washington, Baltimore & Annapolis Railway, Washington, D. C.—A bill has been introduced in the House granting this company a charter for a street railway through Florida Avenue to K Street to Sixth Street, northwest; thence to H Street and down H Street to Thirteenth Street, with a single-track loop around Thirteenth, E and Eleventh Streets back to the double track at H Street. It is provided that the company may contract with the Washington, Baltimore & Annapolis Electric Railway, the Chesapeake Beach Railway, or any other company owning or operating a connecting line, for the joint management, lease or purchase of such line and operate the same in connection with or as an extension of the Washington, Baltimore & Annapolis Railway. Capital stock, $3,000,000. The company is composed of George T. Bishop, Frank H. Ginn, George A. Craig, William Hitz and G. Bowdoin Craighill, the same incorporators as the Washington, Baltimore & Annapolis Electric Railway. The incorporators are all from Cleveland, Ohio.

***Abbeville & Northwestern Railway, Abbeville, Ga.**—This company has been chartered to build an electric railway connecting Abbeville with Fort Valley. The length of the proposed main line will be 58 miles, with a branch running to Montezuma, 17 miles long. Headquarters, Abbeville. Capital stock, authorized, $100,000.

Twin City Light & Power Company, Chehalis, Wash.—This company has been incorporated in Washington for the purpose of constructing an electric railway in and between Chehalis and Centralia, also to carry on a general light and power business. It is announced that the new company has taken over the electric lighting plants of both cities. Headquarters, Centralia. Capital stock, $400,000. Incorporators: C. L. MacKenzie, Colfax; A. Welch and T. J. Patterson, Portland. Directors: H. C. Coffman, Chehalis; Theodore Hess, Centralia; A. Welch, E. W. Hull and E. W. Harding, Portland. [E. R. J., Jan. 9, '09.]

FRANCHISES

Fresno, Cal.—The Board of Supervisors has granted to the Fresno Traction Company the franchise for the extension of its Forthcamp line to the Wilson and North Fresno tracts. The company bid $50 for the 50-year franchise, with the addition after the first five years and to be paid semi-annually 2 per cent on the gross annual receipts.

***San Francisco, Cal.**—Frank D. Stringham, representing the firm of Hillyer, Stringham & O'Brien, has filed an application with the Board of Supervisors for a franchise for a street railway system to begin at Stockton and Market Streets, and out Stockton Street to Sutter Street, through a tunnel of four blocks from Sutter Street to Sacramento Street, then to the surface again to the bay.

Lewiston, Idaho.—Application has been made to the City Council of Lewiston by M. A. Means for a franchise to construct a street railway in Lewiston. The franchise provides for the completion of over 1 mile of track within the next eight months and the completion of 3½ miles within 2½ years. [E. R. J., Jan. 16, '09.]

Morris, Ill.—The City Council of Morris has granted the Chicago, Ottawa & Peoria Railway an extension of one year, until Dec. 31, 1909, in which to complete the interurban railway from Seneca to Morris. H. E. Chubbuck, vice-president.

Anderson, Ind.—The City Council has granted to W. A. Campbell a two years' extension of a local franchise for an electric interurban railway, with which he proposes to connect Anderson, Noblesville and Lebanon. It is stated that the organization of this company will be completed this spring. [E. R. J., Nov. 21, '08.]

Detroit, Mich.—The Detroit Traction Company, through William E. Baubie, has filed with the City Clerk a petition for presentation to the Common Council for a franchise to build a number of street railways in Detroit.

St. Louis, Mo.—The North St. Louis & Suburban Railway Company received an extension of time recently from the St. Louis County Court in which to begin work on its line. The company was granted a franchise three years ago to construct an electric railway from the terminus of the North Broadway line through Jennings to Ferguson and Florissant.

St. Louis, Mo.—The House of Delegates has passed a bill to grant a franchise permitting the Hillsboro, Kimmswick & Northern Electric Railway to enter St. Louis with a new electric railway from the south. The measure has already been passed by the Council, and provides that the company may build tracks over the streets at the extreme south end of the city on condition that a bridge be built over the River des Peres.

Springfield, Mo.—The City Council has passed an ordinance granting the Springfield Traction Company a 20-year franchise for the extension of its Monroe Street line to the new State Normal School. [E. R. J., Jan. 30, '09.]

Addison, N. Y.—Application has been made to the Public Service Commission, of the Second District, by the Tuscarora Valley Traction Company for permission to operate an electric railway between Addison, Woodhull and Jasper, a distance of 19 miles. E. C. Smith and W. E. Barron, Addison, are interested in this project. [E. R. J., Aug. 1, '08.]

TRACK AND ROADWAY

Alabama Railway & Power Company, Ft. Payne, Ala.—This company announces that it will begin construction during this year on the proposed electric railway between Chattanooga and Birmingham. The company also expects to furnish power for lighting. Officers: H. T. Henderson, Durango, Col., president; J. H. Hill, Ft. Payne, Ala., vice-president; C. L. Young, Jr., Durango, Col., secretary and treasurer. [S. R. J., Nov. 16, '07.]

Calgary, Alta.—Bids will be received until Feb. 18 by the City Commissioners for furnishing the following supplies: Approximately 397 long tons No. 80 and 746 long tons No. 60 A. S. C. E. steel rails, together with certain special work, also spikes, bonds, tie plates, angle irons, track bolts, ties, etc.; span wire poles, 30 ft. and 35 ft., 3 sections, cedar poles; 12.5 miles of 00 trolley wire and 10.2 miles of 000 feed wire, span wire, hangers, insulators and conical strain insulators, ears, cross-over and trolley frogs. H. E. Gillis, City Clerk.

Edmonton Radial Railway, Edmonton, Alta.—Announcement is made that the City Council has decided to build an additional 5 miles of track at once. R. R. Keely, general manager.

Vallejo, Cal.—R. L. MacFarlane, the local representative of Randall, Wright & Trowbridge Company, Oakland, which is seeking a street railway franchise in Oakland, announces that the company has determined to enlarge upon its plans, and will build a railway from Vallejo to Benicia, and also to include the Vallejo White Sulphur Springs in its route. [E. R. J., Dec. 26, '08.]

Groton & Stonington Street Railroad, New London, Conn.—Application has been made to the Legislature by this company for permission to construct an extension to Eastern Point.

New London & East Lyme Street Railway, New London, Conn.—This company has applied to the Legislature for authority to extend its lines to the Connecticut River and to Crescent Beach.

East Pensacola City Company, Pensacola, Fla.—J. E. Stillman writes it is the intention of this company to begin the construction of its proposed street railway, not later than March 1. It will extend from Pensacola to East Pensacola, a distance of 1½ miles. Magnolia Bluff, an amusement resort, will be reached by the line. The company expects to purchase one car. Power will be rented from the Pensacola Electric Company. Officers: R. B. Simpson, president; Knowles Hyer, vice-president; H. M. Yonge, secretary and treasurer; J. E. Stillman, manager. [E. R. J., Jan. 9, '09.]

Inter-State Traction Company, Hoopeston, Ill.—Nathan Bond, secretary of this company, writes that contracts have not yet been placed for the building of this projected electric railway from Hoopeston through Rossville, Alvan and Bismark to Danville. Capital stock, authorized, $500,000. Officers: J. S. McFerren, president; A. H. Trego, vice-president, Nathan Bond, secretary; C. C. Williams, treasurer, all of Hoopeston.

Kokomo, Frankfort & Terre Haute Traction Company, Frankfort, Ind.—Announcement is made that this company plans to begin the construction of its proposed electric railway this spring. It will connect the following cities:

Kokomo, Frankfort, Colfax, Crawfordsville, Rockville and Terre Haute. Office, 207 South Main Street, Frankfort. Officers: Oliver Gard, Frankfort, president; J. C. Dewees, Kokomo, vice-president; E. B. Swift, secretary; M. W. Eikenberry, Kokomo, treasurer. [E. R. J., Oct. 17, '08.]

Newcastle Union Railway, Newcastle, Ind.—Albert D. Ogborn advises that this company has been formed for the purpose of constructing an electric railway between Newcastle, Sulphur Springs, Honey Creek and Middletown. A city line will be built in Newcastle, and at Middletown connection will be made with the Union Traction Company's lines. Capital stock, authorized, $50,000. Officers: Thomas B. Millikan, president; Charles W. Mouch, vice-president; Albert D. Ogborn, secretary.

Williamsburg & Iowa City Railway, Williamsburg, Ia.—F. O. Harrington advises that this company contemplates the construction of an electric railway, 28 miles in length to connect Williamsburg and Iowa City. Contracts have not yet been awarded. F. O. Harrington, Williamsburg, president; H. E. Hull, Williamsburg, secretary.

Atlantic Shore Line Railway, Kennebunkport, Maine.—It is stated that this company has plans under consideration for the extension of its lines from Sanford, north through Alfred, Limerick, Kezar Falls and Fryeburg to Rumford Falls, a distance of about 120 miles.

***Puebla Light & Power Company, Puebla, Mex.**—This company, which holds a concession from the State and Municipal Governments of Puebla to build and operate an electric street railway in that city is reported to be preparing to begin this improvement. It is said that the horse-car lines will be electrified and extended.

***Vera Cruz, Vera Cruz, Mex.**—Manuel L. de Guerra, Puerto Mexico, is reported to have obtained a concession from the Government of the State of Vera Cruz to build and operate an electric railway in that town.

Grand Forks (N. D.) Street Railway.—E. J. Lander writes that this company has just been organized and new officers elected. The company has not, as yet, fully outlined definite plans for the ensuing year, but has under consideration the purchase of a 2.5-mile line owned by the Grand Forks Transit Company, which extends from the heart of the city to the State University. If this plan to purchase the Grand Forks line is carried out, and a mile or two of additional track is built the company by the end of the year will have about 5 miles of line in operation. Capital stock, authorized, $250,000, of which $60,000 has been subscribed. Officers: R. B. Griffith, president; J. D. Bacon, vice-president; O. A. Webster, secretary; D. H. Beecher, treasurer, all of Grand Forks. [E. R. J., July 25, '08.]

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—This company has recently completed a 42-mile extension between Seville and Mansfield, Ohio. The completion of this line gives the company a through line from Cleveland to Bucyrus where it connects with the Columbus, Delaware & Marion Railway, which is not in operation from Columbus to Bucyrus. It is stated that the two companies have entered into traffic arrangements by which through service between Cleveland and Columbus will be inaugurated in the near future.

Mansfield & Southern Traction Company, Mansfield, Ohio.—S. A. Ford informs the ELECTRIC RAILWAY JOURNAL that this company proposes to build an electric railway to connect Mansfield, Lexington, Belleville, Butler, Fredericktown and Mount Vernon. Officers: S. A. Ford, president; Thomas Lothram, C. H. Voegele, secretary; Reid Carpenter, treasurer, all of Mansfield.

Ohio & Michigan Southern Railroad, Toledo, Ohio.—Announcement is made that this company proposes to build lines as follows: Toledo and Ann Arbor branch, to run north connecting Lambertville, Mich., Petersburg, Dundee, Milan and Ann Arbor; extension from Petersburg northwest to Jackson via Britton, Ridgeway, Tecumseh, Brooklyn and the chain of lakes south of Jackson. The company has working connections with the electric railways at Jackson, Ann Arbor and Toledo. Track has been laid from Toledo, Ohio, north to Petersburg, and trains are now in operation on this part of the line, and grading has been finished from Petersburg to Ann Arbor. The company expects to build the section from Petersburg to Jackson as soon as the weather permits. A number of bridges are yet to be put in place, including one 125-ft. bridge, one of 100 ft., one of 80 ft. and three of 54 ft. W. E. Niles, 122 Monroe Street, Chicago, Ill., is secretary of the company. [E. R. J., Jan. 2, '09.]

Poland, Boardman & Canfield Railway, Youngstown, Ohio.—E. H. Raupp, manager of the Youngstown & Southern Railway, Youngstown, writes that the Poland, Boardman & Canfield Railway will build an electric railway between Poland, Boardman and Canfield. Headquarters, 23 East Front Street, Youngstown. Officers: Henry Stambaugh, president; S. J. Dill, vice-president; David Tod, secretary and treasurer. The above officers are also connected with the Youngstown & Southern Railway.

Peterborough (Ont.) Radial Railway.—Announcement is made that this company contemplates extending its line from Clear Lake to a point near Stony Lake.

***Inter-City Electric Railway, Reading, Pa.**—This company has been organized to build an electric railway from Reading to Allentown, via Lyons and Tipton, 35 miles long. Capital stock, $500,000. Directors: Maxwell H. Bochow, president; Josiah Fisher, secretary, and Bateman Saddington, treasurer. W. R. Kershner, Allentown, and Jacob L. Hinterleiter, Tipton.

Johnstown & Gallitzin Railway, Johnstown, Pa.—This company, which proposes to build an electric interurban railway from Johnstown to Gallitzin, announces that it is ready to receive bids on the following material to be used in the construction of about 36 miles of single track with turnouts: Special track work, wooden poles, overhead construction, catenary form being considered for the stretches between incorporated towns, the road being entirely on private right-of-way except through small towns. Office, Suppes Building, Johnstown. [E. R. J., Dec. 5, '08.]

Perkiomen Valley Traction Company, Schwenksville, Pa.—I. H. Bardman writes that this company proposes to build an electric railway between the following cities: Collegeville, Trowbridge, Gratersford, Schwenksville, Delphi, Zieglersville, Perkiomenville and Green Lane. Capital stock, $7,500. Officers: I. H. Bardman, Schwenksville, president; S. Hughes, Zieglersville, vice-president; I. H. Smoyer, Green Lane, secretary; George Dunn, Gratersford, treasurer. [S. R. J., May 18, '07.]

Greenville (S. C.) Interurban Railway.—This company announces that it has completed financial arrangements and awarded the contracts for the construction of its projected electric railway from Greenville to Williamston. Construction is to begin not later than May 1. [E. R. J., July 11, '08.]

***Paris Mountain Electric Railway, Greenville, S. C.**—At a recent meeting of people interested in the construction of this proposed electric railway, a committee consisting of A. E. Sussex, J. F. Mitchell and C. H. Crosskeys was appointed to solicit subscriptions from the property owners along the route. It is the intention of the promoters to build an electric railway from Greenville to the summit of Paris Mountain.

***Deadwood, S. D.**—Mayor Adams, of Deadwood, has appointed as a committee John Treber, James Hogarth, George V. Ayres and Jacob Goldberg to confer with James D. Hardin in regard to his proposal to install an electric street railway system in the city of Deadwood.

Whatcom County Railway & Light Company, Bellingham, Wash.—L. H. Bean, Bellingham, local manager of this company, writes that contracts will soon be placed for the building of 3000 ft. of single track.

POWER HOUSES AND SUBSTATIONS

Calgary, Alta.—Bids will be received until Feb. 18 by the City Commissioners for three water-tube boilers, equivalent to 1000 hp, with piping, and induced draft system for 2500 hp; also a 500-kw generator connected to a 750-hp high-speed engine for railway system, with condenser, switchboard, etc. H. Gillis, City Clerk.

Detroit (Mich.) United Railway.—This company is said to have placed an order with the Westinghouse Electric & Manufacturing Company for one 1500-hp steam turbine.

Albany & Hudson Railroad, Hudson, N. Y.—This company has placed an order with the General Electric Company for a 1500-kw steam turbine.

Johnstown & Gallitzen Railway, Johnstown, Pa.—This company is ready to receive bids for steam power plant equipment. It will generate current at about 13,000 volts with two units of 750 kw each. One substation will be located at the power station, which is approximately the center of the distribution system, and an additional substation will be built at each end of the line. Current will be transformed and stepped down at the substations to 600-volts d.c., as the company proposes to operate cars for a distance of 2¼ miles over the Johnstown Passenger Railway. Office, Suppes Building, Johnstown, Pa. [E. R. J., Dec. 5, '08.]

Ponce Railway & Light Company, Ponce, Porto Rico.—This company has recently purchased from the Westinghouse Electric & Manufacturing Company a 200-kw, 2200-volt, two-phase belted generator to replace a 150-kw machine.

Manufactures & Supplies

ROLLING STOCK

Conestoga Traction Company, Lancaster, Pa., is in the market for 20 interurban cars.

Beaumont (Tex.) Traction Company expects to order within the next 10 days five cars.

Shore Line Electric Railway Company, New Haven, Conn., is in the market for four interurban cars.

Ithaca Street Railway, Ithaca, N. Y., has recently ordered two new cars and purchased two second-hand cars.

Johnstown & Gallitzan Railway, Johnstown, Pa., is in the market for eight passenger cars, an express car and two snow sweepers.

Municipal Tramways of Calgary, Alta., will receive bids up to noon of Feb. 18 for 12 standard street railway cars, one sprinkler and one sweeper. H. E. Gillis, city clerk, should be addressed.

Electrical Construction & Machine Company, Rock Island, Ill., is in the market for one double-truck car which will be used on a new electric line to be built between the depot and the hotels at Colfax, Ia.

Wichita Railroad & Light Company, Wichita, Kan., which recently ordered 12 cars from the American Car Company, of St. Louis, will have them constructed under license of the Pay-As-You-Enter Car Corporation.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., has placed an order for 54 sets of trucks with the Standard Motor Truck Company, Pittsburg, Pa. The order for the cars under which these trucks will be used was placed with the Cincinnati Car Company, as noted in the Electric Railway Journal of Jan. 23, 1909.

North Jersey Rapid Transit Company, Paterson, N. J., which was reported in the Electric Railway Journal of Jan. 2 to be in the market for trucks and cars, has sent out specifications for 10 interurban cars. M. R. McAdoo is general manager, with offices in the Colt Building, Paterson, N. J.

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill., states that it will purchase five 55-ft. interurban cars within the next 10 days, and will later increase the order to seven or eight cars. It is expected the cars will be of the three-compartment type, with side-door entrances. W. H. Conrad, 1145 First National Bank Building, Chicago, is general manager.

Spokane & Inland Empire Railroad Company, Spokane, Wash., has ordered from the St. Louis Car Company 10 double-truck single-end city cars for the city lines of Spokane. These cars will be similar to the last order placed by the same company with one or two exceptions. The bodies will be 29 ft. 6 in. long and will be mounted on Brill 27-F1 trucks. Westinghouse straight-air brake equipment, with motor-driven compressors, Westinghouse 101-B2 motors and International registers have been specified.

American Railways Company, Philadelphia, Pa., has placed an order with the American Locomotive Company for four pairs of Type K short wheel-base trucks, for the Scranton (Pa.) Railway Company. The same builders have also furnished 10 pairs of similar trucks for the Dayton (Ohio) Street Railway, four pairs for the Springfield (Ohio) Street Railway and also arch-bar frame freight trucks for the Scranton and Altoona companies, all of which are subsidiary companies of the American Railways Company.

TRADE NOTES

Vacuum Oil Company, London, Eng., has removed to Caxton House, Westminster, London, S. W.

Westinghouse Machine Company, East Pittsburg, Pa., announces that H. T. Herr has been appointed general manager.

Standard Roller Bearing Company, Philadelphia, Pa., has retained Henry Souther, of Hartford, Conn., to devote part of his time to its interests as consulting engineer.

Lincoln Sand & Gravel Company, Lincoln, Ill., has been joined by Bert Harter, formerly in the electrical engineering department of the Roberts & Abbott Company, Cleveland, Ohio.

Raymond Concrete Pile Company, New York and Chicago, will give, at the coming Chicago cement show, working demonstrations of its system of making and placing concrete piles.

Joseph B. Baker, formerly associated with Ray D. Lillibridge, New York, N. Y., has opened an office at 120 Liberty Street, New York, where he will handle technical and engineering publicity.

McClintic-Marshall Construction Company, Pittsburg, Pa., designer, manufacturer and director of steel structures, has opened an office in the Central Building, Seattle, Wash. C. F. Boyce is the sales representative.

Belden Manufacturing Company, Chicago, Ill., has been appointed Western agent of the Hope Webbing Company, Providence, R. I., and will hereafter handle the electric railway trade in the West for the latter company.

Pantasote Company, New York City, has received an order for furnishing Agasote headlinings for the 25 cars that are being built by the Woeber Carriage Company, for the Denver City Tramway Company, Denver, Col.

Metallic Railroad Tie Company, Shirley, Ind., is a new corporation which has just been formed to manufacture and sell metallic railway ties. Geo. Williams, Frank Gordon and James McCune are named as the incorporators.

Northwestern Railway Supply Company, Chicago, Ill., is a new corporation which has just been formed to manufacture and sell railway supplies and equipment. The incorporators are William T. Barbee, Thomas A. Barbee and C. R. Murray.

Railway Telephone & Electric Company, Chicago, Ill., has been incorporated by M. W. Zabel, A. M. Belfield and O. M. Wermich, to do a general manufacturing and sales business in electrical appliances. The capital stock of the company is $30,000.

Duff Manufacturing Company, Pittsburg, Pa., announces that E. A. Johnson has been appointed general Eastern sales manager of the company, with offices at New York. Mr. Johnson was formerly connected with the Watson-Stillman Company, New York, for 12 years.

W. R. Brixey, New York, N. Y., has changed the name under which he manufactures Kerite insulated wires and cables to the Kerite Insulated Wire & Cable Company. Incorporated by W. R. Brixey. Mr. Brixey still retains his offices in the Hudson Terminal Building.

Electric Service Supplies Company, Philadelphia, Pa., exhibited a new carbon brush for railway motors at the meeting of the Central Electric Railway Association in Indianapolis on Jan. 28. These brushes are formed individually so that the material and texture are uniform, thus affording excellent service results.

Triad Engineering & Construction Company, Goshen, Ind., has been incorporated to build interurban railways. The directors are H. A. Butterfield, A. W. Malone, and C. A. Burnett, all of whom were recently connected with the engineering staff of the Winona (Ind.) Interurban Railway.

Northern Engineering Works, Detroit, Mich., have recently supplied traveling cranes to the Black Hills Traction Company, Deadwood, S. D.; one 3-ton crane to the New Phœnix Foundry & Machine Company, Springfield, Mo.; one 15-ton crane to the City of Oswego, N. Y., and two 7½-ton traveling cranes to the Western New York Construction Company.

Ohio Mobile Car Sign Company has opened offices in the Wyandotte Building, Columbus, Ohio. Moving signs mounted on an endless chain will be manufactured for street cars. The officers of the company are: George D. Meiklejohn, president; Charles P. Meyers, vice-president; L. A. Manlove, secretary. A branch office will be established at Omaha.

The Lackawanna Steel Company, New York, N. Y., announces that Samuel B. Sheldon has resigned as general superintendent of its Buffalo plant to become connected with the Bethlehem Steel Company, South Bethlehem, Pa. George F. Downs, assistant general superintendent of the Lackawanna Steel Company, will succeed Mr. Sheldon and T. H. Mathias will succeed Mr. Downs.

James R. Petley, Milwaukee, Wis., treasurer and purchasing agent of the National Brake & Electric Company for the past six years has resigned to become a manufacturer's representative in Milwaukee and vicinity. Mr. Petley will have available a full line of manufacturers', contractors' and foundry machinery and supplies, and will be located at 614 Caswell Building, Milwaukee.

Allis-Chalmers Company has appointed John P. Cosgro district manager of the company for southwestern Texas and northern Mexico. Mr. Cosgro's office will be in El Paso, Tex. Mr. Cosgro has had an extensive experience with the Anaconda Copper Mining Company and the American Smelters Securities Company and he is thoroughly familiar with the territory which he now controls.

Paragon Metal Company, Thirty-first Street and Ashland Avenue, Chicago, Ill., exhibited its new journal bearing

with removable babbitt at the Indianapolis meeting of the Central Electric Railway Association on Jan. 28. The journal brass is so designed that it is held in a fixed position at all times, but it may be inserted or removed very quickly. O. M. Stimson is president of the Paragon Metal Company.

Ohio Filler & Shield Company, Columbus, Ohio, manufacturer of lubricants and paints for railway purposes, has moved into a new factory on City Avenue. At the annual meeting the following officers were elected: President, H. M. Daugherty; vice-president, John T. Adams; secretary, R. F. Rarey; treasurer, J. E. Todd. Former President T. J. Elscher and C. W. Randall, former secretary, are still connected with the company.

Darley Engineering Company, of New York, announces receipt of the following orders: From the United States Navy Department, one 8-in. suction conveyor with a 25-ton storage tank for Charleston Navy Yard; from Armour & Company, one 8-in. ash conveyor for their South Omaha plant; from the American Steel & Wire Company, one 8-in. ash conveyor for its Rankin plant, and from the Quincy Market Cold Storage & Warehouse Company, Boston, Mass., one 8-in. ash conveyor for its Richmond Street plant.

David J. Evans, Chicago, Ill., has resigned as manager of sales, Chicago office, of the Rail Joint Company, effective March 1. Hereafter Mr. Evans will give his personal attention to the Andresen-Evans Company, in which he has been interested since its reorganization. This company has developed new types of ore and coal handling machinery. Prior to his association with the Rail Joint Company Mr. Evans was with the Chicago office of the Lorain Steel Company, and also the North American Railway Construction Company.

Grip Nut Company, Chicago, Ill., announces that it has recently received orders for Grip nuts to be used in the construction of 500 ventilated fruit and vegetable cars and 200 stock cars being built by the American Car & Foundry Company at Madison, Ill., for the San Antonio & Aransas Pass Railroad, also for Grip nuts for the 800 steel hopper cars to be built by the Standard Steel Car Company for the Duluth & Iron Range Railroad. The Grip Nut Company has found it necessary to increase the capacity of its plant at South Whitley, Ind., and this work is under way.

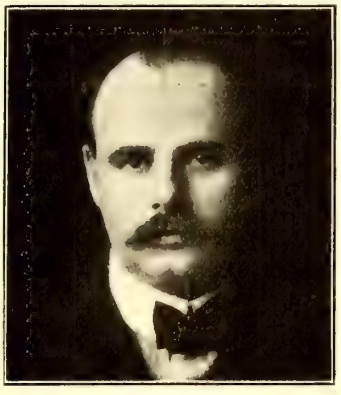
Sunbeam Incandescent Lamp Company, Chicago, has moved its sales office and warehouse from 32 West Polk Street to the Western Electric Company Building at 259 South Clinton Street, Chicago. This change was made as larger quarters were needed to properly take care of the increased volume of business being handled. The lamps of the Sunbeam company are well known, having been on the market for 20 years. The company makes a complete line of carbon, Gem, tungsten and tantalum filament lamps in all sizes and voltages. Its entire output is distributed through the Western Electric Company and its branch offices throughout the United States.

Rochester Coil Company, Rochester, N. Y., announces that G. Rekers has been appointed factory manager and engineer. Mr. Rekers was formerly superintendent of the electrical department of the General Railway Signal Company, Rochester, N. Y., which position he held for the past eight years. Previous to that time he was assistant foreman of the winding department of the Siemens-Halske Company, Chicago. The Rochester Coil Company will put on the market a new and patented armature coil adaptable to any size or type of armature. It will also make a specialty of form-wound magnet coils in all sizes and resistances for repair work. The company's plant is to have a complete equipment of coil winding and insulating machines and impregnating apparatus.

C. G. Young, New York, who for 16 years has been connected with J. G. White & Company, New York, has opened a temporary office at 43 Exchange Place, New York, and announces that he is prepared to undertake engineering construction, examinations and reports, including estimates of earnings for managers, owners, investors in electric railway and other engineering projects. Having been engaged to make a number of important examinations and reports in the Far East, Mr. Young will leave New York on Feb. 15 for the Philippine Islands, China, Japan and Siberia. During this trip he is prepared to make examinations and reports of projects other than those he now has in hand. He expects to remain abroad until August, 1909, when he will return to New York and open offices at 60 Wall Street.

The Schott Engineering Company, Chicago, Ill., has been organized to succeed W. H. Schott in the contracting and engineering business formerly conducted by him and will handle the Schott system of heating. The company was incorporated on Dec. 31, 1908, under the laws of Maine with headquarters at the American Trust Building, Chicago. The officers are: W. H. Schott, president; M. O. Payne, vice-president; C. R. Scott, secretary and treasurer. The officers, together with John D. Hibbard, A. J. Goodhue, W. A. Brown and John T. Shay constitute the board of directors of the new company. Mr. Schott will also carry on a general consulting engineering business. Among the contracts which the company has in hand is the construction of the Government naval training station at North Chicago.

Galena Signal Oil Company, Franklin, Pa., announces that at a recent meeting of the directors of the company S. A. Megeath was elected vice-president and general manager of the company. Mr. Megeath, who is well known in railroad circles, was born in Baltimore, Md., March 17, 1870; spent his early life in Omaha, Neb., and was educated at the State University of Missouri. In 1889 he entered the Omaha National Bank and remained with this institution nearly three years, rising to the position of a teller. He then moved to Wyoming, but soon returned to Omaha to engage in the book and stationery business. In September, 1896, he removed to Franklin, Pa., as special agent for the firm of Miller & Sibley, and in January, 1898, was elected vice-president of the Galena Oil Works, Ltd. Two years later this company was consolidated with the Signal Oil Works, Ltd., under the name of the Galena Signal Oil Company, and Mr. Megeath was made first vice-president of the combined companies. This position he occupied until February, 1907, when he resigned with the intention of engaging in the coal business in the West, but was induced to take charge of the foreign business of the Galena Signal Oil Company for a period of two years. Under his direction this business increased rapidly. His many friends extend their congratulations to him on his election, which came as a recognition of his fitness for the position and his ability as an organizer and executive.



S. A. Megeath

ADVERTISING LITERATURE

Rail Joint Company, 29 West Thirty-fourth Street, New York City, has issued catalog No. 3 containing illustrations and descriptions of Continuous, Weber and Wolhaupter base supported rail joints.

Wagner Electric Manufacturing Company, St. Louis, Mo., has issued Bulletin No. 83 on single-phase motors. This company is well known as a pioneer in this line, and some of its installations are shown in this circular.

Goldschmidt Thermit Company, New York, N. Y., has issued a folder treating of its process for repairing heavy steel and wrought-iron sections. There are several illustrations of repairs made to electric railway apparatus.

National Tube Company, Pittsburg, Pa., has just issued its new catalog descriptive of tubular steel plates for transmission wires. The publication illustrates the many ornamental varieties of poles manufactured by it.

Ohio Brass Company, Mansfield, Ohio, has issued catalog No. 2, describing high-tension porcelain insulators and accompanying detail material, such as pins, cross-arms, wire, etc. Cable clamps, anchors and augurs are also mentioned.

General Electric Company, Schenectady, N. Y., has recently sent out with other publications Bulletin No. 4638, which describes the design of moderate-sized central station switchboards. Bulletin No. 4642 is devoted to U. S. 13 roller bearing trolley base. Pamphlet No. 3728 explains the value and economy of the G. E. tungsten series lamp in street lighting service. Folder No. 3750 describes G. E. improved Type H. transformers.

Chanler Bros. & Company, Philadelphia, Pa., are distributing with their compliments a diary for 1909 bound in Russian leather. Among other things the diary contains a summary of the principal bonds and stocks dealt in on the Philadelphia exchange, and a table of the highest and lowest quotations of New York stock from 1900 to 1908 and of the principal Philadelphia securities for each month of 1908. A feature of the diary that will be appreciated by all interested in street railway securities who are so fortunate as to be favored with a copy of it is the summary of the various issues of the Philadelphia Rapid Transit Company, Indianapolis Traction & Terminal Company, Louisville Traction Company and the Norfolk & Portsmouth Traction Company.

TABLE OF MONTHLY EARNINGS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. * Including taxes. † Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Dec. '08	147,862	82,286	65,576	43,362	22,214
	1 " " '07	160,454	86,147	74,306	43,999	30,307
	12 " " '08	1,909,061	1,095,755	813,306	513,242	300,064
	12 " " '07	1,890,473	1,086,424	804,050	526,532	277,517
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Nov. '08	32,971	18,694	14,277	8,861	5,416
	1 " " '07	33,342	18,483	14,859	7,571	7,288
	12 " " '08	358,094	205,609	152,485	98,429	54,056
	12 " " '07	350,177	197,151	153,026	88,079	64,947
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Dec '08	199,036	*134,488	64,548	44,476	20,072
	1 " " '07	200,968	*181,143	19,824	43,080	†23,255
	12 " " '08	2,167,546	*1,433,850	733,696	527,386	206,310
	12 " " '07	2,221,000	*1,521,479	699,520	479,506	220,014
CHAMPAIGN, ILL. Illinois Tr. Co.	1m., Nov. '08	360,680	196,383	164,297	.....	.....
	1 " " '07	335,889	195,596	140,294	.....	.....
	11 " " '08	3,712,953	2,120,497	1,592,456	.....	.....
	11 " " '07	3,427,210	1,928,521	1,498,689	.....	.....
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Dec. '08	67,995	44,803	23,192	13,817	9,375
	1 " " '07	62,649	41,512	21,137	13,493	7,643
	10 " " '08	637,658	413,027	224,632	137,992	86,640
	10 " " '07	607,860	386,511	221,350	135,120	86,230
CHICAGO, ILL. Aurora, Elgin & Chicago R. R. Co.	1m., Nov. '08	109,912	64,969	44,943	27,723	17,219
	1 " " '07	108,653	63,192	45,461	28,034	17,428
	5 " " '08	671,467	346,198	325,269	138,481	186,787
	5 " " '07	673,627	351,453	322,174	138,549	183,625
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1m., Nov. '08	21,858	* 13,550	8,308	.....	.....
	1 " " '07	22,474	* 12,984	9,490	.....	.....
	11 " " '08	263,757	* 154,636	109,121	.....	.....
	11 " " '07	269,414	*146,158	123,256	.....	.....
Lake Shore Elec. Ry. Co.	1m., Nov. '08	68,352	* 40,716	27,636	.....	.....
	1 " " '07	69,836	* 46,667	23,168	.....	.....
	11 " " '08	893,653	*494,118	399,535	.....	.....
	11 " " '07	936,360	*518,077	418,283	.....	.....
DALLAS, TEX. Dallas Electric Corporation.	1m., Nov. '08	105,194	66,355	38,839	28,395	10,444
	1 " " '07	103,206	62,246	40,960	29,480	11,480
	12 " " '08	1,159,768	780,032	379,736	350,733	29,003
	12 " " '07	1,118,482	762,107	356,375	315,365	41,010
E. ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Dec. '08	172,276	102,146	70,130	.....	.....
	1 " " '07	180,575	96,301	84,274	.....	.....
	12 " " '08	2,009,514	1,062,309	947,205	.....	.....
	12 " " '07	2,157,442	1,127,894	1,029,548	.....	.....
EL PASO, TEX. El Paso Cos.	1m., Nov. '08	47,597	34,684	12,913	7,508	5,405
	1 " " '07	46,431	30,673	15,758	6,159	9,598
	12 " " '08	529,820	381,818	148,002	85,280	62,722
	12 " " '07	497,478	365,921	131,557	67,515	64,042
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Nov. '08	111,794	58,996	52,798	.....	.....
	1 " " '07	115,089	62,619	52,470	.....	.....
	11 " " '08	1,203,884	672,396	531,488	.....	.....
	11 " " '07	1,167,594	683,503	484,091	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Nov. '08	93,282	55,631	37,651	14,915	22,736
	1 " " '07	83,568	47,385	36,183	14,102	22,081
	12 " " '08	1,067,475	622,356	445,118	186,675	258,443
	12 " " '07	1,055,358	593,486	461,872	157,066	304,806
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Nov. '08	104,446	59,593	44,853	20,941	23,912
	1 " " '07	89,740	53,674	36,066	19,909	16,157
	12 " " '08	1,079,118	625,620	453,498	142,793	210,705
	12 " " '07	1,044,599	612,249	432,350	223,786	208,564
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Nov. '08	21,591	12,063	9,529	5,836	3,693
	1 " " '07	19,816	12,361	7,456	4,776	2,680
	12 " " '08	260,483	146,301	114,183	58,658	55,525
	12 " " '07	250,152	146,885	103,267	56,578	46,689
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Nov. '08	36,882	20,199	16,683	7,966	8,717
	1 " " '07	31,171	20,043	11,128	7,114	4,014
	12 " " '08	425,116	250,862	174,253	98,735	75,518
	12 " " '07	391,033	229,113	161,920	72,887	89,034
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Nov. '08	543,514	300,966	242,548	153,899	88,649
	1 " " '07	518,424	276,030	242,394	151,099	91,295
	6 " " '08	3,232,639	1,826,144	1,406,495	931,252	475,243
	6 " " '08	3,166,072	1,620,218	1,545,854	924,565	621,289
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m., Dec '08	50,123	*23,681	26,442	11,483	14,959
	1 " " '07	56,032	*24,946	31,085	11,438	19,648
	12 " " '08	572,272	*292,785	279,487	137,952	141,535
	12 " " '07	605,777	*323,453	282,324	129,010	153,314
LEXINGTON, KY. Lexington & Interurban Rys. Co.	1m., Nov. '08	46,098	32,971	13,127	.....	.....
	1 " " '07	42,988	28,165	14,823	.....	.....
	11 " " '08	566,418	368,670	197,748	.....	.....
	11 " " '07	516,355	330,455	185,900	.....	.....
LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Dec. '08	60,702	*28,326	32,376	10,355	22,021
	1 " " '07	60,468	*30,257	30,210	8,390	21,820
	12 " " '08	670,897	*339,234	331,663	121,677	209,986
	12 " " '07	642,011	*330,169	311,841	101,367	210,474
MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Dec. '08	143,362	*95,463	47,898	35,803	12,095
	1 " " '07	133,314	*90,726	42,587	34,446	8,141
	12 " " '08	1,627,648	*1,034,652	592,996	421,437	171,559
	12 " " '07	1,604,385	*1,007,151	597,233	404,822	192,411
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Dec. '08	401,110	170,326	230,784	101,916	128,869
	1 " " '07	362,755	176,157	186,598	102,160	84,438
	12 " " '08	3,991,105	1,983,805	2,007,300	1,197,201	810,098
	12 " " '07	3,926,667	1,974,721	1,951,945	1,184,605	767,340
Milwaukee Lt., Ht. & Tr. Co.	1m., Dec. '08	182,359	30,425	151,934	60,731	91,203
	1 " " '07	135,010	30,499	104,511	57,065	47,446
	12 " " '08	1,471,477	371,072	1,100,405	716,941	383,464
	12 " " '07	1,172,278	359,441	812,837	561,751	251,085
MONTREAL, CAN. Montreal St. Ry.	1m., Dec. '08	304,885	205,819	99,065	28,027	71,039
	1 " " '07	294,640	192,310	102,330	28,335	73,995
	3 " " '08	935,071	557,295	377,776	82,469	295,307
	3 " " '07	902,723	539,524	363,200	83,254	279,946
NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., Nov. '08	138,599	*79,272	59,327	32,507	26,820
	1 " " '07	139,560	*87,182	52,378	31,232	21,145
	11 " " '08	1,447,947	*865,551	582,396	352,127	230,269
	11 " " '07	1,438,160	*859,201	578,959	325,309	253,650
NORFOLK, VA. Norfolk & Portsmouth Tr. Co	1m., Nov. '08	156,732	87,332	69,400	.....	.....
	1 " " '07	202,006	144,252	57,754	.....	.....
	11 " " '08	1,708,762	1,010,920	697,842	.....	.....
	11 " " '07	2,437,818	1,503,874	933,944	.....	.....
OAKLAND, CAL. Oakland Trac. Co.	1m., Dec. '08	241,268	113,544	127,724	45,943	81,781
	1 " " '07	240,300	120,432	119,868	46,757	73,111
	12 " " '08	2,801,787	1,322,807	1,478,980	550,977	928,003
	12 " " '07	2,789,685	1,406,796	1,382,889	534,008	848,881
San Francisco, Oakland & San Jose Cons. Ry.	1m., Dec. '08	75,929	37,091	38,838	22,727	16,111
	1 " " '07	72,019	37,351	34,668	20,390	14,278
	12 " " '08	901,110	445,717	455,393	259,598	195,795
	12 " " '07	812,868	426,050	386,818	244,677	142,141
PHILADELPHIA, PA. American Rys. Co.	1m., Dec. '08	237,419	.....	.....	.....	.....
	1 " " '07	231,671	.....	.....	.....	.....
	6 " " '08	1,473,151	.....	.....	.....	.....
	6 " " '07	1,571,572	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Nov. '08	8,331	7,013	1,318	2,119	†801
	1 " " '07	8,085	6,784	1,301	2,227	†925
	12 " " '08	121,672	89,732	31,940	26,894	5,045
	12 " " '07	118,941	80,061	38,880	26,925	11,955
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Dec. '08	386,797	177,923	208,874	.....	.....
	1 " " '07	342,293	173,663	168,630	.....	.....
	12 " " '08	4,351,676	2,122,486	2,229,190	.....	.....
	12 " " '07	3,982,657	2,210,591	1,772,066	.....	.....
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Dec. '08	83,259	36,848	46,411	.....	.....
	1 " " '07	74,172	36,170	38,002	.....	.....
	12 " " '08	909,965	455,907	454,058	.....	.....
	12 " " '07	870,286	442,268	428,018	.....	.....
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Dec. '08	910,288	*555,430	354,858	233,866	120,992
	1 " " '07	870,002	*557,907	312,095	231,494	80,601
	12 " " '08	10,593,166	*6,737,460	3,855,706	2,798,738	1,056,968
	12 " " '07	10,828,737	*7,043,882	3,784,855	2,778,023	1,006,832
SAVANNAH, GA. Savannah Elec. Co.	1m., Nov. '08	54,949	34,194	20,755	15,899	4,856
	1 " " '07	51,121	35,286	15,835	15,779	†56
	12 " " '08	595,384	390,850	204,534	187,099	17,435
	12 " " '07	597,489	378,583	218,907	172,247	46,660
SEATTLE, WASH. Seattle Elec. Co.	1m., Nov. '08	398,795	236,679	162,116	95,797	66,319
	1 " " '07	369,585	222,626	146,959	83,765	63,193
	12 " " '08	4,482,215	2,646,033	1,836,182	1,079,302	756,880
	12 " " '07	4,066,272	2,374,164	1,692,108	897,555	794,553
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Nov. '08	136,731	94,261	42,470	43,399	†930
	1 " " '07	135,452	85,529	49,923	42,800	7,123
	12 " " '08	1,684,518	1,086,531	597,988	515,514	82,473
	12 " " '07	1,647,173	1,020,313	626,860	444,555	182,305
TAMPA, FLA. Tampa Elec. Co	1m., Nov. '08	49,176	31,412	17,763	4,414	13,349
	1 " " '07	45,736	27,806	17,930	957	16,973
	12 " " '08	548,406	364,432	183,974	35,608	148,365
	12 " " '07	516,447	374,590	141,857	19,479	122,378
TOLEDO, O. Toledo Rys. & Lt. Co.	1m., Nov. '08	219,885	117,372	102,513	71,960	†30,553
	1 " " '07	220,754	116,957	103,797	67,925	35,872
	11 " " '08	2,306,042	1,257,178	1,048,864	779,657	269,207
	11 " " '07	2,338,330	1,331,495	1,006,835	726,391	280,444

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, FEBRUARY 13, 1909 No. 7

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum
Single copies.....10 cents
Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum
CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.
Single copies.....20 cents
Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9250 copies are printed.*

Messages of the Governors

The publication in recent issues of the ELECTRIC RAILWAY JOURNAL of excerpts from the annual messages of Governors of various States, discussing the subject of regulation and control of public utilities, bears out the expectations that careful observers have had as to the wide and irresistible extent of the movement. For the good of the whole public it is to be hoped that the movement in all the States where it exists will be directed into wise and proper channels. In only a few notable instances have public authorities bothered much about the rights of the corporations within their jurisdiction. But the financial upheaval and the cessation of work on improvements resulting from inability to raise capital on reasonable terms have helped to bring about a realization of the fact that the States owe as careful protection to the security-holders, whose investments make possible the great benefits derived from important public utilities, as they owe to the public served. No laws intended to regulate public utilities corporations can be of lasting advantage to either the corporations or the public unless they are framed with as near a full measure of justice to the rights of all as is possible.

The Value of Fenders and Wheelguards

In the hearing last week before the Public Service Commission of New York, First District, on the report of the sub-committee on fender and wheelguard tests, F. W. Whitridge, receiver of the Third Avenue Railroad Company, said that of 2700 accident cases which had come to his notice, none had occurred under conditions similar to those prevailing in the committee's tests. By this the speaker meant that the dummies were inert, and in this respect the tests did not entirely simulate actual conditions, except those presented by persons drunk or asleep on the track. While this criticism in a sense is true, the tests undoubtedly corresponded to actual conditions as closely as was possible without living subjects, and Mr. Whitridge did not use this reason as a defense against the installation of fenders and wheelguards. It must not be supposed, however, that even the best fenders and wheelguards will prevent a large proportion of the street railway casualties which, unfortunately, occur daily. Boarding and alighting accidents, collisions with other cars and teams, controller burnouts, electric shocks, and at least a few cases of persons getting under the rear wheels, cannot be lessened by the use of life-saving devices on the front end of the car. The claim departments of street railway companies are prone to measure the value of human life in dollars and cents, which, from the nature of their work, is only natural, and from that point of view it seems unreasonable to spend $20,000 a year to prevent an accident which will cost the company $5,000. There is a side to the question, however, which cannot be reckoned by the damages assessed by a jury in court. The company should use every possible means to prevent accidents to passengers and users of the highways on which it operates. If it does this, the most captious critic cannot ask for more. But the public should not assume that the general adoption of fenders and wheelguards will prove a cure for all kinds of street railway accidents; it would be but a beginning.

The Measure of Acceleration

Interest in the measurement of the rates of acceleration of trains is practically a development of electric railway practice. The use of independently driven axles has made possible such an increase in this phase of train movement that the selection of its proper unit possesses an importance which did not obtain when steam was the main reliance as a motive power. But in this particular the practice in this country and abroad has followed entirely different lines, owing to the fact that the acceleration function may be considered either the second derivative of the distance function or the first derivative of the velocity function. The logical unit to use for acceleration thus depends upon which aspect of acceleration we adopt; that is, whether we shall measure acceleration in feet per second per second or in miles per hour per second. The latter is the usual practice in this country; the former, possibly because many of the electrical engineers abroad have also been prominent physicists, is the common method in Europe. A comparison of the relative merits of each plan was selected by C. O. Mailloux as the subject of the paper presented by him at the last International Electrical Congress, and a summary of his defence of the miles-per-hour-per-second method is published elsewhere in this issue. It is interesting to note that Mr. Mailloux, whose previous arguments in favor of this plan have been based largely upon its practical convenience, devotes a considerable portion of his paper to proving its superiority also from a mathematical point of view. Certainly, for a quantity which enters so intimately into all railway speed calculations as acceleration the most logical unit is very desirable, and this Mr. Mailloux clearly shows is miles-per-hour-per-second.

The Knoxville Water Decision

History is being made rapidly in the judicial interpretation of the rights of public service corporations which hasten to the Supreme Court to take shelter under the fourteenth amendment to the Constitution of the United States from threatened municipal and State confiscation. An eminent jurist, who several years ago was Ambassador of the United States to Great Britain, once said that the fourteenth amendment constituted one principal difference between the systems of jurisprudence in this country and Great Britain. In the latter Parliament is supreme and by decree can sequestrate private property for public uses. The last part of the first clause of the fourteenth amendment to the Constitution was avowedly adopted for the protection of the property rights of the minority in this country and of any portion of it, and an appeal to the provisions of this clause has constituted the principal defense in most of the recent appeals to the Supreme Court from adverse corporation legislation.

The conditions in the Knoxville case differ somewhat from those of the recent Consolidated Gas case, already mentioned in these columns, and several points stand out in bold relief in the former decision. The first is that the Supreme Court is prepared to throw its mantle of protection around corporations whose property under State and municipal enactments is being taken without due compensation, but will do so only when the case is one which is absolutely clear. From the decision, it is also evident that the Court does not consider speculation as to possible future losses under proposed legislation to be as convincing as definite figures derived from experience. The old maxim that he who appeals for justice must come into the court with clean hands applies with double force in cases of this kind, but he who deserves relief will receive it. The court made no effort to specify what the company should earn upon the value of its property. A return of 6 per cent, including depreciation, or of 4 per cent, excluding depreciation, was mentioned, but the court said clearly: "We do not feel called upon to determine whether a demonstrated reduction of income to that point would or would not amount to confiscation." Undoubtedly it would hold, from the principles stated in the Consolidated Gas case, that the return to be permitted should depend upon the risk involved, and this would vary in nearly every case. The concluding statement of the court should be borne in mind by every legislative body and public service corporation:

> The courts, in clear cases, ought not to hesitate to arrest the operation of a confiscatory law, but they ought to refrain from interfering in cases of any other kind. Regulations of public service corporations which perform their duties under conditions of necessary monopoly will occur with greater and greater frequency as time goes on. It is a delicate and dangerous function, and ought to be exercised with a keen sense of justice on the part of the regulating body, met by a frank disclosure on the part of the company to be regulated. The courts ought not to bear the whole burden of saving property from confiscation, though they will not be found wanting where the proof is clear. The Legislature and subordinate bodies, to whom the legislative power has been delegated, ought to do their part. Our social system rests largely upon the sanctity of private property, and that State or community which seeks to invade it will soon discover the error in the disaster which follows. The slight gain to the consumer which he would obtain from a reduction in the rates charged by public service corporations is as nothing compared with his share in the ruin which would be brought about by denying to private property its just reward, thus unsettling values and destroying confidence. On the other hand, the companies to be regulated will find it to their lasting interest to furnish freely the information upon which a just regulation can be based.

Slow vs. Fast Acceleration

In the 1907 report of the committee on electrical equipment to the American Street & Interurban Railway Engineering Association, 42.6 per cent of the commutator and brush-holder trouble was attributed to "fast feeding of controllers," while the matter of improper proportioning of resistances was either not separately considered or considered of so little importance that it was grouped with "other miscellaneous causes," totaling only 11.4 per cent. It must be remembered that these percentages are the summation of conclusions reached by the companies reporting to the committee. It is probable that improperly proportioned resistances are responsible for much of the motor trouble generally attributed to improper handling of the controller, as with improperly graded resistances it is impossible for the motorman to handle the manually operated controller so as to get the proper acceleration in an economical manner or without subjecting the motors to peaks sometimes greatly exceeding the commutating capacity.

Much has been said and written as to the evils of fast controller feeding, until many minds have obtained the idea that the slowest feeding of the controller consistent with the maintenance of the schedule is the most economical. This is not always the case, however. The rate of feeding the controller is simply another expression for the relative rate of acceleration of the car during the period of applying full line voltage to the motors. Owing to the fact that it is desirable to keep this rate of acceleration uniform from the start to the full parallel position of the controller, this portion of the run has been called the period of "straight line acceleration." Any run from start to stop may be divided into four parts: (1) Straight line acceleration, (2) full voltage operation of motors, (3) coasting, and (4) braking. The concurrent power losses in any run are of three classes: (a) Power used in overcoming train resistance and the resistance offered by track gradients and curves, or the power used in actually getting the car over the road; (b) power lost in controlling resistances, and (c) power dissipated, as heat in brake shoes, wheels, etc., in bringing the car to a stop.

Train resistance losses cannot be removed or much reduced. Rheostat losses and braking losses can be controlled to an extent, however, by the method in which the car is handled. A given distance may be covered in a given time in many different ways by various proportioning of the different portions of the run. First, a very slow rate of acceleration may be used, such that the straight line acceleration occupies a large part of the time as compared to the time of full voltage operation of motors; in such case the coasting period generally must be very short, and the braking will begin at a relatively high speed. At the other extreme, we may have a second method of performing the same run in the same time—that where the rate of acceleration is as high as the motor capacity will allow. Here the time during straight line acceleration is a much less proportionate part of the total time that current is applied, and current may be cut off in time to allow a considerable amount of coasting, which in turn will reduce the speed, so that less braking is required than in the former instance.

In each of these cases the useful power consumed in taking the car from start to stop, i.e., the power used in overcoming train resistance, is practically the same. The measure of the relative efficiency of the two runs is therefore the relative value of the other losses. As the rheostatic losses are proportional to the time spent in straight line acceleration, the second run is the more economical in this respect in exact proportion to the rate of controller feeding. The second run also loses much less energy in braking, as braking begins at a much lower speed, owing to the longer coasting period. The entire difference in the characteristics of the two runs is due to the difference in the rate of straight line acceleration. Without knowing anything regarding the amount of current or the time current is applied, then, we can safely say that the more rapid the rate of straight line acceleration the more economical the run. The rate of straight line acceleration is, of course, limited by the commutating capacity of the motors, and consequently the statement should properly be that the most economical run is where the rate of acceleration is as great as possible within the commutating capacity of the motors.

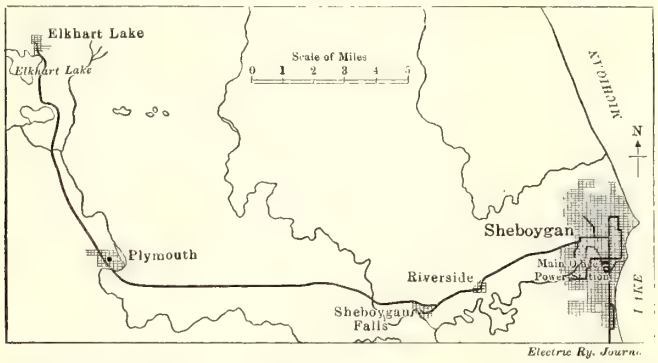
The ideal acceleration is that which is entirely uniform, or where the voltage across the motor terminals is increased in exact ratio with the increasing counter electromotive force of the motors, which increases with the increasing speed of the car. Theoretically, this could be obtained with a resistance having an infinite number of steps, and in such case the current taken by the motors would be uniform during straight line acceleration. Practically, however, the increase in applied voltage is obtained by a series-parallel change in combination with a resistance which is divided into a relatively small and definite number of steps, in order to reduce complications in controlling mechanisms and car wiring. The consequence is, therefore, that at best the straight line acceleration is not perfectly uniform, due to the almost instantaneous rise in current in passing from one resistance step to the next, followed in each case by a gradual falling off in current as the car attains speed. Even with the usual relatively few number of steps in the resistance, however, these steps may be so proportioned that the fluctuations in current may be only 10 per cent or less above and below the average value, thus making the change of rate of acceleration throughout the straight line period and due to this cause relatively small. Great care must be used, however, in proportioning the resistance steps so that these fluctuations may be uniform. It is desirable to obtain the highest rate of acceleration possible within the limit of the capacity of the motor. The average rate of acceleration is dependent upon the average current during acceleration, and this average may be no closer to the limiting capacity of the motor than the height of the highest of these fluctuations. The more uniform the fluctuations are, the closer can the maximum economy be approached without injury to the motors.

In any case where it is believed that motors are being damaged by fast feeding of controllers, the proportioning of resistances should first be carefully looked into. In many cases instantaneous peaks in current during acceleration are sufficient to cause damage, while the average value of the current during this period is such that it actually could be increased with a resultant greater rate of straight line acceleration and greater economy in power consumption by a proper proportioning of the resistance steps.

The correct value of the various resistance steps varies with a large number of affecting factors. No definite list of resistances for a given motor and controlling equipment can be tabulated as applicable to all cases. Engineering formulas are available, however, for such calculations, and the resistances should be carefully determined by the use of such formulas, and after installation checked by means of an ammeter (preferably recording) in the motor circuit. In the absence of knowledge of such formulas the proper resistance values may be obtained by the cut and try method, a recording ammeter being used in the determination, as the "feel" of the car will not give a close enough approximation for economy. In Boston a trial is being made of a buzzer, connected permanently in a relay circuit, to warn the motorman if he exceeds the current which can safely be commutated.

THE DEVELOPMENT OF A SMALL ROAD

One of the papers at the Atlantic City meeting of the Transportation & Traffic Association which was very actively discussed was that by Ernest Gonzenbach, general manager of the Sheboygan Light, Power & Railway Company, of Sheboygan, Wis., on "How Can the Small Road Best Promote Traffic to Increase Its Revenue?" The number of novel suggestions made by the author in this paper indicated that an account and a short history of the system managed by him would be of interest.



Sheboygan Light, Power & Railway Company—Map of Lines.

Sheboygan is a city of about 27,000 inhabitants, some 50 miles north of Milwaukee on Lake Michigan. It possesses the first harbor north of Milwaukee with which it is connected by a line of lake steamers. The leading manufactures are chairs and furniture.

HISTORY OF THE COMPANY

The first street railway in Sheboygan was built in 1885 as a horse line and was operated at a loss for many years. It possessed about 11 miles of city track. In 1893 the line was consolidated with the Sheboygan Electric Light Company under the present corporate name, the Sheboygan Light, Power & Railway Company. In 1895 the lines were equipped with electricity and Walker motors and generators were installed. In 1899, a 6-mile extension was built to the village of Sheboygan Falls. The rails used weighed 45 lb. per yard; the combined trolley and feeder was a No. 0, and the single track was ample for the traffic which the line received. The property as a whole was not profitable.

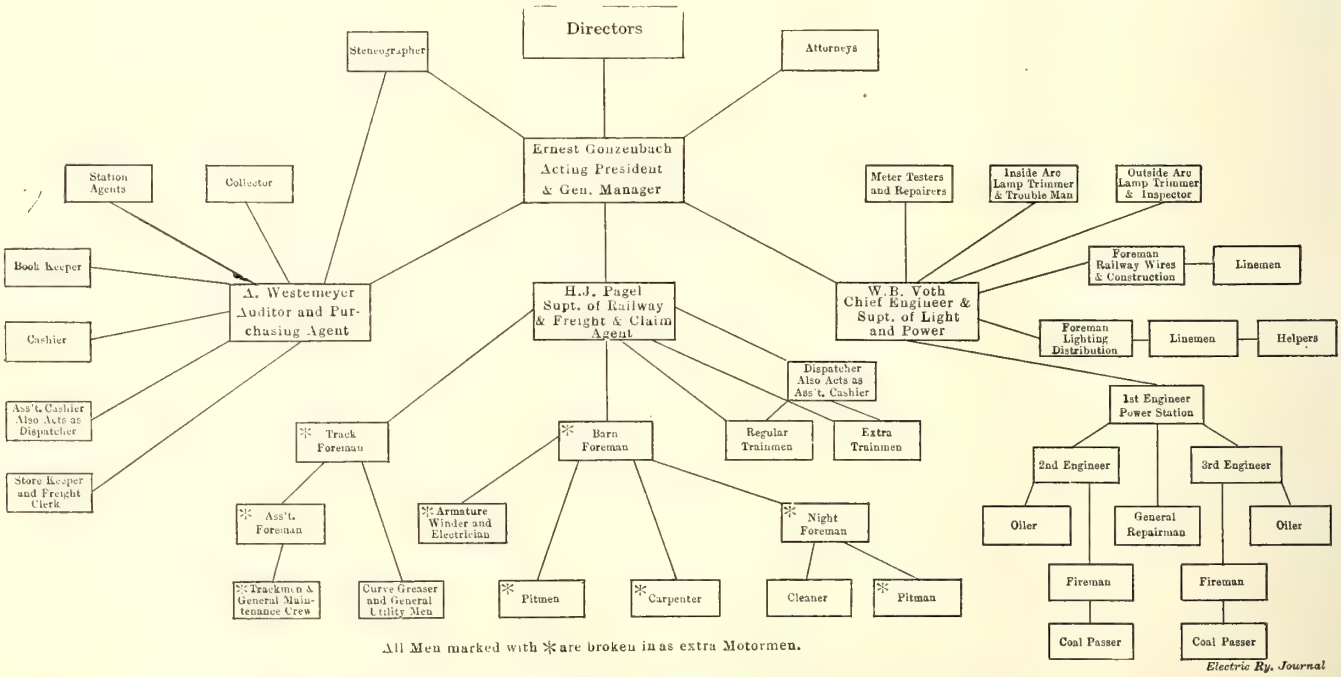
In 1903 the late Dr. F. A. C. Perrine and a number of his associates connected with the Stanley Electric & Manufacturing Company united in a syndicate which underwrote an issue of $600,000 consolidated mortgage bonds, the proceeds of which were used for the purpose of reconstructing the property. A new power station was built and a number of other important improvements were introduced. In 1904 the syndicate secured control of the stock of the company, and Dr. Perrine was elected president of the company.

The present management, appointed by Dr. Perrine, has been in charge since December, 1904. During this time the receipts per mile of city track have increased from $1,700 to $3,000, and the receipts on the interurban division from $2,700 per mile of track to $4,000. These changes have been effected and the improvements described in this article have been installed without an increase in the capitalization of the line, but have been paid for out of the earnings, and the cost of operation on both city and interurban lines is less now than it was in 1903. These facts are sufficient of themselves to make an account of the property and the methods followed instructive.

Three large problems had to be faced when the new start was made in 1904, (1) to increase the receipts, (2) to decrease the expenses, and (3) to improve the relations with the public and authorities, which were then in a somewhat strained condition.

FARES

To accomplish the first, it was decided necessary to take strenuous steps toward increasing the number of rides per capita. Two methods were followed, one to reduce the fares and the other to pay special attention to maintaining the schedule. In a compact city of the size of Sheboygan the management believed that it could carry a good many people who would otherwise walk if the public knew that the cars were absolutely to be depended upon in their schedules, and if the cost of a ride was not great. In consequence, the company voluntarily reduced the fare from 5 cents by issuing tickets which were sold at six for 25 cents and were put on sale



Sheboygan Light, Power & Railway Company—Diagram of Organization

at the office of the company and by conductors on cars. The management reasoned that inasmuch as it had to run a certain number of cars, and was running the minimum number that could properly be operated, it could well afford to make a reduced fare, at least until such time as the number of cars in regular service had to be increased. The theory of the selling of the tickets, as explained by the management, is to get as much unused transportation in the pockets of the public as possible. The longest ride which can be had for this 4 1/6-cent ticket is 3½ miles. The average ride is between 1 mile and 1½ miles. These tickets are not good on interurban cars.

The company furthermore voluntarily issued "workingmen's tickets" which are sold 15 tickets for 50 cents, and are good between 6 a. m. and 8 a. m. and between 5 p. m. and 7 p. m. This again was considered no extra burden on the company, as it formed an inducement for workingmen to ride, which they had not heretofore been in the habit of doing.

The average rate of fare per passenger on the city lines, as a result of these fare reductions, is about $0.042. This high percentage is explained by the fact that during workingmen's hours all fares received are by no means workingmen's tickets. In fact, the percentages of different classes of fares received during these hours are:

Workingmen's tickets	60 per cent
4 1/6 cents	20 per cent
Cash fares	20 per cent

Another advantage of these reduced fares is that as they were established voluntarily, the company has reserved the right to rescind them at any time, if it believes the rates are being abused or if the company is being unfairly treated by the city.

For about a year and a half the company also sold what was known as "shopping tickets." These tickets were good between 9 a. m. and 4 p. m. at the rate of 7 for 25 cents, but have been withdrawn, as explained in Mr. Gonzenbach's paper at Atlantic City.

SCHEDULES

At the same time that the new system of fares was instituted a rigid schedule was adopted. Very few cars are now late, and a record is kept of those who are over 2 minutes behind time. If a car is over 5 minutes late the conductor has to make a written report to the superintendent of transportation giving the reasons for the delay and a copy of this report is placed on the manager's table.

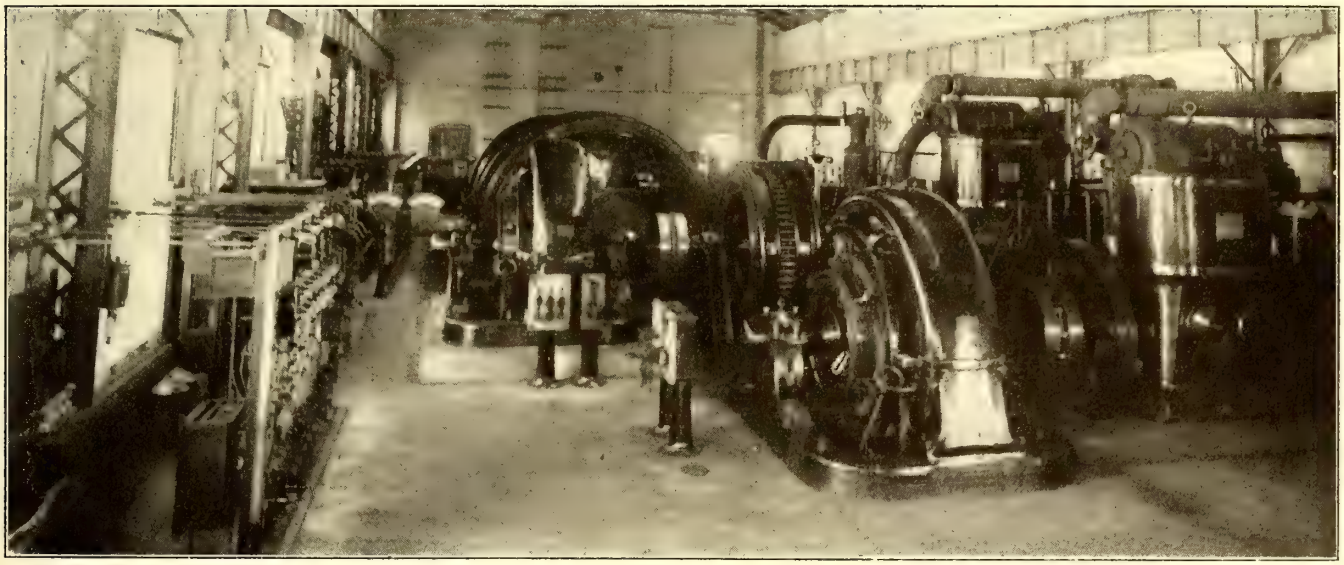
One of the results of having the cars always on time was that it was possible to reduce the number of cars in operation. Thus a city schedule which had required six city cars in winter and nine in the summer was operated with four cars in winter and six in summer. The public accepted the change without much objection, as before they had never been sure of the time of cars, whereas with the new schedule, although the cars were fewer, a passenger could get on a car at a certain corner to the minute.

The combination of lower fares and better schedule has raised the revenue 90 per cent in summer and 225 per cent in winter. The revenue per capita per year on the city cars is now about $1.40.

The following is a statement of the car-miles run during six summer months of last year:

May	32,484	August	37,270
June	35,106	September	33,558
July	37,144	October	31,767

The policy pursued by the company in the matter of fares was soon appreciated, and the relations between the company and the public are now extremely cordial.



Sheboygan Light, Power & Railway Company—Interior of Power House at Sheboygan

IMPROVEMENT IN CAR SERVICE

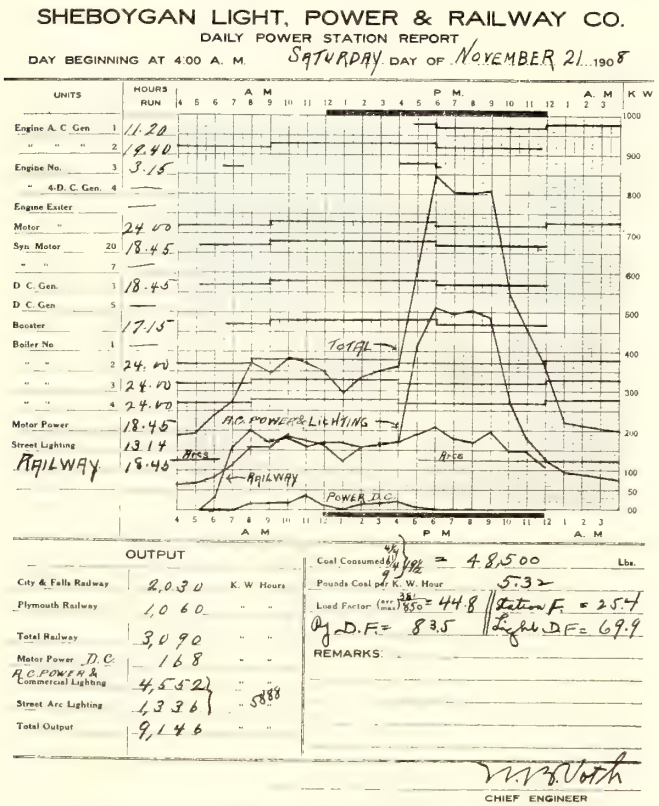
In addition to improving the schedule, the company improved the car service. The use of bob-tail cars were abandoned and all cars now carry conductors. It has also been found that the extra number of fares collected by conductors about pays the wages of the conductor. For city service the company uses single-truck cars with 20-ft. bodies, mounted on Brill trucks and equipped with two 40-hp motors. The schedule speed of city cars is from 8 to 9½ m.p.h.

The city cars are run on three different routes. One of these is a loop line, which makes a round trip every 20 minutes and requires one car. Another is the so-called West Side line, which runs every half hour. The third is the main line through the town. This line requires two cars for its operation, and runs cars every half hour. The city cars make a total of about 525 car-miles per day in winter and about 800 car-miles per day during the summer seasons.

EMPLOYEES

The company believes in the employment of local married

men. The working hours are from 10 to 11 per day and the road is kept in operation 19 hours during the day. The regular men are trained as both conductors and motormen, because during the summer a large number of extra men have to be taken on, and it has been found that these men acquire the duties of motormen more easily than those of conductors, so that most of the regular men act as conductors during the summer. During the winter a regular


SHEBOYGAN LIGHT, POWER & RAILWAY CO.
DAILY POWER STATION REPORT
DAY BEGINNING AT 4:00 A. M. SATURDAY DAY OF NOVEMBER 21 1908
UNITS
HOURS RUN
A M P M A. M
K W
Engine A. C. Gen 1 11.20
" " " 2 12.40
Engine No. 3 3.15
" 4-D. C. Gen. 4
Engine Exciter
Motor "
Syn. Motor 20 18.45
" " 7
D. C. Gen. 3 18.45
D. C. Gen 5
Booster 17.15
Boiler No 1
" " 2 24.40
" " 3 24.40
" " 4 24.40
Motor Power 18.45
Street Lighting 13.14
RAILWAY 18.45
TOTAL
A.C. POWER & LIGHTING
RAILWAY
POWER D.C.
OUTPUT
City & Falls Railway 2,030 K. W. Hours
Plymouth Railway 1,060 " "
Total Railway 3,090 " "
Motor Power D.C. 168 " "
A.C. POWER & Commercial Lighting 4,552 " "
Street Arc Lighting 4,336 " "
Total Output 9,146 " "
Coal Consumed 48,500 Lbs.
Pounds Coal per K. W. Hour 5.32
Load Factor 448
Station F. = 25.7
D.F. = 83.5
Light D.F. = 69.9
REMARKS:
CHIEF ENGINEER

Sheboygan Railway—Daily Power Station Log

man will serve some time in one position and will then be transferred to the other position. The track men and repair men are trained as motormen and serve in that capacity at times of extra traffic. The badges for all trainmen read "trainman" and not "conductor" or "motorman."

Every trainman is obliged to provide himself with a good watch, and these watches are regulated every month by an inspector employed by the company.

POWER STATION

As already stated, the power station is a comparatively modern one and is equipped with Walker and Stanley direct-connected generators and Allis-Chalmers engines. The fuel used is a combination of buckwheat and Hocking screenings. These two kinds of coal are kept in separate bunkers, the mixture being varied according to the load, as when the load is steady, more buckwheat is used. At the power station there is also a bin of soft lump coal which is screened by the men when they have nothing else to do. This coal is used on days when the lighting or railway load is especially heavy and extra output is required. Owing to the demand for filling material in Sheboygan, there is a market for ashes at 25 cents a load.

The power station log, illustrated, is interesting not only on account of the character of the load shown, but also for the compactness of the record. The chart given is for a typical day in the autumn. A copy of the log for each day is laid every morning on the desk of the manager.

SALE OF HEAT

The company supplies exhaust steam for heating a neighboring factory and thus increases considerably the income from its production of power. The lighting machinery is run 24 hours a day.

POWER STATION PREMIUMS

Some four years ago the operating cost for power averaged $11 per 1000 kw-hours, not including labor, and the company agreed to give to the power station force a premium of 10 per cent of the savings made over $11 per 1000 kw-hours. Owing to this competitive system, the power station force has been keyed up to a high state of efficiency, and the saving per month over the figure of $11 amounts to a neat sum.

BATTERY SUBSTATION

The company has one storage battery substation three miles east of Plymouth. The storage battery at this station floats on the line, and in addition to equalizing the load, is used for operating an owl car at night on the interurban line. The company is now, however, putting in a 12,000-volt, 60-cycle motor generator set, to be installed in a new substation being erected at Plymouth.

INTERURBAN LINES

In 1904 the interurban line of the company was extended from the village of Sheboygan Falls to the city of Plymouth, giving a total length of interurban line of 16 miles. At the present time the interurban line is being extended 7 miles from Plymouth to Elkhart Lake, a famous summer resort, which has heretofore been without the electric railway connection, but has nevertheless from



Sheboygan Railway—Line-Repair Car

2000 to 4000 regular guests during the summer season. Double headers are run on the interurban line during the rush hours. Cars are dispatched under train orders with a dispatcher at Sheboygan and duplicate orders for motormen and conductors are issued through an Egry machine.

The interurban passenger cars average about 225 car-miles each per day throughout the entire year. The freight cars average about 100 car-miles per day.

The interurban cars are equipped with four 40-hp motors, are 47 ft. long, and weigh with equipment about 22 tons each. They make the run from Sheboygan to Plymouth in 52 minutes, including a 10-minute lay-over at Sheboygan Falls. This is at the rate of 16 miles in 42 minutes, or a schedule speed of about 23 m.p.h., including city time. Excluding city schedule the interurbans make about 27 m.p.h. The 40-hp motors have stood the service very well and run without excess heating.



Sheboygan Railway—Junction at Sheboygan Falls

INTERURBAN FARES

On interurban lines the rate of fare is based on the rate of 2 cents per mile, if the fare is paid on the car. Tickets are sold to all points at stations of the company, and the single ticket rates are based on 1¾ cents per mile. Round-trip tickets are sold at the rate of 1½ cents per mile. Mileage books are issued in three classes:

100-mile books sold at stations and by conductors on cars, each	$1.50
500-mile books sold at stations only, each	7.00
1000-mile books sold at stations only, each	13.00

The passenger receipts on the interurban division are about 40 cents per car-mile in summer and about 28 cents per car-mile in winter.

The revenue per capita on city lines, as stated, amounts to about $1.40. The revenue per capita on the interurban lines, not including the population of the city of Sheboygan, amounts to nearly $3.

FREIGHT AND EXPRESS

On its interurban line the company conducts a freight business and a milk business which it handles itself, and an express business which it leases. It also supplies electric power to users along the line. The freight traffic is handled by a single car, which makes two trips per day. The rates for freight are about the same as are charged on the steam roads, but only the first four classes are used. The minimum freight rate is 20 cents.

The interurban freight rooms of the company at Sheboygan are at the storage room, so that the same man acts as freight agent and as storekeeper. The stores are kept in separate compartments and the accounting system used is that with a continuous invoice.

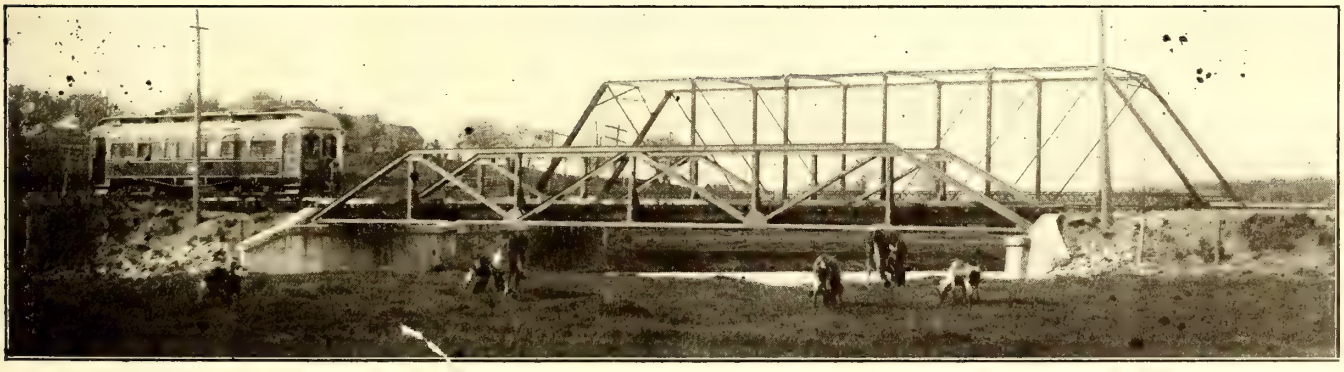
The express business is conducted by the United States Express Company, which has its own wagon service at each end of the line. The contract with this express company nets the railway company several hundred dollars per month.

The principal freight is cheese, for which a rate of 4½ cents is charged per 100 lb. Another large item of freight is plumbers' goods, which are shipped from a factory along the line over the electric line and delivered at the docks of the Goodrich Transit Company, the boat line to Chicago. The company has a traffic arrangement with the Goodrich line and it way-bills goods from any part of its line to any part of the United States. The freight service brings in from $200 to $700 per month, depending upon the season, and the freight car earns from 25 cents to 50 cents per car-mile. The average revenue per ton-mile is about 6 cents. At the present time the company is doing missionary work among the farmers along the line, trying to get them to raise garden truck for the Milwaukee and Chicago markets. Freight delivered to the company's car in the afternoon is delivered the next morning in Chicago—by boat at freight rates which are lower than the steam road rates, an advantage to which the farmers along the line are just waking up.

The milk business is handled by the freight car and a charge is made of 10 cents for an 8-gal. can. The payment is made by use of the usual three-part ticket. A similar ticket system is being installed for the shipping of garden products, including the return of empty crates and garden baskets.

POWER SUPPLY

The fact that the line runs through a dairy country has encouraged the company to look out for power customers among the dairymen and cheese factories, as well as for miscellaneous use by farmers. At the present time the company is supplying power to about 15 motors ranging in size from 3 hp to 5 hp, although there is one motor of 20 hp. The smaller motors are used principally for operating cream separators, cheese machinery and feed cutters. The power is sold for 3 cents per kw-hour. The customer pays for his own installation from the service wires and buys his own motor.



Sheboygan Light, Power & Railway Company—Bridge on Route

PARK

The company owns 26 acres of land known as Lake

View Park. Several years the company operated there a hotel, a theater, two saloons, a baseball park, a menagerie and other attractions. All of these have now been abandoned, as the new management believes it better policy to get out of the amusement business. The company will furnish free site and lighting current for any one putting in new attractions, but does not carry its support further. On the other hand, the company opened a resort during the past season on the interurban line. It is not an amusement park, but a pine grove located along a hillside next to a river and a naturally attractive spot. This park is equipped with electric lights, benches, places for camp fires, etc., but possesses no attractions of the "artificial" kind. In fact, it is entirely a "family picnic resort," and has proved a very big success, as the traffic which it brings is all carried on regular cars. This place is 7 miles from Sheboygan and is reached for a 20-cent round-trip fare.

TIME TABLE

Considerable thought has been given to the time table used on the interurban line, and the form of schedule, though compact, gives a great deal of information. It is contained on eight pages, exclusive of the cover. At the top of each page the following maxim is printed: "The safety of passengers and trains is of first importance, and all operations of working, repair or construction must be



Sheboygan Railway—Typical Freight Station

subservient thereto." At the bottom of each page appears the following: "Every person in the service of this company is expected to be courteous and obliging toward the public and his associates."

All cars are designated by train numbers of two or three numerals, as "33" or "101." The final digits indicate the following: 1, first-class train a. m. going west; 3, first-class train p. m. going west; 2, first-class train a. m. going east; 4, first-class train p. m. going east; 5, second-class train a. m. going west; 7, second-class train p. m. going west; 6, second-class train a. m. going east; 8, second-class train p. m. going east. The first one or two numerals, as "10" or "3," indicate the hour of leaving the terminal. All employees are required to refer to trains by their numbers.

The time table includes a list of the more important rules as well as whistle signals, tariff, instructions about what to do in case of accidents, and a list of the company's surgeons.

EXPENSES OF OPERATION

The expense of operation for the city cars averages 10 cents per car-mile and of the interurban cars 17 cents per car-mile. The percentage of operating expenses to gross receipts is 61 per cent. The operating expenses, as explained, include all new construction for both railway and lighting, except that an account is kept of meters and service in the lighting department, as this charge is made to customers.

The details of the operating expenses are carefully kept on a car mileage basis; some of them follow:

All lubrication, except gear lubrication, 21 cents per 1000 car-miles; gear lubrication, 7 cents per 1000 car-miles; maintenance of rolling stock, average last 6 months, 1.78 cents per car-mile. The latter figure is rather high owing to the small motors used on the cars, but it was not considered advisable to install new motors for the reasons advanced in Mr. Gonzenbach's convention paper.

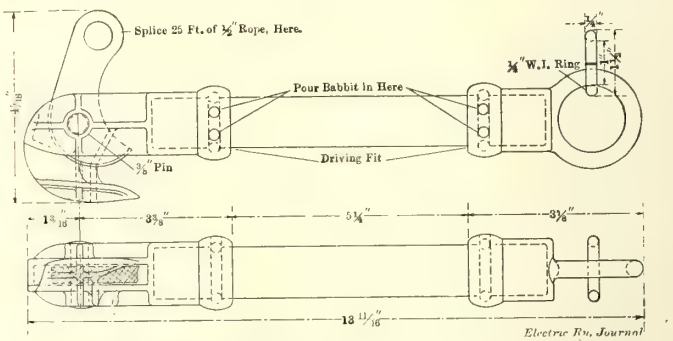
ORGANIZATION

A chart of the organization of the company is shown on page 272. The officers of the company are: Vice-president and general manager, Ernest Gonzenbach; secretary, J. A. Chesney; auditor and purchasing agent, August Westermeyer; superintendent, H. J. Pagel; chief engineer, W. B. Voth.

PICK-UP AT MINNEAPOLIS

Among the ingenious devices developed on the Twin City Rapid Transit Company is the trolley pick-up illustrated herewith. Two of these are carried on each car, and, as the name implies, they are designed to facilitate rapid repair of the overhead construction in case a trolley wire or a span wire should break. One of the pick-ups is fitted with 25 ft. of rope, which is attached to the end of the short lever. The rope on the other pick-up extends about 3 ft. beyond the end of the pick-up and has a noose.

To tie up a broken trolley wire the procedure is as follows: A pick-up is attached to each end of the broken



Trolley Pick-Up Carried on Cars in Minneapolis

wire. The free end of the long rope is then carried through the ring at the end of the pick-up to which it is attached. It is then passed through the noose on the short rope on the other pick-up, and is then pulled taut. This draws the trolley wire back to its normal position. The rope is then tied up until the wire car can arrive and repair the break.

These pick-ups are manufactured in the shops of the company. The metal parts are of malleable iron. The wooden shank is of maple which is boiled in paraffine until it becomes saturated.

A 300-kw Westinghouse turbine unit has been in operation at the Burlington Municipal Electric Light Plant, Burlington, Vt., since 1906. According to the turbine builder, a recent report from this plant states officially that the total expense for repairs up to the present time has been $1.83. Since its installation this turbine has run nearly every night.

THE INDUSTRIAL DEFINITION AND MEASUREMENT OF TRAIN-ACCELERATION

As stated in a previous issue of this paper, a contribution to the technical proceedings of Section V of the recent International Electrical Congress at Marseilles, in September, 1908, was made by C. O. Mailloux, of New York, who was chairman of the delegation representing the American Institute of Electrical Engineers. The text of his paper on "The Industrial Definition and Measurement of Train Acceleration," which was presented in French, has just become available. This paper was, in considerable part, an indorsement of the American method of calculating train acceleration in terms of miles per hour per second, or, if metric measurements are used, of kilometers per hour per second, rather than the European method of using the units of feet, or meters, per second per second. The former method, Mr. Mailloux said, was not only more logical and rational, but was also more practical and convenient. It has the advantage of avoiding an awkward "translation" from one unit of velocity to another in noting the effect produced on velocity by an acceleration or a retardation.

According to Mr. Mailloux's paper, the only phenomena that have to be examined in the study of acceleration are displacements, speeds and changes of speed. As the relationships involved are all kinematical, the only functions that need to be considered are: (1) The distance-time function (Fig. 1); (2) the velocity-time function (Fig. 2); the acceleration-time function (Fig. 3). These three kinematical functions are connected with each other in a characteristic manner. The velocity function is the differential function of the distance function, and it is also the integral function of the acceleration-function. The acceleration function is the first differential function of the velocity function and the second differential function of the distance function. The distance function is the first integral function of the velocity function and the second integral function of the acceleration function. While it is possible to express or formulate these analytical relations with any system whatever of units of measurement of time, distance, velocity and acceleration, it does not follow that there is no choice in the units to be employed. The units adopted should have a certain relation to each other, to obviate factors or constants, i.e., to avoid transformations of coordinates. If we select the unit arbitrarily for one of the three functions without considering the two others, their relations to each other will not be simple; and in passing from any one of them to either of the other two it will be necessary to use a factor, i.e., to "change the scale of ordinates" of one of the functions. Some units must therefore be, in any given case, more "natural" than others.

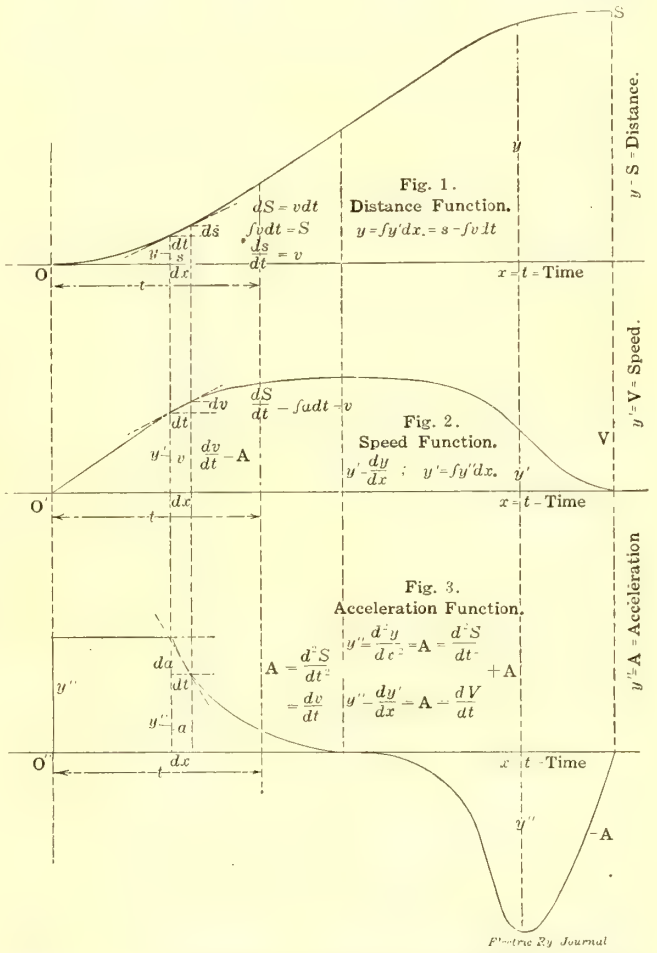
In Fig. 1, representing the curve of the distance-time function, we have $x = t =$ seconds, and $y = s =$ some unit of distance (length), say centimeters, meters or feet. In Fig. 2, representing the first derivative of the distance-time curve, we have $y' = \frac{ds}{dt} = v =$ velocity. The "natural" unit of this velocity will be different according to the unit employed for the function from which it was derived. For instance, if the distance function is expressed in the units already named, the natural unit for the velocity function would be centimeters per second, meters per second or feet per second. These happen to be precisely the velocity units employed in physics. The curve in Fig. 3, which represents the second derivative of the distance function, and which also represents the first derivative of the velocity function, is the acceleration function. In the first case we have

$$y'' = \frac{d}{dt}\left(\frac{ds}{dt}\right) = \frac{d^2s}{dt^2} = A = \text{acceleration} \qquad (A)$$

In the second case we have

$$y'' = \frac{d}{dt}(dv) = \frac{dv}{dt} = A = \text{acceleration} \qquad (B)$$

It is thus seen that there are two possible definitions of acceleration, although many persons are under the impression that there is only one. It may be defined either (A) in terms of a ratio which represents and expresses the second derivative of the distance, or (B) in terms of a ratio which represents and expresses the first derivative of the velocity. The first is what has always been taken for the "classical" definition. It is an indirect definition. The second is the practical as well as the direct and logical definition.



Figs. 1, 2 and 3—Distance, Speed and Acceleration Functions

The unit of acceleration which will be "natural" for each definition will depend on the units employed for the function from which this acceleration has been derived. The two modes of derivation symbolized by equations (A) and (B) will lead to the same results and the same units, if the units of distance (s) and of time (t) are the same in both cases. This is the case for the units of acceleration employed in physics, viz., the centimeter or the meter, or the foot, per second per second, which are derivable from either equation, (A) or (B). We are obliged to acknowledge, however, that the expression meters per second per second, for instance, corresponds much more

directly and naturally to formula (B) than to formula (A), since it specifies a change of velocity per second, the said velocity being itself expressed in meters per second. Indeed, it is a change of velocity rather than of distance which comes to the mind with the idea of acceleration. It is even necessary for the mind to stop and consider—to make a "translation"—in order to realize clearly that the distance really comes into it. As everybody knows, it is the influence exercised and the effect produced on the velocity, and not on the distance, by acceleration, that is of interest. Hence, it is the second formula, (B), or the first derivative of the velocity function, which furnishes the "natural" definition of acceleration. The meter per second per second will therefore be the natural and logical unit of acceleration only in the case where the velocities which vary are themselves expressed in meters per second; and the foot per second per second will be the natural and logical unit only when the velocities are measured in feet per second. For cases where the velocities are measured otherwise, it will be necessary to "translate" these acceleration units in order to understand them.

If the technology of railroading had at the beginning adopted the same units of time, distance and velocity as those used in physics and mechanics, the units of acceleration used in Europe would be entirely natural and logical. Such was not the case, however. These units came too late; and, besides, they were not suitable. The industry of transportation had been obliged to establish and adopt practical units of time, distance and speed, even long before the existence of the units of the C. G. S. system and those used in physics and mechanics, and especially long before questions and problems involving acceleration attracted attention.

In Europe, to measure train acceleration, the practical men borrowed from the theoretical men a measure which was "ready made," thinking then (and believing it still) that this measure, being the most direct and convenient one in physics, must surely be equally so for the measurement of vehicular acceleration. Neither the practical nor the theoretical men noticed that this measure, made on purpose and very practical for measuring variations of velocity expressed in meters per second or feet per second, is not at all suitable for measuring variations of velocity measured in kilometers per hour, or miles per hour. In America it was deemed desirable at the outset that the measurement of the variations of a velocity should be made in such manner as to introduce only one single unit of velocity.

The unit of distance for railroad transportation is the kilometer in metric countries and the mile in America and England. The unit of train-time for all countries is the hour and its subdivision into minutes. The unit of speed of transportation (train velocity) is the kilometer per hour for metric countries and the mile per hour for America and England. These units of velocity are natural and logical, because they result directly from the fundamental kinematical relation, already noted, between the distance function (Fig. 1) and the velocity function (Fig. 2), as a little study readily shows.

It is a mistake to suppose that the practical velocity units, the kilometer per hour, or the mile per hour, can serve only to measure mean values. They can serve equally well to measure and express instantaneous values. Let us suppose (Fig. 4) that the curve $O'OaAB$ be the distance function representing the displacement of a train between two points separated from each other by the distance $S = B'C'$, the time elapsed being equal to $O'C'$. The instantaneous speed (v) at the point A will be equal to the derivative

$$\frac{ds}{dt} = v$$

Now, although the time element, dt, is infinitely small, it is not necessary to measure it or to express it in seconds or in fractions of seconds. It can, quite as well, be measured in fractions of an hour, or any other unit of time whatever. This will become evident if we enlarge the differential triangle $Adtds$ to OCB, in such a way that we shall have $\triangle T = 1$ hour. Since the two triangles are "similar," we shall always have

$$\frac{ds}{dt} = \frac{\triangle S}{\triangle T} = v$$

If, now, we put s = meters, t = seconds, S = kilometers, and T = hours, we will have two expressions for the same instantaneous velocity, v, one in terms of meters per second, the other in terms of kilometers per hour. Since the railroad engineer is interested in the "change of distance" per hour, the second form of expression is that which specifies the "natural" unit of measurement of velocity for his purpose. In the case of acceleration we might also consider changes per hour. This would not be so convenient, however. Acceleration represents variations of velocity which occur in such short times that, in order to study them in detail, a very small unit of time is desirable. We want to note and report instantaneous variations, and to do this the phenomena must be examined at intervals which are very close to each other. Hence we find it convenient to subdivide the unit of train-time, the hour, into seconds, and to take the second as a subsidiary or accessory unit. This is the same as putting two scales of abscissæ in Fig. 2, one of hours and the other of seconds (= 1/3600 of an hour). We could add still other time scales, subdividing the hour into tenths, hundredths, thousandths, millionths, etc. We could always obtain the derivative of the velocity function represented in Fig. 2, no matter by what scale of values we measured the independent variable, t. In every case, and whatever may be the unit value of t, we will have, according to the formula (B), already found

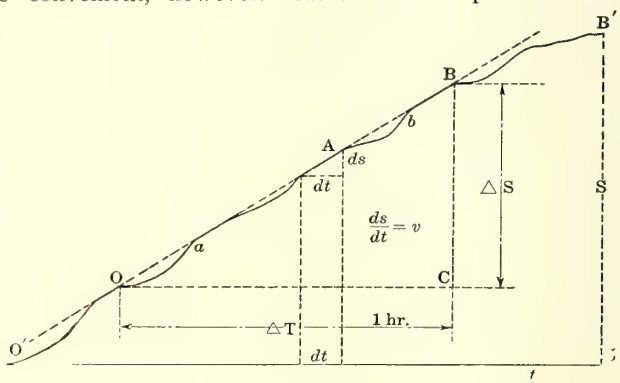


Fig. 4

$$y'' = \frac{d}{dt}(dv) = \frac{dv}{dt} = A; \qquad (C)$$

and the same derivative curve (Fig. 3) can represent correctly all the derivative values for any case whatever, provided the scale of ordinates be varied according to the scale of abscissæ employed. Using the second as the unit value of time, and remembering that transportation velocities are measured in kilometers per hour or in miles per hour (according to the system of units used), the

variation of train velocity, dv, produced in the time interval dt will be equal to a certain number of kilometers per hour or miles per hour. We will therefore have as a measure of train acceleration a ratio of two variations, one of which variations (dv) is that of a velocity, expressed in kilometers or miles per hour, and the other (dt) that of a time measured in seconds; thus

$$A = \frac{dv}{dt} = \frac{\text{kilometers per hour}}{\text{seconds}} = \text{kilometers per hour per second}$$

or else

$$A = \frac{dv}{dt} = \frac{\text{miles per hour}}{\text{seconds}} = \text{miles per hour per second}$$

The expression on the right-hand side defines for each case the "natural" unit of acceleration for measuring variations of velocity when these velocities are themselves measured in kilometers or in miles per hour. This unit establishes the scale of ordinates by which the value of the function obtained by formula (C) is to be read and understood.

By defining and measuring acceleration in the manner just indicated the velocities are measured and expressed in precisely the same manner all the time, namely, before, during and after the acceleration. There is only one unit of velocity. If, for example, that unit is the kilometer per hour, it will be kilometers per hour of velocity that the vehicle will gain or lose during the period of acceleration and not meters per second. There is no translation required, no coefficient to be introduced at any time. Given the value of the acceleration, A, during any interval of time whatever, the corresponding increment of velocity can be found from the formula

$\Delta V = A \Delta t$ or, in general, in the time interval, t, we will have

$$V = \int_o^t dv = \int_o^t A dt.$$

If the acceleration, A, remains constant during a given number of seconds, t, we have

$$V = At$$

Those who are not yet convinced of the advantages of this method are invited to make the same calculations by it and by the "other" method and to note the time required by the two.

It has been asserted in England that the method advocated lacks mathematical rigor. This criticism is unfounded and results from the misinterpretation of a formula of differentiation. The pleas against this method are:

(1) Two units of time, the hour and the second, are used when a single unit should suffice.

(2) Since acceleration is the second derivative of the distance with respect to time, i. e., because

$$y'' = \frac{d^2 s}{dt^2} = A,$$

the quantity in the denominator should be the square of a time-unit; in other words, the definition should comprise a number of units of time which "repeats itself," such "as per second per second," which means that the same number should occur twice as a divisor, as "(seconds)^2."

In answer to the first point, there is, theoretically, no objection to the use of two time-units in the definition of acceleration because the true definition of acceleration, that which is used by everybody, even by the physicists, is related to the velocity-time function, which can itself be defined in any manner whatever. Practically the academic method does not avoid two units of time anyhow, because while it introduces only one unit of time, the second, in the formula, it is always necessary to have recourse to another unit of time, the hour, to "translate" the result of the measurement made by that method, to render it intelligible.

In answer to the second point, it is not at all necessary to derive the acceleration function directly from the distance function. On the contrary, its most logical definition and that which specifies the real unit of acceleration is derived directly from the velocity function. Even if we did wish to derive the acceleration function from the distance function it is not necessary that the two successive differentiations of distance with respect to time be both made by reference to the same unit-value of time. We can obtain the second derivative after having changed the unit of the variable (x) of the first derivative and after having given it any other value whatever (X) provided we change suitably the scale of ordinates of the second derivative by the introduction of a factor equal to the ratio of the two units (X and x) of the variable. That constant is only necessary when we want to retain the same unit of acceleration in all cases. By defining and adopting a practical unit we eliminate the constant just mentioned. The result is a rational logical method where the relations between the three kinematical functions are established as naturally for the units of time, distance and speed in use in the industry of transportation, as they are established for other units of time distance and speed with the academic method.

There may be some academic interest, but there is no practical interest in making the unit of industrial measure of train-acceleration the same as the unit of measure of the acceleration of a mechanism in a physical laboratory. It complicates instead of simplifying the industrial measurements. It is indeed in order to avoid complications and difficulties that practical units have had to be and are still being created and that so much use is made of them.

The constant factor of the ratio between an acceleration measured by the "practical" and by the "academic" methods is easily found by expressing a given acceleration by both methods. This factor turns out, naturally enough, to be equal to the ratio of the two units of velocity which have to be used with the academic method, one to calculate acceleration, the other to "translate" the result. These ratios are 3.6 for the meter unit and 0.682 for the foot unit. The practical unit is 3.6 times smaller than the academic unit with the metric system, i. e., 1 meter per second per second = 3.6 kilometers per hour per second. In the case of the "foot" unit, the foot per second per second = 0.682 mile per hour per second, i. e., the mile per hour per second = 1.46 ft. per second per second (the unit used in England). These observations are inspired and at the same time confirmed by more than 10 years of experience in America with the mile per hour per second as a "practical" unit of train acceleration.

The method of industrial definition and measurement of train acceleration presented in this article is therefore one which has long since proved its worth and its practical utility and advantages can no longer be contested.

An electric railway is to be constructed from Oraka to Takaradzuka, Japan, a distance of 15½ miles, with a branch from Minomo to Armia, 2½ miles. It will cost $1,427,500 and will be controlled by British capitalists.

THE KNOXVILLE WATER CASE

The general interest in the decision of the Supreme Court of the United States in the case of the Knoxville Water Company is such as to warrant a general statement of the conclusions reached by the court. The decision was handed down Jan. 4 and was the result of an appeal from the Circuit Court of the United States for the Eastern District of Tennessee of a case in which the mayor and aldermen of the city of Knoxville were appellants and the Knoxville Water Company was the appellee. The original case was a suit in equity and was brought by the company in the Circuit Court, Dec. 7, 1901, against the city to restrain the latter from enforcing a city ordinance fixing the maximum rates to be charged by the company. The company alleged that the rates in the ordinance were so low that they denied to the company a reasonable return upon the property employed in the business and thereby took it for public use without compensation, in violation of the fourteenth amendment of the Constitution of the United States. The case was tried before a master, who found that the net income under the new rates would be less than 6 per cent on the valuation of the company's property as found by him. In the opinion of the master 8 per cent, which included 2 per cent to provide for depreciation, was the minimum net return which the company was entitled to earn. The judge of the Circuit Court, in his opinion confirming the master's report, adopted practically the master's valuation of the whole plant and property, as well as his conclusions, and issued a permanent injunction against the enforcement of the ordinance.

In its decision the Supreme Court first concludes that the ordinance, although municipal, derived its authority from the Legislature and must be regarded as an exercise of the legislative power. In such cases, the court said, it will set aside legislation only where its constitutional invalidity is very clear.

The decision then takes up the question of the valuation of the property which, according to the master, on March 30, 1901, the date of the passage of the ordinance, was $608,000. This sum was made up by adding to the appraisement of all the tangible property the sum of $10,000 for "organization, promotion, etc.," and $60,000 for "going concern." The Supreme Court declined to express an opinion as to the propriety of including these two items in the valuation of the plant, for the purpose for which it was valued in this case, but left that question to be considered when it should necessarily arise. Assuming them, however, to be correct, it took up the master's valuation of the tangible property, which was based upon the testimony of a witness of the company as to the cost, at the date of the ordinance, to reproduce the existing plant as a new plant. The company contended that the master, in fixing this valuation, made allowance for depreciation. The Supreme Court could see no evidence to support this claim, but declared that some substantial allowance for depreciation should have been made for that portion of the property, such as machinery, which was subject to depreciation. A witness called by the city placed the reproduction value at $363,000 and estimated the allowance that should be made for depreciation at $118,000, or 32 per cent. In the view which the Supreme Court took of the case it did not consider it necessary to determine how much of the master's valuation of the tangible property ought to have been diminished by the depreciation which the property had undergone, except to say that there should have been considerable diminution, sufficient at least to raise the net income found by the Circuit Court above 6 per cent, upon the whole valuation thus diminished.

The court brushed aside the somewhat faint claim of the company that its capitalization should have some influence in determining the valuation of the property, as the evidence showed that all, or substantially all, of the preferred and common stock had been issued to contractors for the construction of the plant and that the nominal amount of the stock issued was greatly in excess of the true value of the property furnished by the contractors.

The Supreme Court also considered that the master and the Circuit Court erred in estimating the gross receipts under the new ordinance. The company had been in the habit of making a discount of 5 per cent on all bills which were promptly paid, and this discount was considered in estimating the effect of the proposed rates. The Supreme Court pointed out that the ordinance required no discount. While the abandonment of the discount would deprive the company of an efficient aid to quick collection of these bills and hence would add somewhat to the cost of collection, the court considered that in the case of a prime necessity like water there were other methods of enforcing prompt payment.

In its original case the company had referred to both the "complete" and "incomplete" depreciation of the plant. These terms were accepted by the court which defined complete depreciation as "that part of the original plant which through destruction or obsolescence had actually perished as useful property," and "incomplete depreciation" as "the impairment in value of the parts of the plant which remained in existence and were continued in use." The company had claimed that in fixing the value of the plant upon which it was entitled to earn a reasonable return, the amounts of complete and incomplete depreciation should be added to the present value of the surviving parts. The Circuit Court refused this contention and was upheld. Upon this point the Supreme Court decision says:

A water plant, with all its additions, begins to depreciate in value from the moment of its use. Before coming to the question of profit at all the company is entitled to earn a sufficient sum annually to provide not only for current repairs, but for making good the depreciation and replacing the parts of the property when they come to the end of their life. The company is not bound to see its property gradually waste without making provision out of earnings for its replacement. It is entitled to see that from earnings the value of the property invested is kept unimpaired so that at the end of any given term of years the original investment remains as it was at the beginning. It is not only the right of the company to make such a provision, but is its duty to its bond and stockholders, and, in the case of a public-service corporation at least, its plain duty to the public. If a different course were pursued the only method of providing for replacement of property which has ceased to be useful would be the investment of new capital and the issue of new bonds or stocks. This course would lead to a constantly increasing variance between present value and bond and stock capitalization—a tendency which would inevitably lead to disaster either to the stockholders or to the public, or both. If, however, a company fails to perform this plain duty and to exact sufficient returns to keep the investment unimpaired, whether this is the result of unwarranted dividends upon over issues of securities, or of omission to exact prices for the output, the fault is its own. When, therefore, a public regulation of its prices comes under question the true value of the property then employed for the purpose of earning a return cannot be enhanced by a consideration of the errors of management which have been committed in the past.

In another part of its decision the Supreme Court held that the Circuit Court was in error. Although the ordinance was passed in 1901, it had never been observed. In

the meantime, the gross income of the company had largely increased. The decision of the Circuit Court was based on the return of the company for the fiscal year ended 1901 so that full evidence of the results for the subsequent years was not included in evidence before the Supreme Court. Hence the latter was unable to say what the effect of such evidence would be. But this evidence was relevant and of great importance and it was an error not to have considered it and to have based judgment upon one year only.

The Supreme Court decided, therefore, that the judgment of the lower court could not stand as "there was error in the appraisement of the present value of the plant, in the deduction of the reductions made by the ordinance and in the exclusion of evidence relating to the operations of the company after the enactment of the ordinance."

The Supreme Court states that its jurisdiction in cases of this kind should be invoked only in the clearest cases. In this instance more than seven years had passed since the enactment of the ordinance and it had never been observed. "If a company of this kind chooses to decline to observe an ordinance of this nature and prefers rather to go into court with the claim that the ordinance is unconstitutional, it must be prepared to show to the satisfaction of the court that the ordinance would necessarily be so confiscatory in its effect as to violate the Constitution of the United States." This same thought, it says, is expressed in ex parte Young, 209 U. S., 123; San Diego Land & Town Company v. National City, 174 U. S., 739, 754; San Diego Land & Town Company v. Jasper, 189 U. S., 439. On the other hand, it cannot be doubted that in a clear case of confiscation it is the right and duty of the court to annul the law. Reagan v. Farmers' Loan & Trust Company, 154 U. S., 362; Covington, etc., Turnpike Company v. Sanford, 164 U. S., 578; Smyth v. Ames, 169 U. S., 466. But the court did not consider the present case as being one of this kind. It says:

Upon any aspect of the evidence the company is certain to obtain a substantial net revenue under the operation of the ordinance. The net income, in any event, would be substantially 6 per cent, or 4 per cent after an allowance of 2 per cent for depreciation. (See Stanislaus County v. San Joaquin Company, 192 U. S., 201.) We cannot know clearly that the revenue would not exceed that return. We do not feel called upon to determine whether a demonstrated reduction of income to that point would or would not amount to confiscation. Where the case rests, as it does here, not upon observation of the actual operation under the ordinance, but upon speculations as to its effect, based upon the operations of a prior fiscal year, we will not guess whether the substantial return certain to be earned would lack something of the return which would save the effect of the ordinance from confiscation. It is enough that the whole case leaves us in grave doubt. The valuation of the property was an estimate and is greatly disputed. The expense account was not agreed upon. The ordinance had not actually been put into operation; the inferences were based upon the operations of the preceding year; and the conclusion of the court below rested upon that most unsatisfactory evidence, the testimony of expert witnesses employed by the parties. The city authorities acted in good faith, and they tried, without success, to obtain from the company a statement of its property, capitalization and earnings.

In conclusion the court expresses itself as follows:

The courts in clear cases ought not to hesitate to arrest the operation of a confiscatory law, but they ought to refrain from interfering in cases of any other kind. Regulation of public-service corporations which perform their duties under conditions of necessary monopoly will occur with greater and greater frequency as time goes on. It is a delicate and dangerous function and ought to be exercised with a keen sense of justice on the part of the regulating body, met by frank disclosure on the part of the company to be regulated. The courts ought not to bear the whole burden of saving property from confiscation, though they will not be found wanting where the proof is clear. The legislatures and subordinate bodies to whom the legislative power has been delegated ought to do their best. Our social system rests largely upon the sanctity of private property, and that State or community which seeks to invade it will soon discover the error in the disaster which follows. The slight gain to the consumer which he would obtain from a reduction in the rates charged by public-service corporations is as nothing compared with his share in the ruin which would be brought about by denying to private property its just reward, thus unsettling values and destroying confidence. On the other hand, the companies to be regulated will find it to their lasting interest to furnish freely the information upon which a just regulation can be based.

If hereafter it shall appear under the actual operation of the ordinance that the returns allowed by it operate as a confiscation of property, nothing in this judgment will prevent another application to the courts of the United States or to the courts of the State of Tennessee. But as the case now stands there is no such certainty that the rates prescribed will necessarily have the effect of denying to the company such a return as would avoid confiscation.

STANDARD SPECIFICATIONS FOR COAL

The committee on standard specifications for coal of the American Society for Testing Materials held a meeting in Pittsburg on Jan. 29. Dr. J. A. Holmes, of the U. S. Geological Survey, Washington, D. C., was elected permanent chairman of the committee. B. F. Bush, president, Davis Coal & Coke Company, Baltimore, Md., was elected permanent secretary. The subject of the sale of coal on heat value specifications was discussed exhaustively, and it was the consensus of opinion that such a method of sale would be feasible. The chairman appointed a committee to classify the users of coal who could properly purchase under standard specifications. The committee reported the following classifications: (1) Steam plants; stationary power, locomotives, ships, naval, etc. (2) Producer gas. (3) Domestic coal; low-pressure heating plants, anthracite, bituminous and coke. (4) Metallurgical; coke, smithing. (5) Gas (illuminating). (6) Cement and miscellaneous drying operations.

Sub-committees were appointed to consider specifications for each of these classifications and report to the general committee next June, when the society holds its annual meeting at Atlantic City. Committees were appointed on sample taking and on educational work. Professor W. F. M. Goss, University of Illinois, was appointed chairman of the committee on specifications for steam plants, and D. T. Randall was appointed chairman of the sub-committee on sample testing. The membership of these various committees is equally divided between representatives of the consumer and the producer, except that, according to the rules of the society, the chairmen of all committees must be either consumers or engineers.

Recent statistics compiled by the French Minister of Public Works show that on June 1, 1908, there were on that date in Europe 317,654 km (197,660 miles) of steam railroad track, exclusive of industrial and secondary railways. Germany led the list. The other important countries, in their order, were Russia, France, Austria-Hungary, Great Britain and Ireland, Italy, Spain, Sweden, Belgium, Switzerland, Denmark, Turkey, Roumania and Holland. In length of track built during 1907 Russia led, with 1715 km, or 1071 miles.

DISCUSSION OF CAR OPERATION IN BOSTON

At a recent monthly meeting of the car-house foremen and division superintendents of the Boston Elevated Railway Company the subject of car operation was discussed from the point of view of the mechanical department. Through the courtesy of the company the following report of the proceedings is here printed. The meeting was so successful that it was decided to bring the facts closer to the car-service employees and two similar meetings were held with the street inspectors and motormen instructors as attendants. John Lindall, superintendent of rolling stock and shops, presided at all the meetings, and the electrical side of car operation was discussed more in detail by John W. Corning, electrical engineer. A noteworthy feature of the work was the exhibition of graphic charts of the car defects occurring in 1907 and 1908 by months and by equipment classifications and the presentation of full-sized diagrams of the current variations during the correct and incorrect operation of a car. Each man was also given a blue print, as illustrated herewith, showing a recording ammeter record taken on a well-run and a poorly operated car and at the conclusion of the meetings the men adjourned to the shop yard, where a test car had been fitted up with a recording ammeter. This car was run in various ways with small groups of men inside on each trip and curves were obtained showing the current demand of the car under different methods of handling.

At the outset Mr. Lindall pointed out that the meeting was not called in a critical spirit, but for the purpose of effecting possible improvements in the service. He explained the uses of the system of defect records (which were described in the Street Railway Journal for April 4, 1908) and showed how the troubles occurring in service have been reduced. Car body defects in November, 1908, were about 400 compared with about 510 a year ago; motor defects were 240, against 720 in 1907; truck defects were 16, against 65; control troubles were 172, against 275; brake defects, 31, against 80, and trouble reported and nothing found, 41 cases, against 150. It was then stated that the manner in which the cars are handled in service has an important bearing upon the failures of equipment and the cost of maintaining it. Last year the committee appointed by the American Street & Interurban Railway Engineering Association to report upon the maintenance and inspection of electric railways sent out a letter to practically all the companies in the United States asking for certain data and information. One of the points brought out in the replies was that about 42.6 per cent of the commutator and brush troubles were due to fast feeding of controllers. When motor equipments are figured consideration is given to the weight of car, weight of load the car is liable to carry, grades on the line, number of stops per mile, scheduled speed and the line voltage. Motors are designed to fulfil these requirements with sufficient capacity to perform the service without excessive heating which deteriorates the insulation, and they are also designed to commutate properly the normal current required for service without serious sparking at the brushes and blackening and burning at the commutator. They are not designed to fulfil these conditions if the motors are not connected up properly, if they are run with the brakes on, or if the power is applied too rapidly. During the past two years the company has done a great deal of work on the equipment to make the motors operate under more nearly normal conditions. Resistance has been rearranged and controllers changed to smooth the acceleration and cut down the current peaks. Lost motion has been taken out of the truck and brake rigging with beneficial results and the company feels that if the handling of the cars by the motormen can be improved further reductions in car defects and maintenance will follow.

Mr. Corning explained the needs of smooth acceleration and showed the waste of power in keeping the current on too long, particularly when the brakes are applied needlessly. If the rail is not dry when the power is applied too rapidly slippage and grinding of the wheels result with slow car movement. About a year ago the company made some demonstrations to its inspectors, showing that better time could be made by applying power less rapidly on a slippery rail. A chart was then discussed with reference to proper and improper operation of the controller, the current curve being shown in red for good handling and in black for poor. The commutating capacity of the motor was explained with reference to the diagram. Thus the current rose only to a maximum of 55 amp in the series position with smooth handling, against about 85 amp with rough manipulation. With proper operation the full multiple current was 125 amp, reached in 9 seconds after starting, and with rough work the maximum current in

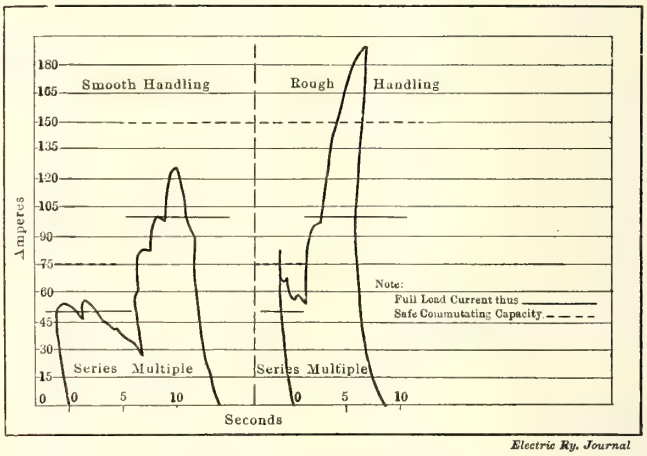


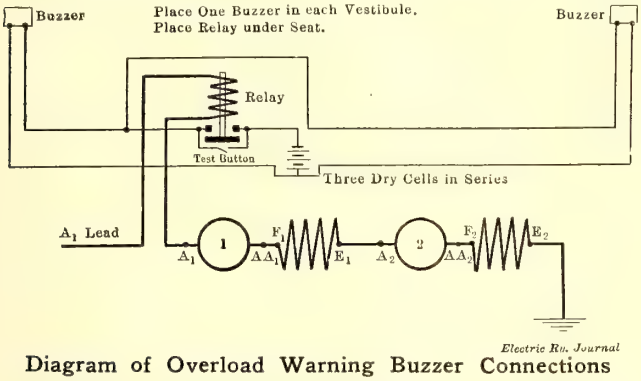
Diagram Showing Current Consumption of Motors with Different Rates of Feeding

multiple reached about 195 amp in 7 seconds. With proper operation the current did not rise above the safe commutating capacity of the motor and barely exceeded the full-load current. In rough handling the full-load current was exceeded in both series and multiple and the safe commutating capacity was considerably exceeded. When this is a frequent occurrence it causes a roughness in the commutator, which ultimately leads to sparking. The current peaks with a car carrying passengers on a grade are still more serious. The effects on passengers and possibility of accident claims resulting from the sudden starting of cars were also considered. The effect of rough handling on the motors was then discussed. The wrench that the bearings get due to sudden rushes of current is undesirable, as is the shock to gears and pinions. The shock to the trucks is bad and the car bodies tend to loosen up at the joints. Another effect of the too rapid movement of the controller is the resulting overheating of the motors.

Mr. Corning pointed out that with the curves exhibited the maximum current per motor was 90 amp with improper operation and only 70 amp with good operation. This has an appreciable effect on the power stations, where it is desirable to limit the maximum current as much as possible.

The heating of the motors is proportional to the square of the current. The rheostat losses are also greater with improper operation.

A trial device has been placed on the cars as suggested by Paul Winsor, chief engineer of motive power and rolling stock, to warn the motorman when he exceeds the proper current in accelerating. This device is illustrated by the accompanying drawing and it consists of a relay



Electric Ry. Journal

Diagram of Overload Warning Buzzer Connections

in the motor circuit adjusted to close a dry battery and buzzer circuit when the current reaches about 80 amp. This relay operates a buzzer at each end of the car, and is set just beyond the commutating capacity of the motor, so that the motorman could so accelerate his car as he maintained the proper speed without causing the buzzer to ring.

In approaching electric track switches it is necessary to operate the car slowly for the reason that there is in the switch mechanism one coil or solenoid whose function is to determine which way the tongue should move. This coil is operated by the current taken by the motors, and the company's measurements show that it takes about 40 amp to operate the coil when it is working properly. As a car is being accelerated from rest this value will be obtained by two or three controller notches without using the brake, and by moving the controller properly, securing a speed of about 7 m.p.h. This is about as fast as the motorman should run through the trolley pan, as a higher speed may prevent the track coils from moving the switch tongue all the way over and thereby cause a derailment or a split switch.

The following points were noted by inspectors as desirable to avoid:

Controller flashed by slow movement in making the transition point and also by quick feeding and holding between notches.

Resistance burned out by running on short notches with motor heating.

Running cars over cut-outs while in the loop, causing motors to flash and fuse to blow.

Overworking motors and grinding out shoes while nearing a stop by applying brakes with the power on or when running over rough rail to steady car.

Fuses blown by rear brake being set, which motorman had failed to detect.

Fuses blown at electric track switches by applying brake too hard.

Car pushed when motor could have been cut out.

Open cars pushed with reverse on center.

Car pushed with switch not properly thrown.

Car pushed with fuse blown and not replaced.

Car pushed with circuit breaker not set.

Throwing to multiple with wheels spinning and resulting in flashing of motors.

Reversing to make ordinary stops.

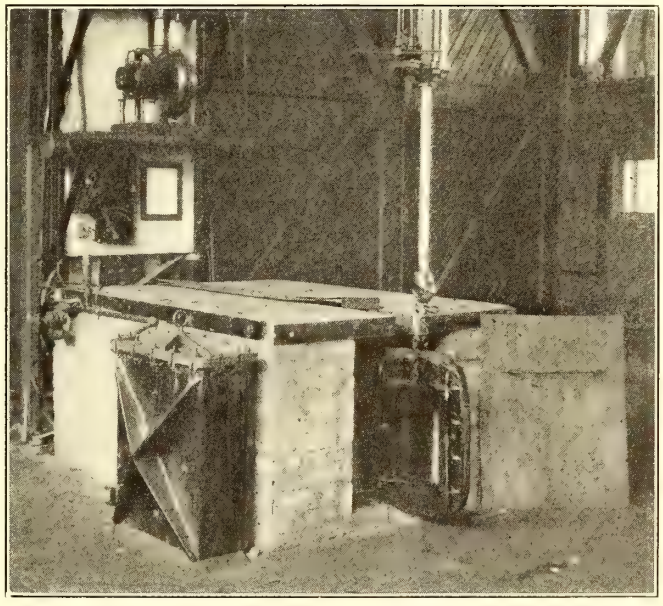
A SIMPLE IMPREGNATING PLANT

A simple impregnating outfit has been built by the shop employees of the Northwestern Elevated Railroad Company, of Chicago, John E. Osmer, master mechanic. This outfit includes a heating oven, an impregnating tank and an air supply for forcing compound into the coils. An accompanying illustration shows the general appearance of this complete outfit as it is built on the shop floor.

The heating oven is 5 ft. x 6 ft. x 4 ft., inside dimensions, and is built of brick with the top supported on angle irons. Beginning above the door in the front of the oven a slot about 4 in. wide extends throughout the length of the top from front to rear. This slot has a sheet-iron cover for retaining the hot air when the oven is in use. This opening makes it possible to handle coils direct from the winding room to the inside of the oven carrying them with the pneumatic hoist shown in the illustration. A short length of chain is provided to lift the coils, and when a coil is being put into the oven this chain passes through the slot in the roof of the oven, which slot is directly under and parallel with the runway of the pneumatic hoist.

The oven is heated with nine electric car heaters placed along one side wall. On the opposite side wall are hooks for supporting small coils. By means of the heaters the temperature within the oven can be maintained at 190 deg. Fahr.

Close to one side of the oven is the pressure tank, 10 in. wide, 22 in. long and 27 in. deep, inside measurements. It is heavily ribbed on the sides and the cover so that it may withstand a pressure of 100 lb. per square inch. When a coil is immersed in the compound in this tank and the cover bolted on pressure for forcing the compound into the coil is supplied by air from the shop pipes. The shop supply of air is maintained at 110 lb., but a feed valve and



Impregnating Outfit in Shops of Northwestern Elevated, Chicago

a safety valve set at 60 lb. maintain the pressure within the tank at from 50 lb. to 60 lb. An ordinary gage serves to indicate the pressure within the tank.

When a coil has been repaired it is carried from the winding room to the inside of the oven by the overhead crane as mentioned and there heated for a sufficient length of time to have the moisture driven out. After heating, the coil while still hot is submerged in the compound which

half fills the cast-iron pressure tank just described. When all bubbling has ceased the cover is securely bolted to the tank and 50 lb. air pressure is applied above the liquid for about 60 minutes; then the cover is removed and the coil is raised and temporarily held on strap-iron saddles while the excess liquid drips back into the tank.

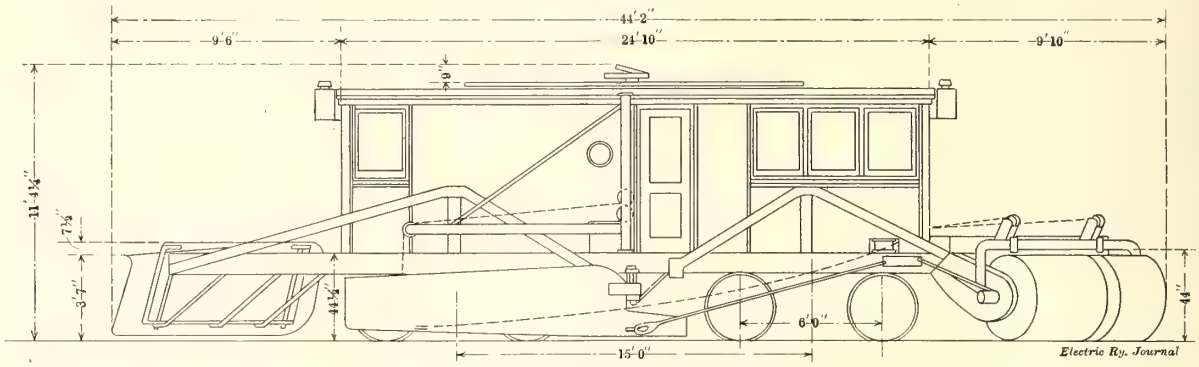
Field coils that have become loose in service on the company's 160-hp motors are brought into the shop, the rivets are tightened, the coils are heated and then submerged in the compound under pressure. After drying they are put back into service and satisfactory insulation by this method has been shown.

NEW SNOW PLOW FOR MINNEAPOLIS

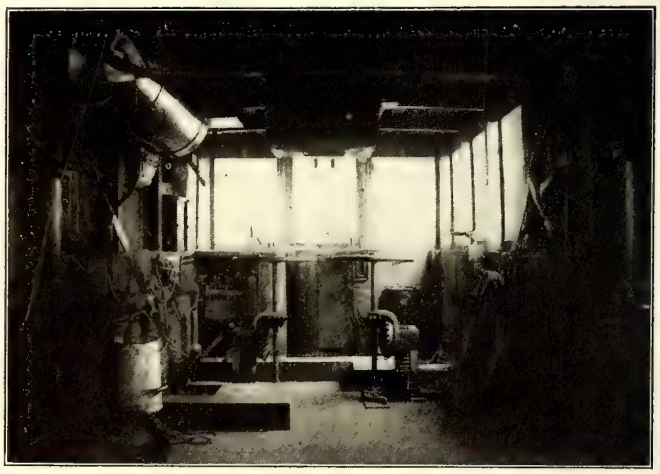
A new type of snow plow has recently been developed at the shops of the Twin City Rapid Transit Company, of Minneapolis. One of these plows was built for service last year, and proved so successful in combating the drifts, which are heavy and frequent in Minnesota, that four others of the same pattern were built last summer.

The new plow is a combination shear plow and sweeper, with the shear at one end and a rotary sweeper at the other. It is equipped to operate in either direction and from both ends, although as a rule the plow end will be the forward end of the plow. In this case the shear and wings will clear the tracks of the greater part of the snow and the amount between the rails left by them will be removed by the sweeper in the rear. When the side wings are extended the plow will remove the snow from a strip 19 ft. wide, including the strip between the tracks, and will throw the snow out 12 ft. from the outside rail. If heavy, frozen drifts which cannot be moved by the front wing are encountered, the plow is operated from the other end and the steel broom soon cuts through the snowdrifts.

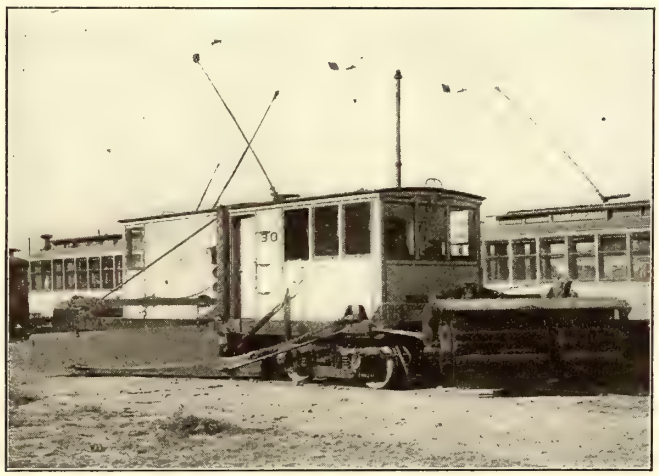
The shear in front, which is supported directly on the extended side sills of the car body and is also braced from above, is fitted at its outer and lower end with a square steel plate which can be set to any desired height, and the height of the shear itself can be regulated by means of a reel and drum from the cab. The bottom of the shear is shod with steel blocks rounded so that they will slide on the rails, and is so constructed that when it strikes obstructions, such as paving blocks, it will rise and ride over them without difficulty. The side wings are also arranged so that they can be dropped from the cab, and when thus set are held rigidly in place by a kind of toggle joint. Both of the wings may be raised and lowered by means of jib cranes and air power.



Side Elevation of Minneapolis Snow Plow



Interior of Cab of Snow Plow



View of Sweeper End



View of Shear Plow End

The steel broom at the rear end of the car is 52 in. in diameter and is revolved by a chain from a special motor carried in the cab. This broom is also raised and lowered by air power.

All electrical cables composing the car wiring are carried in boxed-in troughs on the floor of the cab, so that they are easily accessible in cases of emergency. The resistances are carried on the roof. The car is mounted on Baldwin No. 4 trucks and is equipped with four GE-73 motors with C-6 type M control for operating, a GE-67 motor for revolving the broom, compressors, etc. The weight of the plow complete is 66,500 lb., and it is 44 ft. 2 in. over all.

ELECTRIFICATION OF SALT LAKE & OGDEN RAILWAY

The Salt Lake & Ogden Railway operates a steam railroad, carrying freight and passengers between Salt Lake City and Ogden, Utah, 35 miles distant, over private right of way averaging 66 ft. in width, thus giving ample space for future double-tracking. At the terminal cities it has excellent facilities and free entry under franchises, with loop tracks around the federal building of each city. The road is built for steam railroad service, with practically no curves and a maximum gradient of 1.1 per cent. The track is standard gage laid with 85-lb. rails. It is now proposed to electrify this road and also retain the steam locomotives in service for handling at night the rapidly growing freight business.

Simon Bamberger, ex-State Senator for Utah, is the active head of the corporation, with the title of president and general manager; H. A. Strauss, vice-president. The Falkenau Electrical Construction Company, Chicago, is consulting engineer, and is now engaged in the design of the electrified system and the preparation of plans and specifications for the new work. It is anticipated that it will be possible to so carry forward the work that electric operation may be begun by July.

Hourly local service and a limited service will be given between the two cities. The equipment throughout will be designed for high-grade fast interurban service. The new electric motor cars to be purchased will be equipped with four motors of approximately 100 hp each, multiple-unit control, automatic air brakes, heavy trucks, and will contain smoking and baggage compartments. These cars will be geared for a maximum speed of 60 m.p.h. In addition to the purchase of new cars, the electrification work will include equipping electrically approximately 40 existing cars now in use, which will be utilized as trailers in trains consisting of from two to six units in conjunction with the new motor-car equipment.

Mr. Strauss has recommended the use of the direct-current system at 650 volts, with overhead span construction. This conclusion was reached after weighing carefully the advantages and disadvantages in this undertaking of the a.c. single-phase system, the 1200-volt d.c. system and the standard direct-current system with a voltage of 650. Power for the line will be supplied either from a generating station to be erected by the railway company, or will be purchased from one of the several high-tension hydro-electric supply lines which now practically parallel the company's right of way. Four substations to receive and convert 88,000-volt current will be erected and equipped, each with two motor-generator sets of 300-kw capacity.

The road which is to be electrified traverses an exceedingly fertile and densely populated section, and has an enormous excursion traffic from both terminals throughout the summer months to a summer resort known as "Lagoon," owned by the interests controlling the railroad.

REPORT OF WISCONSIN RAILROAD COMMISSION

The second annual report of the Railroad Commission of Wisconsin, which has just been issued, relates to the work of the commission during the year ended June 30, 1908.

Of 114 formal complaints against railway companies, seven related to street and interurban railway service and rates. Of 673 informal complaints and other informal matters regarding railways, six related to street car service and rates.

Fifty-one indeterminate permits were issued to corporations which filed notices of surrender of franchise with the commission under the provisions of the law of 1907. Among these companies were the following: Menominee & Marinette Light & Traction Company; Ashland Light, Power & Street Railway Company; Merrill Railway & Lighting Company; Chippewa Valley Railway, Light & Power Company.

The following statistics of accidents are presented:

The steam railroads and the electric street and interurban railways together reported 240 persons killed and 2743 injured by them in this State during the year ended June 30, 1908. Of these the steam roads were responsible for 207 killed and 1867 injured; the electric railways for 33 killed and 876 injured.

The steam roads killed 4 passengers and injured 151 more; the electric railways killed 5 and injured 759. Forty-eight employees were killed by the steam railroads and 5 by electric railroads; while 1486 and 40, respectively, were injured. Crossings account for 34 of the deaths reported by the steam roads and 76 of the injuries; the electric lines reported 5 injured in this manner. Seventy-three trespassers on right of way and 15 trespassers on trains were killed by the steam roads, and one of each class by the electric roads; the injured of this class numbered 45 and 39, respectively.

Struck by train was the most common cause of death reported. The railroads killed 155 in this manner and injured 200 more; the electric railroads killed 23 and injured 65. The steam roads report 17 deaths by falling from trains and 176 injured; the electric railways 56 injured. Jumping on and off trains resulted in 11 deaths on the steam, 6 on the electric railroads; and 174 and 448 injuries. Coupling and uncoupling cost 6 lives and 120 injuries. Collisions caused 5 deaths and 72 injuries on the railroads and 120 injuries on the electric railways. One death and 12 injuries were caused by overhead obstructions.

The report gives the following figures of the expenses of the commission: Amount expended under the railroad commission law, $48,169.77; amount expended under the public utilities law, $17,513.74; total, $65,683.51. The expense for the joint engineering staff of the Railroad Commission and the Wisconsin Tax Commission, including salaries and traveling expenses, but exclusive of instrumental equipment, was $31,199.09, divided as follows: Public utilities, $13,132.50; Railroad Commission, except public utilities, $9,128.82; Tax Commission, $8,937.77.

Among various suggestions for legislation the commission makes the following:

The administration of the public utilities law has revealed no weaknesses in its essential provisions. In several instances the commission has been obliged to place a somewhat liberal interpretation upon it in order to make the law fit the concrete situations which were presented. It will be assumed, however, that the interpretation thus placed upon the law is in harmony with its spirit and the

intention of the Legislature, unless the Legislature directs otherwise. The only amendment to the public utilities law which may be suggested is one extending the period of time during which public utility companies, organized before the enactment of the law, can surrender their franchises and secure in lieu thereof indeterminate permits. The utilities law limited the time during which a franchise could be surrendered to July 1, 1908. Since this date a number of companies have inquired of the commission as to the manner in which they could now surrender their franchises. In our judgment it is desirable that utilities still operating under franchises granted before the enactment of the law, should have an opportunity to surrender the same at any time in the future. Possibly it is in the interest of the public to go a step further and, under the reserve power of the constitution, by statute repeal all franchises still in existence and grant in lieu thereof indeterminate permits. The second suggestion is obviously a much larger proposition, but we are inclined to believe that it merits careful consideration.

The public convenience and necessity law could to advantage be modified so as to permit the commission to consider the financial ability of the applicants in passing upon the application for such certificate, as some doubt exists at present of the right of the commission to inquire into such matter. The law might be further amended to authorize the commission to permit modifications of the certificate of public convenience and necessity at any time subsequent to its first issuance.

CHICAGO RAILWAYS REHABILITATION PROGRESS

Using a full page in the Lincoln Centennial issue of a Chicago daily paper on Feb. 7 the Chicago Railways Company presented a statement of its rehabilitation progress. A portion of the record was entitled "What the Chicago Railways Company Is Doing to Give Chicago a Perfect Traction System." The statements follow:

"Accepted its franchise ordinance Jan. 29, 1908. On Nov. 15, 1908, had completed 50 per cent of its rehabilitation requirements and was 25 per cent ahead of the amount specified in the ordinance for that period.

"Has removed the trailers and installed new 'pay-as-you-enter' cars on seven of its biggest trunk lines. Has built 74.40 miles of new track—modern grooved rails laid in concrete.

"Has 650 'pay-as-you-enter' cars of the most up-to-date model, either in service or in various stages of completion in the Pullman shops. (The ordinance requires that 225 new cars shall be installed a year after the acceptance.)

"Has installed 227 miles of vitrified clay tile duct for underground cable, about 50 per cent of the required amount. Has replaced 75 miles of trolley with heavier wire, or 44 per cent of the amount specified.

"Has let contracts for 126 miles of underground cable. Has laid 35 miles of auxiliary cable.

"The following buildings are completed; some of them cover the area of a city block: Car shops, paint shops, a modern warehouse and additions at West End, near Fortieth Avenue; car station at Twenty-fifth and Leavitt Streets, with a capacity of 145 cars; car station at Lincoln, Sheffield and Wrightwood; substation at Milwaukee Avenue and Cleaver Street; machine shop at Dewey Court. In addition to these buildings the station at Madison and Fortieth Avenue has been remodeled to accommodate 70 new 'pay-as-you-enter' cars; the Armitage barn, to accommodate 90 of the new cars; Devon Avenue, to hold 125 of the long vehicles; Lawndale station, to accommodate 75 cars, and Lincoln Avenue station, to accommodate 95 cars—a total of 455. With the new barns that are to be constructed, there will be accommodations for nearly 2000 cars, and the stations will be up to date in every respect, so that the cars can be thoroughly cleaned every day."

The company now has in service nearly 300 of the new "pay-as-you-enter" cars and 350 more are in the shops fast approaching completion. At an early date the contract will be placed for 550 additional cars of the same type and before the end of this year the Chicago Railways Company will have in operation 1200 of the new "pay-as-you-enter" cars representing an outlay of approximately $7,000,000.

The new cars are in operation on seven of the principal lines of the company—Madison Street, Evanston Avenue, North Clark Street, Milwaukee Avenue, Armitage Avenue, Blue Island Avenue and Ogden Avenue. Other lines are being equipped as fast as possible. Meanwhile the heavy double-truck cars from the principal thoroughfares have been placed on other lines, to the great improvement of the service generally.

The total expenditure for rehabilitation so far has been about $10,000,000. The track is said to cost about $50,000 per mile. The company expects to complete the rehabilitation of all its lines this year. It has planned to build 112 miles of track, including 26 miles of extensions, before the close of next December. This will include new tracks in the important network which extends through the heart of the city, work upon which was started the latter part of 1908.

The tunnels connecting the loop district with the north and west sides have been out of service for the last two years, but the Board of Supervising Engineers lately has prepared plans for rebuilding the La Salle and Washington Street bores and it is assumed that the transportation difficulties in the downtown section will be overcome to a considerable degree by the construction of these subways and the relief of the bridges. The Van Buren Street tunnel practically is completed and the cars soon will be running through it, materially relieving congestion in that part of the city.

MAGYAR-AMERICAN ENGINEERS ORGANIZE

A number of Hungarian engineers and architects have organized the "American Society of Hungarian Engineers and Architects." The society has two objects: To bring in closer touch engineers and architects of Hungarian extraction living in this country, and to give moral support and information to newcomers, and to encourage the exchange of engineering, technical and industrial information between the technical men of Hungary and of the United States and to foster technical societies, sciences and industries. The society will hold monthly meetings, where papers will be read and discussed. The membership consists of mechanical, electrical and civil engineers, chemists, architects and craftsmen. Following are the officers of the new society: President, A. Henry Pikler, M.E., member of the American Institute of Electrical Engineers, engineer in charge of transformer department, Crocker-Wheeler Company, Ampere, N. J.; vice-president, Karoly Z. Horvay, architect, chief draftsman, building bureau of Board of Education, Brooklyn, N. Y.; secretary, Zoltan de Nemeth, M.E., New York Edison Company; treasurer, Sandor Oesterreicher, E.E., associate member of the American Institute of Electrical Engineers and of the American Society of Mechanical Engineers, New York Edison Company; assistant secretary, Ernest L. Mandel, B.S.C.E., bureau of Commissioner of Public Works, New York City.

FENDER AND WHEELGUARD HEARINGS BEFORE THE NEW YORK PUBLIC SERVICE COMMISSION

On Feb. 4 and 5 the New York Public Service Commission, First District, gave two hearings in pursuance of its intention to learn the attitude of the street railway companies under its jurisdiction with regard to a proposed form of order specifying the adoption of wheelguards with or without fenders. The first hearing, held on Thursday, Feb. 4, was for the railways of Kings, Queens, Bronx and Manhattan boroughs, comprising nearly all the mileage in New York and vicinity. The second hearing was held on Friday, Feb. 5, and was attended by representatives of the electric railways in the Borough of Richmond. Commissioner Maltbie presided at both sessions.

THURSDAY'S SESSION

Commissioner Maltbie, in opening the Thursday session, referred to the recently issued report of the Schenectady and East Pittsburg fender and wheelguard tests made by the sub-committee on safety devices. While it was true that the proposed form of order would be based largely on the work of this sub-committee, the Public Service Commission would by no means be bound to it. He assumed that the street railway companies would not deny the necessity of some kind of protection, and expected that their arguments at the hearing would be confined to the desirability of using one or the other form of protection on their cars.

A. W. McLimont, chairman of the sub-committee on safety devices and electrical engineer of the Public Service Commission, was then duly sworn. He testified that the report as issued was correct, and summarized the recommendations made therein. The committee had recommended, he said, that all cars should have automatic wheelguards, and in addition that the cars in the less congested boroughs of New York should also have projecting fenders.

The first railway representative called was A. H. Masten, one of the lawyers for the Metropolitan Street Railway Company. Mr. Masten said that the receivers of the company had been engaged for some time in making tests of wheelguards and other safety devices. Those which they are now testing are the two which received the highest percentages in the report made by the sub-committee of the commission. J. L. Quackenbush, another legal representative of the Metropolitan Street Railway Company, said that the wheelguard views expressed in the report were the same as those given out about a year ago by Oren Root, general manager for the receivers of the Metropolitan Street Railway Company.

The next witness was F. W. Whitridge, receiver of the Third Avenue Railroad Company, Union Railway Company and other lines. Mr. Whitridge said that as the tests conducted by the commission were made on lay figures, they bore absolutely no relation to what exists in practice, unless the person struck is asleep or drunk on the track. Of 2700 cases which came to his notice, not one had presented conditions similar to the tests. For that reason he was disposed at first to take a light view of the report, but some time ago he came to the conclusion that there ought to be some kind of a safety device on every car. He had already installed 50 Hudson & Bowring wheelguards, and he was gratified to find he had selected the very device which had received the highest mark from the commission. He spoke highly of the record which the H-B guard had made in many cities throughout the world, and believed it was the best thing available in case a person should be in the positions given in the tests. He had no objection to equipping his cars as quickly as possible. He did object, however, to the proposition that the cars operated in Bronx Borough should be equipped with projecting fenders in addition, because some parts of that section are quite as congested as Manhattan Borough. Fenders were nothing but a nuisance where wheelguards are installed. The one objection he had with regard to the sub-committee's statement on wheelguards was the proposal that the wheelguards should be attached to the truck rather than to the body of the car. There were several objections to this, but the main one was that the plan of attaching wheelguards to the truck is patented. At this time 50 of the new pay-as-you-enter cars are equipped with the H-B wheelguard, and the rest of the cars are being furnished with this device as rapidly as possible. He expected to complete in a very few weeks the equipment of all of the electric railways operated by him as receiver. In reply to a question from Commissioner Maltbie, Mr. Whitridge stated that he would ask the wheelguard manufacturer how long it would take to equip all the cars, so that the commission would be able to set a date in its proposed order. In conclusion, Mr. Whitridge said that in view of the sentimental notions which prevail regarding the sacredness of human life, it was very desirable to do everything possible to save it. Inasmuch as the commission had approved the device which he considered the best, he had no complaints to make.

A. H. Masten, representing the Metropolitan Street Railway Company, was recalled to the stand. He did not agree with Mr. Whitridge in having no objection to the proposed order as to wheelguards. His company's experience thus far with the two devices tested had not been sufficient to say that one has a marked superiority over the other. One has worked very satisfactorily except in a few cases, and in general the company has not had time to decide which is the better. It seemed unwise in advance of further preliminary tests to standardize such devices at this time and to require the railways to install absolutely one or the other of the two guards. Commissioner Maltbie pointed out in reply to Mr. Masten that the proposed order will not confine the railway companies to any particular device, as they will have the privilege to use anything that will pass satisfactorily such tests as the commission may direct. In reply to a question from the commissioner, Mr. Masten said that the two wheelguards which his company has on trial are the Parmenter and the Hudson & Bowring types. He admitted that both had been in use elsewhere, but asserted that they had not been previously tried out under conditions like those in New York City. He did not wish to suggest the date on which the proposed order should become effective without conferring with the operating department.

Oren Root, the general manager for the receivers of the Metropolitan Street Railway Company, was then called to the stand. He said that he could not tell how long it would take to equip the cars with an improved wheelguard; that would depend entirely on the deliveries of the manufacturers. Of the two wheelguards which his company is trying out, the Parmenter has been in use on the Madison Avenue line for about a year, and therefore has been quite thoroughly tested. The H-B guard, however, has come into the American market more recently, so that his company's experience with it is rather limited. He was not prepared to give an opinion until the Eighth

Avenue line is actually equipped with the H-B type. The tests of the commission were of value in indicating the type of safety device to be used, but he did not believe that the results thus secured should be conclusive. They ought rather to be supplemented by tests in actual operation. The only objection that he had was that any particular device should be specified by the commission. The percentage of accidents in which a wheelguard might be of use is very small; nevertheless, when an accident of that character does occur it is important that the wheelguard should be of the most efficient type.

J. J. Kuhn, of Dykman, Oeland & Kuhn, representing the Central Park, North & East River Railroad Company, was not prepared to say whether it is necessary to equip the cars with both fenders and wheelguards. He did not think that the commission should order the company to put on expensive equipment merely as an experiment. Perhaps the commission would consider further experimenting. Commissioner Maltbie pointed out that the order will not specify any particular device, and that a railway company can submit any device it chooses, subject to approval. Mr. Kuhn said that his engineers had told him that fenders were more desirable than wheelguards, as a loose wheelguard dropping on the track could easily derail a car. Commissioner Maltbie said in reply that if the wheelguards were properly maintained they would not fall down, and Mr. Kuhn admitted that he had not heard of such accidents. He thought, however, that either a wheelguard or fender should be ordered by the commission, but not both. As he had no engineers of the company with him, he asked that another hearing be given to go into the matter further.

George W. Linch, receiver for the Second Avenue Railroad Company, said his company was willing to go ahead with wheelguards or fenders if absolutely necessary. He had had no chance to experiment, but F. W. Whitridge, receiver of the Third Avenue Railroad Company, had invited him to witness his company's experiments. At present the cars of his company are equipped with Sterling-Meaker pilot wheelguards.

J. F. Teyser, of Mayer & Gilbert, representing the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, said the proposed order of the commission would not apply to his company, as it operates only five horse cars, and the safety devices would impede the movements of the horses.

J. L. Quackenbush, representing the New York City Interborough Railway, had the same objections as Mr. Whitridge to placing fenders on cars operated in Bronx Borough. He wished to confer with Mr. Whitridge and E. A. Maher, general manager of the Third Avenue Railroad and the Union Railway companies, on this question. Commissioner Maltbie said that another hearing would be held to discuss the feasibility of fenders, and that the present hearing would be confined to a discussion as to when the order on wheelguards should become effective.

Oren Root, general manager for the receivers of the Metropolitan Street Railway Company, was prepared, however, to proceed with the discussion on the fender question. He said that fenders had been found worthless on the congested lines of Manhattan Island, and the last had been removed eight or ten months ago. Under the traffic conditions in Manhattan Borough it was practically impossible to keep such devices in proper repair. The speed of the cars is very much less on Manhattan Island. A fender to prevent accidents must be operative, and in many cases during his company's seven to eight years' experience it had been found that many were not operative at the end of the day, or even of the trip. The object supposed to be protected by the fender rolled along the side of the car, and there had been a material proportion of cases where ankles and legs had been broken when passengers were knocked down or run over by vehicles on being thrown aside by the fender. For instance, on Broadway, where the average speed was 5 to 6 m.p.h., a person who was crossing the street based his ability to avoid a car on the observation of the position of the platform height, not of the position of a projecting fender. This error resulted in many accidents to pedestrians in crossing the streets. He did not see any particular reason for specifying fenders above Fifty-ninth Street, as the congestion in some parts of upper Manhattan, notably on Eighth Avenue, was as great as it was downtown. Even in the upper districts a fender would cause many injuries. A wheelguard underneath the car was the only practicable plan; besides, it was not feasible to have a fender on the car in addition to a wheelguard, as the fender would interfere with the efficiency of the wheelguard. The front fender would not save life, and might throw the body away in such a manner that the wheelguard would not work. In response to a query from Commissioner Maltbie, Mr. Root admitted that it would be possible to tie up the fender when in congested districts. It was almost invariably the case, however, that the fender does not pick up the body, but leaves a limb in position to be run over by a wheel.

J. J. Kuhn, representing the Coney Island & Brooklyn Railroad, asked for time to confer with the engineers of the company.

W. S. Menden, chief engineer of the Brooklyn Rapid Transit Company, understood that the recommendations contained in the report were the things desired by the commission. Commissioner Maltbie pointed out that the report was not final, and that the commission would not take action until the companies had presented their side of the case. Mr. Menden said that the operating conditions in Brooklyn as to cars and track differed very much, as they ran from the smallest single-truck to the largest double-truck cars over the bridges, paved streets with girder rail, on unpaved roadways with T-rail, on steam railroad track, etc., hence it was difficult to determine whether a wheelguard would be practicable. His company had experimented with wheelguards some years ago, and at that time found them impossible to operate. He, therefore, desired that the commission would give the Brooklyn Rapid Transit Company at least 30 days more to consider this question. Commissioner Maltbie wanted to know why the company had not been experimenting within the last few years. Mr. Menden said that his company could not operate the guards on account of irregularity of paving, and that in some parts of Brooklyn the wheelguards would be torn off on account of interlocking rails and other causes. As to fenders, the company also had a number of objections to them, although it had installed what it considered the best available. Commissioner Maltbie said the commission well understood that nothing is ideal. He did not agree with Mr. Menden that the hearing should be adjourned for 30 days, as the company was no doubt informed of the tests and had had time to look around for available devices.

Mr. Menden could not promise that he would be prepared with all the facts in less than 30 days, as in all probability it would be necessary to try out a number of

the devices under the different conditions existing on the various lines. Commissioner Maltbie inquired whether the company was not already in possession of the necessary data on clearances throughout the system, and Mr. Menden said that it was, but that actual trials were necessary to determine unforeseen obstructions. He said that there would be no objection to the installation of fenders if the commission approved the type used by the Brooklyn Rapid Transit Company. Commissioner Maltbie wanted to know why the company had not submitted this fender for trial at Schenectady. Mr. Menden said he had understood that only manufacturers were invited to submit their devices. Unfortunately, their fender manufacturer died a few months ago. The company was willing to put on anything that should be found practicable, but the conditions are peculiar in Brooklyn, and he thought that he ought to be given more time on the question of wheelguards. This fender was as satisfactory as any with which the company was acquainted. Mr. Maltbie said that the commission had not decided to what tests it would confine itself. Mr. Menden requested that the commission look into the accident record of his company to learn about the effectiveness of its fender. He added that an order for the application of fenders would not be satisfactory to the company unless it was for the one it was now using.

G. B. Hanavan, representing the New York & Queens County Railway Company, said that the operating conditions on his company's lines are similar to those of the Brooklyn Rapid Transit lines operated in Queens County as regards unpaved streets and irregular paving. His company installed less than two years ago the Sterling-Meaker fender, which obtained a rating of 76.8 per cent in the commission's tests. He did not question the necessity of a fender, and in view of the record made at the commission's own trials, he saw no reason for displacing the type now in service. As to wheelguards, that was a fairly debatable question, in connection with which he desired time to study the matter of paving and other obstructions. The report of the sub-committee on tests showed that it was aware of objections of this character. In general, he could say that his company had acquiesced in the commission's fender order in advance. Commissioner Maltbie stated that in considering the question of fenders in use, authenticated trials in service would receive due credit, further examination being made only if considered necessary. Mr. Hanavan also represented the Long Island Electric Railway Company, and pointed out that this road had a peculiar condition, inasmuch as the larger part of the line is in the territory under the jurisdiction of the Public Service Commission, Second District. It seemed to him that some co-operation was desirable between the two commissions, so that the orders made by one would be acceptable to the other.

C. L. Addison, vice-president of the Ocean Electric Railway Company, said that the 19 cars operated by his company were all equipped with the Consolidated car fender, which his company considered a first-class device. In addition, the cars are equipped with fixed wheelguards made up of plain boards. As the fender used had received a rating of 78.2 per cent at the commission's tests, he did not think that it would be fair to have the commission order this design displaced, neither could the company afford to purchase new fender equipment. Commissioner Maltbie said that the companies would be asked to submit their designs after the order is issued, and action will be taken in accordance with the recorded performances of the fenders. Wheelguards will be taken up later.

In concluding the session, Commissioner Maltbie said that it was not a question of approving one design, nor even of demanding a certain percentage. The discussion on safety devices for the companies represented at this meeting was then adjourned to 3:30 p. m., Thursday, Feb. 11.

FRIDAY'S SESSION

At Friday's session A. H. Larkin appeared as counsel for the Staten Island Midland Railway and the Richmond Light & Railroad Company. Mr. Larkin stated that the companies he represented were using a type of fender (Providence) which had received 78.2 per cent in the report of the commission's sub-committee on accidents. Consequently, he thought that his companies were in the right so far as fenders were concerned. The wheelguard would be of small service on most of the system, owing to the track conditions; nevertheless, the companies fully appreciated that the inquiry of the Public Service Commission was along lines of benefit both to the public and the railroads. It was merely a question of whether wheelguards would be such a substantial, additional benefit that the commission would be justified in ordering the Staten Island companies to place them on all the cars.

Commissioner Maltbie asked if the automatic track wheelguard, which drops on the track, would not be the best. Mr. Larkin thought it would, as such wheelguards can normally be carried with the same clearance above the rails as the other parts of the equipment.

The next witness was Thomas J. Mullen, superintendent of the same railways. He said that in four years' operation of these lines he knew of only three cases where bodies struck by cars had passed under the fender and were caught by the trucks. He did not know the total number of accidents during this period. The companies owned about 230 car bodies and 200 equipments. It would cost about $6,000 to equip all of the cars, as he did not think it good policy to attempt changing wheelguards from one car to another. During the winter the company operates about 58 cars. Mr. Mullen said he was not familiar with the amounts paid out for personal injury suits. Commissioner Maltbie asked if he did not think an expenditure of $6,000 was justified, even if it resulted in saving only one life a year. Mr. Larkin replied to this question by stating that it was the policy of his companies to do everything possible to make operation safe and reduce accidents. If, in the judgment of the commission, the possible reduction in accidents would justify the installation of wheelguards, they would cheerfully install them. He had no further testimony to offer, as Mr. McLimont had treated the whole matter very fairly in the report of the sub-committee. He was free to admit that wheelguards afforded extra safety in paved streets, but it was doubtful if they would do so on country roads, especially in winter, on account of snow and ice.

Mr. McLimont said that the snow and ice trouble could be obviated by turning the trip gates up where the track is thus obstructed. Automatic wheelguards are successfully used in Canada under such conditions.

A new device has recently been introduced on the tramway system at Rebensburg, which is intended especially to reduce the wear of the trolley wire on curves. By means of special tools a sheath of hard copper sheet, 1 mm in thickness, is pressed round the trolley wire in lengths of 1 m, so that the seam is on the upper side. These sheaths can easily be renewed when they are worn through.

TOPICS PROPOSED FOR DISCUSSION AT THE 1909 CONVENTION

At the recent meeting in New York of the committee on subjects of the American Street & Interurban Railway Association, William A. House, president, United Railways & Electric Company, Baltimore, one of the members of the committee, submitted to the committee a series of suggested topics, which was prepared by him after consulting with the heads of his various departments. The list is so comprehensive that it will be impossible for the various associations to take up all of the subjects suggested, but the material furnished was of great value to the committee and contains a number of topics which will, no doubt, be considered at future meetings. The list follows:

ROAD DEPARTMENT

1. Concrete Track Construction:

Is it advisable to go extensively into this form of track construction in view of the following conditions?

1. Its enormous cost, together with the fact that it is still in its experimental stages.

2. Its providing such a permanent foundation for the track structures as to make it exceedingly difficult and expensive to adapt the tracks to new conditions which are constantly being brought about by the city in connection with the construction of sewers and the laying of improved paving, etc.

2. Corrugated Rail:

We are experiencing more and more difficulty with the corrugation of girder rail in city streets and we think that the various arguments and explanations which have been advanced supposedly to elucidate the causes of this particular kind of rail depreciation are not thorough, conclusive or convincing, as this corrugation seems to take place under all conditions of track construction, at least in so far as we are now advised, wherever and however located, on curved as well as straight track alignment, and under both light and heavy equipment, when operated at either low or high speed.

3. Track Pit Construction:

The merits of girder rail as compared with T-rail track construction for pits.

4. Preservation of Timber:

Is it not advisable to prolong the life of ties and poles by the use of some of the numerous wood preservatives now on the market?

5. T-Rail in City Streets:

This type of track construction is a most important question, especially for electric railways operating in the smaller municipalities, and is one which, in our opinion, will receive more careful consideration and be more universally adopted in the future in the small and large municipalities, as its value on account of lowness of first cost, as well as subsequent maintenance, becomes more generally appreciated.

6. Improved Joints:

There are a number of appliances now on the market for giving more stability to rail joints, among the most prominent of which are the "Continuous," the "Atlas," the "Cox" and the "Weber" rail joints.

The following methods of welding the ends of the rails are also extensively used:

Electric welding.
Cast welding.
Thermit welding.

From our experience with all of the above methods of improved ways of keeping up track joints we have found electric welding the most satisfactory.

MOTIVE POWER DEPARTMENT

7. Purchase of Coal:

The advisability of purchasing coal in the open market on contract to supply a given amount daily, instead of contracting for same to be furnished under strict specifications limiting the amount of ash, fixed carbon, volatile carbon and moisture.

A number of large consumers follow the former method while others follow the latter, each considering theirs the better one.

8. Reinforcement of Iron Street Poles with Concrete and Steel Filler to Strengthen Against Corrosion at Street Level:

Several companies have adopted the method of putting steel rods in poles, then filling them with concrete (forming reinforced concrete filler), to save scrapping them and replacing with new ones. This has also been done to stiffen poles to enable them to stand strains put on them by feeders at street corners where the feeders make turns.

9. Concrete Pole:

The reinforcement of concrete has now reached a stage where it is possible to construct poles of sufficient strength to stand the side strains imposed on them by overhead construction and yet maintain sightliness of construction.

A number of companies have such poles in use and their experience would be interesting.

SHOPS DEPARTMENT

10. Reporting Accidents and Defects of Equipments:

Many accidents are not reported by crews or workmen, as they consider them of such a slight nature as not to be worthy of attention, and no report being received, the proper repairs cannot be made.

This is a very serious mistake. One of the large Eastern steam railroads (B. & O.), on looking closely into this matter, found that the amount of money expended by it daily due to this cause alone was $10,000. In nearly all the cases looked into had a report been made the outlay would have been avoided.

11. A Department of Statistics:

An operating department especially should be in possession of the performance of all materials that are being handled, as the cost per car-mile of the various items used is the only and final basis for obtaining a knowledge of what is being done. To do this requires quite an elaborate statement into which they are unable to go on account of the more pressing work of carrying on the routine of the department. Does this pay?

12. When Should Apparatus Be Withdrawn from Service and Scrapped on Account of Excessive Repairs.

The cost of maintaining apparatus in operating condition for one or two years is often so excessive as to represent an outlay equal to the first cost of new apparatus. Of course, this is an extreme condition, but conditions more or less similar are continually met with, and it becomes a question that should be thoroughly gone into.

CLAIM DEPARTMENT

13. The Claim Department and Its Relation to the Operating Department:

Reasons:

a—The importance of all accidents being reported promptly to the Claim Department.

b—The importance of co-operation between the Operating and the Claim Departments in all matters relating to accidents.

c—The opportunities afforded the Claim Department by learning the causes of many accidents and suggesting a remedy to the Operating Department for its consideration.

d—The importance of having the employees of the Claim Department report to the Operating Department any infraction of the rules by employees of the latter department which may come under their observation and which may lead up to an accident.

14. The Unreported Accident, Its Evil and Remedy:

Unreported accidents:

Conductors fail to report accidents because:

a—They do not think it is necessary.

b—They do not want to take the time to make the report.

c—Because the people say to the conductors they are not injured and the first heard from them is through an attorney or suit.

The evil:

a—The Claim Department is in the dark as to whether the claim is based upon a real accident or fake.

b—The difficulty of making proper investigation.

c—Lack of defense which enables the plaintiff to recover a verdict in cases which if properly defended might result in a verdict for the defendant.

The remedy:

How to eliminate this character of accidents is a matter on which it is felt every Claim Department will be glad to hear a free and full discussion.

TRANSPORTATION DEPARTMENT

15. Weekly Bulletins to Platform Employees:

Giving them fuller knowledge of their work so as to raise them to a higher standard of efficiency.

16. Employees' Savings Department:

Does it not encourage men to save and prolong their stay with a company, since as soon as they have accumulated sufficient savings they are enabled to invest in a home near their place of employment and thus take a greater interest in the success of the company by reason of the fact that they feel they are more closely identified with it?

17. Photograph Indentification:

To protect against "floaters" or discharged men who obtain employment under assumed names.

18. Rearranging Car Routes:

Is it advisable to change long-established routes, and what is the effect of such change on traffic?

19. Regulating Traffic:

Requesting shoppers to do their buying earlier, and the baseball managers to hold their games earlier in the afternoon, so as to relieve the rush-hour service.

PURCHASING AGENT

20. Accounting of the Purchasing Department:

Which is the more advantageous way for this to be done, in the department itself or in the Auditing Department?

21. Should the Purchasing Agent Also Be the Storekeeper?

With some companies such an arrangement is in effect, whereas with others the two positions are separated. Which is the more advantageous, and why?

In connection with this subject would say the purchasing agent of one of the largest railway systems in the country (Boston Elevated) made the remark at the last convention that he considered he saved money for his company by devoting all his efforts to the matter of purchases and having nothing whatever to do with the keeping of stores.

22. Sub-Storerooms:

Are they advisable, and if so, should they be operated under the jurisdiction of the main storeroom, or else be under the control of the head of the department to which they are attached?

ACCOUNTING DEPARTMENT

23. Bill Form—Advantage or Disadvantage:

Has the bill form which has been advocated and adopted by some street railway companies and other large corporations proved of advantage or disadvantage? In either case give reasons.

24. Head of Accounting Department:

Is the head of the Accounting Department of a street railway simply a recorder of figures, showing certain results and facts, or should he be generally informed on physical conditions of the road, and what should be his relationship with the heads of the operating departments?

CASHIER'S DEPARTMENT

25. Transfer Advertising:

Will greater benefit be derived from sale of the privilege or from their use for advertising your own parks, other attractions, etc.?

(This company uses it for its own purposes.)

26. Employee Tickets:

Does the abuse of employee tickets in the shops, power, track and overhead line departments justify an increase in wages equivalent to the allotment of tickets per diem in order to discontinue their use?

27. Conductors-Receivers' Department:

Insuring correct returns being made by conductors and their confidence in receivers' reports.

This is requested so as to establish if possible a system of forms and methods better than those now in use.

INSURANCE DEPARTMENT

28. Insurance of Railway Properties:

Methods employed for minimization of fires and protection of properties.
Experience of companies in the adjustment of losses.
Results attained in securing satisfactory rates.
What can be done to secure closer relationship between the assured and the insurance companies for securing better rating and prompt settlement of losses?
Would the valuation placed upon property by a standard appraisal company prior to a fire be of benefit to a railway company in the adjustment of a loss?
Do insurance companies accept their valuations, and what has been the experience of railway companies who have had their property so appraised?

GENERAL

29. Draw Distinction Between Operating and Maintenance Expenses and Depreciation:

It would be desirable to know in this connection what is the position to be taken by the management of a large street railway in ascertaining the depreciation on its equipment, tracks, overhead and machinery, and what, if any, provision is to be made for same out of its earnings.

30. What Should Be the Relationship Between a City Government and a Public Service Corporation, with Respect to Taxation, Where the Corporation Pays to the City, in Addition to the Usual Tax on Stock and Real Estate, a Certain Percentage of Its Gross Receipts, and Is a Means of Building Up the Taxable Basis of the City, by Reason of the Extension of Its Lines Into Undeveloped Sections, Which Lines Are Operated at a Loss?

31. Is a Large Street Railway System, Which Has a Number of Suburban Lines Reaching All of the Principal Suburban Towns and Villages Within an Area of Twenty Miles, Justified in Operating Its Own Express Business, or Would It Be Preferable to Lease the Privilege to an Express Company?

32. Standardizing and Adopting Uniform Statements and Reports Issued by the Various Departments of a Street and Suburban Railway Company for the Information of Its President and General Manager.

HISTORY OF THE TWIN CITY RAPID TRANSIT COMPANY

The three concluding full-page newspaper advertisements containing the history of the Twin City Rapid Transit Company, of Minneapolis, Minn., were published on Jan. 30 and Feb. 1 and 2. The advertisement of Jan. 30 compares the street railway mileage, area and population of 12 cities in the United States and Canada of the same class as Minneapolis. Minneapolis has the largest area of any of the 12 cities with which it is compared and has less people per square mile of area. A table is published to show that the Minneapolis Street Railway Company serves a larger area with less population per square mile than any other street railway in any city of its class in the United States and Canada, and it claims to give the people of Minneapolis a street railway service for a 5-cent fare which is unexcelled. The growth of the street railway system is summarized as follows: In 1875 Minneapolis had an area of 11.5 square miles and a total mileage of 2.5 miles. In 1909 the area of Minneapolis is 53 square miles, or 4.6 times its area in 1875. The mileage of the street railway system, on the other hand, has grown to 156 miles, or 62.3 times its mileage in 1875.

The advertisement which appeared in the papers of Feb. 1 was entitled, "Cost of Construction and How the Money Was Raised." The point was emphasized that very large expenditures have been occasioned in the past by reason of the obsolescence of the early types of equipment through the advancement of the art of street railway transportation and by the requirements of the city. It is pointed out that expenditures for improvements and reconstruction are necessarily a part of the capital of street railway enterprises during the years of their development and remain a valid part of the capital in the final development of the system. To demand that these successive investments of new capital put into the property for improvements be wiped out would be confiscation. The methods of raising money through giving of bonuses to investors is defended on the ground that the method was compulsory, for the development of the country was dependent upon it, and the results, in all fairness and justice, must be accepted. The present conditions in well-settled communities are better. For more than 15 years all the stock issued by the Minneapolis Street Railway Company has been sold at par for cash.

The concluding advertisement, dated Feb. 2, is a brief summary of the previous articles. From the primitive horse car line in 1875 the property of the company has been developed to its present state of efficiency, and each stage of the development has called for expenditures of large sums of money in excess of earnings from operation. For 24 years, or up to 1899, not a dollar was paid in dividends, and since 1899 the dividends have ranged from 2½ per cent to 5 per cent. The physical condition of the property is second to none in the country. There is no city in the world of a comparative population or area where a greater return is received for fare paid than in Minneapolis. Attention is called to the fact that the average wage scale of trainmen throughout the country is 20 per cent lower than is paid in Minneapolis, and the company considers its high wage scale is necessary and that it should be continued. All items entering into the construction and maintenance of equipment and roadway have increased in cost during the past 10 years from 50 to 125 per cent. The 5-cent piece, however, has grown no larger.

The company states as its opinion that it is a certainty that new lines cannot be built, extensions cannot be made and other improvements carried on for anything less than a straight fare of 5 cents, with transfers. Reductions in fare will inevitably mean reduced wages and lower efficiency of employees, as well as reduce service, evidenced by the poor appearance and condition of cars, track and roadway. During the past 10 years, the company has spent for betterments an average of $1,000,000 per year. During the next 5 or 10 years developments and improvements may make it necessary to expend even larger sums of money if the company is to maintain its position as one of the best street railway companies in the world. The final advertisement concludes with this statement: "Should any question be raised as to the rate of fare (which is the foundation of our business and the basis of all our calculations as to revenue) it would be evident that the company cannot make definite plans for the future and will encounter serious difficulty, if not absolute defeat, in its efforts to finance future betterments. We submit our record of 33 years as indicating a broad-gage and progressive policy in the community. We want to be enabled to continue it."

THE 1908 PROCEEDINGS OF THE ENGINEERING AND THE TRANSPORTATION & TRAFFIC ASSOCIATIONS

The secretary of the American Street & Interurban Railway Association has just issued in an imposing volume of about 900 pages the combined proceedings of the Engineering and the Transportation & Traffic Associations. The divisions of the volume devoted to each organization bear as frontispieces splendid sepia portraits of Presidents Simmons and Allen. The makeup of the articles and the appearance of the text and illustrations are all that could be desired. The volume is separately indexed and so thoroughly that any part of the proceedings, whether in the papers or discussions, can be found very readily. This book alone is worth far more than the $5 associate membership fee required to get it to all interested in electric railway work and for that reason it should prove quite potent as an inducement to those who are considering joining the association.

COMMITTEES OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

President A. A. Anderson, of the Central Electric Railway Association, has appointed the following committees for the year 1909:

STANDING AUDITING COMMITTEE

M. W. Glover, auditor (chairman), Ohio Electric Railway;
A. F. Elkins, auditor, Columbus, Delaware & Marion Railway;
Walter Schroyer, auditor, Indiana Union Traction Company.

RULES AND REGULATIONS GOVERNING ANNUAL TRANSPORTATION

Geo. Whysall, general manager (chairman), Columbus, Delaware & Marion, Railway;
W. S. Whitney, general passenger agent, Ohio Electric Railway;
H. A. Nicholl, general manager, Indiana Union Traction Company;
F. W. Brown, general freight and passenger agent, Michigan United Railways;
J. O. Wilson, general passenger agent, Cleveland, Southwestern & Columbus Railway.

CLAIMS COMMITTEE

E. C. Carpenter, claim agent (chairman), Indiana Union Traction Company;
J. M. Boyer, claim agent, Ohio Electric Railway;
F. R. Fahlsing, claim agent, Fort Wayne & Wabash Valley Traction Company;
Chas. A. Floyd, claim agent, Chicago, Grand Rapids & Holland Railway;
F. W. Wakeman, claim agent, Northern Ohio Traction & Light Company.
A. L. Neereamer, secretary.

FINANCE COMMITTEE

C. N. Wilcoxon, general manager (chairman), Cleveland, Southwestern & Columbus Railway;
Geo. Whysall, general manager, Columbus, Delaware & Marion Railway;
W. G. Irwin, president, Indianapolis, Columbus & Southern Traction Company;
H. E. Vordermark, auditor, Fort Wayne & Wabash Valley Traction Company;
F. D. Norviel, general passenger and freight agent, Indiana Union Traction Company.

INSURANCE COMMITTEE

H. M. Staats, manager (chairman), American Insurance Company;
F. W. Coen, general manager, Lake Shore Electric Railway;
H. P. Clegg, president, Dayton & Troy Electric Railway.

LIGHTNING ARRESTER COMMITTEE

W. E. Ralston, superintendent power and shops (chairman), Cleveland, Southwestern & Columbus Railway;
Chas. F. Turner, superintendent motive power, Columbus, Delaware & Marion Railway;
F. E. Cole, superintendent, Louisville & Northern Railway & Lighting Company;
H. S. Dickey, general superintendent, Winona Interurban Railway;
C. J. Ferneding, general manager, Dayton & Xenia Transit Company;
Fred Hecklar, master mechanic, Lake Shore Electric Railway;
F. D. Bundy, master mechanic, Ohio Electric Railway;
M. M. Baxter, electrical engineer, Western Ohio Railway;
G. H. Kelsay, superintendent of power, Indiana Union Traction Company;
M. J. Kehoe, electrician, Fort Wayne & Wabash Valley Traction Company.

UNITED STATES MAIL, COMPENSATION FOR HANDLING

H. A. Nicholl, general manager (chairman), Indiana Union Traction Company;
F. W. Brown, general freight and passenger agent, Michigan United Railways;
Geo. Whysall, general manager, Columbus, Delaware & Marion Railway.

PUBLICITY COMMITTEE

Geo. S. Davis, editor (chairman), *Electric Traction Weekly;*
L. E. Gould, Western editor, Electric Railway Journal;
E. B. Grimes, vice-president, Ohmer Fare Register Company.

RULES BOOK COMMITTEE

C. N. Wilcoxon, general manager (chairman), Cleveland, Southwestern & Columbus Railway;
F. D. Carpenter, general manager, Western Ohio Railway;
F. W. Coen, general manager, Lake Shore Electric Railway.

STANDARDIZATION COMMITTEE

R. C. Taylor, superintendent motive power (chairman), Indiana Union Traction Company;
Fred Hecklar, master mechanic, Lake Shore Electric Railway;
M. M. Baxter, electrical engineer, Western Ohio Railway;
W. E. Ralston, superintendent power and shops, Cleveland, Southwestern & Columbus Railway;
L. W. Jacques, master mechanic, Fort Wayne & Wabash Valley Traction Company;
H. D. Murdock, superintendent, Indianapolis & Louisville Traction Company;
L. M. Clark, master mechanic, Terre Haute, Indianapolis & Eastern Traction Company;
R. N. Hemming, assistant superintendent, Ohio & Southern Traction Company.

SUBJECT COMMITTEE

C. C. Reynolds, general manager (chairman), Terre Haute, Indianapolis & Eastern Traction Company;
A. J. Purinton, general manager, Toledo & Chicago Interurban Railway;
H. U. Wallace, general manager, Chicago, Lake Shore & South Bend Railway;
L. J. Drake, Jr., Galena-Signal Oil Company;
F. W. Brooks, general manager, Detroit, Monroe & Toledo Short Line;
W. A. Carson, general manager, Evansville Railways Company.

SUPPLY COMMITTEE

J. F. Ohmer, president (chairman), Ohmer Fare Register Company;
L. J. Drake, Jr., Galena-Signal Oil Company;
S. D. Hutchins, Westinghouse Electric & Manufacturing Company;
W. H. Bloss, Ohio Brass Company;
H. C. Marsh, General Electric Company.

TRAFFIC COMMITTEE

W. S. Whitney, general passenger agent (chairman), Ohio Electric Railway;
F. D. Norviel, general passenger and freight agent, Indiana Union Traction Company;
J. H. Crall, general passenger and freight agent, Terre Haute, Indianapolis & Eastern Traction Company;
A. E. Klauser, general manager, Toledo, Port Clinton & Lakeside Railway;
F. I. Hardy, superintendent transportation, Fort Wayne & Wabash Valley Traction Company;
J. F. Starkey, district passenger and freight agent, Indiana Union Traction Company;
C. C. Collins, traffic manager, Western Ohio Railway;
Geo. S. Henry, traffic manager, Indianapolis & Cincinnati Traction Company;
C. C. Trees, auditor, Kokomo, Marion & Western Traction Company;
M. J. Insull, general manager, Louisville & Northern Railway & Lighting Company.

TRANSPORTATION COMMITTEE

T. F. Glover, general manager (chairman), Terre Haute, Indianapolis & Eastern Traction Company;
E. L. Schmock, assistant secretary, Cleveland, Painsville & Eastern Railroad;
H. C. Warren, general manager, Toledo & Indiana Railway;

R. W. Reynolds, general superintendent, Chicago, South Bend & Northern Indiana Railway;
C. F. Smith, general manager, Toledo, Urban & Interurban Railway.

VIGILANCE AND MEMBERSHIP COMMITTEE

C. D. Emmons, general manager (chairman), Fort Wayne & Wabash Valley Traction Company;
R. W. Hunter, Poole Bros.;
C. R. Button, Telegraph Signal Company;
R. G. Cummins, general manager, Marion, Bluffton & Eastern Traction Company;
Chas. Currie, general manager, Northern Ohio Traction & Light Company;
F. J. Green, general manager, Springfield, Troy & Piqua Railway.

LIMITED TRAINS BETWEEN EVANSTON AND MILWAUKEE

On Feb. 8 the Chicago & Milwaukee Electric Railroad placed in service the first of its three-car limited parlor-buffet trains, which will operate between Milwaukee, Wis., and Evanston, Ill., connecting at the latter city with the Northwestern Elevated service into Chicago. Nine new cars have been especially built for this parlor-car train service by the Jewett Car Company and the first of the trains was thrown open to inspection at Evanston on Feb. 6 and at Milwaukee Feb. 7. The general public was extended an invitation to inspect the train, and as a result there was at Evanston a continuous file of visitors passing through the train from front to rear during the three hours the train was exhibited.

The through service between Evanston and Milwaukee is made possible by the completion on Oct. 31, 1908, of the



Chicago-Milwaukee Limited Train in Terminal Station at Evanston

double-track Wisconsin division of the Chicago & Milwaukee Electric Railroad from Racine to Milwaukee. The company now has a well-built double-track road 72.8 miles in length over which it will give service between its Evanston terminal, where connection is made with the Northwestern Elevated into Chicago, and its Milwaukee terminal, which is located at Second Street and Grand Avenue, close to the business center of the city. From North Chicago Junction to the Milwaukee City limits the roadway is so located and built that trains can be operated at very high speeds. In this 41-mile section of double-track road the total curvature is but 76 deg. and no curve is sharper than 1 deg. Except for one grade of 1 per cent the maximum grade between Waukegan and Milwaukee is 0.5 per cent. The track is laid with 80-lb. rails and is well ballasted with stone and gravel. To obtain this exceptionally low grade a very large amount of earth handling was necessary. There are several cuts of more than 225,000 cu. yd. and one fill of 500,000 yd. The longest cut is 8000 ft. and the largest fill is 7000 ft. long.

The new equipment, which is being put into the limited service between Evanston and Milwaukee, includes three combination passenger, smoking and baggage cars, three passenger coaches and three combination parlor-café observation cars. In the ELECTRIC RAILWAY JOURNAL of Oct. 3, 1908, a floor plan was presented showing the seating arrangement of these three types of cars as coupled for train service. The head car of the three-car trains is divided into three compartments: At the front is a baggage room with wooden drop seats; next is a smoking compartment seating 16, and the rear half of the car is a passenger compartment seating 26. A toilet room is built against the middle bulkhead. The middle car is undivided and seats 54 passengers. It is provided with a toilet room at the rear. Except in the smoking compartment, where green leather is used, the seats in the two forward cars have mahogany arm rests and are upholstered in green plush. The baggage compartment is finished in "mission" style. Rubber aisle mats are used.

The rear car is divided into two compartments. One compartment seats 7 and the other seats 20. The seats in this parlor car are wicker chairs with green leather cushions and trimmings. The floor is covered with a thick green carpet. In fact, the general tone of all the interior decorations with the exception of the rich mahogany woodwork is green. The facilities for serving meals in the parlor car are most complete. Provision is made for serving 12 at one time on tables which may be attached to the sides of the car between the comfortable portable chairs. The cook has an enclosed kitchen fully equipped with utensils and alcohol stoves. Two toilet rooms are provided, each of which has a Duner flush hopper and a wash basin with running water. It is proposed to give a complete buffet service and neat four-page menu cards, one for each meal, are to be distributed. The menu cards exhibit a wine list and on the last page is a map of the route over which the trains operate.

The cars for this new train service are each 52 ft. 6 in. long over all and are built with center sills extending from buffer to buffer. The side platform sills of steel extend back under the cars to form the top side bearings. Each car is mounted on two Baldwin trucks with rolled-steel wheels, Symington journal boxes and carrying four GE-73 motors per car. A locomotive type pilot is mounted on each truck. All cars are arranged for double-end service and have type M control and Westinghouse automatic air brakes. An extra swinging door is arranged so that when the control and the brake valves are not in use they may be completely enclosed. If this end of the car forms the head end of the train the door is swung open and fastened against the bulkhead to form a cab for the motorman. Some of the special equipment on these cars includes Curtain Supply Company fixtures; O. M. Edwards balanced sash window fixtures; Knutson trolley retrievers; Ohmer registers; Van Dorn couplers; Q & C steps, and Peter Smith heaters.

Four limited trains of three cars each will be operated each way during the day. The running time for the 73-mile ride between Evanston and Milwaukee will be 2 hours and 15 minutes. Three trains will be required to fulfil this special limited service. Fourteen local trains each way make the run in 2 hours and 45 minutes. Between Evanston and Waukegan over the south half of the line there is a 15-minute headway. The cash-fare rate is a little less than

2 cents per mile. From Evanston to the Milwaukee city limits, 69 miles, the one-way fare is $1.20. The local fare in Milwaukee is 5 cents. Round-trip tickets are sold at a reduction over one-way tickets. The following table shows the rate at which round-trip tickets good returning within 30 days are sold:

Where ticket fares are		Chartered car rates are		Where ticket fares are		Chartered car rates are	
One way	Return	One way	Return	One way	Return	One way	Return
$0.05	$0.10	$10.00	$15.00	$0.60	$1.10	$25.00	$43.00
.10	.20	10.00	15.00	.65	1.20	27.00	47.00
.15	.25	10.00	15.00	.70	1.25	29.50	50.00
.20	.35	10.00	15.00	.75	1.30	31.50	54.00
.25	.40	10.50	18.00	.80	1.40	33.50	58.00
.30	.50	13.00	22.00	.85	1.50	35.50	61.00
.35	.60	15.00	25.00	.90	1.60	37.50	65.00
.40	.70	17.00	29.00	.95	1.70	39.50	68.00
.45	.80	19.00	32.50	1.00	1.75	42.00	72.00
.50	.90	21.00	36.00	1.05	1.80	44.00	76.00
.55	1.00	23.00	40.00	1.10	1.90	46.00	80.00

These car rates are for maximum load of 60 passengers, and conductors will collect regular rates or tickets for each passenger in excess of 60.

A charge of $5 is made for each hour that the car is used beyond the limits of the published time card. If a car is kept waiting at any point along the line an additional charge of $1 per hour is made.

On account of the excellence of the new through-train service an additional fare varying from 5 cents to 25 cents, according to the mileage, is collected by the conductor. Including this charge, the through fare from Chicago to Milwaukee is 60 cents less by the electric line than by steam. It is stated in the time card that the payment of such excess fare does not entitle a passenger to a seat in the café-parlor car to the exclusion of those who wish to patronize the café service.

COMMITTEES OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

President C. Loomis Allen, of the Transportation & Traffic Association, has announced the organization of a number of the committees of that association. Following the plan adopted by the association, the members of the committees on the training of employees and that upon interurban rules are divided into classes, so that the terms of all do not expire at the end of the year. In the latter case the committee is made up of six members, three of which go out of office at the end of each year, but in the case of the committee on training of transportation employees the appointment is for three years and the terms of office of two members expire during the year. The names of the committees appointed follow:

COMMITTEE ON TRAINING OF TRANSPORTATION EMPLOYEES

One Year

J. W. Brown (chairman), superintendent, West Penn Railways Company, Connellsville, Pa.;

W. R. W. Griffin, superintendent, Rochester Railway Company, Rochester, N. Y.

Two Years

F. S. Cummins, general manager, Inter-Urban Railway Company, Des Moines, Ia.;

C. D. Emmons, general manager, Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.

Three Years

C. E. Learned, superintendent inspection, Boston Elevated Railway, Boston, Mass.;

W. H. Douglass, general superintendent, Northern Ohio Traction & Light Company, Akron, Ohio.

COMMITTEE ON INTERURBAN RULES

One Year

J. N. Shannahan (chairman), vice-president and general manager, Washington, Baltimore & Annapolis, Baltimore, Md.;

F. D. Carpenter, general manager, Western Ohio Railway Company, Lima, Ohio;

J. E. Duffy, superintendent, Syracuse Rapid Transit Railway Company, Syracuse, N. Y.

Two Years

H. E. Chubbuck, general manager, Illinois Traction System, Champaign, Ill.;

Howard F. Grant, Stone & Webster, Boston, Mass.;

H. A. Nicholl, general manager, Indiana Union Traction Company, Anderson, Ind.

COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC

G. W. Parker (chairman), general freight agent, Detroit United Railway, Detroit, Mich.;

E. H. Hyman, manager, Electric Package Company, Cleveland, Ohio;

A. Eastman, general express and passenger agent, Utica & Mohawk Valley Railway Company, Utica, N. Y.;

L. E. Fischer, vice-president, Illinois Traction System, Danville, Ill.;

P. P. Crafts, general manager, Iowa & Illinois Railway Company, Clinton, Ia.;

C. V. Wood, traffic manager, New England Investment & Security Company, Springfield, Mass.

COMMITTEE ON PASSENGER TRAFFIC

M. C. Brush (chairman), vice-president and general manager, Newton Street Railway Company, Newtonville, Mass.;

Franklin Woodman, general manager, New Hampshire Electric Railways, Haverhill, Mass.;

E. F. Peck, general manager, Schenectady Railway, Schnectady, N. Y.;

F. W. Coen, general manager, Lake Shore Electric Railway Company, Cleveland, Ohio;

W. S. Whitney, general passenger agent, Ohio Electric Railway Company, Cincinnati, Ohio;

J. R. Pratt, Indianapolis Traction & Terminal Company, Indianapolis, Ind.

In addition, there will be committees on transfers and transfer information and on city rules. The membership of these committees will be published when completed. The work of the association at the next convention will be confined to the reading and discussion of the reports of these six standing committees, one of which, that on transfers and transfer information, is a new committee. The work of this committee, it is believed, will be of great interest, and special study will be given to this subject.

It is expected the two committees on rules, one on city rules and one on interurban rules, will submit revised codes that will provide for recent changed conditions and will, it is hoped, give a standard book of rules for both city and interurban service that will standardize operating practice. The other subjects selected are of very timely interest, and an interesting convention for the transportation and traffic officers of the member companies of the association is practically already guaranteed.

The recently published statistics of the electric traction systems of the United Kingdom are divided into three classifications: The first covers 136 systems of tramways which obtain electricity from a combined lighting and traction station; the second table refers to tramway systems which have generating stations for traction only, there being 47 systems of this kind; the third table relates to 16 electric railways under construction. The total length of tramway track now recorded in the tables is 3843 miles, compared with 3651 miles last year. In the course of the next few months the total length of railroad track in England on which electrical working is in operation will be 411 miles.

COMMUNICATION

TRANSPORTATION OF MAIL CARRIERS

NORFOLK & PORTSMOUTH TRACTION COMPANY,
NORFOLK, VA., FEB. 4, 1909.

To the Editors:

At a meeting of the American Street & Interurban Railway Traffic & Transportation Association at Atlantic City there was considerable discussion about the prices paid for the transportation of mail by the United States Postal Department. It developed that, with the exception of a very few companies which are large enough to have established railway mail service through the streets of the city, the handling of mails is confined to electric interurban and suburban routes. I presume that the relations of many of these lines with the government are very similar to those of the steam railways, and that the price of 3 cents per mile, which would be given a company like ours, for instance, for the transportation of one or two sacks, is not increased when the number carried reaches as many as a dozen. This, then, is a matter which can be adjusted by the individual companies or by an agreement in which all the small companies who carry mail might join. The proposition which interested me at that time, but which I did not bring up, was not so much the carrying of mail as the carrying of the carriers, and after this meeting was over I sent out a circular letter, which read as follows:

At the last meeting of the Traffic & Transportation Association the question of transportation of mail carriers was up for discussion. There seem to be various methods in regard to this. Our own is as follows:

The Post Office Department in Norfolk has a certain appropriation for the transportation of mail carriers. We take this money, divided into equal monthly installments, and the carriers are permitted to ride free when in uniform with the pouch on their shoulders. There is probably some abuse of this system and there seems to be no special reason why these men should be carried below cost. With a view of correcting it, I would be glad if you would give me the method pursued by you.

We shall be glad to give you any information at any time we can serve you. Thanking you for your prompt reply, we are

Very truly yours,

This was sent out to 225 companies operating in the principal cities of the United States. In reply we got data from 189 places, a list of which is enclosed. A recapitulation of this list shows as follows:

In 134 cities no concessions at all are made, the government buying regular tickets for the postmen, or the postmen paying regular fare. In 31 cities postmen are carried under contracts similar to our own, riding on the uniform without payment of fare. In 14 places special rates are made, but the carriers are provided with tickets at these special rates. In 10 places carriers are allowed to ride without paying any fare, this being a franchise condition in most of these places.

It would seem from the above that a good many of the companies were very much in the same position as we are in at Norfolk. The Post Office Department was allowed so much money for the transportation of carriers and, by agreement with the postmaster, this money was divided into quarterly payments. The men were then permitted to ride when in uniform and on duty, without paying fare, the purpose being to facilitate in this way the work of the Post Office Department and the movement of such mail as was distributed by the carriers. The difficulty with this form of contract is the fact that in all growing towns the number of carriers is constantly being increased and that the post office authorities, having no particular interest in so doing, do not conserve the interests of the transportation companies by asking for corresponding increases in the amounts of their appropriations.

For the past few weeks we have been collecting data on this subject, and find that with 56 carriers in Norfolk we receive $1,300 per annum. The total number of rides per diem averages 279, or five rides for each carrier, hence the revenue per ride is only 1.27 cents. On the strength of this information we have decided to notify the local post office authorities that on July 1 the present contract will be cancelled and that the money in the hands of the postmaster for this transportation will have to be used in the purchase of tickets at the regular rates, which are six tickets for a quarter.

It will be noticed from the list that the most of cities in which the carriers ride free are on the Pacific Coast, and that the carriers are included in the same category as policemen and firemen. This is probably the result of a careless draft of the franchise in the first instance, as no particular benefit would accrue to the municipality because the local trolley company assumes this burden for the United States Government. For this reason it should not be difficult, if the matter was taken up with the city authorities, to have this clause in the franchise abrogated.

E. C. HATHAWAY, General Manager.

DATA ON TRANSPORTATION OF MAIL CARRIERS

Pay regular fare in the following cities:

Atlantic City, N. J.	Government buys special tickets, but pays regular rates for same.
Albany, N. Y.	Government buys special ticket at regular fare rate.
Akron, Ohio	Formerly had contract similar to ours, but canceled account of abuse.
Auburn, N. Y.	Formerly made special rate.
Augusta, Ga.	Formerly had contract.
Boston, Mass.	Government buys regular tickets on both surface and elevated.
Bridgeton, N. J.	Government buys regular tickets.
Buffalo, N. Y.	Government buys special tickets at regular rates.
Baltimore, Md.	Government buys regular tickets.
Cleveland, Ohio	Policemen and firemen also pay fare.
Covington, Ky.	Formerly had contract; canceled account of abuse.
Chester, Pa.	Government buys tickets at regular rate.
Dayton, Ohio	Government buys tickets at regular rate.
Denver, Col.	Formerly had contract. Now have special ticket which Post Office Department buys at regular rate.
Dubuque, Ia.	Straight 5-cent fare.
Duluth, Minn.	Government buys tickets at 5 cents each.
Davenport, Ia.	Government buys 5-cent tickets.
Dayton, Ohio	Government buys tickets.
Des Moines, Ia.	Government buys 5-cent tickets.
Decatur, Ill.	Government buys tickets.
Detroit, Mich.	Government wants to go back to former contract, but railway company refuses.
Fort Worth, Tex.	Sell government special tickets at regular rate, good only between 7 a. m. and 7 p. m.
Fort Smith, Ark.	Government buys regular tickets.
Fond du Lac, Wis.	Government buys regular tickets.
Fort Wayne, Ind.	Formerly had contract. Now require regular fare in Fort Wayne and all cities along lines.
Houston, Tex.	Special ticket purchased at regular rate.
Jacksonville, Fla.	Government buys regular tickets.
Joliet, Ill.	Formerly had contract.
Jamestown, N. Y.	Government buys regular tickets.
Kingston, N. Y.	Formerly had contract.
Knoxville, Tenn.	Formerly had contract.
Leavenworth, Kan.	Formerly sold half-rate tickets.
Lincoln, Neb.	Formerly had contract. Government now buys tickets.
Lynchburg, Va.	Government buys tickets.
Lewiston, Maine	Formerly had contract.
Marion, Ohio	Government buys regular tickets.
Madison, Wis.	Formerly had contract. Firemen and policemen are also charged regular fare.
Milwaukee, Wis.	Government buys tickets.
Mount Vernon, N. Y.	Special ticket at regular rate.
New Britain, Conn.	Firemen are also required to pay regular fare. Policemen ride free.
Newburgh, N. Y.	Government buys regular tickets.
Newark, N. J.	Have had contract, but are cancelling same on all lines of Public Service Corporation.
Newport News, Va.	Formerly had contract.
Pueblo, Col.	Government wants to make contract, but railway company refuses.
Peoria, Ill.	Also carry part on contract and are glad to use either system.
Paducah, Ky.	Government buys regular tickets.
Portland, Maine	Government buys regular tickets.

Peoria, Ill.....Post Office Department wants to make contract, but railway company refuses.
Providence, R. I.....Postmen formerly had 2½-cent ticket.
Rochester, N. Y.....Formerly had contract.
Salt Lake City.....Formerly sold 3-cent ticket to postmen.
Springfield, Mass.....Operate 14 lines and have contract on only one line.
Sioux City, Ia.....Formerly had contract.
St. Joseph, Mo.....Had contract at one time.
Schenectady, N. Y....Formerly had contract. Government buys regular tickets.
Springfield, Ohio.....Formerly had contract.
Springfield, Mass.....Formerly had contract.
Waterbury, Conn.....Government buys regular tickets.
Washington, D. C.....Washington Railway & Electric Company formerly had contract. Capitol Traction Company refused to make contract.
Wilkes-Barre, Pa.....Government buys regular tickets.
Wilmington, Del.....Government buys regular tickets.
Wichita, Kan.....Company refuses to make contract.
Zanesville, Ohio.....Government buys regular tickets.

The following cities have contracts with the government, whereby the government pays them a lump sum and postmen in uniform are allowed to ride free:

Allentown, Pa.....Company not satisfied with arrangement.
Atlanta, Ga.....Free riding limited to hours between 6 a. m. and 6 p. m. Company seems to be satisfied.
Altoona, Pa.....Company is satisfied—thinks it gets more out of it than if Post Office Department bought tickets.
Bangor, Maine.....Are looking up a better method of handling.
Brooklyn, N. Y.....Do not say whether satisfied or not.
Binghamton, N. Y.....Are satisfied.
Bellingham, Wash.....Twenty dollars per year per carrier until 6 p. m. Sundays not included.
Chicago, Ill.....Do not say whether satisfied or not. Chicago Railways Company.
Chicago City Railway Company is obliged to use an arrangement of this kind by ordinance.
Council Bluffs, Ia.....Limited to certain hours. Fifty-four dollars per man per year, approximately.
E. St. Louis, Ill.....Between hours of 6 a. m. and 6 p. m. Do not say whether satisfied or not.
Elmira, N. Y.....Two hundred dollars per year.
Kansas City, Mo.....Three dollars per month per carrier. Contract adjusted every two years. Seem to be satisfied.
Lancaster, Pa.....Are asking government to increase appropriation. Think they are now getting an average of 4 cents per passenger.
Minneapolis, Minn.....Get $36 per year per carrier. Expect to discontinue shortly.
Nashville, Tenn.....Deficiency in government appropriation made up by carriers. Seem to be satisfied.
Newtonville, Mass.....Are not satisfied with arrangement.
Omaha, Neb.....Five thousand four hundred dollars for 125 carriers. Are not satisfied.
Portland, Ore.....Are satisfied with arrangement.
Quincy, Ill.....Two dollars per carrier per month. Think they get more out of it than when government bought tickets.
Rockford, Ill.....Receive $750 per year. Contract just made.
St. Paul, Minn.....Thirty-six dollars per year per carrier. Expect to discontinue shortly.
San Antonio, Tex.....Don't say whether satisfied or not.
Seattle, Wash.....Not satisfied.
Springfield, Mo.....Receive $61.58 per month. Are not satisfied.
Topeka, Kan.....Receive $600 per year for transportation between 6 a. m. and 6 p. m. on week days. Not carried free on Sundays.
Terre Haute, Ind.....Receive $800 per annum. Transported between 6 a. m. and 6 p. m.
Worcester, Mass.....Want to change.
Wilmington, N. C.....Satisfied.
Wheeling, W. Va.....Want to change. Also want to take up question of increasing rates for carrying mails.

The following cities make special rates for mail carriers:

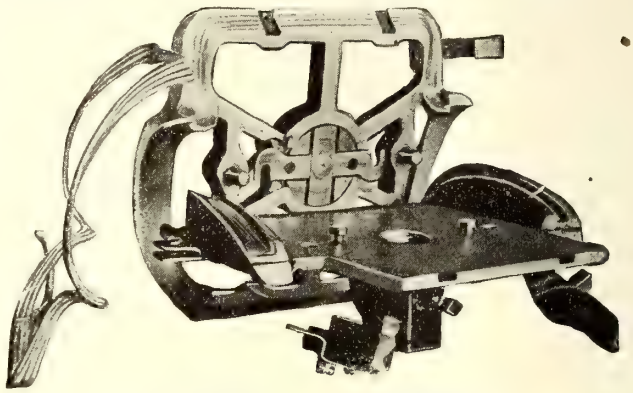
Butte, Mont.....Special ticket at 2½ cents each.
Concord, N. H.....Special ticket at 4 cents each.
Charleston, S. C.....Furnish special tickets, for which 3.68 cents each was received last year. Also carry messengers for $10 per quarter.
Harrisburg, Pa.....Three cents each.
Fitchburg, Mass.....Two and one-half cents. Limited to daylight hours.
Holyoke, Mass.....Sell tickets to government at two-thirds regular price, good for postmen in uniform.
Grand Rapids, Mich...Special ticket at special rate.
Johnstown, Pa.....Three and one-half cents each. Do not favor making the low rate.
Memphis, Tenn.....Sell tickets 11 for 50 cents. Will not make contract for lump sum.
Richmond, Va.....Special tickets at 2½ cents each.
Shreveport, La.....Sell government 3½-cent tickets.
San Diego, Cal.....Sell special ticket, good only when in uniform, for 2½ cents. Formerly had contract for lump sum.
Saginaw, Mich.....Sell tickets eight for a quarter.
Tacoma, Wash.....Sell special ticket for 4 cents each, good only for carriers when in uniform.

The following cities allow mail carriers to ride free, without compensation:

E. Liverpool, Ohio.....Compelled to do so by franchise.
Los Angeles, Cal.....Condition of franchise.
Little Rock, Ark.....Condition of franchise.
Oklahoma City, Okla..Required by franchise. Think carriers are useful to company in cases of accidents and are satisfied with arrangement.
Oakland, Cal.....Franchise condition.
Poughkeepsie, N. Y...Not a franchise condition.
Phillipsburg, N. J.....On account of mail contract with government.
Spokane, Wash.....Franchise condition.
San José, Cal.....Franchise condition.
San Francisco, Cal....Not a franchise condition. Negotiations pending for remuneration.

A SPECIAL COIL FORMER

The American General Engineering Company, of New York, in filling an order for a South American electric railway had occasion to design a rather novel factory armature coil former for a GE-58 motor. The armature coil of this motor, as shown alongside the opened former, has a peculiar bend, which cannot be obtained on coil formers of ordinary design. This bend is made on the form illustrated by means of a spring clip on one side and a pressure clamp on the other. As each turn is brought through to these side locks, the latter are opened and closed by a quick snap of the operator's thumb.



Coil Former for GE-58A Motor

An important feature, which is applicable to other designs of armature coils, is the method of locking the halves of the coil former. Usually the former is locked on the belt side by two drag-fit pins, which do not prevent the loosening of the halves when the wires in the former are being flattened with a hammer. In this design the halves are locked with a central double-hook pin which is locked or released with half a turn from the outer side through a central shaft and handle. The strain on the plate is taken by the dowel pins and not by the two screws. The former is constructed of steel bronze, with reinforcing ribs in the upper half.

MEETING CARBON BRUSH SPECIFICATIONS

At the October, 1908, convention of the American Street & Interurban Railway Association it was stated in discussing the report of the committee on maintenance of and inspection of electrical equipment that 18 per cent of railway motor troubles was due to carbon brushes. The specifications suggested at that meeting have been taken up by the Speer Carbon Company, St. Mary's, Pa., which asserts that it has produced a brush that will stand far more severe tests than those recommended.

The company's new FP brush is for railway motors, which require a hard brush to cut the mica and keep the commutator in condition. This brush is very close grained, low in resistance and, it is said, will not break or chip off. It is best adapted for railway motors that have no slotted commutators. Grade No. 300 is for motors with grooved commutators, where the mica gives no trouble. This brush is very low in resistance, carries high amperage and is medium soft, but tough. It is said to be very fine grained, dense and will not chip or break under the most severe conditions. The brush marked H is for a.c. motors, where a soft, close-grained and homogeneous brush is required. This brush is high in conductivity and will stand heavy overloads. Lamination is said to be entirely eliminated in all of these new brushes.

THE WESTINGHOUSE STORAGE-BATTERY REGULATING SYSTEM

A storage battery with an automatic regulating system forms an ideal solution of the problem of keeping a constant load on the generating system. This is automatically effected by the regulator controlling the voltage of the booster in series with the battery. This regulator in turn is controlled by the load conditions. The battery and the booster are usually placed across the line in parallel with the generator circuit, but between it and the load.

If desired to regulate an a.c. system the battery and booster are connected across the d.c. terminals of a rotary converter and the battery charges and discharges by means of a regulator controlled from the a.c. circuit. With this system either a.c. or d.c. circuits can be regulated simultaneously. In case only an a.c. circuit is to be controlled a boosted rotary can be used and the booster eliminated, using a small exciter in its place, which is controlled by

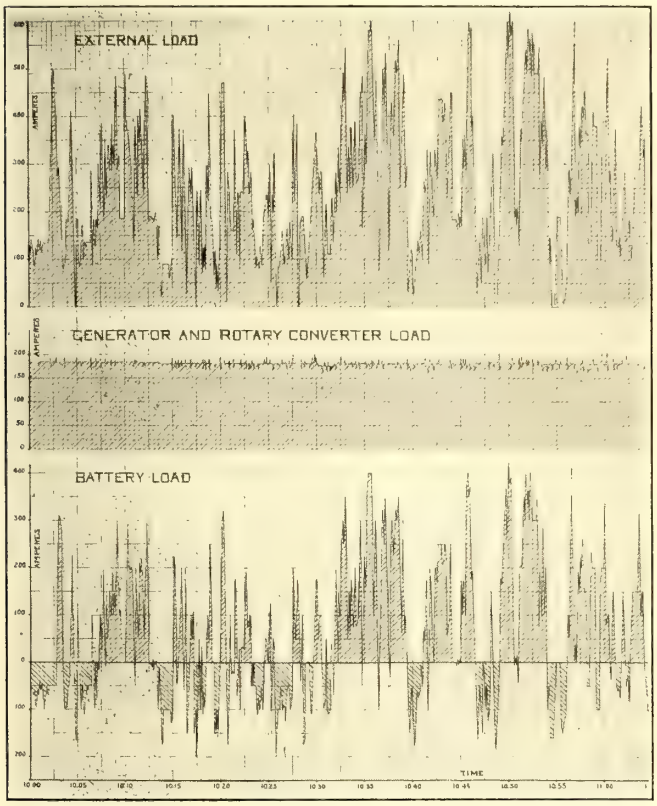


Fig. 1—Log of Battery and Regulator Test

the regulator, to furnish current for the separately excited fields of the rotary. It is asserted that all of these requirements have been more than met by the type of relay regulator used by the storage-battery department of the Westinghouse Machine Company and hereinafter described.

Fig. 1 is the log of a battery and regulator test showing a constant rotary load with a variable external load at the plant of the Southern Colorado Power & Railway Company, Trinidad, Col. This load is due to a railway in Trinidad and an interurban railway running through mining towns for 13½ miles. The company operates five to eight cars, four during light traffic, three of which are city cars and one interurban, or five city cars and three interurban cars during heavy traffic. During certain parts of the day it also uses one of the interurban cars as a locomotive to haul coal. The average load runs about 100 kw, while the maximum reaches upward of 400 kw.

The generating plant consisted of one 200-kw, 550-volt, d.c. generator direct-connected to a steam engine, three three-phase alternators of 105, 165 and 600 kw, respectively, direct-connected to steam engines, and a 250-kw, two-phase rotary operating from a three-phase a.c. circuit.

Before the installation of the storage battery and regulabor it was necessary for a great part of the time to keep both the 200-kw a.c. unit and the rotary converter in operation. Since then either unit is ample for the entire d.c. load.

Fig. 2, with reference letters, shows the regulator. The e.m.f. of the booster, or boosted rotary, is altered by changing the excitation of a single separately excited field winding. This field winding receives its energy from a small exciter which has, in addition to a self-excited shunt winding, two equal and opposite pilot field windings. The current in these two windings is controlled by the making and breaking of the double relay contacts *E* in Fig. 2. These contacts in turn are controlled by the primary relay of the regulator, which consists of a current member *A* working in conjunction with the potential member *B*, closing or opening the energizing circuit of the relay magnet *D*.

Current coil *A* works in a permanent magnetic field and is balanced by an adjustable spring tension. The current flowing through the coil *A* is proportional to the current flowing through a shunt in the circuit to be controlled, and to the ends of which the terminals of the coil are connected. This is equivalent to an ordinary ammeter movement, with the exception that the range of motion is exceedingly small. The voltage coil *B* is exactly equivalent, excepting that its position varies according to the voltage of the booster exciter.

The primary relay contact *C* is established by the conjunction of the current and potential coil levers. This contact, therefore, intermittently energizes the electromagnet *D*, which operates the main relay contacts *E*. The lower contact *E* energizes one of the pilot fields, while the other contact *E* energizes the equal and opposite field. These pilot fields act in opposition so that with the same amount of current flowing through both there would be no voltage upon the exciter. If one of them receives exciting current it will tend to start up an exciter voltage in a given direction, but the shunt coil of the exciter will tend to carry the field to full saturation. This will be checked by the potential coil of the relay. It will thus be seen that as the external load changes on the system contact is broken, the booster voltage is raised, due to the exciter voltage rising, and the battery is caused to discharge. This discharge will continue at an increasing rate until the operating equilibrium of the system is again restored and is entirely independent of the condition of battery charge or discharge as long as there is enough booster pressure behind the battery to give the required discharge to maintain the load constant. Vice versa, if the load drops the opposite effect is secured, namely, the other pilot coil tends to cause the exciter to build up in the opposite direction, which is further aided and carried to a maximum by the shunt coil, thus causing the battery to charge.

Practically no energy is handled by the regulator, since the voltage produced by the pilot coils is only 20 per cent of the total voltage of the exciter. The exciting energy of the booster will not, at a maximum, be over 8 per cent, and the energy handled by the regulator will be a fraction of 1 per cent of the booster field energy; as a result the regulator operates with absolutely no sparking of the contacts, which means that there will be practically no wear.

A five-step high resistance *F* is connected in series with

the lead from the controlling shunt. This resistance is cut into or out of circuit by a handle of rotary switch *G*. Thus the effective drop across the current coil *A* can be varied by cutting in or out resistance, which will mean a greater or less current flowing through the shunt to produce a given deflection of the current coil arm *A*, as the case may be. The generator load will therefore be varied through five steps by shifting the switch *G*. The load can further be adjusted anywhere between these steps by changing the tension of the current coil spring by the handle *H*. This covers the entire range of capacity of the generating system so that the average load on the machines can be held anywhere from full load to 10 per cent of full load.

The average load does not slowly rise as the battery becomes further and further discharged or drop off as the battery becomes charged. This effect, if desired, can be very easily secured by raising or lowering the sensibility weight *I* of the regulator. The degree of regulation is limited entirely by the speed of the booster and does not depend in any way upon the regulator, as the speed of action of the regulator is far beyond the speed of magnetization of any commercial type of booster. A booster could be built to change its voltage with exceeding rapidity, but as the cost increases with the speed of magnetization, beyond a certain point such refinement of regulation is not commercial, besides being unnecessary.

The true measure of regulating quality is the comparison of the fluctuation of the average generator load taken into consideration with the maximum changes of the external load. For instance, a greater fluctuation of the generator load would be expected when the average generator load is only 25 per cent of the maximum external load than when the average generator load is 75 per cent of the external load.

Bearing this in mind the following table will be of interest:

Type of regulator, period, source of data.	Westinghouse long period, 1½ hours, So. Col. Pr. & Railway Co., Jan. 22, 1908. Amp.	Per cent.	Westinghouse short period, 80 seconds, So. Col. Pr. & Railway Co., August, 1907. Amp.	Per cent.
External load:				
Maximum	630	0.00	434	0.00
Minimum	0	..	14	..
Variation, total	630	..	420	..
Generator load average	181	..	187	..
Maximum	210	..	194	..
Minimum	153	..	177	..
Variation, total	57	..	17	..
Variation above average	29	16	7	3.8
Variation below average	28	15.5	10	5.5
External load variation:				
Maximum above average generator load	449	248.	247	132.
Maximum below average generator load	181	100.	173	92.7
Per cent absorbed by battery regulator system	..	91.	..	95.9
Maximum variation generator load, plus or minus average generator load divided by maximum variation external load, plus or minus average generator load	..	6.46	..	4.13
Maximum variation in power output* of generator, plus or minus average generator load	..	1.9	..	2.2

*Basis of ampere-hours found by integrating load curve of generator.

It will be seen by referring to this table that the maximum current fluctuation on the generating system is only 9 per cent in the test extending for 1½ hours and 4.1 per cent in short test, of what the current fluctuation would have been if the battery and regulator had not been used. Furthermore, that the energy fluctuation was only 1.9 per cent in the long test and 2.2 per cent in short test, of what it would have been if the regulator and battery had not been used. When it is considered that the maximum variation above the average generator is 248 per cent in the long test and 132 per cent in the short test and the maximum variation of the external load below the average generator load is 100 per cent in the long test and 93 per cent in the short test, the closeness of this regulation will be appreciated.

If this device is used as an a.c. regulator: In place of the d.c. coil *A*, the arm of which makes contact at *C*, a polyphase wattmeter movement will be substituted, the arm of which will make contact at *C* in the same manner. For controlling the average load the transformer ratio will be changed by moving the handle *C* instead of cutting out resistances, as in the case of the d.c. regulation. In all other respects the two regulators are identical.

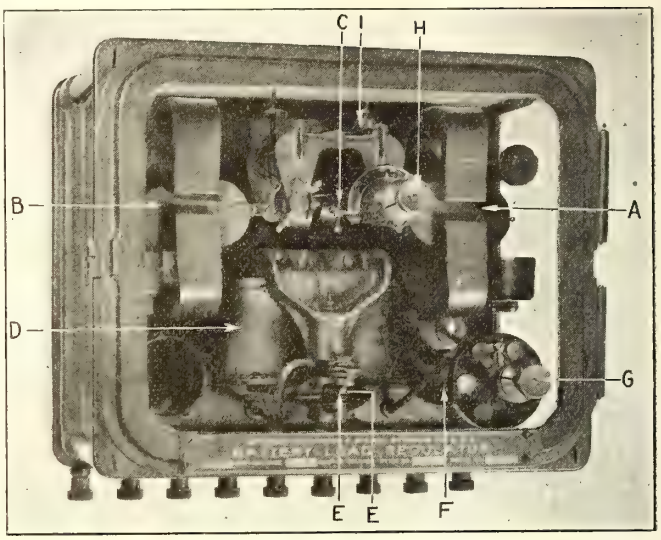


Fig. 2—Battery Load Regulator

Only two adjustments are necessary to effect any desired change in operating conditions—one to change average generator load, the other to limit the amount of battery charge or discharge. These changes are effected by simply turning one handle for each desired change. The station busbar system does not require extensive alterations, such as the insertion of resistances or solenoids.

SEAMLESS STEEL TROLLEY POLES

The General Electric Company has placed on the market a new light seamless steel trolley pole constructed of cold-drawn seamless tubing with a reinforcement 16½ in. in length at the butt inserted cold under such high pressure that the reinforcement practically is part of the pole proper. The diameter of the pole (1½ in.) is uniform from the butt to within 3 ft. from the top, at which point it tapers to 1 in. at the end to receive the harp. This construction increases the transverse strength and eliminates any trouble caused by a large bow in the pole, especially noticeable when the trolley wheel is depressed to the maximum in passing under low overhead clearances. The deflection of a 12-ft. pole with a 43-lb. weight at the end is only 10 in. with no permanent set.

The seamless steel trolley pole is several pounds lighter than lap-welded poles of the same length. It is believed that the resulting decrease in inertia by reducing the heavy arcing, pounding and wrenching will materially increase the life of the trolley wheels. These poles are especially adapted for use with the United States 13 roller-bearing trolley base furnished as standard on all General Electric equipments.

The tramways system of Porto Alegre, Brazil, has been purchased by an English company for $530,000.

ELECTRIC RAILWAY LEGAL DECISIONS

NEGLIGENCE

Illinois.—Street Railroads—Collision—Question for Jury—Negligence—Contributory Negligence—Children—Action—Declaration—Existence of Duty—Failure of Duty.

In an action for injuries received from being struck by a street car, held that the question of defendant's negligence was for the jury.

A declaration charging that it was the duty of defendant to provide suitable and safe contrivances upon its cars for the purpose of braking and stopping them when necessary, but not alleging a failure to provide such devices, is insufficient to charge negligence.—(Hackett v. Chicago City Ry. Co., 85 N. E. Rep., 320.)

Kentucky.—Compromise and Settlement—Qpestions for Jury—Carriers of Passengers—Action for Injuries—Witnesses—Credibility—Evidence to Show Bias.

In an action by a passenger against a street car company for injuries, whether plaintiff had compromised her claim prior to the action held to be a question for the jury.

In a personal injury action against a carrier, evidence that a physician who was a witness for defendant had proposed during the trial of the case to compromise it for $400 was admissible, as tending to show that he was taking an interest in the case for defendant, and was biased.—(Louisville Ry. Co. v. Williams, 109 S. W. Rep., 874.)

Kentucky.—Damages—Personal Injuries—Pleading—Evidence Admissible—Matters to Be Pleaded.

Where plaintiff alleged that she received certain specified internal injuries, and sustained a shock to her nervous system, from a collision, but did not allege injury to her eyes, evidence as to the condition of her eyes after the injury was admissible, as bearing upon the question of the internal injuries received and the shock to the nervous system, which of necessity must be manifested by outward symptoms.

Such evidence should be excluded from consideration of the jury in fixing damages, as the injury to the eyes was not sued for.

Plaintiff by his pleading in an action for personal injuries should apprise the defendant of the injury for which recovery is sought, but the evidence by which the injury is to be established need not be indicated by the pleading.—(Louisville Ry. Co. v. Ellerhorst, 110 S. W. Rep., 823.)

Massachusetts.—Carriers—Street Railroads—Care as to Passengers.

A street car company, having stopped its car to let a passenger on, is bound to keep the car standing until she has got entirely on the car; but, where the passenger is a strong, robust woman in apparently perfect health, it need not keep the car standing until she has seated herself.—(Sauvan v. Citizens' Electric St. Ry. Co., 83 N. E. Rep. 405.)

Massachusetts.—Carriers—Injury to Passenger—Negligence.

Though the guard urges the passengers to speed in getting into a car of an elevated train, and a passenger within, standing by the door, holding to a rod, has her hold loosened by passengers passing by her, and her hand slips, and the tip of a finger gets into the jamb of the door, and while it is there the guard closes the door onto it, there is no negligence, making the carrier liable for the injury, it not being shown that the guard saw or should have seen the position of the finger, or that he should have reasonably anticipated it, or that the hasty entrance of passengers urged by the guard would result in any injury to plaintiff.—(Hines v. Boston Elevated Ry. Co., 84 N. E. Rep., 475.)

Michigan.—Carriers—Street Railroads—Setting Down Passengers—Sufficiency of Evidence.

A street is not a passenger station for the safety of which a street railway company is responsible, and ordinarily a passenger having safely alighted from a street car becomes at once a traveler on the highway, but it is the duty of the street railway to exercise proper care to see that the place of alighting is safe.

In an action against a street railay company for injuries to plaintiff, a passenger, through falling, after alighting from a car, into an excavation made by defendant near its tracks, evidence held sufficient to warrant a finding that defendant was negligent in stopping its car where it did and inviting plaintiff to alight there without in some suitable way informing her of the conditions.—(Spangler v. Saginaw Valley Traction Co., 116 N. W. Rep., 373.)

Minnesota.—Street Railroads — Collision — Contributory Negligence.

The fact that the plaintiff had been, immediately before being run into by a street car, driving his team faster than a walk, in violation of a city ordinance, is not conclusive evidence of negligence, which will prevent the recovery of damages in an action against the street railway company, unless it also appears that such negligence contributed toward the causing of the accident.—(Mullane v. St. Paul City Ry. Co. and McDonald v. St. Paul City Ry. Co., 116 N. W. Rep., 354.)

Missouri.—Evidence—Documentary Evidence—Relevancy—Preliminary Proof—Matters Explanatory of Things in Evidence—Photographs—Condition at Time of Accident—Carriers—Actions for Injury to Passengers—Pleadings—Variance—Specific Acts of Negligence—Trial—Instructions—Cure of Instructions—Care Required of Carrier—Degree of Care Required of Carrier.

In an action by a passenger against a street car company for injuries from the overturning of a car two witnesses testified that they thought the conductor's name was "Rayborn" (as spelled by the stenographer), and one said he thought the conductor was W. B. Rayborn. The pleadings in an action by W. B. Reaburn, the conductor, against the same defendant, for injuries received in the same accident, were offered in evidence, and there was no pretense made at the trial that the plaintiff named in the pleadings in question was not the conductor of the car at the time of the accident in question, or that he was not the one mentioned in the oral testimony. Held, that admission of the pleadings was not error, on the ground of lack of evidence that the conductor of the train on which the plaintiff was injured was the same person who was plaintiff in the action in which the pleadings offered in evidence were filed.

Where, in an action against a carrier for injuries to a passenger, the answer of the carrier, in an action by another plaintiff for injuries in the same accident, was introduced in evidence to prove an admission therein, the petition in the former action was also admissible to explain the allegations of the answer, but should have been restricted to that purpose by the court in its instructions.

Photographs, showing condition of a trestle, track, and car in question, taken shortly after an accident occurred, are admissible in evidence when it is shown that they are correct representations of the conditions as they then existed.

If a petition, in an action by a passenger for injuries, charges negligence in general terms, then proof of negligence either in relation to the tracks or roadbed would make out a prima facie case for plaintiff; but, when the petition alleges specific acts of negligence, there is no right to prove other acts, and the allegations of specific acts of negligence cannot be treated as surplusage.

An instruction, as to the care required of a carrier of passengers as to keeping its tracks and roadbed in proper condition, which was erroneous because the petition alleged negligence only as to the tracks, is not cured by an instruction that, even if there were certain defects in the tracks and roadbeds, and the cars were derailed, and plaintiff was thereby injured, if defendant could prove that the derailment was not caused by any neglect on its part in providing and maintaining reasonably safe tracks and roadbed, plaintiff could not recover, since there was a restatement of the matter relating to the roadbed which was not alleged, and the burden of proving defendant's negligence was placed on defendant, where it did not properly belong.

It is the duty of a carrier to use the utmost care and foresight, which capable and faithful railroad men would take under like circumstances, to keep its tracks and roadbed in a reasonably safe condition for the running of cars over them.

In an action by a passenger for injuries from the overturning of a car, where there was evidence that the tracks were not in a proper condition, defendant requested an instruction that a carrier of passengers is not obliged to foresee and provide against casualties which were not known to occur before, and which may not reasonably be expected, and that, if a carrier availed himself of the best known and most extensively used safeguards against danger, he has done all the law requires, and his liability is not to be ascertained by what appears for the first time after the disaster, to be a proper percaution against these occurrences; that the defendant and its agents, etc., in the management and operation of its cars, were by the law required to exercise only such care and prudence as was reasonably practicable, and if plaintiff was injured as the result of some occurrence, which careful and prudent men in the situation of defendant's agents would not reasonably have expected, then the occurrence was an accident, and defendant was not liable; that the mere fact that an accident occurred, and plaintiff was injured, does not of itself entitle plaintiff to

recover, and if defendant's servants exercised all the care and prudence that were reasonably practicable under all the circumstances, and the accident happened without negligence on their part, then plaintiff could not recover under any circumstances. Held, that the requests were properly refused, as not imposing a sufficiently high degree of care upon the carrier.—(Kirkpatrick et al. v. Metropolitan St. Ry. Co., 109 S. W. Rep., 682.)

New York.—Carriers—Injuries to Passenger—Evidence.

In an action against a street car company for injuries to a passenger, resulting from a trench in the street at which a car was negligently stopped, evidence that the trench was not dug by defendant, but by a gas company, is immaterial.—(Walsh v. Richmond Light & R. R. Co., 108 N. Y. Sup., 950.)

New York.—Carriers—Street Railroads—Passengers—Invitation to Board Cars—Evidence—Sufficiency—Negligence—Contributory Negligence—Evidence.

The fact that a car approaching a crossing slowed down after a person had signaled it to stop was not necessarily an invitation to such person to board the car; the motorman being bound to keep the car under control as it approached the crossing.

In an action for injuries to a person while attempting to board a slowly moving street car, caused by the car suddenly increasing its speed, evidence held not to show that such person was invited to board the car.

In an action for injuries to a person while attempting to board a slowly moving car, caused by the sudden increase of its speed, evidence held not to show that defendant was guilty of negligence, or that such person was free from contributory negligence.—(Howard v. Forty-second St., M. & St. N. Ave. Ry. Co. et al., 110 N. Y. Sup., 125.)

New York.—Master and Servant—Injury to Servant—Defective Appliances—Notice—Action for Injuries—Notice of Injury—Employer's Liability Act.

Plaintiff was handed a defective chain by his employer's master mechanic, with instructions to use it in removing an armature. While so using the chain it broke, and plaintiff was injured. It sufficiently appeared that the employer had notice of the defect in the chain. Held, that plaintiff could recover under Employer's Liability Act, Laws 1902, p. 1748, c. 600; he having properly served the notice of injury required thereby.

In an action by a servant for injuries under the employer's liability act, a notice of injury as follows: "Notice is hereby served upon you, pursuant to chapter 600, p. 1748, of the Laws of 1902, that William Eddington was injured while in your employ at your place of business in the Union Railway Shed, West Farms, on the 16th day of June, 1904, by having an armature fall on him while working in a pit" is sufficient in form under the statute.—(Eddington v. Union Ry. Co. of New York City, 109 N. Y. Sup., 819.)

New York.—Negligence—Evidence—Burden of Proof—Street Railroads—Injuries to Person on Track—Contributory Negligence.

In an action for injuries, plaintiff must show that his conduct did not so concur with defendant's negligence as to have become a proximate cause of the injury.

Where, in an action for the death of one who was run over by an electric car between street crossings, it appeared that just before he started to drive a team of horses across the track he looked eastward along the track at a point where it was visible for 600 ft., and then proceeded 35 ft. to the track, where he was struck by a car coming from the east, he was guilty of contributory negligence, as if he had looked again before crossing the track, he must have seen the car so as to have been able to avoid the accident.—(Baxter v. Auburn & S. Electric R. Co., 83 N. E. Rep., 469.)

New York.—Street Railroads—Maintenance of Trolley Poles—Liability for Injuries.

A driver of a truck was injured by a wheel being caught by a trolley pole of a street railroad company on property owned by a ferry company for its business. The pole was about 6 in. outside of the curb. It was necessary to maintain a pole near where it was. Permission from the ferry company to move the pole behind the curb had been denied. The ferry company had denied the railroad company the right to make any physical change of the surface of the ground where the pole was located. Held, that the company was not liable, either on the ground that it negligently maintained the pole, or on the ground that it failed to place a hub stone at the base of the pole, since it was only required to exercise reasonable care, which did not require of it any attempt to proceed to condemn the right to maintain the pole back of the curb.——(Lanigan v. Brooklyn Heights R. R. Co., 110 N. Y. Sup., 30.)

New York.—Street Railroads—Collision with Vehicles—Damages.

In an action for injuries to plaintiff's horses and truck in a collision with defendant's car and for the services of a veterinarian, the evidence showed that the value of one of the horses before the accident was $200 and that right afterward it was not worth over $5, but that after treatment by the veterinarian it was able to do light work. Its value after recovery was not shown. Held, that defendant, having been called on to pay for the veterinary services, was entitled to the benefit of any resulting appreciation in the value of the horse, and in the absence of proof as to the difference in value prior to the injury and after recovery there was no basis for the assessment of damages to the horse.—(Solomon v. New York City Ry. Co., 107 N. Y. Sup., 744.)

Rhode Island.—Carriers—Passengers—Injury While Boarding Car—Contributory Negligence.

Where one pursues a street car after it has started, and in attempting to board it falls, he is guilty of contributory negligence, barring recovery for his injury.—(Lee v. Rhode Island Co., 68 Atl. Rep., 475.)

Washington.—Trial—Findings Inconsistent with General Verdict—Witnesses—Cross-examination.

A complaint in an action for personal injuries by a passenger against a street railway company alleged that while that, when the car started, plaintiff was standing with both feet on the steps of the car. Held, that the special verdict did not negative the general verdict that the car was started while plaintiff was alighting, which was the gist of the negligence charged.

Where, in an action for personal injuries by a passenger against a street railway company, it appeared on the direct examination of plaintiff's husband that he was commonly called "doctor," and that, when the conductor asked him his name, he handed him a handbill, containing his name, picture, location of his office and advertisement of his method of treatment, cross-examination was properly permitted as to whether he was a licensed practitioner, whether he prescribed for his wife, and the handbill was properly admitted in evidence, the jury being entitled to know who the witness was and the character of his business.—(Grant et al. v. Spokane Traction Co., 91 Pac. Rep., 554.)

Washington.—Carriers—Passengers—Personal Injuries—Contributory Negligence—Negligence of Operatives.

Where a passenger on a street car asked the conductor to stop at a certain street, and he said, "All right," and, upon approaching the street, the conductor closed the gates on the platform side of the car, and left the gates open on the opposite side, and then gave the signal to stop, and plaintiff, with a grip in his hand stood at the open gate and when the car slowed down as though to stop alighted, but was thrown and injured by the car starting up at full speed, the passenger was not guilty of negligence as a matter of law.

Such facts were sufficient to show that the motorman and conductor were negligent in starting the car again before plaintiff was safely off.—(Marbourg v. Seattle R. & St. Ry. Co., 94 Pac. Rep., 649.)

CHARTERS, FRANCHISES AND ORDINANCES

Kentucky.—Eminent Domain—Proceedings—Statutory Provisions—Construction—"Railroads"—"Railways" — Interurban Railroad—Length of Railway Constructed—Effect—Railroads—Charter—Construction—Termini of Road—"From"—Eminent Domain—Evidence as to Compensation—Examination of Witnesses—Use of Word "Value."

Ky. St. 1903, sec. 842a, provides that interurban electric railroad companies authorized to construct a railroad 10 or more miles in length incorporated under the laws of the commonwealth shall have the same rights, powers and privileges as are now granted to or conferred upon railroad companies. Sec. 835 et seq. permit condemnation of land by any company authorized to construct a railroad which shall be unable to contract with the owner of any land necessary for its use. A railroad corporation was organized to construct and operate a line of railway not exceeding 10 miles long from the city of Covington to the town of Erlanger, and such points beyond as might thereafter be determined upon, to be operated by electricity or other improved methods of rapid transit. Held, that the term "railroad," as used in sec. 835, has the same meaning as "railway," and that the company had the same right to condemn private property for a right of way that a steam railroad would have, especially since under its charter it might use steam.

The fact that the entire 10 miles of railway authorized by its charter had not been constructed by the company was

immaterial in the absence of a showing that it did not in good faith intend to complete the line as authorized.

Articles of incorporation of a railway company provided that it was to be constructed and operated "from" Covington to Erlanger, and such further points beyond as might thereafter be determined upon and over and along such streets, roads, etc., as might be acquired by due process of law. Held, that the expression "from" Covington meant from within the city, and that land within the city could be condemned for a right of way.

Though the market value of land to be taken under condemnation is the thing to be determined, the fact that the court did not require the uniform use of the term "market value" in questioning witnesses is not error where the term is occasionally used, though the word "value" alone was principally used by both counsel and witnesses.—(Devon v. Cincinnati, C. & E. Ry. Co., 109 S. W. Rep., 361.)

New York.—Street Railroads—Acquisition of Rights in Streets—Consent of Highway Officers.

A consent by the highway commissioners of a town to the construction of a railroad was not void because the route consented to was at the time entirely over private property, in which the public had not then acquired any rights whatever.—(People ex rel. Westminster Heights Co. v. Coler, Borough President, et al., 105 N. Y. Sup. 887.)

New York.—Railroads—Intersection—Duty of Companies—Enforcement—Determination of Place and Manner of Intersection—Rights of Village Trustees—Consent of Public Service Commission.

Under Railroad Law, section 12, Laws 1890, page 1087, chapter 565, requiring a corporation whose railroad is intersected by a new road to unite with the corporation owning the new road in forming necessary intersections and connections, the forming of such intersections and connections of tracks of crossing roads is a public duty, enforceable by the Attorney General, if not by individual shippers.

Railroad Law, section 11, Laws 1890, page 1087, chapter 565, prohibits the construction of a railroad in a village street without an order of the Supreme Court. Section 12 requires a corporation whose railroad is intersected by a new road to unite with the corporation owning the new road in forming necessary intersections, and provides that, if the two corporations cannot agree upon the points or manner of such intersection, the same shall be determined by commissioners, one of whom must be appointed by the court. Held, that a village, having authorized an electric railway to lay tracks in a street and across a steam railroad, must be deemed to have included the right of the companies to intersect their tracks to exchange cars, and the village trustees had the right to participate in the determination of the place and making of such intersection, and that, the two companies and the village being unable to agree upon the matter, the duty devolved upon the Supreme Court to make such determination, which may be done through commissioners.

Railroad Law, section 12, Laws 1890, page 1087, chapter 565, provides that if crossing railroads cannot agree upon the points or manner of intersection the same shall be determined by commissioners, etc. Section 11 prohibits the construction of a railroad in a village street without an order of the Supreme Court. Public Service Commission Law, section 53, Laws 1907, page 920, chapter 429, prohibits construction or extension of a railroad without a certificate of public convenience and necessity by the commission, and provides that, except as otherwise provided, no carrier shall exercise any franchise or right under the railroad law or any other law not theretofore lawfully exercised, without first having obtained the permission and approval of the proper commission, etc. Held, that section 53 does not supersede such provisions of the railroad law, that it is not necessary to procure the commission's consent before making a connection between crossing roads, and that section 53 does not require the commission to determine the point or manner in which an intersection is to be made.—(Village of Ft. Edward v. Hudson Valley Ry. Co. et al., 84 N. E. Rep., 962.)

New York.—Statutes—Construction—Language of Act—Intent of Legislature—Words and Phrases—"Net Income"—Street Railways—Franchise—Compensation to City—Statutes—Construction—"Net Income"—Action—Reference.

The words used in an act should be taken in their ordinary sense, and should be given such force as will effectuate the legislative intent.

The "net income" of a street railway, like net earnings, is that sum which remains after deducting from the gross income or earnings the cost of producing them, and any indebtedness of the company to government or to private parties is a part of the expense of operating the railway, as ordinarily understood.

Laws 1867, p. 1275, c. 489, authorized a corporation to construct an elevated railroad in New York City, and sec. 9 provided the corporation should pay 5 per cent of its "net income" from passenger traffic upon Manhattan Island to the city in such manner as the Legislature might thereafter direct as compensation for use of the streets. Laws 1868, p. 2034, c. 855, sec. 2, provided that the company pay quarterly to the city comptroller 5 per cent of its net income for the improvement of the streets through which the road was constructed. Secs. 2 and 3 also provided that such payments should be the legal compensation in full for the use and occupancy of the streets, and the claims of the city should constitute a prior lien on the railway. Held, that it was the legislative intention that the compensation to the city be actual and substantial, and by "net income" was meant the gross passenger traffic receipts, less the general expenses of operating the road, and the amounts paid for general taxes, the rental damages to abutting owners for trespass upon their interests in the streets, and interest on the corporation's mortgage bonds are not to be deducted in determining the "net income," they being general charges against the corporation, and not against the passenger traffic.

In a suit by the city to recover 5 per cent of the "net income" from the passenger traffic of a street railway in certain streets, that being the statutory compensation provided for the use of such streets by it, where the referee before whom an accounting was had of the railway's earnings from its traffic was not requested to, and did not, separate the amount of any taxes upon the particular part of the railway structures and property, from the operation of which the company received the income, but merely stated in his findings the tax paid upon this franchise and personal property, the annual tax paid by the company cannot be deducted from the earnings by the court in rendering judgment in determining the "net income" from the passenger traffic on those streets out of which the city was entitled to compensation.—(City of New York v. Manhattan Ry. Co., 84 N. E. Rep. 745.)

Texas.—Eminent Domain—Compensation—Measure—Taking Entire Tract—Value of Land with Improvements—Damages—Excessive Damages—Evidence—Weight of Evidence—Number of Witnesses.

In proceedings by a street railway to acquire property by condemnation, the property should be valued as a whole, and the entire value thereof was properly shown, including the improvements thereon, which might be done either by valuing the lots in their improved condition, or by valuing the lot and improvements separately and adding the combined values.

In condemnation proceedings by a street railway company to acquire property consisting of a lot, dwelling house and automobile barn, the evidence examined, and held not to show that an award of $55,000 was so grossly excessive as not to be the result of a fair and impartial consideration of the evidence.

In determining whether an award of damages for the value of property taken in condemnation proceedings was excessive, the mere excess in the number of plaintiff's witnesses who placed a lower value on the property than defendant's witnesses cannot control.—(Foley et al. v. Houston Belt & Terminal Ry. Co., 110 S. W. Rep., 96.)

Wisconsin.— Eminent Domain — Compensation — Persons Entitled—Proceedings to Take Property — Appeal — Harmless Error.

The laying of double tracks in a street and their use for interurban purposes was not a taking for interurban purposes, entitling the then owner to compensation, where the laying of the tracks was expressly authorized by amendment to the street railway franchise, under which the street was also used for street railway purposes.

Street railway tracks, roadbed, poles and wires used for street railway purposes and also illegally for interurban purposes, were not, by the mere enactment of Laws 1901, p. 686, c. 465, authorizing an interurban railway to condemn a right of way and the continuation of the use for interurban as well as street railway purposes, transformed into interurban tracks, etc., so as to entitle the then owner to compensation as for a taking for interurban purposes, but continued, as before, street railway tracks.

Where, in condemnation proceedings, the commissioners appraised the damages to the then owner at a specified amount and to his grantor as nominal, and the grantor was not entitled to any damages, his omission by petitioner from the notice of appeal from the award was a technical informality, and was not ground for dismissal of the appeal.—(Brickles v. Milwaukee Light, Heat & Traction Co., 114 N. W. Rep., 810.)

News of Electric Railways

Cleveland Traction Situation

Mayor Johnson admitted to a committee of the whole of the City Council on Feb. 2 that his insistance that a clause should be incorporated in the proposed new franchise which would allow the city or some corporation designated by the city to take over the property at $110 a share for the stock had delayed a settlement. He said that the deliberations had not been reduced to writing, but that measures involved in the suggestions of Judge Tayler were put in writing. The Mayor favors the plan of allowing the company to declare dividends of not more than 6 per cent, any return on the investment above this amount to be used to reduce the fare. The plan regarding the sliding scale of fares is to operate the lines at a fixed fare for, say, six months, at the end of which time the rate is to be increased or decreased according to the results attained in operation.

The change in fares did not produce any great confusion, although a number of complaints were taken to the City Council in the form of resolutions. One member presented a 3-cent fare ordinance which he requested be presented to the Cleveland Railway, and if refused, to the Forest City Railway. It was referred to the committee on street railways.

Judge Tayler of the United States Circuit Court has requested Judge L. E. Knappen, Grand Rapids, Mich., to preside at the hearing of arguments on the expiration of the franchises on the Woodland Avenue and West Side lines.

A meeting of the City Council as a committee of the whole was held on Feb. 3. The receivers of the properties were present by invitation. In reply to questions regarding their experience with 3-cent fares and the reasons for the changes that were made in routing cars when the fare was increased, the receivers referred the members of the City Council to Judge Tayler. Receiver Scott, however, announced at the commencement that Judge Tayler had under consideration the routing of Quincy Avenue cars downtown instead of stopping them at East Fifty-fifth Street. Council finally agreed that Mayor Johnson and City Solicitor Baker should talk the various matters over with Judge Tayler and they met the Judge after the formal Council meeting and it was arranged to have the Quincy Avenue cars run to the Public Square. A rate of 3 cents had been established on Quincy Street, but the court and the receivers felt that this should be the rate for the entire trip, although the cars pass over a portion of the Euclid Avenue line, on which a 5-cent fare is charged.

Another meeting of the Council was held on Feb. 4 and the discussion of complaints was continued. The receivers were not present, as Judge Tayler preferred that members of Council take up all matters with the court. Councilman Flower said that the receivers should operate more cars over Quincy Avenue and intimated that the cars were not furnished because they would take business from Cedar and other lines which are collecting a higher fare. Mayor Johnson did not agree with this view of the matter and so expressed himself. Councilman Koch introduced a resolution to require the city to count the passengers on the 3-cent and the 5-cent lines so as to secure data to sustain the argument that more cars are needed on the low-fare lines.

Henry J. Davies, secretary of the Cleveland Railway, has pointed out the danger of including the purchase clause proposed by Mayor Johnson in any franchise that may be offered the company. Mr. Davies says that the price of the stock would never get beyond $110 a share, the purchase price proposed by the Mayor, while the Cleveland Railway owns it, because of the liability of a forced sale at that figure any time. Then, if another sale directed by the city is prohibited, the price of the stock in the hands of the favored company would jump to 133, assuming that 6 per cent dividends are guaranteed, as proposed in Judge Tayler's plan. The continuous right of the city to take over the property at 110 at any time would also work to the detriment of the service as the natural disposition would be against applying earnings to betterments, and improvements could be made only by issuing new stock which the city would have to take over at 110 if it decided to purchase the property.

John J. Stanley, vice-president of the Cleveland Railway, stated in an interview that the company will not accept a franchise that will allow the city to force the sale of the property to any corporation it may designate at 110. He said that the city is asking too much in insisting upon a clause that shall compel the company to transfer its property before the expiration of the franchise.

The Forest City Railway organized as follows on Feb. 3: M. A. Fanning, C. H. Miller, Thomas P. Schmidt, Charles F. Seelbach, A. M. Willard, Herman Schmidt, F. A. Mehling, Fred C. Alber and Francis E. Wright, directors; M. A. Fanning, president; C. H. Miller, vice-president; Fred C. Alber, secretary and treasurer. It is claimed that a few hundred shares of the stock of the company which were not transferred to the Cleveland Railway, under the agreement of April 27, 1908, constitute the corporate authority for the legal existence of the company. While the company sold its property and franchises to the Cleveland Railway, it is claimed that it still has a right to exist as an independent company and to engage in the street railway business. This move followed the introduction in the City Council on Feb. 1 of a resolution to the effect that the Cleveland Railway be tendered a 3-cent franchise and that if it did not accept the grant the Forest City Railway be given a blanket franchise at that rate. Cleveland Railway officials think the election of directors and officers by the Forest City Railway was illegal.

City Solicitor Baker has prepared two letters to be presented to Council in which he will say that the grants to the Forest City Railway are of such a nature that the city cannot enforce the exchange of transfers between the lines and that the patrons of these lines are securing the benefit of a ride to any point on the entire system by the payment of 2 cents in addition to the regular 3-cent fare. He will, however, object to splitting the Denison-Central line at the Square, as both ends are 3-cent lines and he thinks that passengers are entitled to a through ride for one fare. As to the Payne-Bridge and Superior-Detroit lines this condition does not exist and he is not in a position to insist upon restoration of the through service.

The receivers have increased the service on Quincy Avenue by taking some of the cars from the Scovill line during the rush hours. On the other hand, the order that interurban cars carry city passengers has been modified, and only three lines will be required to do this and they will stop only at fixed stations on certain divisions. The receivers say that the service rendered by the local cars at all other points is sufficient and that the interurban companies are supported legally in their contention against making stops in the city.

Arrangements have been made for the special committee of the Chamber of Commerce to meet at stated intervals for the discussion of the street railway question. They will possibly make some suggestions to the committee which is now endeavoring to settle the street railway matter, and if the effort now under way fails they may formulate a franchise for presentation to the City Council.

Brill fare boxes will be placed on the Euclid Avenue cars within a few days. Johnson fare boxes have been fitted with Brill tops for the Payne, Bridge, Central and Denison lines. A record will be kept of the operation of these lines and the difference in collections will be noted.

At the meeting of the City Council as a committee of the whole on Feb. 8 Mayor Johnson advised the Council to give Judge Tayler time to consider the matters he has before him and stated that as a matter of courtesy to him nothing should be done until he gives his decision regarding the routing of cars. Mr. Johnson read from a pamphlet figures which he claims should prove that the deficit of $120,000 for October, November and December, as reported by the receivers, should have been a surplus of $42,000. He attacked the $23,000 legal expenses of the receivers, the fund of 5 cents per car mile set aside for maintenance and the 7/10 of a cent per car mile for damage claims. The charge as prescribed in the lease, he said, is $130,000 more than was actually spent. Mr. Johnson says that the operation of the lines at a 3-cent fare and a charge of 1 cent for transfers would have yielded a surplus of $75,000 for the last three months of the year.

The 35 regular cars on Euclid Avenue went into operation as pay-as-you-enter cars on Feb. 8. They are equipped with Brill fare boxes. The trippers and the Euclid Heights cars have not been equipped.

Hearing on Cambridge Subway Stations

The Massachusetts Railroad Commission gave a hearing Feb. 3 on the petition of the Boston Elevated Railway Company for approval of the company's plans for stations at Harvard Square, Central Square and Sixth Street in connection with the Main Street subway, which the company is about to build in Cambridge.

George A. Kimball, chief engineer of elevated and subway construction, submitted plans and models of the proposed stations, and explained that in the company's plans for the Harvard Square station one of the tracks for subway trains is placed higher than the other, and the same arrangement is planned for surface car tracks entering the underground station, to avoid grade crossings. In the general scheme the simultaneous loading and unloading of passengers from the same car is avoided to reduce the opportunity for congestion. Outbound subway train traffic from Boston is delivered upon a platform at a level above the inbound track. From this platform three passageways for foot passengers lead to the cars for Arlington and the north, Watertown and Newton on the west, and the street above. The northerly and westerly traffic are separated in order to provide greater capacity for surface car movement and to avoid congestion. Passengers would all move in one direction.

Mr. Kimball then pointed out that there would be small entrance or exit structures in Harvard Square, on the company's property near Dunster Street, and in the sidewalk near the college building. Four surface car platforms would also be provided, two at Brattle Street and two at Massachusetts Avenue. Each platform would be 200 ft. long and about double the capacity of those at the Park Street loop of the Tremont Street subway. The passageways are to contain no stairways, and the steepest grade for walking is to be about 10 per cent. The only stairway climbing will be in ascending to the street.

At the Central Square station the subway passes under the center of Massachusetts Avenue, and the station is placed between Brookline and Pearl Streets. There will be a platform on each side of the subway tracks 234 ft. long, with stairways connecting to similar platforms on the surface of the street. The inward platform on the surface will be 7 ft. wide, and will have five stairway connections below. The outbound platform will be 11 ft. wide, with four stairways. The design narrows the sidewalk on the street to give 20 ft. between the curbing and the station fencing on each side for team traffic. The surface platforms would be enclosed to allow the passengers to transfer without the use of tickets. Shelters would be constructed above the platforms. This plan avoids the congestion which occurs when passengers go and come between surface cars and transfer booths or men located at the edges of the sidewalks.

At the Sixth Street station the subway will come at the foot of a long grade whence the trains leave the new bridge in crossing the Charles River from Boston, outbound. The station platform would be about 900 ft. west of the incline, which is to be built on a 3 per cent gradient. Passengers would here change by ticket between trains and surface cars on Massachusetts Avenue, Broadway and Sixth Street routes. The platforms here at the surface level would not be enclosed. The company deemed it inadvisable to put the station any nearer the incline on the grounds of danger and interference with rapid handling of trains. The hearing was continued until Feb. 10.

Spokane & Inland Empire Railroad Arranges to Make Employees Stockholders

Jay P. Graves, president of the Spokane & Inland Empire Railroad, Spokane, Wash., has addressed the following letter to the officers and employees of the company, setting forth a plan by which they may become stockholders of the company.

"A number of corporations in the United States have, during the last few years, adopted plans whereby their employees were afforded opportunities for acquiring their stock or securities on safe and easy terms, believing that thereby employer and employee were brought closer together to their mutual benefit.

"Believing thoroughly in the principle, and desiring to bring about and maintain between this company and its employees a community of interest and consequent good feeling, the company has arranged with the Union Trust Company, Spokane, to supply to any officer or employee of the company shares of its preferred rights or preferred stock at the market price, plus an interest which may have accrued on the purchase price between the time of purchase by the Union Trust Company and its sale, and a commission of 5 per cent on the amount purchased. No profit is made by the Union Trust Company except the commission, it purchasing the stock in the market and selling it to the purchaser at cost.

"Easy terms will be made, the purchaser paying not less than 15 per cent of the purchase price in cash, and the deferred payments being arranged to suit the purchaser, provided that not longer than five years will be allowed, the deferred payments bearing interest at 5 per cent per annum.

"In case the purchaser becomes sick or disabled, leaves the service of the company, is discharged, or dies before the stock is paid for, the Union Trust Company will, if requested to do so, cancel the contract and repay to the purchaser, or in case of death to his heirs, all sums paid on account of the purchase price. After the purchase is completed, the company will, in any of the events above stated, take the stock off the hands of the purchaser, or his heirs, at the price paid for same, plus 5 per cent per annum interest and less any dividends on the shares that may have been paid.

"The par value of the shares is $100, the selling price by the Union Trust Company to be the cost plus commission and interest. Holders are entitled to dividends at the rate of 5 per cent per annum before dividends are payable to holders of the common stock. Above 5 per cent, up to 7 per cent, the two stocks share equally in dividends. The shares are redeemable at any time by the company upon the payment of $135 a share and accrued dividends. Owing to the recent financial depression, it is believed that the shares can now be purchased for less than par."

Valuation of Minnesota Steam Railways

The Minnesota Railroad Commission has made public figures showing the results of its valuation of the physical property of steam railways in that State. Two sets of tables were prepared by the commission, owing to differences of opinion between the representatives of the commission and the railways as to land valuations. These estimates are entitled "A" and "B." The land valuation used by the railways in Estimate "A" is based on what the commission's investigations show it would probably cost the roads now to acquire the land for railway purposes. Estimate "B" bases the land valuation upon what it would probably cost now, if the land were not used for railway purposes, to acquire it for other than railway purposes. The total of the land value under Estimate "A" is $73,201,758 and the total of Estimate "B" is $41,275,260. The following estimates of the commission relating to the total valuation of the physical property are given:

"A"		"B"	
1907 Cost of Reproduction.	Present Value.	Cost of Reproduction.	Present Value.
$411,735,195	$360,480,161	$360,951,548	$322,565,107

In the foregoing tables the differences between the two estimates of the commission are due altogether to different allowances for the cost of reproduction of land used for right-of-way and terminals. The railways estimated the cost of reproduction in 1906 at $500,675,781.

Wisconsin Commission Inquires Into Storm Losses.—The Railroad Commission of Wisconsin has sent letters to the public utilities companies and railroad corporations in the State asking for information regarding the losses due to the storm of Jan. 27 to 29.

Questions City's Right to Use Guarantee Deposit.—The right of Springfield, Ohio, to use $500 deposited with it by the Ohio Electric Railway as a guarantee will be tested in the courts. Already $400 of the fund has been expended to repair water mains that are said to have been injured by the jarring of the heavy cars operated by the company.

The Question of Appraising the Detroit United Railway.—The committee of 50 prominent business men of Detroit selected by the Mayor to consider the terms of the renewal of the franchises of the Detroit United Railway has selected a sub-committee which now has under consideration the appointment of some one to appraise the property of the company. While nothing definite has been done as yet regarding the appointment, it is understood that Professor Cooley, of the University of Michigan, is being considered favorably. Professor Cooley is perhaps best known publicly from the work performed by him in the appraisal of the railroads of Michigan at the instance of the late Governor Pingree.

Institute Anniversary Dinner.—The American Institute of Electrical Engineers will celebrate the completion of its first quarter of a century with an anniversary dinner, at the Hotel Astor on Mar. 11. The annual dinners of the Institute have always been extremely successful, while the historical character of this affair promises to make the occasion more than usually interesting. President Ferguson has appointed T. C. Martin chairman of the Dinner Committee; the other members appointed are as follows: T. Beran, M. Coster, M. M. Davis, H. A. Foster, G. A. Hamilton, R. T. Lozier, W. McClellan, F. A. Muschenheim, H. W. Pope, C. W. Price, F. A. Scheffler, E. A. Sperry, A. Spies, A. Williams and G. H. Guy.

Pennsylvania Street Railway Association.—In the Electric Railway Journal of Feb. 6 mention was made of the appointment of Henry M. Stine as secretary of the Pennsylvania Street Railway Association. Mr. Stine has entered upon his duties and has taken offices in the Harrisburg National Bank Building, Harrisburg. A meeting of the executive committee of the association was held on Feb. 2 and a plan was outlined at that time for following the bills introduced into the Legislature at the session now being held. R. P. Stevens, president of the association and president of the Lehigh Valley Transit Company, Allentown, Pa., also expects to spend a considerable part of his time in Harrisburg in connection with association matters. Meetings of the executive committee of the association will be held from time to time, as it may be deemed necessary. Practically all of the street railway companies in Pennsylvania are now members of the association, the membership having been increased recently by the addition of about 20 companies.

Hearing on Forest Fires in New York.—The hearings by the Public Service Commission of the Second District of New York on the prevention of forest fires along the lines of steam railroads are being held at Albany. The New York Central & Hudson River Railroad contends that all of the figures before the commission on the cost of changing locomotives from coal to oil burning are lower than those computed by its experts, and gave $60,000 instead of $27,000 as the cost of changing from coal to oil burning locomotives on the 75 engines necessary to operate the Mohawk & Malone line. The figures for seven months' use of oil and five months' use of coal were $299,000 more than for the 12 months' use of coal. G. R. Henderson, for the State, gave $163,572 as his estimate of the excess cost of oil for the same period. The plan which the company proposes for clearing and keeping clear its right of way, patroling the system and arranging for the necessary fire equipment would involve an expenditure of $33,983 for installation and an annual maintenance expense of $30,251.

Public Service Commission Law in Vermont.—Governor Prouty, of Vermont, has approved the act changing the name of the Railroad Commission to the Public Service Commission and extending the authority of the commission to the telephone, telegraph, gas, water and power companies, mention of which was made in the Electric Railway Journal of Jan. 30, 1909. The present members of the Railroad Commission are to continue in office as Public Service Commissioners to the expiration of the term of their original appointment. Companies coming within the provisions of the act are required to furnish the commission with schedules of their charges for service and with such special information regarding the details of management as the commission may deem expedient. The commission, however, is not to make such information public except as it may be necessary in reports to the General Assembly or in judicial proceedings. Reports of all accidents are to be filed with the commission, and if in the opinion of the commission a public investigation is necessary the commission shall fix the time and place of the hearing. The commission also is given authority to readjust rates where it deems them to be discriminatory. Section 16 provides that "a corporation organized under the laws of Vermont, subject to the provisions of this act, shall not increase its capital stock nor issue mortgages, bonds or other securities except such as are payable within one year from date of issue, without first securing permission of the Public Service Commission on petition and hearing for that purpose." The salary of each commissioner is to be $1,700 a year. The salary of the chairman, however, is to be $2,200 a year.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—A resolution has been introduced in the Senate that the Judiciary Committee inquire "whether there is any danger of such action by public authorities of any other State as will encroach on the sphere of the constitutional authority of Connecticut over its own railroad corporations and over the railroads located within its territory, and if so, to recommend such legislation as may seem to be required for the purpose of preserving intact the just jurisdiction of Connecticut over its internal affairs." This resolution is understood to refer directly to the suit in Massachusetts seeking to compel the New York, New Haven & Hartford Railroad to relinquish control of the properties which it holds in Massachusetts through the ownership of stock. Among the bills introduced into the House are the following: Providing for the taxation of street railway stock at its face value; providing that street railway companies shall issue school tickets at half fare during a period of from one hour before to one hour after the school session; compelling street railways to maintain waiting rooms at certain crossings. Among the bills introduced into the Senate is one which provides that an express business conducted by an electric railway shall be taxed as an express business and that returns of said business shall be made regularly each year to the Tax Commission.

Indiana.—The Indiana House has passed the Statsenburg bill authorizing toll roads to allow electric railways to use their rights of way.

Massachusetts.—The House, without debate, on Jan. 15 suspended the rules and admitted the New Haven-Berkshire bill admitting the petition of Representative Curtis and others authorizing the New York, New Haven & Hartford Railroad to purchase the franchise and property of the Berkshire Street Railway.

Minnesota.—Public utilities of all kinds, except street railways, are placed under the supervision of the State Railroad Commission in a public utilities bill introduced in the House. The bill also contains a provision for an "indeterminate permit" by which any public service corporation may relinquish its franchise and receive a permit without any time stated, provided it gives reasonable and satisfactory rates and service.

New York.—Governor Hughes of New York has sent to the Legislature for confirmation the reappointment of John E. Eustis as a member of the Public Service Commission of the First District and of James E. Sague as a member of the Public Service Commission of the Second District, whose terms of office expired on Jan. 31, 1909. Both Mr. Eustis and Mr. Sague are reappointed for the full term of five years. The nominations have been referred to the Finance Committee.

Ohio.—Governor Harmon has approved the Alsdorf bill, which, if enacted, will do away with 12 tax boards and create a State board of three members in their stead. This small board will fix the tax valuation of all public service corporations, a duty which has fallen to the County Auditors for the last 50 years. It is contended that three competent appointees could appraise these properties more equitably than the County Auditors. The Ohio Supreme Court has declined to allow a quo warranto suit to be instituted in that court to oust J. C. Morris from the office of State Railroad Commissioner. John C. Sullivan, appointed to the position by Governor Harmon, sought to bring the suit in the highest court in order to secure an early decision. The court stated that the matter was not so urgent but that the suit could be tried in the Circuit Court, and then, if desired, it could be brought to the Supreme Court on the points of law involved. Mr. Sullivan will probably file the suit in the Franklin County Circuit Court. Commissioner Morris holds that he was properly appointed, that his appointment was confirmed by the Senate, and that Governor Harmon has no right to appoint a successor until his term has expired.

Ontario.—Feb. 16 has been set as the date for the opening of the Ontario Legislature. Very few special measures are in prospect, and it is doubtful if the session will be prolonged. Only a few street railway matters have been broached so far. The Toronto Suburban Railway, it is understood, proposes to apply for permission to operate on Sunday, and incorporation is to be asked by the Tillsonbury & Southern Counties Radial Electric Railway, which proposes to build between Tillsonbury, London, Woodstock and Ingersoll.

Pennsylvania.—A bill has been introduced in both branches of the Legislature to enlarge the Pennsylvania State Railroad Commission from three to seven members, four of whom shall be practical railroad men of 15 years' experience. It is not expected that this bill will pass, but the opinion prevails that at least one member of the commission should be a practical railroad man, which is not the case at present, and an attempt may be made to amend the original act at this session. Mr. Tunis has presented a bill requiring both ends of trolley cars to be enclosed between Dec. 1 and April 1. A new merger act, which will permit corporations chartered under different acts, general or special, to merge, has been presented by Mr. Moyer, chairman of the Judiciary General Committee. The provision is made that the companies must not be engaged in different lines of business. Much interest is shown in the action to be taken by the Committee on Municipal Corporations on the Ehrhardt bill, which provides that the real estate of all public service corporations within the State shall be subject to taxation for county, city and borough purposes.

Texas.—A proposed amendment to the Constitution of Texas, which has for its object the encouragement of interurban electric railway projects in Texas, is pending in the Legislature. Its provisions give counties the right to vote taxes and issue bonds to build or aid in building interurban electric railways.

Financial and Corporate

New York Stock and Money Market

FEB. 9, 1909.

This is surely the day of small things in the stock market. Small trading, small price changes and small dealers. The volume of trading is hardly averaging 400,000 shares a day and it is said that the majority of this is done by floor speculators. A day or two of fractional advances is followed by a day or two of sagging prices. The small traders buy a few hundred shares apiece on a decline and that starts an advance; the prospect of a profit of a point or two is a sufficient signal to unload, with a consequent decline. The most important development during the past week was the final declaration of that long-promised dividend on Brooklyn Rapid Transit. It was only one per cent and no assurance was given that it would be repeated quarterly. The immediate effect of the declaration on the stock was not appreciable. As usual, the insiders had known what was coming long in advance—as evidenced by the 20-point rise in the stock in the last three months.

Within the past few days there has been renewed activity in the Interborough-Metropolitan issues. Considerable trading in both the preferred and the common has been done and the street is full of rumors as to what is about to happen. There have been only slight price changes, however, and there is little reason to believe that any practical system of reorganizing the Metropolitan Street Railway has been devised. A much better explanation of the commotion is the published statement that the Interborough properties are showing returns of $14,000 a day more than those of the same period last year. The Street is anxiously waiting for the decision of the up-State Public Service Commission on the application of the Erie Railroad for permission to issue $30,000,000 of bonds.

The money market continues easy and the demand for bonds is as eager as ever. The call of the United States Treasury for $30,000,000 from National Banks has had little effect. Rates quoted to-day are: Call, 2¼@2½ per cent; 90 days, 2¾@3 per cent.

Other Markets.

The Boston stock market shows little disposition to do much trading in traction securities. A few shares of Massachusetts Electric have been sold, both of common and preferred, but prices are little changed. Boston Elevated has been traded in to a limited extent at about 129.

In the Philadelphia market, Rapid Transit and Philadelphia Electric have been fairly active. The former has maintained its price in the neighborhood of 27½, but the latter has shown a disposition to be weak and is down a few points from previous quotations. Electric Storage Battery is stationary around 44.

Tractions in Chicago are dull. Even the various series of Chicago Railways stock seem to be temporarily out of the market. Subway stock is the only issue which evinces any life, and the price of this is practically unchanged in the neighborhood of 26.

In Baltimore, the United Railways 4s are still the active issue in traction dealings. Every day quite a number of these bonds and the other issues of the same company are offered and bought. Prices, however, show little variation. The 4s are about 85, the incomes 51½, and 5s in the neighborhood of 79.

Quotations of various traction securities as compared with last week follow:

	Feb. 2.	Feb. 9.
American Railways Company, Philadelphia	*45	*45
Boston Elevated Railway	126	129
Brooklyn Rapid Transit Company	70⅞	71
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a74	a74
Consolidated Traction Company of New Jersey, 5 per cent bonds	a106	a107
Detroit United Railway	56½	61½
Interborough-Metropolitan Company	15⅜	16⅛
Interborough-Metropolitan Company (preferred)	41¾	43⅞
Manhattan Railway	*151½	148½
Massachusetts Electric Companies (common)	13⅝	14¼
Massachusetts Electric Companies (preferred)	65	69
Metropolitan West Side Elevated Railway, Chicago (common)	*16	*16
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	*42	*42
North American Company	80¾	81⅛
Philadelphia Company, Pittsburg (common)	42	*41¾
Philadelphia Company, Pittsburg (preferred)	44	44¼
Philadelphia Rapid Transit Company	27¾	27¼
Philadelphia Traction Company	*03	93
Public Service Corporation, 5 per cent collateral notes	a100	a100
Public Service Corporation certificates	a76	a77
Twin City Rapid Transit Company, Minneapolis (common)	99¼	104⅝
Union Traction Company, Philadelphia	54¼	53⅛

a Asked. * Last sale.

Report of Detroit United Railway

The annual meeting of the stockholders of the Detroit United Railway was held on Feb. 2. A. E. Peters, Detroit, was elected a director to succeed H. A. Everett, Cleveland, resigned. J. C. Hutchins, president of the company, said that arrangements have been made to retire the $1,500,000 of notes which fall due in March. The report of the company for the year ended Dec. 31, 1908, as presented at the meeting, compares as follows with the report for the year ended Dec. 31, 1907:

	1908.	1907.
Gross earnings	$7,114,760	$7,073,245
Operating expenses, including taxes	4,559,123	4,465,043
Net earnings from operation	$2,555,637	$2,608,202
Income from other sources	64,957	60,505
Gross income less operating expenses	$2,620,594	$2,668,707
DEDUCTIONS.		
Interest on funded and floating debt:		
Detroit United Railway	$1,138,799	$1,106,548
Rapid Railway System	135,050	135,050
Sandwich, Windsor & Amherstburg Railway	23,785	18,000
Detroit, Monroe & Toledo Short Line Railway	122,131	121,700
Detroit, Jackson & Chicago Railway	198,900	172,950
	$1,618,665	$1,554,248
Dividends, Detroit United Railway	.....	$343,750
Charged to depreciation reserve	$300,000	276,000
Charged to contingent liability reserve	50,000	.....
Total deductions	$1,968,665	$2,173,998
Surplus income	$651,927	$494,708

PASSENGER STATISTICS, YEAR 1908.

Revenue passengers	126,668,968
Transfer passengers	36,622,490
Employee passengers	5,472,416
Total	168,763,874
Receipts revenue passenger	$0.0525
Receipts per passenger	0.0394

MILEAGE STATISTICS, YEAR 1908.

Car mileage	30,111,196
Earnings, car mile	$0.2362
Expenses, car mile	$0.1514
Net earnings, car mile	$0.0848

The condensed balance sheet of the company as of Dec. 31, 1908, shows:

ASSETS.

Value of entire property	$38,085,156
Treasury securities	3,005,459
Accounts current	710,536
Sundry prepaid expenses account	43,500
Current assets, such as cash, materials and supplies, etc	590,377
Discount on gold notes and bonds	164,751
Total	$42,599,779

LIABILITIES.

Capital stock	$12,500,000
Mortgage bonds and gold notes	25,633,000
Vouchers payable, bills payable, unredeemed tickets, etc	1,028,789
Total reserve fund	946,825
Surplus account (less adjustments) and net income, 1908	2,491,165
Total	$42,599,779

In presenting the report, President Hutchins said:

"The company made liberal expenditures during the year in the maintenance of its tracks, rolling stock and other properties. On Jan. 1, 1908, the company's depreciation reserve stood credited with $526,000. Some heavy expenditures were incurred for extensive renewals of tracks and foundations, involving heavier construction to meet increased traffic conditions, particularly on Jefferson, Michigan and Grand River Avenues, a part of the cost of which, to-wit, $137,385, was charged against this depreciation reserve. There was added to the credit of the depreciation reserve during the year $300,000, leaving said fund with a present credit balance of $688,615. At the beginning of the year the company's surplus stood credited with $1,996,363. There has been credited to a contingent liability reserve the sum of $50,000 out of the earnings of the year 1908 and the sum of $150,000 out of the surplus above mentioned, leaving a present surplus of $2,491,165."

Massachusetts Railroad Commission Lists Dividend-Earning Roads.

The Massachusetts Railroad Commission has transmitted the following list of electric railways to the Bank Commissioner of Massachusetts, in accordance with the statutes providing that the Bank Commissioner shall annually be notified of the street railway companies which appear from the returns made by them to have annually earned and properly paid, without impairment of assets or capital stock, dividends of not less than 5 per cent upon their capital stock for the past five years: Boston Elevated Railway, Boston & Revere Electric Railway, Citizens Electric Street

Railway of Newburyport, Dartmouth & Westport Street Railway, East Middlesex Street Railway, Fitchburg & Leominster Street Railway, Holyoke Street Railway, Pittsfield Electric Street Railway, Springfield Street Railway, Union Street Railway of New Bedford, West End Street Railway. The bonds of these companies are a legal investment for Massachusetts savings banks.

Annual Report of Northern Ohio Traction & Light Company

The Northern Ohio Traction & Light Company showed a decrease of slightly under 1 per cent in its gross earnings during the year ended Dec. 31, 1908, as compared with the previous year. The increase in the average mileage operated during this period was 3.4 per cent. The following table shows the totals for the year, as compared with the two preceding years:

Year ended Dec. 31.	1906.	1907.	1908.
Gross earnings for year	$1,703,340	$1,909,061	$1,890,473
Operating and taxes	1,006,842	1,095,755	1,086,424
Net earnings	$696,498	$813,306	$804,049
Applied to payment of interest on bonds and collateral trust notes	483,174	513,242	526,532
Available for company's uses	$213,324	$300,064	$277,517
*Dividends on stock	113,527	158,778	134,151
Surplus	$99,797	$141,286	$143,366
Average mileage in operation	200	207	214
Gross earnings per mile	$7,885	$8,556	$8,168
Net earnings per mile	3,115	3,558	3,386
Ratio of expenses to earnings	59.11	57.40	57.47

*March and June dividends for 1908, ½ of 1 per cent; September and December dividends for 1908, ¼ of 1 per cent.

From the surplus for 1908, shown in the foregoing, there was deducted $112,007 on account of "depreciation, reconstruction," etc., as compared with a similar charge in the preceding year of $100,000. The final balance sheet surplus as of Dec. 31, 1908, was $782,942. The condensed statement is supplemented by details of earnings and expenses. The gross revenue derived from freight amounted to 2.4 per cent of the total gross earnings from all sources. The gross earnings include $66,657 from "parks," representing 3.5 per cent of the total gross revenue for the year.

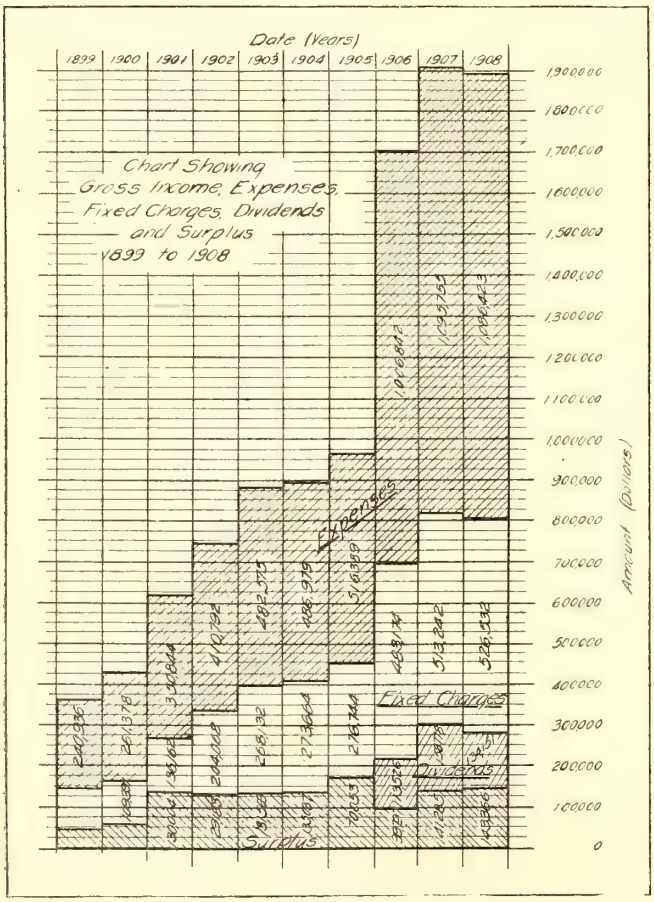


Chart of Earnings of the Northern Ohio Traction & Light Company

The total expenditures for maintenance of equipment and of way and structures amounted to $247,762, which is equivalent to 13.2 per cent of gross earnings, or 22.9 per cent of the operating expenses. The following table shows the earnings and expenses in detail for three years:

Earnings.	1906.	1907.	1908.
Passengers	$1,449,900	$1,645,864	$1,623,070
Light and power	126,249	137,921	142,544
Car mileage	4,662	4,228	4,107
Freight, etc.	41,250	43,299	44,615
Parks	61,419	68,561	66,656
Interest and discount	4,522	2,898	2,589
Miscellaneous	15,338	6,290	6,892
Total	$1,703,340	$1,909,061	$1,890,473
Expenses.	**1906.**	**1907.**	**1908.**
Maintenance way and structures	$89,502	$95,820	$100,160
Maintenance equipment	132,568	155,945	147,603
Operation power plants	215,080	251,212	243,202
Conducting transportation	318,603	354,092	355,320
General	251,089	238,686	240,139
Total	$1,006,842	$1,095,755	$1,086,424
Net earnings	696,498	813,306	804,049

H. A. Everett, the president, says in his statement to shareholders:

"Notwithstanding the slight decrease in income for the year, the property has been maintained at its usual high standard. The total expenditure for maintenance was $247,763, as against $251,765 for the year 1907, a decrease of only $4,002. This slight decrease is due entirely to the reduction in the cost of material and not to any lack of attention to either the roadbed or the equipment.

"There were replaced 21,000 ties in 1908, as against 15,000 in 1907.

"On North Howard Street, in Akron, 2000 ft. of the old 60-lb. rails on the southbound track were removed and replaced by 80-lb. 7-in. T-rail. On South Howard Street, between Market and Main Streets, the southbound track was renewed with 114-lb. 7-in. Trilby rails, laid on steel ties with concrete foundation and repaved with brick and asphalt, and notwithstanding that the new construction is of a more expensive type than the track it replaced, no part of this expnese has been capitalized.

"The total amount expended for additions and betterments during the year was $162,103, subdivided as follows:

Track, roadway and electric lines	$44,688
Buildings and fixtures	1,645
Power houses	45,025
Cars and equipment	53,863
Electric light department	14,147
Miscellaneous	2,734

"On March 15 and June 15, the usual dividend of one-half of 1 per cent was paid. On account of the summer earnings showing a decrease, the directors thought it advisable to reduce the dividend for the third and fourth quarter of the year to one-quarter of 1 per cent.

"The company now has 663 stockholders of record, an increase of 128 over the previous year."

Annual Report of Ft. Wayne & Springfield Railway

The annual report of the Ft. Wayne & Springfield Railway, Decatur, Ind., covering the year ended July 31, 1908, shows gross revenue of $48,498 and expenses of $34,509, leaving net revenue of $13,989. To this total there was added $6,995, representing the net revenue obtained in the first six months of operation, and making a total of $20,984. From this total two dividends, aggregating $9,919, were paid, leaving a balance of $11,065.

The total number of passengers carried during the year was 166,413. The number of employees carried was 7,905. The total number of passenger car-miles run was 154,601 and the number of baggage car-miles run was 13,595.

The report shows the following division of earnings by months:

	Passenger earnings.	Freight and express earnings.	Sundry receipts.
August, 1907	$4,020.78	$587.12	....
September, 1907	3,768.15	543.51	$22.98
October, 1907	3,237.89	829.60	22.50
November, 1907	2,619.00	342.25	209.00
December, 1907	3,230.17	293.00	....
January, 1908	3,010.71	633.56	....
February, 1908	2,827.92	423.53	5.15
March, 1908	2,804.20	626.72	18.04
April, 1908	2,651.37	530.46	....
May, 1908	4,052.29	990.42	304.09
June, 1908	3,695.36	888.03	76.00
July, 1908	4,317.13	842.97	74.55

Brooklyn (N. Y.) Rapid Transit Company.—The directors of the Brooklyn Rapid Transit Company at a meeting on Feb. 5 declared an initial dividend of 1 per cent. The resolution authorizing the dividend, which provides that it shall be paid quarterly, thus putting the stock on a 4 per cent basis, follows: "Resolved, That a dividend of 1 per cent on the capital stock of this company be paid on April 1 to stock of record on March 10. Resolved, That as dividends are declared they be made payable on April 1, July 1, Oct. 1 and Jan. 1. A surplus over operating ex-

penses and fixed charges sufficient to pay a dividend has been shown by the reports of the company for some years, but a conservative policy has been followed, and none has been declared. At the same meeting the directors re-elected the retiring officers, abolishing, however, the office of third vice-president held by H. C. DuVal. Mr. DuVal was elected president of two of the subsidiary companies, the Coney Island & Gravesend Railway and the Brooklyn, Queens County & Suburban Railroad.

Calumet & South Chicago Railway, Calumet, Ill.—The Calumet & South Chicago Railway has recently sold $150,000 of its first mortgage bonds to the First Trust & Savings Bank, Chicago, Ill. They increase the outstanding issue of first mortgage bonds from $500,000 to $650,000. The securities are similar to the rehabilitation bonds of the Chicago Railways Company and the Chicago City Railway.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—The bondholders committee of the Illinois division of the Chicago & Milwaukee Electric Railroad announces that sufficient bonds have been deposited with it to commence foreclosure proceedings and that after Feb. 15 no further deposits of bonds will be received except upon such terms as the committee may impose.

Chicago (Ill.) Consolidated Traction Company.—The Harris Trust Company, Chicago, Ill., announces that 75 per cent of the underlying bonds of the Chicago Consolidated Traction Company, aggregating $2,250,000, have been deposited under the call of the protective committee appointed in November, 1908, when the North Side Electric Street Railway defaulted on its interest. The time for deposit expires March 1.

Denver (Colo.) City Tramway.—A meeting of the stockholders of the Denver City Tramway has been called for March 6 to vote to retire and discharge a bond issue and mortgage authorized at a special meeting of the stockholders on Aug. 27, 1908, and to authorize an issue of not more than $25,000,000 of 5 per cent, 25-year bonds to be secured by a mortgage covering all of the property of the Denver City Tramway.

Greensboro (N. C.) Electric Company.—It is announced that this property has been sold to a syndicate organized by W. N. Coler & Company, New York, N. Y. A new corporation, to be called the North Carolina Public Service Company, will be formed with a capital stock of $3,500,000, to take over the property. Coler & Company, at their office in New York, said that a statement would be made by them in the near future regarding extensions and improvements.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—At the annual meeting of stockholders of the Indianapolis & Cincinnati Traction Company recently, the following directors were elected: W. I. Durban, W. J. Alford, T. F. Rose, G. A. Ball, J. F. Wild, C. L. Henry and J. J. Appel. The directors re-elected the following officers: C. L. Henry, president; T. F. Rose, vice-president; J. F. Wild, secretary; J. J. Appel, treasurer.

Interstate Railways Company, Philadelphia, Pa.—The Interstate Railways Company defaulted on Feb 1 on the interest on its $10,776,600 of collateral trust 4 per cent. bonds, and in accordance with a plan outlined by Edward B. Smith & Company, Philadelphia, Pa., for the reorganization of the company, bondholders of the company desiring to become associated with Smith & Company are urged to deposit their holdings with the Philadelphia Trust, Safe Deposit & Insurance Company, Philadelphia. E. J. Moore, C. F. Fox, John S. Bioren, William Rotch Wister and Charles H. Bean, who also own a considerable amount of the bonds of the Interstate Railways Company, have sent the following notice to bondholders of the company: "Bondholders are strongly urged not to deposit their bonds with any depository until a clear and comprehensive plan of reorganization has been submitted in full detail. Bondholders are requested to send their names and addresses, together with the amount of their holdings, to Thomas L. Mattson, No. 314 Chestnut Street, Philadelphia."

Kenosha (Wis.) Electric Railway.—The Kenosha Electric Railway, which, as announced on page 114 of the ELECTRIC RAILWAY JOURNAL of Jan. 16, 1909, has been purchased by the Investment Registry Company, London, Eng., has elected officers as follows: H. E. Spalding, president; Lloyd Harris, vice-president; Clayton R. Taylor, secretary and treasurer; H. E. Spalding, Lloyd Harris, Wm. L. Carpenter, Clayton R. Taylor and C. B. Shedd, directors.

London (Ont.) Street Railway.—The report of the London Street Railway for the year ended Dec. 31, 1908, was presented at the annual meeting of the company in London on Feb. 3. It shows as follows: Gross earnings, $235,032 for 1908, as against $232,376 for 1907; net earnings, $67,465 for 1908, as against $64,351 for 1907; surplus, $39,010 for 1908, as against $37,123 for 1907. In presenting the report H. A. Everett, president of the company, said that $50,000 of bonds had been disposed of recently; that there had been no further developments relative to the sale of the property to the city, and that at the election in January a substantial majority had been obtained to the proposal to operate cars on Sunday.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—At the annual meeting of the Mahoning & Shenango Railway & Light Company to be held on Feb. 16, it will be voted to issue $3,000,000 in bonds to provide funds for extensions and improvements.

Metropolitan Street Railway, New York, N. Y.—Two thirds of the general mortgage and collateral trust 5 per cent bonds, of the Metropolitan Street Railway due in 1997 have been deposited with the Guaranty Trust Company, New York, for the committee of which Alexander J. Hemphill is chairman. The time for deposit of bonds has been extended to include Feb. 23, after which date no more deposits will be received except upon payment of $5 per bond.

Montgomery (Ala.) Traction Company.—Richard Tillis has turned over to the Montgomery Traction Company 10,000 shares of stock of the company of a par value of $100 per share, and all of these having been cancelled, the capital stock of the company has been reduced from $2,000,000 to $1,000,000. At the purchase of the property of the company by Mr. Tillis, the company was reorganized with a capital of $2,000,000 so as to cover the bonded debt as required by law. Much of this indebtedness having since been eliminated, it was deemed advisable to reduce the capital.

Northwestern Elevated Railroad, Chicago, Ill.—It is announced that the Northwestern Elevated Railroad Company has arranged to finance its requirements and to refund the outstanding issue of 4 per cent bonds. It is proposed to sell $3,668,000 of bonds owned by the company and to refund the entire issue of $19,498,000 of bonds outstanding. At the same time, the preferred stock of the company will be placed on a dividend basis of not less than 4 per cent per year. The bonds which it is proposed to retire do not mature until Sept. 1, 1911. They are convertible into preferred stock and can be redeemed on any interest date at the option of the company at 102½ and accrued interest. If the bonds are called for redemption, the holder will still have the option of taking preferred stock instead of bonds.

New York State Railways, Rochester, N. Y.—The following official announcement has been made regarding the New York State Railways, which is to take over as a holding company the electric railways in New York State controlled by the Central Railway Syndicate: "More than 85 per cent of the preferred stock of the Rochester Railway having been deposited with the Guarantee Trust Company, New York, under its letter of Dec. 18, 1908, and the consolidation agreement having been approved, notice is now given that the time for further deposit of such stock has been extended to Feb. 10, 1909, after which date deposits will be accepted on such terms as may be hereafter fixed."

Newport News & Old Point Railway & Electric Company, Newport News, Va.—The Maryland Trust Company, Baltimore, Md., on Feb. 9 filed in the United States Court at Norfolk a bill asking a receiver for the Newport News & Old Point Railway & Electric Company.

Southern Street Railway, Chicago, Ill.—The committee of the City Council on local transportation has appraised the property and finances of the Southern Street Railway at $750,000. The value of the physical property was placed at $520,158, the franchise was valued at $174,598 and approximately $56,000 was allowed for paving done by the company. If the company accepts this value a lease of the property will be arranged with the Chicago City Railway, which will then operate it under the same conditions that it now does its own lines.

Toronto (Ont.) Railway.—The Toronto Railway has increased its annual dividend rate to 7 per cent.

Waupaca Electric Light & Railway Company, Waupaca, Wis.—Irving P. Lord and Wallace H. Lord have purchased from A. M. Penney, P. M. Olfson and Charles Churchill stock of the Waupaca Electric Light & Railway Company to the amount of $38,800 par value. The following officers have been elected: Irving P. Lord, president and general manager; W. H. Lord, secretary; Grace B. Lord, vice-president; Estelle A. Wheeler, treasurer and assistant secretary. It is understood that a number of improvements will be made to the property.

Western New York & Pennsylvania Traction Company, Olean, N. Y.—The Public Service Commission of the Second District of New York has authorized the Western New York & Pennsylvania Traction Company to issue to the Trust Company of America a mortgage of $5,000,000 supplemental to its mortgage executed to the Colonial Trust Company, this company having been merged with the Trust Company of America.

Traffic and Transportation

Court Files Memorandum Regarding Attendance at Meetings of Commission in New York

Judge Lacombe of the United States Circuit Court on Feb. 4 filed the following memorandum, in accordance with a request by Receivers Joline and Robinson of the Metropolitan Street Railway, New York, for instructions concerning their attendance before the Public Service Commission of the First District of New York in the matter of the Eighth Street line and others.

"Receivers have asked the Court for instructions as to whether they should appear before the Public Service Commission on a hearing in the matter of Eighth Street line and another as to fenders and wheelguards.

"As to 'hearings' generally before the Public Service Commission the practice, as the Court understands it, is as follows:

"Being of the impression that some change in operation of street cars is desirable, the board sets on foot an investigation. Its inspectors watch the movement of cars and count them and their passengers; its engineers visit the property and make examinations—all of these send reports in to the commission. One or more of its members consider these reports, perhaps make further inquiry, and the subject is then brought before the board at an executive session, and presumably is carefully looked into and a form of order prepared which it is supposed will effect an improvement.

"That order is then served upon those in charge of the road with the statement that they will be given a hearing before the Public Service Commission or one of its members on some named day. When that day comes the reports of the board's officials and employees are laid before it, and in some cases they are further examined along the same lines. The representatives of the road are allowed to examine witnesses, who are cross-examined by counsel for the board.

"Thereafter in executive session the commission decides whether or not the proposed order, which it had already carefully prepared, should be made final, and, if it be, the order is served and obedience to it enforced by fine or mandamus. The same body is, therefore, practically complainant, prosecutor, judge, jury and sheriff. Under these circumstances it has seemed to the receivers (and the court approved their conclusion) that in cases where they had already fully informed the commission of the reasons why they objected to the order, they would accomplish nothing by attending the hearing; in such cases they have accepted final orders with the statement that they would obey them so far as possible.

"If fined for alleged subsequent disobedience it would be for them to show that compliance was impossible—as, for instance, that they could not reconstruct 10 cars a day after their repair shops and car barns were destroyed by fire, or that in certain congested streets they could not always run cars on a few seconds headway. In cases, however, where they dispute the commission's authority to make the proposed order, as in the Fifty-ninth Street 'zone' transfer case, they have attended hearings and put in testimony as an essential preliminary to an application for review in the State courts.

"The hearings now ordered may possibly so develop as to make it desirable to attend, should the wheelguards or fenders of some particular manufacturer or patentee be prescribed or should some order be made fining receivers for some alleged failure to run cars in conformity with orders, the receivers might conclude to bring the matter before the State Court, and in order to do so effectively it might be necessary for them to be represented on the hearing. The notices apparently contemplate something other than the ordinary car service hearings, and receivers may attend them."

Explanation by Public Service Commission of Cost of Fender Tests

In explanation of the expenditures made by it in connection with the tests of fenders conducted recently at Schenectady and Pittsburg, the Public Service Commission of the First District of New York has issued a statement which says in part:

"A schedule of tests was laid down, comprising 72 different tests for each fender, each of these tests having different conditions as to pavement, speed and position of dummy on the tracks.

"In order that the effectiveness of the devices could be studied to the fullest extent, the dummies were so built with the joints in the dummies, and fully clothed, so as to re-act as nearly like persons as possible. The matter of clothing was found to be very important. The fender would apparently make a clean pick-up, and at the last second a part of the clothing would roll under the fender and catch in some place and pull the dummy off and cause it to get under the car. This happened frequently, and demonstrated clearly that fenders and wheel guards must be so constructed and arranged that the clothing of persons cannot get underneath.

"This may seem a simple proposition, but when the commission takes up the matter of requiring companies that have been having large numbers of accidents to change their fenders, the companies will doubtless insist that their fenders are of the best. Fortunately, the commission now has proof as to which are the best fenders and will produce such proof.

"The tests at Schenectady and Pittsburg lasted nearly two months and more than 1800 different tests were made. A photograph was made of each test, so that we now have satisfactory evidence as to what every one of the devices can do under the different conditions as to pavement and speed that exist in New York City. The entire tests have cost less than $10,000. The report upon them will show that the commission conducted the tests in a careful and economical manner and has produced results that are bound to have great influence in the selection of safety devices for cars, not only in New York City but throughout the country, for we have received communications from city authorities and from street railway companies in other cities of the country asking for the report at the earliest moment in order that they might determine the character of fenders to be used in their cities."

Pay-As-You-Enter Cars in Washington.—On Feb. 21 the Capital Traction Company, Washington, D. C., expects to place 20 pay-as-you-enter cars in operation on its Fourteenth Street division.

Cars for Women Urged in Subway.—Mrs. Frederick W. Longfellow has suggested to the Public Service Commission of the First District of New York that the Interborough Rapid Transit Company should be ordered by the commission to reserve the last car of each train operated in the subway exclusively for unaccompanied women.

Recommendations by Pennsylvania Commission Regarding Waiting Rooms.—The Pennsylvania State Railroad Commission has recommended that the Lebanon Valley Street Railway establish a waiting room at its distributing point in Lebanon, Pa., at the terminus of its lines in Myerstown, at a point about the center of Annville, and at its terminus in Palmyra.

Dividend for Employees of the Columbus Railway & Light Company.—On Feb. 1 the Columbus Railway & Light Company, Columbus, Ohio, paid the employees a dividend in proportion to the amount of their wages for a fixed period. This dividend is secured by declaring a dividend of one-half of 1 per cent on the capital stock of the company.

Prize for Name of Limited Train.—The Illinois Traction Company, Peoria, Ill., has offered a cash prize of $10 for the best name suggested for the new train between Springfield and St. Louis, which will be in operation on April 1. The trains will leave Springfield and St. Louis morning and evening and make the run in three hours. B. R. Stephens, traffic manager of the company, is conducting the contest, which will close on March 15.

Side-Door Subway Trains in New York Subway on Feb. 15.—The Public Service Commission of the First District of New York has granted the Interborough Rapid Transit Company an extension of time until Feb. 15 in which to place the experimental trains composed of cars equipped with side-entrance doors in operation in the subway. Commissioner Eustis in explanation said: "It has been a physical impossibility to get the cars ready sooner. The company has been experimenting with two kinds of pneumatic apparatus, with which the doors are to be opened. Owing to the failure of the manufacturers to deliver the apparatus that has been selected, some of the cars could not be equipped. Word has been received from the manufacturers that the cars to constitute the first train will be delivered by Feb. 10. That will make it possible to have the first train ready by Feb. 15."

New Timetable by Illinois Traction System.—A new 14-page timetable of the Illinois Traction System has just been issued by the general traffic department, of which B. R. Stevens, Springfield, Ill., is manager. It is attractively printed on cream-tinted paper with brown covers. On the first inside page there is a large map of the system and on the opposite page a table of contents with a plain

statement to intending passengers advising them to purchase tickets before boarding cars. The timetables for each of the divisions are presented on 10 pages and below the timetables is exhibited information with regard to the handling of baggage, mileage tickets, express and freight service and sleeping-car service. On the inside of the back cover a very interesting comparison is presented of the rates of fare by steam railroads and electric railways, showing the percentage saved by electric railways. The outside covers are decorated with engravings of passenger, express and sleeping cars.

Hearing on West Roxbury Service.—The Massachusetts Railroad Commission gave a hearing recently on the petition of residents of the Germantown section of West Roxbury for modifications in the service on the Grove Street-Oakdale line of the Old Colony Street Railway, with the request that the line be operated by the Boston Elevated Railway from Washington and Grove Streets to the Boston-Dedham line. A. A. Ballantine, counsel for the Boston Elevated Railway, stated that the company does not feel willing to operate its cars on a single track over which the cars of another company are run. R. S. Goff, general manager of the Old Colony Street Railway, then stated that the length of line in question is only about one-third of a mile, and presented figures showing the traffic on the line on Jan. 25, 26 and 27, 1909. The service is performed by a single car, which operates on a half-hourly interval from 6:35 a. m. to 10:35 p. m. between Grove and Washington Streets, West Roxbury, where the service of the Boston Elevated Railway ends, and the section of East Dedham called Oakdale, a total distance of approximately 1 mile. Mr. Goff stated that the line barely paid its running expenses.

Accident Fakir Held on Perjury Charge.—David A. Howard, age 28, colored, of Baltimore, Md., was arrested on Feb. 2, 1909, by Wm. M. Atkinson, of the Baltimore police, charged with attempting to defraud the United Railways & Electric Company, Baltimore, out of $50 by false representation. On Jan. 8, 1909, Howard visited his wife, from whom he was separated, and in an altercation that followed he received a fracture of the left arm and several cuts about the head. Subsequently he made an affidavit that a wagon which he drove had been struck by an eastbound car of the United Railways & Electric Company and that he had been thrown out of the wagon and his arm broken. His arrest was brought about as the result of an investigation by Captain Pumphrey, Detective Atkinson and Special Agent Jos. J. Gilbert of the United Railways & Electric Company. After the arrest Howard confessed to Capt. Pumphrey, and Detectives Armstrong and Atkinson that the injuries he sustained were the result of the fight at the house of his wife. Justice Grannan, at the Central Police Station, held Howard for the action of the Grand Jury in default of $2,000 bail on the charge of perjury and attempting to obtain money by false pretense.

Recommendation That District of Columbia Regulate Its Own Public Utilities.—Reporting on the Jenkins bill recently introduced in the House of Representatives providing for the purchase by the District of Columbia of the property of all public utility companies within its boundaries, District Commissioner Macfarland said to his fellow commissioners: "While the Commissioners recognize that the District electric railway commission, composed of the citizens of the District, appointed by the Interstate Commerce Commission to aid it in the execution of the duty imposed upon the Interstate Commerce Commission by Congress at the last session with respect to the regulation of the street railways of the District of Columbia, has done a valuable and efficient service, resulting in improvement, the Commissioners believe that this is a strictly municipal function which ought to be performed by the municipal government. There is no reason why the Interstate Commerce Commission should be performing this function even with the aid of District citizens, who give their time freely for that purpose. The street railway systems, the two gaslight companies, the electric light and power company and the telephone company ought to be under the supervision of the District Commissioners, and the recommendation of legislation for this purpose is earnestly renewed. It seems to me that Congress should be given opportunity to consider this proposition in the view that it might be adopted, and give the District the benefit of adequate public regulation of all the public utility corporations. If that fails to produce satisfactory results then the only recourse would be to acquire the plants and operate the public utilities as part of the municipal system. I move that the substance of this statement be adopted as the report of the Commissioners on this bill." It is expected that the Jenkins bill will be amended in accordance with these recommendations or that a substitute measure will be introduced.

Personal Mention

Mr. C. E. Morgan has been appointed general manager and purchasing agent of the Indianapolis, Crawfordsville & Western Traction Company, Crawfordsville, Ind., to succeed Mr. Eugene Holcomb.

Mr. Charles Murdock has been elected president of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to succeed his father, Samuel Murdock, deceased.

Mr. John E. Eustis and **Mr. James E. Sague** have been renominated by Governor Hughes of New York as members of the Public Service Commission of the First District of New York and the Public Service Commission of the Second District of New York, respectively. Both Mr. Eustis and Mr. Sague are reappointed for five years.

Mr. H. C. DuVal, who was formerly third vice-president of the Brooklyn (N. Y.) Rapid Transit Company, on Feb. 5, was elected president of the Coney Island & Gravesend Railway and the Brooklyn, Queens County & Suburban Railroad. The office of third vice-president of the Brooklyn Rapid Transit Company was abolished at the annual meeting of the directors.

Mr. Alfred Anderson, who was recently appointed purchasing agent of the Metropolitan Street Railway, New York, N. Y., has long been connected with railroad and steamship interests. He was general purchasing agent of the Panama Railroad and the Panama Steamship Line for 10 years and also acted as general shipping agent and assistant purchasing agent of the Isthmian Canal Commission for four years.

Mr. Charles G. Lohman, who recently resigned as general traffic manager of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has been appointed assistant to Mr. J. E. Calish, assistant treasurer and general manager of the Buffalo & Lake Erie Traction Company, Erie, Pa. Mr. Lohman before being appointed general traffic manager of the Chicago, South Bend & Northern Indiana Railway was general superintendent of the company. He has been identified with electric railroading for about 10 years, having entered the employ of the Indianapolis Street Railway in 1899.

Mr. William B. Rockwell has resigned as general manager of the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., and Mr. R. A. Dyer, Jr., assistant general manager and electrical engineer of the Rochester, Syracuse & Eastern Railroad, has been appointed to succeed him. Mr. Rockwell has been connected with the Syracuse, Lake Shore & Northern Railroad since July, 1902. He is treasurer of the Hurley Track Laying Company and expects to remove to Mexico in May in the interest of the Hurley Track Laying Company, which has recently closed a contract for laying several hundred miles of track for the Cananea, Rio Yagua & Pacific Railroad.

Prof. H. H. Norris, of Cornell, is being mentioned in connection with a nomination for a managership in the American Institute of Electrical Engineers. In a recent circular letter, signed by Professors Nichols, Bedell and Karapetoff, his qualifications for this office are mentioned as follows: "Professor Norris has been closely associated for the past few years with the affairs of the Institute as chairman of the educational committee and as a member of the committee on meetings and papers, and on sections. This gave him a close insight into the proper management and the best policies of the Institute, as well as personal acquaintance among the most prominent members of the Institute."

Mr. Louis C. Fritch, whose appointment as consulting engineer of the Illinois Central Railroad to supervise the perforation of plans for the electrification of that company's Chicago terminal was announced in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909, has been connected with the Illinois Central Railroad as assistant to the president since March 1, 1905. Mr. Fritch was born at Springfield, Ill., in August, 1867, and was graduated as a civil engineer from the University of Cincinnati. Subsequently he was admitted to the bar in Ohio. In 1884 Mr. Fritch entered railway work with the Ohio & Mississippi Railway as supervisor's assistant and was assistant engineer of that company from Jan. 1, 1886, to October, 1892. He then was appointed engineer of maintenance of way of the company, and chief engineer in charge of construction of the Cincinnati & Bedford Railway. From Nov. 1, 1893, to Sept. 1, 1899, Mr. Fritch was division engineer of the Baltimore & Ohio Southwestern Railroad, which absorbed the Ohio & Mississippi Railway. From Sept. 1, 1899, to Nov., 1902, he was superintendent of the Mississippi division of the

Baltimore & Ohio Southwestern Railroad. Since November, 1902, Mr. Fritch has been connected with the Illinois Central Railroad.

Mr. S. S. Neff, who recently resigned as general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J., has been elected president of the Interstate Engineering & Supply Company, Philadelphia, Pa. This company will do a general engineering and contracting business, and Mr. Neff's first work with it will be in connection with the building of a 10,000-kw power station for the Metropolitan Electric Company at Reading, Pa., with substations between Pottstown and Wormelsdorf. Mr. Neff is a graduate of Rensselaer Polytechnic Institute, and was connected with the Pennsylvania Railroad for nine years after he was graduated as supervisor of maintenance of way and assistant civil engineer. Later Mr. Neff held positions successively with the Cornwall Railroad, the Great Northern Railroad, the Vandalia Railroad and the Lake Superior & Ishpeming Railroad. Subsequently he became connected with the Union Elevated Railway, Chicago, from which company he resigned in 1900 to enter the employ of the Boston Elevated Railway as consulting engineer. In February, 1901, Mr. Neff was appointed superintendent of the elevated lines of the Boston Elevated Railway. Mr. Neff was also at one time connected with the Mexico City Tramways.

OBITUARY

Jose F. de Navarro, for many years prominent in financial circles in New York, is dead. Mr. de Navarro was financially interested in the elevated railroads of New York and was one of those who arranged for the financing of the original elevated lines.

Thomas Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., died at his home in that city on Feb. 4. Mr. Lowry had not been well for about two years, and recently his health failed very rapidly. Mr. Lowry was born in 1843 on a farm in Logan County, Ill. His early education was secured at the country school house in Logan County, after which he spent a year in Lombard University, at Galesburg, Ill., and then studied law at Rushville, Ill., where he was admitted to the bar in 1867. The same year he opened a law office in Minneapolis and a few years later was made judge of the Hennepin County Court of Common Pleas. After the panic of 1873, when money was difficult to obtain and the people generally were discouraged, Mr. Lowry turned his attention to the struggling street railway in Minneapolis, with which he was afterward continuously connected, at first as vice-president and later, when the systems in Minneapolis and St. Paul were consolidated, as president. Through his efforts the Twin City Rapid Transit Company has been developed into one of the most modern and best-equipped properties in the country. Mr. Lowry was also president of the Minneapolis, St. Paul & Sault Ste. Marie Railway. In the early days of the American Street Railway Association, Mr. Lowry took a very active interest in its affairs and in 1890 was elected president of the association. He inherited from his Irish ancestry an inexhaustible fund of wit, which together with his optimism and zeal made him very popular, especially in the Twin Cities. One of the newspapers in eulogy of Mr. Lowry said, editorially: "The news of the death of Thomas Lowry will be received with deep regret by all who knew him. No man envied his wealth, for it was well earned and well spent. If for nothing else, he was remarkable for making his traction company the most popular institution in two great cities. To this his own unaffected modesty and high personal character largely contributed." The funeral services were held at Mr. Lowry's late home in Minneapolis on Feb. 6, the Rev. Mr. Shutter pronouncing the benediction. All the cars of the Twin City Rapid Transit Company and the trains of the Minneapolis, St. Paul & Sault Ste. Marie Railroad stopped for five minutes at 2 o'clock on the day of the funeral, as a last mark of tribute by the employees of these companies. Mr. Lowry is survived by his wife, two daughters and a son, Mr. Horace Lowry, superintendent of the Minneapolis division of the Twin City Rapid Transit Company.



Thomas Lowry

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Nashville, Fayetteville & Birmingham Railway, Huntsville, Ala.**—This company has been chartered to build an electric railway to connect the cities named in the title. Office, Huntsville. Capital stock, $50,000, all of which has been subscribed. Incorporators: John C. Dremer, president; James A. Moores, secretary; J. M. Robertson, treasurer; N. S. Boone, S. W. Fleming, G. F. Pitts and H. K. Bryson.

***Pearl Harbor Traction Company, Honolulu, Hawaii.**—An application has been filed with the Territorial Treasurer asking for a charter for this company which proposes to extend the lines of the Honolulu Rapid Transit Company to the Naval Station at Puuloa, Pearl Harbor. Capital stock, $100,000. Officers: L. Tenney Peck, president; Alfred L. Castle, secretary; Charles H. Atherton, treasurer.

***Woodward (Okla.) Interurban Railway.**—Chartered in Oklahoma to construct an electric railway, 140 miles in length, and connecting the following cities: Mutual, Richmond, Stiling, Canton, Fort Supply, Buffalo and Englewood, Kan. Office, Woodward. Capital stock, $25,000. Incorporators: James Spurlock, Homer Wilcox, Jos. Boquet, Jos. Ennis, William Payne, Robert Innis, Frank Tucker, Earl Workman and Ben F. Willett, all of Woodward.

***Portland, Baker City & Butte Electric Railway, Portland, Ore.**—This company has been incorporated in Oregon for the purpose of building electric railways through the State extending to Butte, Mont., by way of Clackamas County and touching at Baker City before leaving the State. Capital stock, $2,000,000. Incorporators: Mark W. Gill, H. J. Martin and C. D. Charles.

***Paris & Mount Pleasant Railroad, Paris, Tex.**—Incorporated to build an electric railway from Paris passing in a southeasterly direction through the counties of Lamar, Red River and Franklin into the county of Titus and to Mount Pleasant, a distance of about 50 miles. Headquarters, Paris. Capital stock, $75,000. Incorporators: R. F. Scott, T. J. Record, S. W. Williams, N. H. Ragland, J. J. Culbertson, H. P. Mayer, A. N. Rodgers, all of Paris, and H. A. Wilson, C. O. Lide and E. S. Lillenstern of Mount Pleasant.

FRANCHISES

New Westminster, B. C.—It is stated that the British Columbia Electric Railway is about to make application for permission to cross certain roads in the municipality of Coquitlam. The company plans to build an electric railway from Westminster Junction to Coquitlam Lake, a distance of about 7 miles.

National City, Cal.—The Board of City Trustees has granted the San Diego Southern Railway a franchise to operate its lines over the city streets and private right-of-way within the corporate limits of National City. The new franchise is an official recognition of the company's right to operate under the franchise granted to the old National City & Otay Railroad by the Board of County Supervisors before the city was incorporated.

Santa Barbara, Cal.—The City Council has passed an ordinance granting to the Santa Barbara Consolidated Railroad a franchise for a street railway along Bath Street from the southerly line of its intersection with Second Street, to the center line of intersection of Bath Street and Fourth Street.

Elgin, Ill.—Announcement is made that the Elgin, Woodstock & Lake Geneva Railway will apply at the next meeting of the City Council for a 50-year franchise to enter the city over two routes—one for passenger traffic and the other for freight traffic—with a terminus at the corner of Milwaukee Street and River Street. [E. R. J., Oct. 24, '08.]

New Orleans, La.—An ordinance will be introduced at the next meeting of the Police Jurors of the Parish of St. Bernard in Louisiana, by the New Orleans Railway & Light Company, asking for a franchise for a double-track railway to be operated from the Orleans Parish line to the plant of the American Sugar Refining Company in St. Bernard Parish. It is stated that the railway company will operate both passenger and freight cars.

Camden, N. J.—An ordinance which proposes the construction by the Camden & Delaware Tunnel Company of a tunnel under the Delaware River, between Philadelphia

and Camden, and the running of a railway through it was introduced at the meeting of the Camden City Council on Jan. 28. A franchise for the tunnel project has already been granted by Philadelphia Councils. The ordinance was read and referred to the Committee of the Whole to meet on Feb. 18. [E. R. J., Jan. 30, '09.]

Kenmore, Ohio.—The Turkeyfoot Traction Company, which plans to build an electric railway between Akron and Massillon, has been granted a franchise by the Kenmore Council. Thomas L. Childs, Akron, promoter. [E. R. J., Jan. 2, '09.]

Kansas City, Mo.—James A. Stewart, representing the Kansas City & Olathe Electric Railroad, has been granted a 30-year franchise to build and operate a single or double-track electric railroad over the public thoroughfare from Junction Cemetery, Shawnee, to the Missouri State line in Rosedale. The franchise also provides for a right-of-way for a spur to be run from the main line in Greystone Heights to the proposed new county bridge across the Kaw River at Seventh Street. This will give the road an entrance to Armourdale and establish a direct line from Kansas City, Kan., to Rosedale.

New York, N. Y.—The South Shore Traction Company has asked the Public Service Commission of the First District for a certificate of public convenience and necessity. It plans to build and operate an electric railway from the Nassau County line at Central Avenue, through Jamaica, Hoffman Boulevard and Thompson Avenue, to and across the Queensboro Bridge. At the easterly end the line will connect with one which will reach Patchogue. The Manhattan terminal at first will be at Fifty-ninth Street and Second Avenue. The company has offered a 5-cent fare from the easterly boundary of Queens to the Manhattan end of the Queensboro Bridge and an 8-cent fare for a through ride from the Queens-Nassau county line to Forty-second Street and the North River.

New York, N. Y.—The Bronx Traction Company, a subsidiary of the Union Railway, has asked the Public Service Commission of the First District to further its effort by granting the necessary permission to build its line from Westchester Avenue down Classon Point Road. A hearing was ordered for Feb. 16.

New York, N. Y.—The South Flatbush Railroad has formally petitioned the Board of Estimate and Apportionment for a franchise to construct an electric street railway 3 miles long from the Brighton Beach line of the Brooklyn Union Elevated Railroad, at Avenue Q to Avenue Q and Flatbush Avenue, Brooklyn. John C. Langan, Brooklyn, and J. J. Boughman, New Cumberland, Pa., are interested in this new line. [E. R. J., Jan. 16, '09.]

Youngstown, Ohio.—The City Council has passed an ordinance granting the Lake Erie & Youngstown Railway a franchise to build its line into Youngstown. It will extend direct from Youngstown to Conneaut. John H. Ruhlman, president of the company, states that work on the new railway will be started this spring. Gasoline motor cars will be operated. [E. R. J., Dec. 5. '08.]

Eugene, Ore.—The Lane County Commissioner's Court has granted to the Lane County Asset Company, recently organized at Eugene, a franchise to build an electric railway over the county roads from Eugene to Florence. The franchise provides that the survey be completed within 90 days from the granting of the franchise; 15 miles of the road must be completed in the first year, 25 miles the second year and the entire road built within three years. The applicants for the franchise are George M. Miller, J. W. Zimmerman, Charles H. Fisher and Fred Fisk, all of Eugene. [E. R. J., Jan. 30, '09.]

Media, Pa.—The Philadelphia & West Chester Traction Company has presented a petition to the Media Council, asking for the passage of an ordinance granting it a franchise over certain streets. It is the intention of the company to make Media the terminus of a line running from State Street, across the townships of Nether Providence, Marple, Springfield and Upper Darby, and make direct connections with the elevated road at Sixty-ninth and Market Streets. It is also reported that the company intends to extend the line westward through Media, Lima and Gradyville, connecting with their main line on the West Chester pike in Edgmont.

Deadwood, S. D.—The County Board is reported to have granted a new franchise to the Black Hills Traction Company to construct an electric railway from Spearfish to the Northwestern tunnel.

Chattanooga, Tenn.—The War Department has granted S. W. Divine a franchise to construct an electric railway for freight and passenger service from the corporation line at Long Street to Fort Oglethorpe. It is stated that Mr. Divine will soon apply to the General Council for a franchise to build a loop system in Chattanooga. [E. R. J., Oct. 24, '08.]

Waco, Tex.—The City Council has passed an ordinance granting to Max Elser and his associates a 35-year franchise to construct and operate an electric interurban railway through the city. [E. R. J., Jan. 30, '09.]

Charlestown, W. Va.—The County Court of Jefferson County has refused the application of the Winchester & Washington City Railway to build an electric railway over the road from Charlestown to Shenandoah Junction, but has permitted it to build a line from Shenandoah Junction to Kearneysville by the way of Bardane, and in addition to this also granted a franchise to build from Kearneysville to the Berkley County line. [S. R. J., May 9, '08.]

TRACK AND ROADWAY

***Decatur, Ala.**—It is reported that W. H. Morris, Russellville, is interested in a plan to build an interurban electric railway from Decatur, via Moulton, to Russellville, about 45 miles.

Crow's Nest & Prairie Electric Railway, Pincher Creek, Alta.—This company advises that the building of this proposed electric railway has been abandoned, for the present at least. The line would extend from near the western end of Crow's Nest Lake easterly through or near to Coleman, Blairmore, Frank, Bellevue, Lundbreck and Cowley. James H. Schofield, Pincher Creek, is one of the promoters of this project. [E. R. J., Sept. 26, '08.]

Mesa, Ariz.—Dr. A. J. Chandler, president and general manager of the Consolidated Canal Company, who recently applied for a franchise for a street railway in Mesa, writes that he has not as yet perfected any plans for the proposed railway, neither has a company been organized or incorporated. [E. R. J., Feb. 23, '08.]

Central California Traction Company, San Francisco, Cal.—It is stated that this company contemplates extending its electric railway from Lodi to Woodbridge.

Atlanta, Ga.—Judge J. T. Pendleton has refused to appoint a receiver for the Georgia Securities Company and the Atlanta, Griffin & Macon Electric Railway, which propose to build and operate an interurban electric railway between Atlanta and Macon. [E. R. J., Oct. 17, '08.]

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill.—This company announces that it will place contracts during the next two months for the building of 17 miles of new track and the electrification of 2½ miles of steam road. W. H. Conrad, 1145 First National Bank Building, Chicago.

Chicago (Ill.) Railways.—An expenditure of $4,000,000 for roadbed rehabilitation, including the immediate purchase of rails, ties, cement and other construction materials, has been authorized by the Board of Supervising Engineers to be applied on the improvement of the system of the Chicago Railways. The purchase includes all the items called for by the company's program to lay 112.16 miles of track this year, with the exception of the special work. On the details of that the Board now is at work, and orders, it is announced, will be placed at an early date. Everything included, the plans to be adopted call for the expenditure of $12,000,000 during the spring, summer and fall months. Contracts are to be placed for 22,453 gross tons of 9-in. steel rails, 208,053 ties, 101,212 tie rods, 416,106 tie plates, 832,212 screw spikes, 832,212 lag screws, 21,306 rail joints, etc.

Springfield, Beardstown & Quincy Railway, Petersburg, Ill.—G. L. Harnsberger writes it is the intention of this company to construct an electric railway from Springfield to Quincy. Capital stock, $150,000. Officers: H. H. Colby, president; C. W. Houghton, vice-president; R. E. Bone, secretary and treasurer, all of Pittsburg; G. L. Harnsberger, Springfield, chief engineer.

Mattoon, Shelbyville, Pana & Hillsboro Traction Company, Mattoon, Ill.—W. R. Patton writes that this company has secured franchises to build an electric railway in and between Mattoon, Shelbyville, Tower Hill, Nokomis, Windsor and Irving. Hillsboro and Pana have not yet granted franchises. Capital stock, $5,000. Officers: W. R. Patton, Charleston, president; J. B. Craig, Mattoon, secretary; J. W. Yantis, Shelbyville, treasurer. [S. R. J., April 18, '08.]

Winona Interurban Railway, Winona Lake, Ind.—Announcement is made by this company that work will begin on the line from Warsaw to Fort Wayne, by way of Columbia City, as soon as the Peru extension is completed. The section between Warsaw and Columbia City will be completed first and put in operation, and then the section between Columbia City and Fort Wayne will follow. The

funds will be raised by the sale of 5 per cent bonds. The estimated cost is $30,000 per mile.

Keokuk & Columbus Junction Transit Company, Keokuk, Ia.—Theo. A. Craig writes that this company has not yet decided when contracts will be awarded for the construction of this proposed 75-mile electric railway which is to connect the following cities: Keokuk, Summitville, New Boston, Charleston, West Point, Lowell, New London, Winfield and Columbus Junction. The company expects to furnish power for lighting. Capital stock, $10,000. Office, 28 North Fifth Street, Keokuk. Officers: J. E. Peterson, New London, president; D. B. Hamill, Keokuk, vice-president; Theo. A. Craig, Keokuk, secretary; Ira W. Wills, Keokuk, treasurer. [E. R. J., June 6, '08.]

***Clarinda, College Springs & Southern Railway, College Springs, Ia.**—The Engineering Construction & Securities Company, Chicago, has secured a contract for the financing and construction of an 18-mile electric railroad from Clarinda, on the Chicago, Burlington & Quincy Railroad, via College Springs, to Blanchard, Ia., or Elmo, Mo., on the Wabash Railway. Active work on the financing will be begun at once, the work to be in charge of C. B. Judd, chief engineer, and C. A. Ross.

***Lawrence, Kan.**—It is stated that Albert Emanuel and W. R. Sullivan, Dayton, Ohio, are considering the construction of a street railway in Lawrence.

Kent Traction Company, Baltimore, Md.—Alva A. Lamkin, 611 Equitable Building, Baltimore, general manager of this company, announces that plans have been made for beginning construction on the proposed 12-mile overhead electric railway between Tolchester and Chestertown this spring. The line will also reach Tolchester Beach, an amusement resort. The company expects to purchase 10 cars. The power station and repair shops will be located in Chestertown. [E. R. J., Dec. 12, '08.]

***Guadalajara, Jalisco, Mex.**—George Mitchell, New York, is at the head of a syndicate of Americans and Mexicans who have applied to the State Governments of Jalisco and Zacatecas for concessions to build an electric railway between Guadalajara and Mezquital del Oro, a distance of about 65 miles. The line will do a freight as well as a passenger business. E. D. Cruise is chief engineer with headquarters at Guadalajara.

***Mexico City, Mex.**—It is reported that the British firm of S. Pearson & Son, Ltd., who are operating the National Tehuantepec Railroad under lease from the Mexican Government, are interested in the proposed railroad that is to be built from the station of San Geronimo, on the National Tehuantepec line, to the city of Merida. The federal government recently granted a concession for the construction of the mountain division of 80 miles of the proposed line. It is provided in this concession that the 80 miles which it covers is to be operated by electricity. The electric division of the road will run between San Cristobal and Tuxtla. From San Geronimo to Merida by the route of the proposed road is more than 450 miles.

Rochester & Manitou Railroad, Charlotte, N. Y.—This company announces that it will build 1 mile of track, largely relaying old rails. It will also construct a 2000-ft. concrete viaduct and a 600-ft. wood-piled trestle.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—This company is said to have decided upon a definite route for its proposed 25-mile extension from Port Byron to Syracuse. The line will provide direct service from Syracuse to Rochester. It is the intention of the company to have the extension completed and ready for operation by the first of next January.

Findlay-Marion Railway & Light Company, Columbus, Ohio.—This company announces that it will begin on April 1 the construction of the proposed overhead electric railway which is to connect Findlay, Mount Blanchard, Forest, Marseilles, Meeker and Marion, a distance of 46 miles. The company expects to purchase 12 cars. A contract has already been awarded to furnish the company with power. Capital stock authorized, $250,000, to be increased to $1,250,000. Headquarters, 535 Columbus Savings & Trust Building, Columbus. Officers: R. P. Hankey, 57 Smith Avenue, Detroit, Mich.; William Bishop, Mount Blanchard, vice-president; G. W. Meeker, Columbus, secretary and treasurer. [E. R. J., Nov. 21, '08.]

Painesville & Youngstown Railroad, Windsor, Ohio.—At a recent meeting of the promoters of this projected electric railway which is to extend through Leroy, Windsor and possibly Warren, an organization was effected for the purpose of placing the project before the public. The organization as formed consists of H. E. Hammer, chairman; O. A. Bartlett, Leroy, president and F. H. Murray, Painesville, trustee. [E. R. J., Jan. 9, '09.]

People's Railway, Toronto, Ont.—Announcement is made that this company has not yet awarded any contracts for the construction of the proposed overhead electric railway which is to connect Stratford, Berlin, Guelph and Woodstock, by way of New Hamburg, Berlin, Fergus and Elora. The system will have about 88 miles of single track. It is the intention of the company to begin construction in April. Power will be purchased from the Hydro-Electric Commission. The repair shops will probably be located at New Hamburg. The company has already applied for a charter. The capitalization will be $1,000,000. Bonding powers to the extent of $20,000 per mile are asked. Headquarters, 428 Traders' Bank Building, Toronto, Ont. Provisional directors: N. R. Bugg, Bright, Ont.; W. A. Bugg, Joseph McNeil, A. N. Warfield and J. H. Wood, Toronto; W. J. C. Madden, Calgary, Alta.; R. E. McNeil, Delphi, Ind. R. T. Gough, B. of B. N. A. Chambers, Toronto, chief engineer. [E. R. J., Jan. 9, '09.]

Philadelphia & Garrettford Street Railway, Philadelphia, Pa.—This company is planning to make two extensions to its lines. The first extension will be made from the company's terminus in Upper Darby to Springfield Township, and will enter Media at State Street and the Providence Road, and will run along State Street beyond Orange. The other extension will be from the Upper Darby terminus to the Lansdowne railway station.

Greenville, S. C.—A. E. Sussex, Greenville, writes that the plan of building an electric railway from Greenville to the summit of Paris Mountain is still in a preliminary stage. No company has been formed up to the present time and no details arranged. Mr. Sussex states that the entire matter is in the hands of the Chicago Development Company, which will construct the railway, provided the people of Greenville will subscribe the sum of $30,000. [E. R. J., Feb. 6, '09.]

***Seneca, S. C.**—Capt. W. A. Thompson, of Seneca, is reported to be interested in a proposition to build an electric railway from Walhalla to Seneca.

Gainesville, Tex.—It is stated that E. S. Alnutt will begin the construction of a street railway in Gainesville on March 1. Contracts have already been placed for material. The line will be equipped with six-cylinder motor cars. [E. R. J., Jan. 2, '09.]

Mount Pleasant, Tex.—H. W. Peterman has begun the grading for the proposed gasoline motor railway which is to extend from Mount Pleasant to Red Springs Lake and Delwood Park, about a mile from the city. [E. R. J., Aug. 8, '08.]

Southern Traction Company, Fort Worth, Tex.—This company plans to build a gasoline motor line between Fort Worth, Everman, Burleson, Joshua and Cleburne. The permanent location surveys will be made at once. Connections will be made with the International & Great Northern Railway at Fort Worth and Everman; with the Houston & Texas Central Railway between Fort Worth and Everman; with the Missouri, Kansas & Texas Railway at Burleson, and with the Gulf, Colorado & Santa Fé at Cleburne. The company has not yet decided when contracts will be awarded for material and equipment. Headquarters, Room 28, Dundee Building, Fort Worth, Tex. Trustees: S. B. Hovey, H. H. Cobb and T. Yarbrough, all of Fort Worth.

Montgomery Traction Company, Christiansburg, Va.—E. S. Hagan announces that this company proposes to build an electric railway from Christiansburg to Cambria. It has not yet been decided when contracts will be awarded. Capital stock, authorized, $25,000. Officers: C. A. Johnston, Christiansburg, president; E. S. Hagan, vice-president and general manager; C. X. Wade, secretary and treasurer, all of Christiansburg.

Winchester & Washington City Railway, Winchester, Va.—It is announced that this company, which at present operates a power plant, will build an electric railway to connect Winchester and Washington, D. C. Capital stock, authorized and issued, $175,000. Bonds, authorized and issued, $125,000. Officers: S. H. Hansbrough, president; Chas. Millikin, vice-president; Shirley Carter, secretary and treasurer; D. M. Swink, superintendent, all of Winchester. [S. R. J., May 9, '08.]

Big Bend Transit Company, Spokane, Wash.—This company announces that it has practically completed its financial arrangements and active construction will begin early in the spring. The company has acquired some 45 miles of right of way. Part of the proposed construction involves a line to Davenport, Wash., some 15 miles in length, projected from the river route. Several extensions have been surveyed, and most recently a line from the junction of the rivers down the Columbia, about 6 miles, to Peach. The surveyed route follows the valley of the Spokane River from Spokane west about 60 miles to Miles. The company now owns about 7 miles of right of way on the Indian and Military Reserves, all of which has been graded; also a terminal grant adjoining the right of way along the Colum-

bia River, providing several thousand feet of river frontage. From this terminal steamboat service will be provided to take care of the tonnage and passenger traffic up the valley of the Columbia River for a distance of 65 miles. The company also owns a water power site on the Spokane River, 2 miles from its mouth, capable of developing 25,000 hp. Directors: W. A. Nicholls, president; F. E. Goodall, vice-president; F. J. Finnecue, I. W. Anderson, J. W. Sawyer and I. W. Fry, all of Spokane.

Seattle, Snohomish & Everett Railway, Seattle, Wash.—Charles M. Kimball writes it is probable that within three months this company will begin the construction of its proposed overhead electric railway which is to connect Seattle, Bothell, Snohomish and Everett, a distance of about 32 miles. Capital stock, authorized and issued, $500,000. The company expects to purchase from six to ten cars. Headquarters, 443 New York Block, Seattle, Wash. Officers: Clyde C. Chittenden, president; Joseph R. McLaughlin, vice-president; Charles W. Kimball, secretary and treasurer. [E. R. J., Aug. 22, '08.]

POWER HOUSES AND SUBSTATIONS

Shore Line Electric Railway, New Haven, Conn.—This company, which contemplates the construction of an electric railway from Stony Creek east to the Connecticut River and north to Essex, is said to have awarded a contract to the New Haven Rigging Company, New Haven, for the driving of the piles in connection with laying the foundation for the power plant to be erected at Saybrook.

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill.—This company advises that it will place contracts during the next two months for a 500-kw rotary converter and the construction of a substation. W. H. Conrad, 1145 First National Bank Building, Chicago, Ill.

East St. Louis & Suburban Railroad, East St. Louis, Ill.—It is announced that this company contemplates enlarging its power station at East St. Louis which will necessitate the purchase of new machinery. Charles F. Hewitt, general superintendent.

People's Gas & Electric Company, Burlington, Ia.—C. H. Walsh, manager of this company, announces that orders have just been placed with the Jeffrey Manufacturing Company for coal and ash handling apparatus, and with the Murray Iron Works Company, Burlington, for new water-tube boilers. [E. R. J., Aug. 1, '08.]

Parsons Street Railway & Electric Company, Parsons, Kan.—This company, which holds a franchise for a street railway in Parsons, has purchased the power plant of the Parsons Electric Light & Power Company. It is announced that the company will expend about $50,000 in improving the power station. Albert Emanuel, Dayton, Ohio, president.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company is said to have purchased a plot of ground adjoining its power plant on the south for the plant's enlargement. Boilers and turbine engines will be added to the plant to handle extra business and an addition to the station will be built.

Toledo Railways & Light Company, Toledo, Ohio.—The armature of one of the 3000-kw turbines in the power plant of this company burned recently. A duplicate unit has furnished energy since.

Oklahoma (Okla.) Railway.—It is announced that this company is in the market for coal and ash handling apparatus.

Pittsburg (Pa.) Railways.—This company has awarded the contract for furnishing a 5000-kw generator for the Brunots Island power plant to the Westinghouse Electric & Manufacturing Company. The contract for furnishing and installing all steam and exhaust piping in connection with setting up this generator has been awarded to the Pittsburg Valve, Foundry & Construction Company.

SHOPS AND BUILDINGS

Atlantic Shore Line Railway, Kennebunkport, Maine.—The car house of this company, a one-story brick building, was destroyed by fire on Feb. 7. It is reported that seven semi-convertible cars were also burned. The loss is estimated at about $50,000, covered by insurance.

Boston & Northern Street Railway, Boston, Mass.—Fire on Feb. 6 destroyed this company's car house, situated on Green Street, Melrose Highlands, together with three open and four closed cars. The loss is said to be in the neighborhood of $100,000.

Ohio Electric Railway, Cincinnati, Ohio.—It is stated that this company has closed a deal for a depot site in Lima. The depot will be located on East Market Street, occupying 100 ft. in frontage and extending 300 ft. on Central Avenue and 400 ft. through to Union Street.

Manufactures & Supplies

ROLLING STOCK

Rochester & Manitou Railroad, Charlotte, N. Y., expects to purchase 20 recording fare registers.

Atlantic Shore Line Railway, Kennebunkport, Maine, lost six open cars and a closed car in a fire which destroyed its barn at Kennebunkport on Feb. 6. They will be replaced before summer.

Boston & Northern Street Railway, Boston, Mass., lost three open cars and four closed cars in a fire which destroyed its car barns at Melrose Heights on Feb. 6. It does not expect to replace these cars.

Oklahoma Railway Company, Oklahoma City, has purchased from the American Car Company, St. Louis, six single-truck closed cars 20 ft. long and four 30-ft. semi-convertible double-truck cars.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., has purchased four 10-bench cars and 41 motors from the Dorner Railway Equipment Company, Chicago, Ill. These equipments will be delivered at once.

Miami (Fla.) Electric Railway, which is in the hands of H. C. Roomes, receiver, has decided to abandon electricity as motive power and will operate gasoline motor cars. At present the company operates three cars.

Rochester & Sodus Bay Railway, Rochester, N. Y., has placed an order for four interurban car bodies with the G. C. Kuhlman Car Company, Cleveland. This order was referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909.

Ashland (Wis.) Light, Power & Street Railway, has purchased five motor and five trailer 10-bench single-truck cars for immediate delivery from the Dorner Railway Equipment Company, Chicago, Ill. The order also included 20 motor equipments.

Eastern Pennsylvania Railway, Pottsville, Pa., has awarded a contract to the Cincinnati Car Company for two semi-convertible cars. The contract for the electrical equipment was awarded to the General Electric Company, but no decision has been reached regarding the trucks.

Helena Light & Railway Company, Helena, Mont., has placed an order with the Cincinnati Car Company for two single-truck closed city cars. The electrical equipment for these cars will be supplied by the General Electric Company. The order for the trucks has not yet been placed.

Chicago (Ill.) Railways Company will receive bids on Feb. 15 for 350 pay-as-you-enter cars. They will be of practically the same dimensions as the cars ordered about a year ago, but will probably be somewhat lighter. Later the company will probably increase the order to 550 cars.

Findlay-Marion Railway & Light Company will soon be in the market for 12 interurban cars for its new line from Findlay to Marion, Ohio, 46 miles. Construction work on the line will be begun in April. G. W. Meeker, 535 Columbus Savings & Trust Building, Columbus, Ohio, is secretary of the company.

Ohio & Michigan Southern Railroad, Toledo, Ohio, will order three interurban cars within the next 30 days. This is a preliminary order and the company will need additional equipment for its projected lines as they are completed. W. E. Niles, 122 Monroe street, Chicago, Ill., is secretary of the company.

Conestoga Traction Company, Lancaster, Pa., which was reported in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909, to be in the market for 20 interurban cars, will probably buy about 18 new cars this spring, but has not definitely decided on the exact number. If 18 cars are purchased, six will be double-truck closed cars measuring 40 ft. over all, six will be single-truck closed cars measuring 30 ft. over all, and six will be double-truck open cars measuring 40 ft. over all.

Salt Lake & Ogden Railroad, Salt Lake City, Utah, will soon purchase several motor cars for use on its line between Salt Lake City and Ogden, which line is to be electrified immediately. In addition to the motor cars to be purchased, the company will rebuild upward of 40 of its steam passenger cars and equip them for operation by electricity. The motor cars will each be equipped with four 100-hp motors, multiple-unit control, automatic air brakes, and will be geared to run 60 miles an hour.

TRADE NOTES

Chandler Bros. & Company, Philadelphia, Pa., announce that L. W. Ffoulkes has become associated with them in their bond department.

Ottawa Car Company, Ottawa.—This company is build-

ing 10 additional pay-as-you-enter cars, under license of the Pay-As-You-Enter Car Corporation, for the Ottawa Electric Railway Company.

Dorner Railway Equipment Company, Chicago, Ill., reports it has sold four Westinghouse motors and a wheel press to the Hutchinson Interurban Railway Company, Hutchinson, Kan.

Westinghouse Machine Company, builder of the Roney stoker, reports that the Public Service Corporation, Jersey City, N. J., has adopted this type of stoker as the result of detailed competitive tests between Westinghouse and other makes, 15 equipments being ordered for the present.

Standard Roller Bearing Company, Philadelphia, Pa., announces the appointment of F. M. Germane, formerly sales manager, as assistant general manager of the company; T. J. Heller as sales manager, and F. W. Lawrence as Western representative, the latter with headquarters at Chicago.

Crocker-Wheeler Company, Ampere, N. J., has closed a contract to equip with motor drive the new woodworking factory of the John Hofman Company, Rochester, N. Y. The order includes a generator, three lighting transformers and 40 induction motors ranging from 1 hp to 30 hp, with a total capacity of about 200 hp.

M. P. Paret has resigned as chief engineer of the Kansas City, Mexico & Orient Railroad to enter into partnership with E. J. Beard as consulting engineer, with main offices at Kansas City, Mo. Mr. Beard was formerly principal assistant engineer of the Chicago, Rock Island & Pacific Railroad, and for the last two years has been chief engineer of J. G. White & Company, New York.

Archer & Rollins, Kansas City, Mo., have formed a partnership for carrying on a general engineering business in their section of the country. These gentlemen have each been engaged in engineering work for several years past. The offices are at 536-537 Beals Building, Kansas City, where Mr. Archer has maintained an engineering office for some time past. The new firm would like to receive catalogs from manufacturers descriptive of their material.

American General Engineering Company, New York., has recently made arrangements to handle the repair work of the Watson-Stillman Company on all classes of the latter company's machinery and equipment in and about New York. The central location of the American Company's shop on West Street, and its reputation for good workmanship and quick delivery will enable the Watson-Stillman Company to give prompt and efficient service on all its repair work in New York City.

Lord Electric Company, New York, has appointed the Monroe Brass & Wire Company, of Cincinnati, its exclusive territorial agent in the Cincinnati territory; the W. R. Garton Company, of Chicago, exclusive agents in the Chicago territory, and T. C. White, of St. Louis, exclusive agent in the St. Louis territory. These agents will handle the various products of the Lord Electric Company, which include Earll retrievers and catchers, laminated soldered rail bonds, Shaw lightning arresters, auto-discharge, laminar and vertical unit choke coils, together with other specialties now being placed on the market.

I. R. Nelson & Company, Newark, N. J., announce that besides the regular repair work done at their shops in Newark, an experienced force of men is employed on special emergency work which a railway company may want done in its own shops. This applies particularly to overhauling and painting summer and winter cars in the seasons when such work is usually done. Several contracts for painting summer cars have recently been closed by this company with electric railways in the Eastern States. Some work has already been commenced although it is early in the season. Experienced painters are employed by the company and contracts are taken to do this work at the railway companies' shops and according to their specification.

Allis-Chalmers Company, Milwaukee, Wis., has obtained a gas engine contract from the Pittsburg Plate Glass Company for additional equipment at Crystal City, Mo., which already contains the famous unit of 3500-kw. capacity, exhibited at St. Louis Exposition in 1904. The new apparatus consists of two a.c. generators of 3000-kw combined capacity, each driven by a 34-in. x 48-in. horizontal twin-tandem gas engine. For the Kokomo, Ind., plant of the same company there are being built three gas engines and generators with an aggregate capacity of 2250 kw. Additional contracts for gas engines, at present pending, involve 30,000 hp.

ADVERTISING LITERATURE

O. M. Edwards Company, Syracuse, N. Y., has issued catalog B, describing its latest types of window fastenings.

Westinghouse Traction Brake Company, Pittsburg, Pa., has issued an instruction pamphlet describing electric pump governors.

Walch & Wyeth, 87 Lake Street, Chicago, Ill., have issued an illustrated booklet describing the Erwood straightway swing gate valve.

The Franklin Electric Manufacturing Company, Hartford, Conn., is sending to the trade a circular calling attention to the quality of the line of tungsten lamps which it makes.

Dean Bros.' Steam Pump Works, Indianapolis, Ind., have issued a 56-page catalog describing their condensing machinery, together with tables of dimensions, capacities, etc.

Ferracute Machine Company, Bridgeton, N. J., describes in catalog No. 16, dated Jan. 1, 1909, the full line of stamps, presses and metal working machinery of other kinds which it makes.

Industrial Instrument Company, Foxboro, Mass., with offices in New York and Chicago, has issued bulletin No. 16, illustrating and describing revolution counters, tachometers, tachographs and similar instruments made or imported by it.

Archbold-Brady Company, Syracuse, N. Y., is distributing three folders which contain some interesting views of the steel towers and poles erected by that company for Niagara power transmission and catenary steel bridges for the Syracuse, Lake Shore & Northern Railroad.

Rhodes, Curry & Company, Amherst, Nova Scotia, are sending out a large calendar with a view of their extensive works for the manufacture of cars and car parts.

Wood Drill Works, Paterson, N. J., has issued a 12-page booklet entitled "Wood Rock Drills," showing their adaptability to tunnel driving, drilling in concrete, and open-cut work, with detailed costs of driving the Tieton tunnel at North Yakima, Wash., U. S. Reclamation service and on other engineering works.

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., has published in pamphlet form court decisions relating to the following patent litigation: Tesla polyphase system, patents Nos. 381,968, 382,279, 382,280; spring-ring armature, Nolan patent No. 582,481; edgewise circuit-breaker, Wright & Aalborg patent No. 633,772.

Joseph Dixon Crucible Company, Jersey City, N. J., has recently published a 24-page pamphlet with the title "Lubricating Motors," which discusses the application of graphite for lubricating automobiles, motor boats and motor cycles. The February number of "Graphite," published by this company, contains an article by W. H. Wakeman on corrosion in steam boilers.

Fred T. Ley & Company, Inc., Springfield, Mass., are sending out a booklet which contains photographs of a number of installations for which they have been contractors. Among the contracts were the following: line building construction for the Connecticut River Power Company; cable work for the Connecticut Company; concrete abutments for the Boston & Albany Railroad; track and retaining wall construction for the Shelburne Falls & Colrain Street Railway Company, and track work for the Springfield Street Railway Company.

NEW PUBLICATIONS

Die Fortschritte auf dem Gebiete der Elektrischen Fernbahnen (Progress in the Field of Long Distance Electric Railroading). By O. C. Roedder, Wiesbaden; C. W. Kreidel, 1909; 324 pages (7 in. x 10½ in.); 172 illustrations. Paper, 12.6 marks.

The author of this work has set himself the task of summing up the characteristic operating features of all the d.c and a.c. systems which are applicable to long-distance railway electrification. In this he has admirably succeeded. His understanding of American railway affairs, partly through former residence in the United States, has made his chapters on the electric railways of this country unusually accurate and interesting. In fact, it would be difficult to find anywhere a better résumé of all the operating statistics and descriptions which have been published in this paper or presented in recent years before the American Institute of Electrical Engineers, the New York Railroad Club and other bodies. Undoubtedly, this portion of the work will be especially valuable to the German railway world. Mr. Roeder has summarized European practice in like manner. The drawings and curves apparently were redrawn for reproduction and add much to the comfort of the reader. Another striking feature of the work is the series of tables giving the fundamental data on 77 important electric railways of high-tension d.c. and a.c. types.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, FEBRUARY 20, 1909 No. 8

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL 9000 *copies are printed.*

Mixing Paint

The tricks of the painter's trade are many and like most other classes of employees, painters will too often save themselves labor when they can at the expense of the quality of their work. One of the commonest ways of shirking is to thin out paint with turpentine and thus make it easy to spread. It is difficult to detect thin paint after the first coat is applied, but the consequences of this labor-saving expedient are evident after a few months' exposure. The best way of preventing this and similar reprehensible practices is to issue paint and supplies from the paint storeroom just as tools are issued from the toolroom of the machine shop, and to allow no one but the paint-shop foreman to have access to the storeroom or to mix paint. This plan insures economical use of painting supplies and uniformity in color and quality of the paint applied.

The Central Electric Traffic Association

At the annual meeting of the Central Electric Traffic Association the satisfactory statement was made by Chairman Neereamer that the organization of the Central Electric Railway Association is now on a sound financial basis. It was necessary that adequate arrangements of this character be made before the traffic association could begin to do the work for its members which its organizers planned. After the completion of the selling and basing fare sheet, upon which work is now in progress, there will still be, Mr. Neereamer states, "An open field for the labors of the traffic association." The Central Electric Traffic Association had the misfortune to start on its career during a period of declining business, political campaign and financial unrest. That it survived this discouraging combination of circumstances is creditable to Mr. Neereamer and his supporters. The association is now demonstrating that it occupies a position where it can be of unquestioned assistance to its member companies. Its usefulness should continue to increase as the possibilities of long-distance passenger traffic and of profitable express business are realized more clearly.

Distributing Fare Increases

By its decision disapproving of the increase of fares from 5 cents to 8 cents on the Town Farm line of the Lawrence & Methuen Street Railway Company, and its suggestion that the company appears entitled to a distributed increase over the system as a whole, the Massachusetts Railroad Commission affirms the principle that an operating property must be considered as a whole, and that the burdens of the less profitable portions of a system must be carried by the entire road. In this case a 5-cent fare was charged by the company for transportation over practically equivalent distances on others of its lines, and as the company desired to equalize the poorer returns of the not inaptly designated Town Farm division without affecting traffic on the balance of the system, it was deemed expedient to increase the fare on the lightly patronized line from 5 to 8 cents. In view of the difficulties of determining just what are the operating costs on branches of railway systems, it is gratifying that a way is thus opened for the company legitimately to increase its revenues, if it so desires. In the last analysis a reasonable return on the investment required to give the service needed after pay-

ing all operating costs and fixed charges is all that an operating company can desire, including, of course, a substantial accumulation of reserve funds to meet the contingencies of the future. Fundamentally, it matters less how this necessary increase shall be obtained than that it shall be assured. While the company's practice in this case is not sustained by the commission, an alternative method capable of producing substantially the results desired is suggested.

Committees to Assist the Manager

Every large railway system has on its staff men who are especially well qualified to pass judgment on some one feature of railway construction or operation. How, then, to get the utmost value from the services of such men is a problem in management. One method, and a good one, used on the Illinois Traction system in solving important problems is to place the consideration of their solution in the hands of specially appointed committees chosen far and wide from the department heads, and selected only with regard to the knowledge which may be useful in solving the new problems to the best advantage of the company. When a detail of operation is to be considered, such a problem, for instance, as the choosing of schedules for a new branch line or the task of determining the number and character of cars necessary to serve a city line to be opened at some future time, the general manager details from the departments most interested a committee of three or four men to study the problem, investigate the possibilities for solution and recommend to him the best means or methods to be used. Other questions would be referred to committees made up of different classes of men. After those who have been delegated to study any problems have pursued the work to the extent of their ability, they formulate a report, which is addressed to the general manager, who thus has all the essential data required for a decision. This method of handling problems of construction and operation not only has the advantage of saving time and affording the maximum reliability of judgment, but it also has an educational value by forcing the men to study the details of their work not ordinarily encountered.

Government Regulation of Corporations

The inviolability of vested rights in property, as guaranteed by the Constitution, has long been the keynote in the relations existing in the United States between capital and the public. But the most far-seeing financiers realize that even vested rights must yield for the public welfare and safety whenever, for any reason, they assume a position really antagonistic to the rights and privileges of the great mass of individuals composing the country's population. A fuller realization of this fact is tending to bring about a fair and rational relationship between the interests of capital on the one hand and those of the people who have made possible the acquisition of wealth by capitalists on the other hand. In the course of a banquet speech in New York last week Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, dwelt on the need of recognition by capital of the sacredness of the rights of the public and the danger of defiance and disregard of these rights by so-called vested interests. In the course of his remarks on that occasion he said:

> Rights of the individual are subordinate and must submit to those of the public. The opportunities for the acquisition of wealth have been and are so great that large and increasing fortunes of individuals and corporations compel the most thoughtful men to dread the results of the future unless the influence and power of money can be controlled by government authority. The question is too far-reaching to be laughed out of court. If the power of accumulated money be not so controlled, who can tell when or how and to what extent it may be attacked by the mob?

The tendency of the times, we believe, is yet very far away from social revolution and confiscation of private or corporate property, but such a warning is worthy of attention, coming as it does from a man of the standing of Judge Gary, who represents the largest single aggregation of capital in the world. The wave of unreasoning public antagonism toward corporations and wealthy individuals is noticeably subsiding. In its place a widespread movement has been begun toward government regulation of corporation activities, which, if wisely administered, will protect alike the public and the owners of corporation securities from extortion, exploitation and unfair dealing.

Specialists in the Shops

The remarkable record of the Third Avenue Railroad in reducing equipment failures during the past eight months, which is described in detail elsewhere in this issue, was brought about very largely through adopting a policy of having all car repair work done at one place and selecting specialists who are held responsible alone for maintaining a single part of all cars. It is reasonable that a man who does nothing else but pack journal boxes, for example, will in time become more expert in this operation than another man who does all kinds of work on a car. Every detail of shop maintenance and repair work requires some degree of expert skill. The tendency in all large manufacturing establishments is toward specialization, and specialization leads naturally to piece work.

It is not always easy to establish a piece-work system in repair shops on repair work, but the practice of the Philadelphia Rapid Transit Company is interesting in this connection. This latter company has put nearly all of its shop employees on this basis of individual effort, and has also made a point of specializing in every detail of its maintenance and repairs. For example, the Philadelphia company is running some of its heavy elevated cars for periods exceeding 15 months without adding a drop of oil to the journal boxes. One man has entire charge of packing, oiling and inspecting the journals, and no other shop employee is permitted to disturb the packing or add oil. When it is necessary to remove wheels and axles the journal expert superintends the removal of the journal boxes and replaces them on the axle. A record of 15 months continued running without lubrication is remarkable and, of course, it would not be possible to make such a record without using the very best quality of packing and oil and having journals which are well designed. Nevertheless, the secret of the long life of packing in journals is largely due to the careful and expert inspection and maintenance of the one man who has charge of this detail.

This principle is carried out in other departments of the same company's shops. For instance, in the armature department one man does nothing but soldering and another man does nothing but turn commutators; the armature winders are entirely relieved in this work. In another department one man babbitts all bearings and is responsible for the composition of the metal as well as the quality of the finished bearings. Too much stress cannot be laid on the troubles arising from ignorant and irresponsible workmanship in isolated car houses. It is not possible for one inspector personally to supervise all of the pit men in a large depot, and if they are permitted to make repairs, repack journals and do similar work, their lack of skill is sure to manifest itself in trouble later on.

Retailing Railway Power

In the promotion of many interurban lines one of the benefits widely heralded has been the availability of electric light and power for all farms and villages along the route. How little current is being sold to rural customers is best known to interurban railway men. It is possible that the field mentioned by the promoters may profitably be more vigorously cultivated.

At a recent meeting of the Central Electric Railway Association in Indianapolis, G. H. Kelsay, superintendent of power, Indiana Union Traction Company, described the electrical equipment necessary for supplying light and power to consumers direct from interurban transmission systems. One point clearly brought out by this interesting paper, but not directly stated in it, is that during the last few years the manufacturers have greatly improved the electrical equipment necessary for furnishing this service. It is far more practicable now than ever before to supply light and power customers from railway transmission circuits.

The load factor of almost every interurban power station is quite generally recognized as being notoriously bad. Were it commercially possible in railway plants to obtain smooth load curves, the cost of power could be lessened considerably. Therefore, any method or means for accomplishing this end in a way consistent with good operating policy should be welcomed. The sale of power for commercial use offers one convenient and simple method.

The chief advantages to be obtained by the sale of current fed from transmission circuits are: (1) Increased revenue and (2) better load factor on the generating units.

It was suggested in the article earlier referred to that the cost of power can very closely be determined by railway accountants, and, therefore, the task of ascertaining what rate must be charged for power sold from a transmission system should not be difficult. If, on the other hand, an attempt is made to set down the detailed costs which enter into the production and the delivery of power from a small isolated plant, furnishing comparatively few consumers, the figures should be scrutinized most carefully before being accepted as correct. When an electric railway freight or express service is instituted it is improper, from an accounting standpoint, to assume that the general expenses of the road are not increased or that the new traffic should not bear its proportion of the cost of superintendence, power generation and distribution, and maintenance. The cost of supplying power for commercial purposes from the railway circuit, however, can fairly be considered upon a somewhat different basis. If it simply reduces the load factor it may be classed simply as a by-product. As Mr. Kelsay puts it, "A dollar earned from the sale of current for power and lighting does not add a cent to the cost of some of the heaviest investments which make up the cost of traction lines. It adds only to the fixed and operating costs of the power station and transmission system, and a small expense to the auditing department and management, representing approximately only 15 to 20 per cent of the total operating charges on interurban railways."

Referring again to the load factor, it will be often found that demands made for lighting and commercial power not only smooth the load curve of each day, but also the yearly load curve. Interurban railway service makes its most severe calls upon the power plant for current during the summer months, when travel is at its maximum. Sundays, Saturdays and holidays are the times of peak railway loads, but ordinarily are also the times when the current demands for lighting and power uses are at a minimum. In the winter months, when the lighting load may be expected to be at its maximum the railway load will be at its lowest point.

The service, of course, on account of the reliability which must exist in railway work, would be far better than usually is obtained in small power stations. A question on this subject which undoubtedly first comes to mind is: Could the railway company in selling current from its transmission system assure the consumer good voltage regulation? This question Mr. Kelsay answers by calling attention to an extreme case within his own experience on the Indiana Union Traction system. Near Indianapolis, at the end of the transmission system and approximately 40 miles from the power plant, current is used for lighting a large and important public building. This current is taken directly from the three-phase railway high-tension transmission system. The voltage is reduced through static transformers with the secondaries star-connected and the neutral grounded. While there are excessive fluctuations of load on the transmission system, the distribution from the low-tension side of the transformers is said to be made at a far more steady voltage than that ordinarily given by isolated plants in small towns.

An interurban railway soliciting lighting business should bear in mind that there are times when if cars are not running it may be necessary to make repairs on the transmission circuits. If a lighting consumer at such a time needed any considerable amount of current and could break his contract if current were not available, then the company might be embarrassed. It should also be remembered in soliciting that the best consumers would be those whose load demand would not occur simultaneously with the maximum traffic on the cars. There are, of course, other than these, all the usual conditions regarding the sale of current which a lighting company must observe, and which should carefully be considered before a railway transmission system is called upon to carry any considerable additional load.

POWER PLANT EXTENSIONS OF THE BOSTON ELEVATED RAILWAY COMPANY

Extensive enlargement of the power plants of the Boston Elevated Company was carried out and completed about a year ago by the Stone & Webster Engineering Corporation, but the details of the work have not been available until the present time. In December, 1906, the



Power Station Improvements in Boston—Exterior of Lincoln Wharf Station

engineers were called upon by the Boston Elevated Company to study the power situation of the elevated and surface lines of Boston. Investigation showed that 7500 kw in additional electrical equipment was needed immediately and that the shortage would in the course of another year increase to more than 10,000 kw. It was therefore decided to install without delay 10,800 kw of direct-current generating machinery, with the necessary boilers, while an ultimate decision on recommendations for a plan of broad permanent power development was pending. On Jan. 18, 1907, definite arrangements were made for the work of construction.

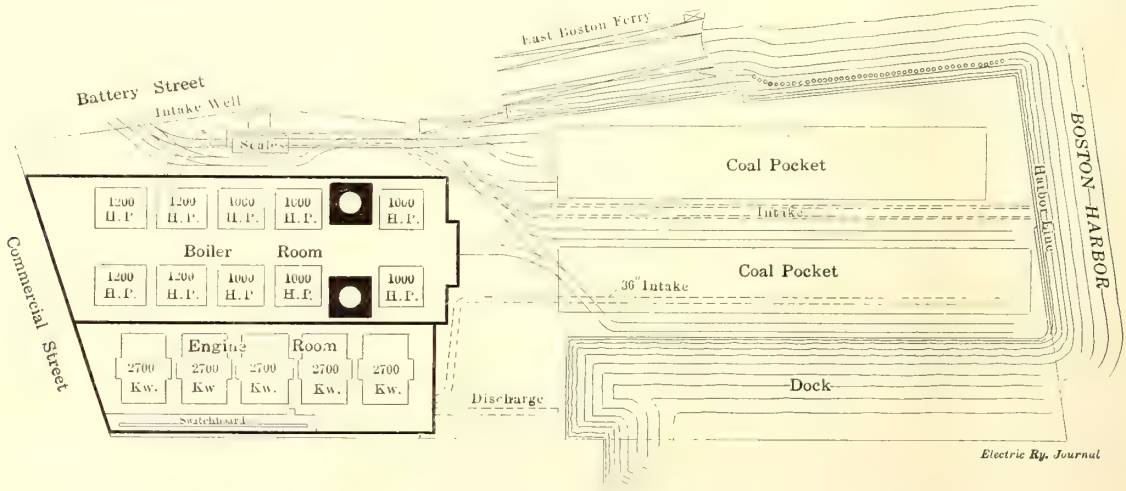
The emergency installation of 10,800 kw consists of four 2700-kw units distributed among three power stations. Two of the units were added to the Lincoln Wharf station, located on the harbor front in the heart of Boston proper, and one each to the Harvard station in Cambridge and the Charlestown station, on the Mystic River, in Charlestown. It was stipulated that these new installations should be ready for service within one year, or by Feb. 1, 1908. At the same time still earlier completion was desired in order that the equipment might relieve the old stations before the next succeeding period of heavy winter traffic, and the work was pushed with this end in view.

The stations were maintained in regular operation throughout the period of enlargement. Some serious physical difficulties interfered with rapid work. The construction was of a heavy and permanent character, and was at no point compromised for the urgent time requirement. Notwithstanding these adverse circumstances the desired time was made. The work was finished within 10 months, so that the various units were ready to go under commercial load.

LINCOLN WHARF STATION

The Lincoln Wharf power station furnishes electrical energy for the surface and subway lines in the heart of the city, as well as for a large part of the elevated system. The original station contained three 2700-kw, direct-current, vertical, cross-compound units and 6000 hp of Babcock & Wilcox boilers. The extension for the two new units is carried on a heavy concrete foundation supported on piles. The superstructure frame is of very heavy steel, particularly in the boiler room, where it is designed to carry boilers, economizers and an overhead bunker of 3000 tons capacity, or 33 tons per linear foot. Both the foundations and superstructure were designed by the constructing engineers, the architectural features being worked out by the architectural department of the Boston Elevated Company.

The new boiler room equipment consists of eight 600-hp Babcock & Wilcox boilers, with boiler suspensions attached directly to the building columns. The superheaters

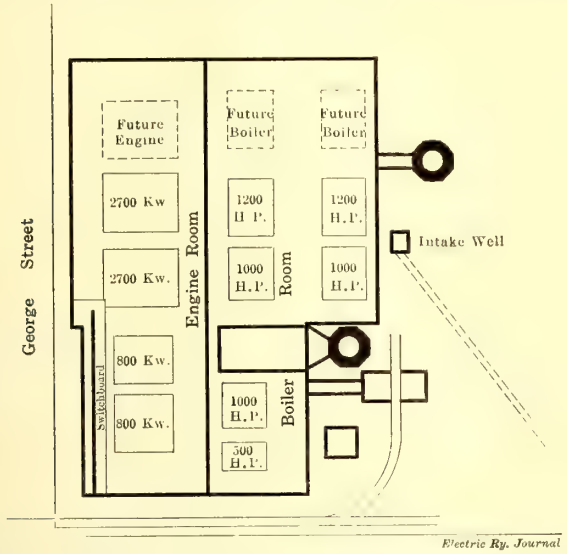


Power Station Improvements in Boston—Plan of Reconstructed Lincoln Wharf Station

have such area that they will give 50 deg. superheat at normal boiler output, and not more than 75 deg. at 50 per cent normal output. Roney mechanical stokers, each having an effective grate area of 111 sq. ft., exclusive of the dead plates and one-half the dumping grates, are provided throughout. The grates proper are of the sectional-fin type. The boiler feed-water equipment consists of four

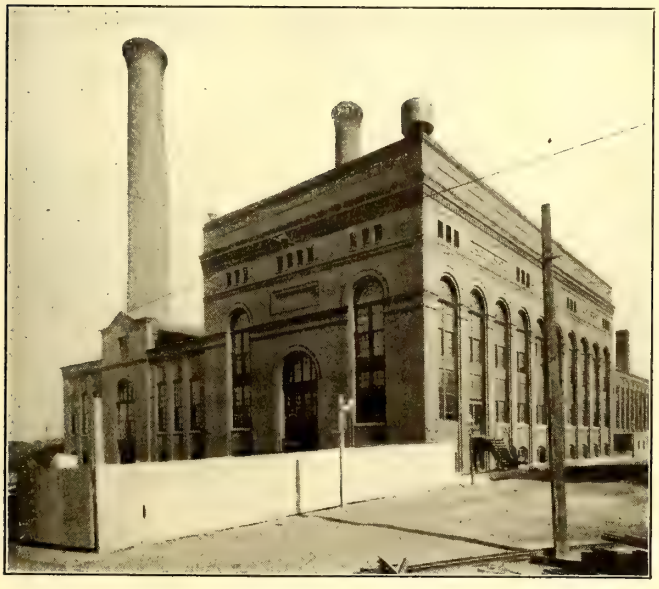
Warren outside, center-packed pumps in the basement under the boilers, any three of the pumps being of sufficient capacity to supply all the boilers when running at 50 per cent overload.

The feed water passes successively through primary heaters between the engines and condensers, through open heaters fed by exhaust steam from the auxiliaries and finally through the economizers. These economizers are



Power Station Improvements in Boston—Plan of Reconstructed Charlestown Station

of the B. F. Sturtevant heavy pattern, tested to 400-lb. cold-water pressure. The primary heaters between the engines and condensers are of the horizontal, closed type, and are designed to raise the feed water from 40 deg. Fahr. to within 5 deg. of the temperature of the exhaust steam. The open heater is of the Cochrane horizontal, cylindrical type, with cast-iron trays, and raises the temperature of

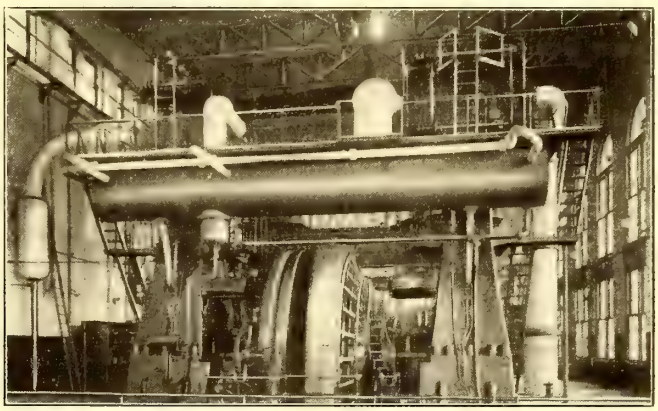


Power Station Improvements in Boston—Exterior of Charlestown Station

the feed water to within 3 deg. of the temperature of the exhaust from the auxiliaries. The economizers deliver the water to the boilers at a final temperature of about 250 deg. Fahr.

Squire's automatic feed-water regulators have been supplied in all the stations, on old boilers as well as new. This device controls the feed valve through pressure exerted on a diaphragm which tends to close the valve when the water in the boiler rises above a predetermined level. A pilot valve actuated by the expansion of a metal harp located in the side of the boiler regulates the pressure on the diaphragm. The harp is placed at the proper height in respect to the water level to give the maximum expansion or contraction for any change in the height of the water. The action of this automatic device is safeguarded by a water-column alarm which will attract the fireman's attention and enable him to regulate the water supply by a hand-operated valve in case of disarrangement of the automatic feed.

The new engines are of the heavy rolling-mill type, with a large factor of safety, and were built by the William Tod Company. When running at the designed initial steam pressure of 180 lb. per square inch, they have a sustained overload capacity of 50 per cent, with decrease in normal speed not exceeding 2 per cent. Each engine has a special barring arrangement consisting of a circular rack inside the rim of the flywheel and a pinion driven by a 30-hp electric motor. Jet condensers, built by the Warren Steam Pump Company, are used in connection with vertical direct-acting twin air pumps. The steam cylinders of these air pumps are 16 in. and the air cylin-



Power Station Improvements in Boston—Interpole Generator in Charlestown Station

ders 48 in. in diameter, with a common stroke of 24 in. These condensers were at the time of installation the largest of the type that had been turned out by the manufacturers.

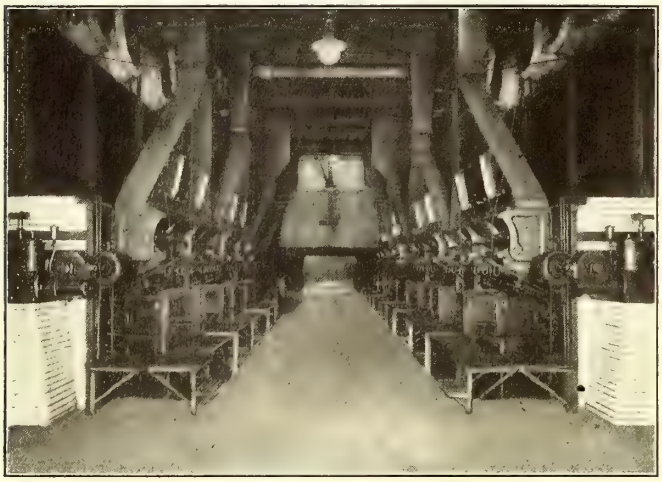
The generators are of the direct-current railway type, and were built by the Allis-Chalmers Company. The winding is compound and designed so that by the adjustment of a shunt on the series field they will operate at any characteristic between an approximate rise of 10 per cent and an approximate fall of 10 per cent at the full-load potential of 575 volts. The falling characteristic was required to provide for proper distribution of load among the company's various stations. Commercial efficiencies guaranteed by the makers ranged from 89 per cent at one-quarter load to 94.8 per cent at full load, decreasing to 94 per cent at 50 per cent overload. The switchboards and electrical distributing system have no particularly novel features. However, a part of the reconstruction consisted in moving the switchboard proper from the level of the engine-room floor to a gallery extending the entire length of the engine room.

In the general work of reconstruction of the Lincoln station one of the most difficult features was a new tunnel for the supply of condensing water. Previously the plant had been supplied through a suction main, but the enlarged station required a gravity intake and limited space made

tunneling necessary. The tunnel is 6 ft. in diameter and 210 ft. long, lying 19 ft. below mean high water. It was driven without the use of a shield in 56 working days and without accident. The workmen were safeguarded from danger of cave-in by steel roof plates.

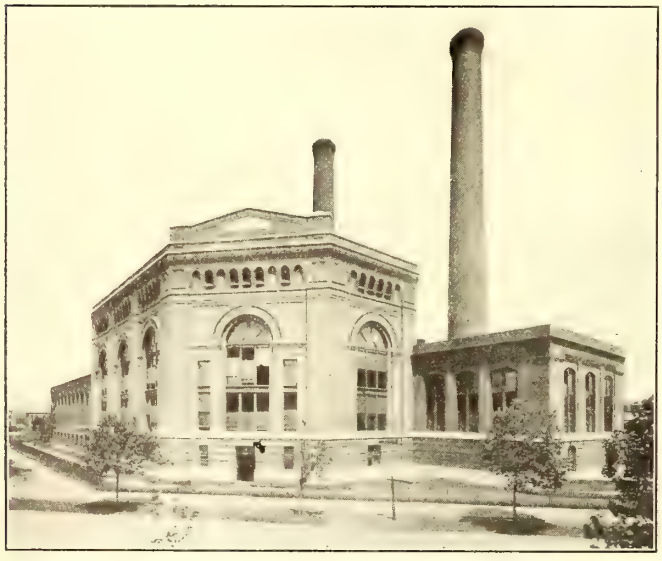
CHARLESTOWN STATION

The Charlestown station furnishes electricity for all the lines operating in Charlestown, Somerville, Everett and



Power Station Improvements in Boston—Boiler Room of Charlestown Station

Chelsea. The old station contained 1200 hp of engines, boilers and auxiliaries in a small structure, and one 2700-kw unit, with boilers, in a modern extension of the original structure, making practically 4000 kw in all. The recent work consisted in the enlargement of this newer portion to accommodate the new unit and to provide space for a future machine of the same capacity. It included also the construction of intake and overflow tunnels for the condensing requirements of both the old and new por-

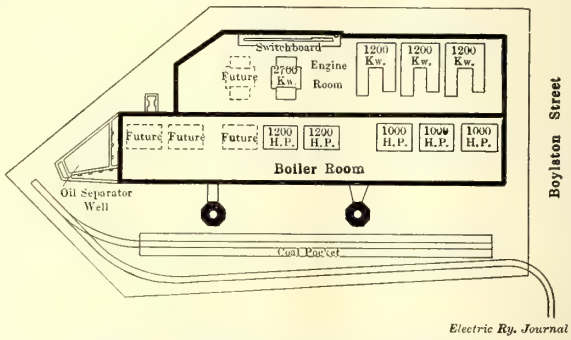


Power Station Improvements in Boston—Exterior of Harvard Station

tions of the plant. The original suction intake and overflow pipes were so deteriorated as to require replacing in any event, so they were entirely removed and a new gravity system was installed. The intake and discharge tunnels are about 800 ft. long and 4 ft. in diameter, leading to the Mystic River.

In the new building the foundations are of concrete, with wide footings resting directly on a bed of hard gravel, except under the new chimney and a portion of the north wall, where, on account of an underlying stratum of silt, it was necessary to drive piles. The superstructure is of steel frame and brick construction, with a longitudinal brick wall dividing the engine room from the boiler room. The new boiler room will accommodate eight 600-hp Babcock & Wilcox boilers, though but four such boilers are included in the present installation. The new chimney and flues are of sufficient area for eight boilers. The boilers were built according to exceptionally rigid specifications, no cast iron or semi-steel being permitted in any part of the work. They were erected entirely independent of the building structure. In front they are carried on building columns and in the rear by the standard Babcock & Wilcox type of suspension.

Superheaters are included and are of the same type and heating capacity as those installed in the Lincoln Wharf station. The new stoker equipment also is similar to that in the Lincoln Wharf station. The overhead bunker capacity is 600 tons, or 75 tons per boiler. This is three days' supply, or enough to carry over holiday periods or periods when it is necessary to make repairs on coal-handling or conveying apparatus. The conveying apparatus consists of an inclined bucket conveyor from a hopper out-



Power Station Improvements in Boston—Plan of Reconstructed Harvard Station

side the building to the top of the boiler room and a horizontal fly conveyor to the several bunkers.

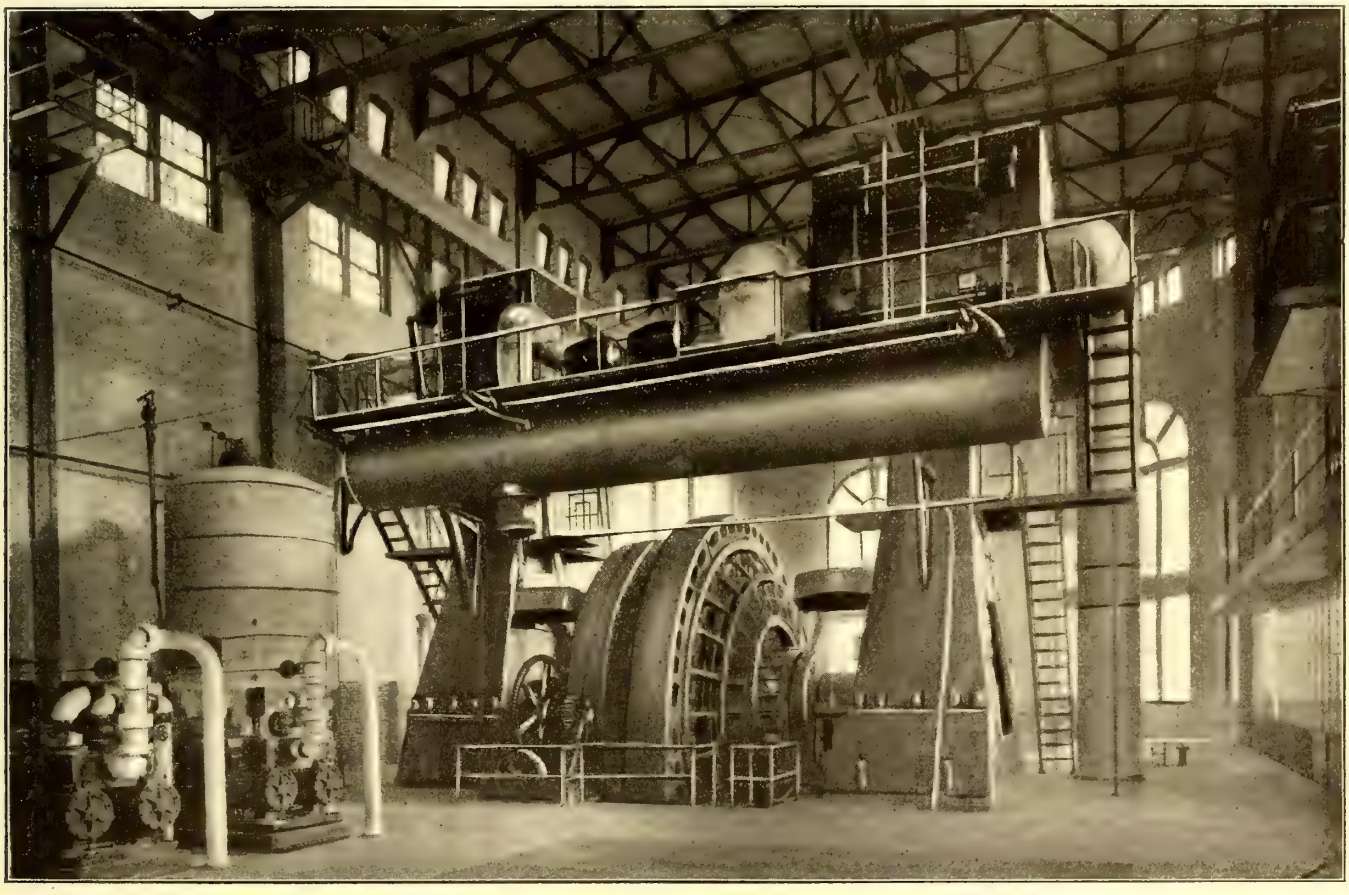
Economizers were not installed, because that would have entailed increasing the area of the boiler room and the saving effected by them would not have justified the extra expense. To heat the feed water both a primary heater between engine and condenser and a Cochrane open heater are installed. The primary heater raises the temperature of the water to within 5 deg. of the temperature of the exhaust steam from the engine. The open heaters then increase the temperature of the feed water to about 210 deg. Fahr. before it enters the feed pumps.

The new engine is of the vertical cross-compound type and was built by McIntosh, Seymour & Company. The normal rated capacity at 190 r.p.m. and 160-lb. steam pressure at the throttle is 4100 hp, the maximum capacity being 7000 hp. With a superheat of 50 deg. the guaranteed steam consumption varies from 12.75 lb. at one-quarter load to 12.5 lb. at full load, increasing to 13.85 lb. at 50 per cent overload. The valve gear is the standard type of the makers, the main steam and exhaust valves being driven by fixed eccentrics, while the steam cut-off is effected by a riding valve controlled by a shaft governor. All valves are of the gridiron type. The condensing apparatus is similar to that in the Lincoln Wharf station.

The new generator in this plant is of the General Electric 600-volt railway type. It is built with commutating

interpoles and was one of the first large generators thus equipped. In this case the operation has been most effective. Sudden and extreme changes of load can be effected without shifting of the brushes, and, even when running at a 50 per cent overload, the circuit-breaker may be tripped without sparking at the brushes. At the same time the generator has run satisfactorily in parallel with the other generators of standard non-interpole type. The guaranteed commercial efficiency of this interpole generator varies from 94 per cent at one-half load to 95½ per cent anywhere in the range from full load to 50 per cent overload.

Aside from the actual extension, a great deal of reconstruction was carried out in the old plant, with a view of increasing efficiency and reducing fire risk. New stokers were placed under four of the old boilers. Old motor-driven feed pumps were replaced by duplex steam pumps. The piping system was changed over, and a Bulkley condenser was replaced by a twin vertical air pump and jet condenser, the same type as the condenser installed with the new engine. The switchboard was relocated in a steel and concrete gallery. A fireproof floor was built in the engine room, replacing a wooden floor, and various changes were made in the oil filtering and distributing system.



Power Station Improvements in Boston—Engine Room of Harvard Station

HARVARD STATION

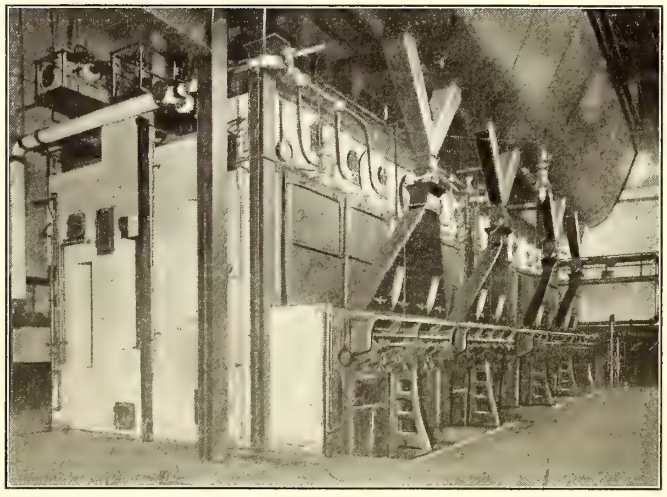
Located on the new Charles River Boulevard, near Harvard Square, this station serves Cambridge, as well as the rapidly growing districts to the north and west. In this station more than in either of the others has a revolution been worked in the external appearance. Architecturally, it has been very carefully designed so as to conform to a park-like environment. The old structure was a plain brick building containing 3600 hp of engines and boilers. The new extension fronts on the Charles River Boulevard, and its pleasing façade practically effaces the older portion.

In building this station unusual measures were adopted to secure stable foundations. The ground is of a swampy nature, and in the old station the horizontal engines caused marked oscillations of the structure, especially when two or more of them were running in unison. To obviate this weakness a plan was used in the new structure which practically made a monolith of the entire foundation bed. The whole foundation area was first enclosed in a cofferdam of heavy yellow pine sheet piling driven to a depth of 30 ft. below grade. Piles were then driven within this area until it was literally packed solid. Whereas the first piles driven sank into the silt almost 20 ft. under the mere weight of the hammer, the piles last driven finally encountered such friction that the travel was only about 1 ft. under the blow of a 2000-lb. hammer. This elaborate sub-base was completed and the concrete foundation laid upon it ready for the steel within two months from the time ground was broken.

The old and new portions of the foundations were bonded together by means of steel beams and rods buried in the concrete and the steadying effect of the new sub-base is transmitted to the old foundations through this bond. While the remote end of the old building still vibrates, the motion gradually diminishes to the point of junction with the new structure, beyond which point there is no perceptible movement.

Severe restrictions were encountered by the engineers in planning the discharge water system. The Park Commission of the city of Cambridge had permitted the building of the plant on the chosen site only upon the agree-

ment of the Boston Elevated Company to prevent the oil in the condensing water from finding its way into the Charles River. Filtration was not practicable, owing to lack of room for filters large enough to handle the 800,000 gal. of water discharged per hour at peak load. The labor required to keep such filters in order presented another objection. The device finally decided upon was virtually a large separator. The discharge water flows slowly through



Power Station Improvements in Boston—Boiler Room of Harvard Station

a concrete pit of large area. The oil rises to the surface before the end of the pit is reached and is held by means of baffle boards until it can be drawn off into the oil pit. The oil pit is formed at one side of the separator by an adjustable weir. In practice it has been found that this weir can be adjusted so the flow over at its top at peak load will be just sufficient to remove the oil which has accumulated at lighter loads, thus making the separation process nearly automatic. The slight amount of water which comes over into the oil pit is drawn off by means of a drain connected to the city sewer. There has been no trouble from oil getting into the river. In this station the equipment does not differ in any noteworthy particular from that installed in the Charlestown station, and detailed description is unnecessary.

THE CONNECTICUT REPORT

The report of the Connecticut Board of Railroad Commissioners, containing the reports and statistics of the electric railway companies in that State for the year ended June 30, 1908, has just been submitted to the Legislature. It shows that the New York, New Haven & Hartford Railroad controls 718.859 miles of the 895.037 miles of electric railway tracks reporting to the commission. Of the total 18.384 miles are in New York State.

Some of the more important statistics follow:

	1907-08	Increase
Gross earnings	$7,318,240	$504,554
Operating expenses	4,769,989	248,916
Net earnings	2,548,251	255,637
Car mileage	29,024,838	1,334,725
Passengers carried	138,530,816	10,829,391

The gross earnings per mile of track were $8,191.03; per car mile, $0.2521; per car hour, $2.339. The operating expenses per mile of track were $5,338.87; per car mile, $0.1643; per car hour, $1.524. The number of persons injured was 1,565, including 38 killed.

ACCIDENT INSTRUCTION IN PHILADELPHIA

A series of five articles on the "Problem of Reducing Accident Damages," by Frederick W. Johnson, assistant general claim agent of the Philadelphia Rapid Transit Company, was concluded in the issue of the Electric Railway Journal for Feb. 6. These articles described the methods of instructing trainmen in the prevention of accidents and in the proper handling of accident cases as practised by the Philadelphia Rapid Transit Company. As a result of an experience extending over nearly a year with this system of instruction the company has decided to extend the system and to put into effect a number of new features. Mr. Johnson will devote a large part of his time to instruction work among trainmen, and an outline of his future plans may be summarized as follows:

The first task is necessarily that of devising ways and means for holding whatever advantage the company has been able to gain up to the present time. The present practice of giving two series of lectures per year, one in the late spring and the other during the fall, will be continued, and in addition there will be inaugurated the practice of holding special classes in addition to the regular classes between these two series of lectures. These special classes will be held from time to time at individual operating depots whenever the men show the need of other instruction along specific lines. The company has not been able heretofore to develop in this direction on account of the inability of those in charge of the instruction work to devote the time necessary for this purpose. An operating depot will be deemed in need of special class instruction if it is reported for developing a weakness in the matter of obtaining witnesses or failure to promptly report all accidents or because of an excessive number of collisions of cars or other classes of accidents.

The school of instruction in accident work at headquarters, which all new employees are required to attend, will be revised in several essential respects. Printed matter, to be placed in the hands of new employees to still further impress upon their minds the importance of the oral instruction which is given them in these classes, will be prepared. This material will be written with a great deal of care, and it is believed that considerable good will accrue from its use.

The company intends also still further to impress upon the minds of its division superintendents the necessity of sending to the headquarters school all experienced conductors or motormen who demonstrate a need of additional instruction. In the event of a conductor or motorman falling short of the required standard without any reasonable explanation, he will be adjudged a proper candidate for further instruction at headquarters. In time, it is thought that these requirements will assist materially in strengthening certain defects which up to the present time have proved to be obstacles to the development of the company's accident work.

Changes, innovations and new ideas must be introduced from time to time in order that the interest of the trainmen may be retained in work of this character. With this idea in mind, the style and form of the present weekly accident bulletins will be changed somewhat, making them a little more complete in detail and more attractive in appearance. The company is also considering the advisability of issuing these bulletins every second payday instead of weekly, as at present.

In order to keep in the closest possible touch with the local situation at each of the company's operating shops,

Mr. Johnson will set aside one day of each week for the purpose of personally calling on each of the depots, thus taking advantage of all suggestions which may be advanced by superintendents or others. It is believed that by these means it will be possible still further to interest the division superintendents in the work of reducing accident damages, and many valuable ideas also will doubtless be picked up during the course of these visits.

The company intends to keep an even more accurate record of statistics of every character concerning the nature, number and location of various types of accidents with a view of guiding its efforts in the future along lines likely to prove productive of the greatest good. An effort will be made to study conditions on other large city systems, with a view of finding other improvements which could be adopted to advantage by the company in Philadelphia.

The efforts of the company so far have been confined solely to instructional work among its trainmen. A very large field is open in bringing the importance of the subject of accident damages before the general public in such a way as to enlist their hearty co-operation. It is believed that in time the company will be enabled to enlist the support of a portion, at least, of the traveling public and a very large number of the business houses, which have many teams upon public streets, in a general movement to prevent accidents. If placed before them in the proper light the subject can be made to appeal to them as being one of mutual interest. It has also been suggested that the subject might be placed to advantage in some way before the thousands of children in the public schools for the purpose of inculcating caution in their minds. In a city the size of Philadelphia the number of children who are injured in one way or another by street cars in the course of the year constitutes a problem well worthy of careful study.

GROUT MIXING MACHINE OF THE UNITED RAILWAYS OF ST. LOUIS

The accompanying illustration shows a grout mixing machine designed and built by the United Railways Company of St. Louis. This mixer has been found to be of considerable value as a labor saver when track is being constructed in paved streets. The equipment comprises an old mail car from which one-half of the body has been removed, leaving an open platform on which the motor-driven mixer is mounted. The remaining half of the body serves as a storage room for cement and tools. The mixer proper comprises a tank in which are agitating paddles carried on a horizontal shaft driven by a GE-800 motor with standard railway gearing. The paddles within the mixing tank were originally designed for a Drake concrete mixer, but have been reset so they act against one another and do not tend to move the mixture from one end to the other, but only to keep it thoroughly stirred up inside of the mixing tank.



Grcut Mixing Machine Built by the United Railways of St. Lcuis

When it is necessary to use grout in constructing pavement the mixer is run to a pile of sand and the desired amount placed in the mixing tank; then as the car is moved along the street, cement is added and the paddles are revolved during the journey. When the place is reached where the grout is to be used water is thrown into the tank by means of a hose and the moving paddles quickly complete the mixture. The paddles are kept running all the time while the mixture is in the tank so that the sand will not settle, and thus a thorough mixture is assured. The grout after having been mixed is discharged through either of the two spouts shown and in this way can be placed directly on the street where desired. But little work is required to sweep the mixture into the joints of granite pavement or to spread it for a foundation on which paving blocks may be laid.

REBUILDING MONTREAL SINGLE-TRUCK CARS FOR PAY-AS-YOU-ENTER SERVICE

Since the first pay-as-you-enter cars with long platforms were built at Montreal experience has shown that a platform of the extreme length originally used is not necessary for the success of the pay-as-you-enter system of fare collection. Accordingly, the platforms of the cars



Montreal Single-Truck Car Before Remodeling for Pay-As-You-Enter Service

built recently at the Hochelaga shops of the Montreal Street Railway Company have been shorter; yet the latest type of cars has been found to maintain schedules with equal efficiency as compared with the early cars having 9-ft. platforms and has in every way been as satisfactory.





Construction Views of Montreal Single-Truck Cars in Shops, Showing Method of Lengthening Rear Platforms

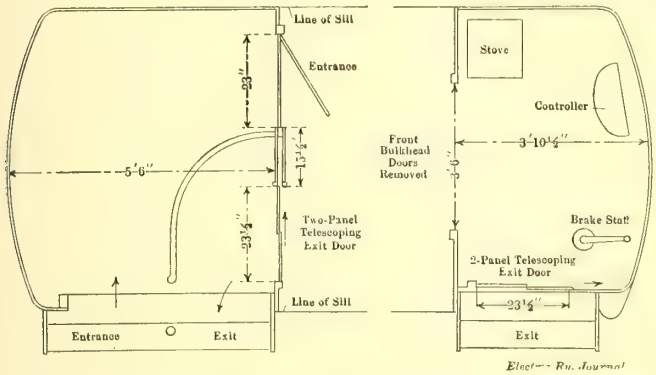
In view of these circumstances it was recently decided to shop some single-truck cars, of which there were a number in service, for a thorough overhauling, and provide them with pay-as-you-enter platforms. The cars as originally built by the Montreal Street Railway were single-enders, 20 ft. 6 in. long over the end panels, 7 ft. 6 in. wide over the sills and had platforms 3 ft. 10½ in. long at both ends. The front platform was full vestibuled, with a 20-in. folding door on one side, which was designed exclusively for the motorman's use, and the rear platform was vestibuled except at the step. In reconstructing the cars for pay-as-you-enter operation a two-panel telescoping door was substituted for the folding door at the front platform. By this change in the door, which, with an alteration in the position of the brake staff, was the only one required for the front platform, an exit 23 in. wide was secured. The rear platform was lengthened from 3 ft. 10½ in. to 5 ft. 6 in. and the rear bulkhead provided with the door arrangement characteristics of all pay-as-you-enter cars.

In undertaking the work on the rear platform much of the old material was found to be in first-class condition, in spite of the fact that the cars had been in service for over 10 years. The entire vestibuling was used, with the addition of a 20-in. panel on the side. The platform hood was lengthened 20 in. and recovered with new canvas, split joints being employed in the woodwork to make a thoroughly finished and substantial job. For the platform framing new side knees were employed, and these were plated with ¼-in. steel on both sides. The center timbers were spliced and a new crownpiece and new flooring employed.

Though the width of the car body was very limited, the rear bulkhead doors were very satisfactorily arranged. The swinging door used for entrance was made 23 in. wide and an exit 23½ in. wide was secured by employing a two-panel telescoping door of the same dimensions as that used for the front platform. These doorways have been found amply wide for expeditious movement.

Aside from the lengthening of the rear platforms, the

cars were entirely overhauled. The work included the insertion of 10½-in. truss planks over the side sills, the reupholstering of the seats, the cleaning and revarnishing of all interior woodwork and the installation of a push-button circuit. The exteriors of the cars were repainted and car numbers lettered on the front dasher in large aluminum figures on a red background, so as to be readily discernible



Plan of Montreal Single-Truck Car Platforms, Remodeled for Pay-As-You-Enter Service

from a distance. This is the method used by the Montreal Street Railway to designate all of its pay-as-you-enter cars.

Thus far 20 of the single-truck cars with 5-ft. 6-in. pay-as-you-enter platforms have been placed in service, and their success has been so marked that the management has decided to rebuild all of the single-truck cars now in service for pay-as-you-enter operation as rapidly as they can be withdrawn and shopped without curtailing the equipment required for daily service. They are the



Rear Platform of Rebuilt Montreal Single-Truck Car

first single-truck cars of this type thus far placed in operation either in the United States or Canada. When the first cars were rebuilt it was anticipated that the 5-ft. 6-in. platforms might be too short to handle to advantage a large number of passengers at a time, but no difficulty has been experienced whatever and the cars have been able to maintain the same schedule as the large double-truck pay-as-you-enter cars with long platforms. The usual increase in receipts and reduction in accidents has also been noticeable. The cars are very economical to operate because of their light weight, which totals only 20,700 lb., the weight of the body being 9700 lb., the truck weighing 6600 lb. and the motors and electrical equipment 4400 lb.



Montreal Single-Truck Car as Rebuilt for Pay-As-You-Enter Service

The work of rebuilding the cars was done by the mechanical department of the Montreal Street Railway Company in the Hochelaga shops under the supervision of the Pay-as-you-enter Car Corporation.

MASSACHUSETTS STREET RAILWAY ASSOCIATION

The regular meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, on the evening of Feb. 10. The address of the occasion was given by John R. Graham, president of the Bangor Railway & Electric Company, on "The Electrification of a Part of the State of Maine." Mr. Graham described the recently completed hydro-electric plant of the Bar Harbor & Union River Power Company at Ellsworth, Maine, which supplies power to Bangor as well as to Bar Harbor, and which is under the control of the Bangor railway and electric interests. The methods of construction in the plant were described, and the speaker then devoted some time to a review of the water-powers now under operation in central Maine, and the utilization of those of the Penobscot and Kennebec rivers for electrical purposes.

Reference was made to the new Lewiston, Augusta & Waterville Street Railway, whose headquarters are at Lewiston, and which is made up of several local companies centering in and about Lewiston and Augusta, with lines reaching Mechanic Falls, Brunswick, Bath, Turner, Sabattus, Togus, Winthrop, Gardiner, Hallowell and Winslow. About 60 miles of new road have been built within the last two years. The whole company is now operated as one system of about 140 miles of track. There are 113 passenger cars. The longest route is between Lewiston, Augusta and Waterville, the distance being 50 miles total and the running time three hours. The roadbed is substantial, and the track is built of 70-lb T-rails with Weber joints. Twin terminal bonds are used the entire length of the road. The company uses a double trolley wire installation. It is possible to travel from Bath to Waterville, 80 miles, with only one change of cars. The freight possibilities are attractive and will be developed as soon as feasible. The company has leased a large block in Lewiston for its general offices at a central point, where 600 cars pass within an 18-hour day. It is now possible to travel by trolley from Boston to Waterville, Maine.

THE NEW YORK PUBLIC SERVICE COMMISSIONS*

BY THOMAS M. OSBORNE, MEMBER OF COMMISSION OF THE SECOND DISTRICT

In New York State we have lately been bothered by a new political catch-word—"government by commission." During the recent State campaign one could hear on all sides, "Yes, I admit this or that; but I am opposed to government by commission;" and one of the ablest and most perverse of our metropolitan newspapers announced itself as being in favor of "the summary arrest and, so far as practical, the abolition of government by commission, whereof the portentous growth in State and nation constitutes one of the greatest dangers of the times, and whereof the extreme of futility has been illustrated in Governor Hughes' principal creature"—the "creature" referred to being the Public Service Commission, of which I have the honor to be a member.

The truth is, there are many forms of government by commission, and some are good and some are bad. The Supreme Court of the United States is a commission to hear and determine final appeals and decide, if it can, upon the meaning of the constitution; the Interstate Commerce Commission is a body which, violently opposed at its inception, has become a necessary means of controlling our great interstate railway corporations. There are various commissions in the several States which cover a variety of activities—railroad, gas, electricity, prison and highway commissions; our boards of education are commissions specially charged with the interests of the schools; there are in most cities commissions for the police, fire, charities and other muncipal departments. All these are examples of "government by commission;" and there are many others.

MUNICIPAL COMMISSIONS INADEQUATE

Speaking personally, and after some experience with municipal commissions, it has occurred to me that in general the difference between a commission that is worth while and one the usefulness of which may be questioned, depends, perhaps, on the fact whether their duties are judicial or administrative. I believe that most municipal commissions are very inadequate means of getting at results. I refer to the police and fire commissions, or the commission of public works in a city the size of that in which I was once a part of the administrative government. [Mr. Osborne was formerly Mayor of Auburn, N. Y.—Eds.] I found in my own experience that a commission of three to manage the fire department was by no means as efficient as a single individual. One does not have to go behind one's business experience to understand the reason for that. An individual who has an office to administer, who has certain work to perform, takes pride in having that work done well, because its well-doing reflects credit upon him personally; and you could not possibly conduct a great manufacturing business by having a commission to undertake the work of the superintending officer. You could not have a commission to manage each department as a foreman manages it; and the best results are obtained when you focus the responsibility upon single individuals, making them again responsible to the head of the concern. And so far as the city I have referred to, Auburn, is concerned, we made extensive changes in our charter, by which we abolished the old city commissions and substituted individuals appointed by the mayor and removable by him, and the results have been far better for the city.

How absurd those city commissions often are I have found in my course of travels through New York State. I struck one small municipality that had an elaborate police commission of three. I asked how many men there were on the force, and was told there were four. In another city I went to there was a commission of four on the board of public works, and with the common notion that bipartisanship is nonpartisanship, it was called a nonpartisan commission, two of the commissioners being Republican and two Democratic; and in order to be fair, the Republican party having two wings, one was appointed from one wing and the other from the other; ditto with the Democrats. So that you had two Democrats fighting between themselves and two Republicans fighting between themselves; and whenever any party issue came up you had the Democrats against the Republicans. At the time I speak of the whole street department had been held up for several months, and the city was rent in twain over the immensely important question as to the appointment of an additional street sweeper.

I am opposed to such municipal commissions. We have in New York State various State commissions—some of them appointed because our State officers have not been the efficient officers that they should be. According to our present system of election of minor State officials, when it comes to nominating them in State conventions they are parcelled out to the different local bosses in different parts of the State. The result is just what one would expect. I have never met anybody in New York State who could remember the name of one of these State officials, with some few honorable exceptions, five years after he retired from office; and some of them have been so useless and the departments have been run so badly that the Legislature has in its wisdom decided to appoint a commission to do the work of the State official.

RELATIONS OF CORPORATIONS TO PUBLIC AND STATE

Among the commissions that have seemed to me wise and calculated to work for the public benefit are the public service commissions of New York State. It has been very well understood for some years past that the problem of the relations of our great public service corporations to the public on one side and the State on the other formed a very serious problem—if not the most serious problem which faced us. It has not been quite so well understood, at least among us in New York, that there were only three possible solutions of that problem—only three possible ways in which we could move forward.

(1) We could let things alone, to drift as they may and settle themselves if they will;

(2) We could adopt State ownership; or

(3) Have some form of State regulation and control.

When you come to analyze the question there are no other possible courses.

(1) We have tried letting things alone in the past, and it has resulted in an intolerable condition of things. Offensive monopoly on the part of corporations; swindling by irresponsible and unscrupulous promoters; financial loss of innocent investors; blackmail by corrupt legislators and politicians and practical robbery and continuing robbery of an outraged public for the benefit of the swindlers and blackmailers—these have been the too frequent results of the "let alone" policy. And such things do not "settle themselves" with justice to the public or the State, for there are certain evils which creep in, which cannot be remedied without great suffering.

(2) State ownership is a remedy which is believed in by many excellent and thoughtful men; but a majority of such are not yet convinced of its desirability—at least not until they have tried another method. State ownership has two obvious and great disadvantages. First, it would require an enormous investment of public funds for utilities which are already provided for the public service by private capital; and second, it would require a large force of public servants of a kind our democracy has not yet learned to manage in a businesslike way, or even in any considerable number to produce.

(3) By State regulation and control we can secure all the advantages of public ownership without its disadvantages. Leaving the financial ownership and management of the public utilities in the hands of private persons, but forcing those persons to recognize their obligations toward the public and the State (because their investment rests upon a practical monopoly granted by the State), we can enforce justice to all three parties in interest—make the investments more stable and conservative, while securing to the public its rights and at the same time guarding the future interests of the State.

CHANGE IN RELATIONS

There has been such a change within a generation or two in the whole social structure, in social conditions, that we very often fail to recognize the alteration in the relations between these great public service corporations and

*Abstract of address read before the Annual Meeting of the National Municipal League, Pittsburgh, Pa., on Nov. 19, 1908.

the public and the State. It was evidently anticipated that the railroad would be in the nature of a highway upon which the people might run their own private carriages, just as they ran their own private carriages upon the turnpike. In other words, in the beginning the railroad was a *competitor* of the turnpike and the canal. It was not in any sense a monopoly; it was a competitor—a new form of competitor to an existing system.

All this brings before us forcibly the great difference in the manner of looking at these public service corporations. When we examine into the other utilities subject to the New York Public Service Commissions Law, besides the railroads, we find the same interesting facts, which we are so apt to forget. When trolleys came into use they formed a new sort of competition against the more expensive cab companies. The interurban trolleys were competitors of the railroads. When gas came into use it was only a new-fangled light offering itself in competition with candles and lamps. Electric light, when it appeared in its turn, was a competitor of gas. Now, beginning as a new form of competition, these public utilities rapidly, many of them (less rapidly, of course, in the case of the railroads), became a public convenience, and from a public convenience they became a public necessity, because the social structure grew up around them and made such use of them that it became absolutely dependent upon them; and after they became an absolute public necessity, and in the case of railroads, where not only the commercial prosperity, but even the very lives of large communities depended upon them, then these public utilities became practical monopolies; for wherever a public utility has a community in its grasp it becomes a monopoly. We have hesitated to recognize them as such, and have tried to regulate them by competition. We have chartered rival railroads. We have chartered rival gas companies and electric companies. But free and open competition is not possible in these public utilities, and we are forced back to the plain proposition that they are monopolies, and must be regulated as such. That being conceded, we are justified in demanding State regulation; and there is no form of State regulation that has yet been devised that is as good and efficient as a commission, such as that in Wisconsin has turned out to be, and such as we hope these in New York are turning out to be.

I would say that we have not the excellent provision of the Wisconsin law—the provision forbidding discrimination in rates which is in the railroad section of our law, but does not exist in the lighting section of the law. It was presumably overlooked because of the law being somewhat hastily drafted. It is an extraordinarily successful law, considering how rapid was its preparation. The lighting act passed the year before, the gas and electricity act, was put almost bodily into the commissions law, so that many of the points where the old law failed to be effective are also ineffective in our present act.

I think it may also be said that the commissions have been of great service to the public service corporations along the lines Dr. Meyers has mentioned, in making them see very often the poor results of their own management; for in some cases the lack of foresight, the lack of good management is something quite extraordinary.

WHAT THE COMMISSIONS HAVE ACCOMPLISHED

Among the accomplishments of the commission can be said to be these:

1. *The authorization of new corporations.* It has been said that the New York law has absolutely killed the extension of business. In answer it may be said that the up-State commission has authorized 20 new companies in the 15 months from July 1 to October 1; three railroads and 17 gas and electric companies, besides nine extensions of old companies.

2. *It has authorized new capital.* Not long ago it was stated by a gentleman prominently connected with some of the public utilities in New York that no new capital was going into public utilities on account of the passage of the law and the drastic action of the commissions. Our commission has authorized the issue of $106,000,000 of new securities within the 15 months, and that means honest capitalization. In face of the hard times which the country has been passing through, that is not so bad.

3. *Abolition of railroad rate discrimination.*

4. *Abolition of rebates.* There can be no real uniformity of rate if rebates are permitted. By a uniform system of accounts rebates can now be detected, and it is believed that the practice has been effectually stopped.

5. *Improvement in freight service.*

6. *Reduction of rates.*

7. *Improvement in passenger service.* I think the proportion of trains on time has increased from 60 per cent to about 80 per cent. There is still room for improvement.

8. *Trains taken off have been restored.*

9. *Stops have been ordered* for the convenience of various localities.

10. *Repayment of excessive or illegal charges.*

11. *Elimination of grade crossings.* The advent of the motor has made this subject one of increasing importance. The commission has moved in this matter as fast as the appropriations made by Legislature will allow, and many dangerous crossings are being replaced by new and safe crossings.

12. *The inspection of railroad lines.*

13. *Inspection of trolley railroad lines.* A careful inspection by competent experts of all street and interurban trolley lines, similar to the railroad inspection.

14. *Trolley express companies refused.* The commission has declined to allow the formation of an express company for trolley service. A company became incorporated, with a right to do an express business not only on half a dozen trolley lines centering in Syracuse, which were all more or less owned by the same parties, but all over the United States, and, in fact, it did not stop with the United States. The commission declined to allow the company to do business, holding that it was the proper function of the road itself to take care of its own business, without an intervening corporation to extort additional charges.

15. *Investigation of accidents.*

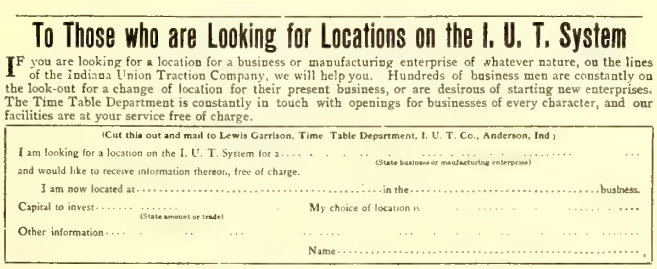
16. *Inspection by gas companies.*

17. *Inspection of electric companies.* All new electric transmission lines inspected. All meters tested and inspected.

18. *Minor complaints.* A large number of small individual complaints have been remedied, covering a wide and fertile field of possible bad feeling toward the railways.

INDUSTRIAL LOCATIONS OFFERED BY INDIANA UNION TRACTION COMPANY

The timetables of the Indiana Union Traction Company, Anderson, Ind., call attention to the possibilities for industrial location offered by the communities on the lines of the system. The accompanying illustration of an advertisement taken from the timetable for February, 1909, shows the readiness of the company to assist business enterprises seeking locations.



To Those who are Looking for Locations on the I. U. T. System

IF you are looking for a location for a business or manufacturing enterprise of whatever nature, on the lines of the Indiana Union Traction Company, we will help you. Hundreds of business men are constantly on the look-out for a change of location for their present business, or are desirous of starting new enterprises. The Time Table Department is constantly in touch with openings for businesses of every character, and our facilities are at your service free of charge.

(Cut this out and mail to Lewis Garrison, Time Table Department, I. U. T. Co., Anderson, Ind.)

I am looking for a location on the I. U. T. System for a..... (State business or manufacturing enterprise)
and would like to receive information thereon, free of charge.
I am now located at.....in the.....business.
Capital to invest..... (State amount or trade) My choice of location is.....
Other information.....
Name.....

Advertisement Announcing Industrial Locations on Indiana Union Traction Company's Lines

In an article in the *American Magazine* for February entitled "Sending a State to College," by Lincoln Steffens, reference is made to the work of Prof. B. H. Meyer, of the Railroad Commission of Wisconsin, as professor of political economy at the University of Wisconsin.

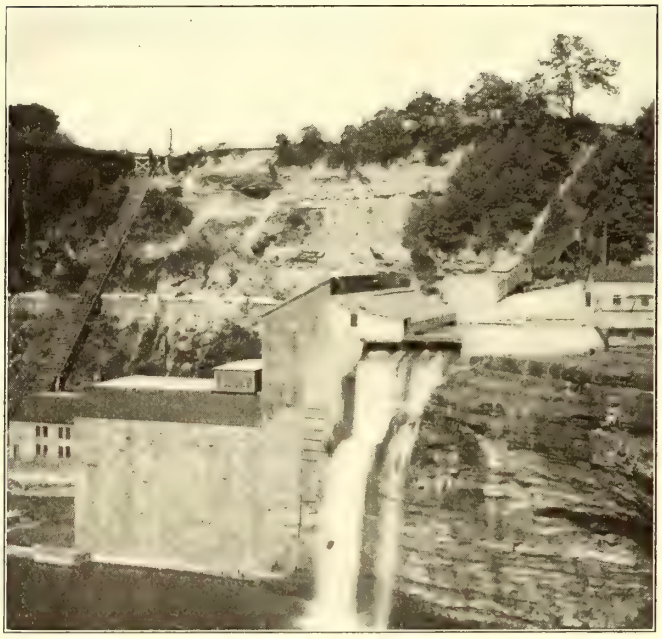
WATER-POWER AND TRANSFORMER STATIONS OF THE ROCHESTER RAILWAY & LIGHT COMPANY

The Electric Railway Journal of Jan. 23, 1909, contained an article entitled "The Power System of the Rochester Railway & Light Company" which gave a general list of the company's power stations and a detailed description of the Brown's Race plant, known also as Station No. 3. This article will present some details of the important water-power Stations Nos. 5 and 4 and of the new transformer house for Niagara Falls power.

STATION NO. 5

The largest water-power station of the Rochester Railway & Light Company is known as Station No. 5, and is about 4550-kw capacity. It is on the Lower Falls of the Genesee River, where there is a head of 96 ft. It is 47 ft. x 90 ft. x 47 ft. high, and is built of masonry on concrete founded on the rock at the bottom. This station contains three 2100-hp turbines, two built by the Trump Manufacturing Company and one by the I. P. Morris Company; a 900-hp Morris turbine; a 450-hp Leffel turbine driving a railway generator, and a duplicate driving an alternator.

The electrical equipment installed comprises three 1200-



Rochester Power Plants—Station No. 5, the Most Important Hydro-Electric Installation

kw, three-phase, 4150-volt G. E. generators, each of which is direct-connected to one of the 2100-hp turbines; one 500-kw, 550-volt generator, one 300-kw, 550-volt generator, and one 350-kw, 4150-volt, three-phase generator; the last three machines being of General Electric, Westinghouse and Bullock make, respectively. In addition to the generating equipment there is the following transforming apparatus: nine 71-kw constant-current transformers for alternating-current series circuits and a 500-kw frequency changer. The latter set has a 4150-volt, three-phase, 60-cycle motor and a 11,000-volt, three-phase, 25-cycle generator, and is used for supplying energy to a 40-mile suburban line formerly fed from a steam-driven station located about 6 miles outside the city. Each of the large alternators receives exciting current from a 20-kw multipolar generator fitted to the extreme end of the shaft. The frequency changer has a 25-kw exciter set belted to it, as has also the Bullock set. In addition there is a 50-kw motor-generator set available for boosting railway feeders.

Two high-tension lines carrying energy from Niagara Falls are brought underground to Station No. 5. One of these passes direct from Station No. 6 and the other also comes from Station No. 6, but reaches Station No. 5 by way of Station No. 1. The 11,000-volt lines radiate from Station No. 5, one line being used to supply energy to Sodus Point, 40 miles away, and the other supplying energy to the railway at Charlotte and vicinity. The Niagara lines are run underground from the Rochester Railway & Light Company's transformer station at Elmwood Avenue to Station No. 6. The transformer station is supplied from the Ontario Power Company's switching station, 4 miles outside the city. All the feed wires from Station No. 5 are carried up the face of the power house next to the falls, where they enter conduits forming part of the race wall and are carried up the high bank, where they enter the underground conduit system.

STATION NO. 4.

Station No. 4 is on the Upper Falls, on the west side of the Genesee River, alongside the tracks of the New York Central Railroad. When water is plentiful this station carries a railway load of about 3000 kw. The head available at Station No. 4 is 94 ft., and the water power developed is 4200 kw. The equipment comprises two twin Leffel turbines rated at 500 hp and belted to four 150-kw, 250-volt Edison bipolar machines; two single Leffel wheels rated at 500 hp, belted to four 150-kw, 250-volt Edison machines; one Poole & Hunt wheel rated at 600 hp, connected by the American system of rope drive to a countershaft, to which are belted two 150-kw, 125-volt Edison machines; one Poole & Hunt wheel belted direct to two 150-kw, 125-volt Edison machines; one 500-hp Leffel turbine belted to two 150-kw, 125-volt Edison machines; one 1200-hp Trump wheel belted to countershaft to which are belted two 150-kw and two 200-kw Edison bipolar machines; one 1200-hp Trump wheel direct-connected to an 800-kw, 250-volt generator feeding the outside wires of the Edison system, and one 1200-hp Allis-Chalmers wheel direct-connected to an 800-kw, 250-volt generator, also feeding into the outside wires of the Edison system. The 250-volt Edison generators are, as occasion demands, thrown in series and connected to the street railway network. To take advantage of the copper distribution available from this station two 500-kw motor-generator sets and one 350-kw motor-generator set are installed. These receive energy from the steam-driven stations and feed into the network focused here. In this way a great saving is effected in the amount of copper necessary to feed this district from the other stations at periods of very low water. The 300-kw motor-generator set is made up of a 350-kw induction motor and two 150-kw, 125-volt compound-wound generators. In the summer it is used principally as a 125-volt or 250-volt booster for the railway feeders, and during the fall and winter it is used chiefly as a plain shunt-wound machine feeding into the Edison system. The machines are capable of taking full load without the series winding. The other motor-generator sets have synchronous motors.

The Edison machines are used chiefly for overloads on water power, and when water is plentiful they carry the load of the steam units, which may then be shut down. When the water is low the company has sufficient other more economical units to carry the load, but since at high water and flood condition the water runs to waste anyway, the Edison machines are brought into use. For peak-load conditions the machines are used about 70 hours a year.

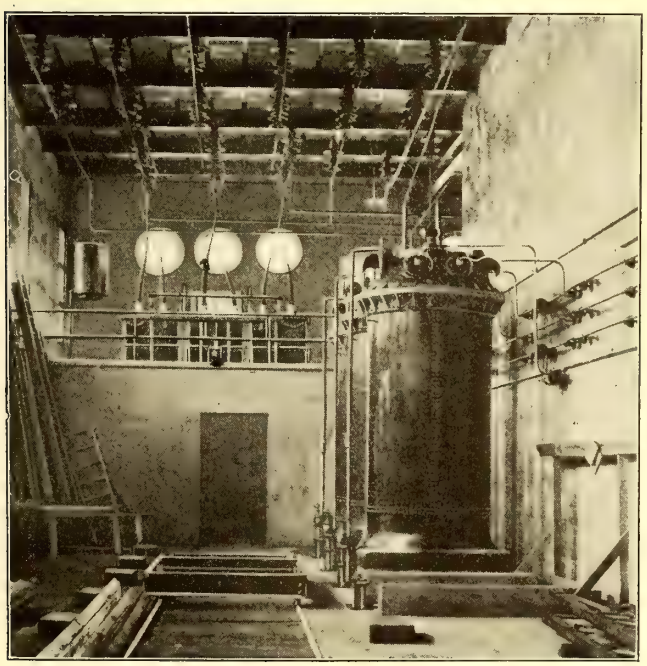
The railway circuits are controlled from a board on the

river side of the station. This board has 12 feeder panels and seven tie panels. There are four tie circuits running to Station No. 6 and three tie circuits running to Station No. 3. Some of the Edison three-wire circuits and the railway circuits are carried on a pole line across the river. The lines are supported on cross-arms, which in turn are held by I-beams fastened to concrete piers built on the river bed. The feeders are made up of 500,000 circ.-mil cables.

TRANSFORMER SUBSTATION

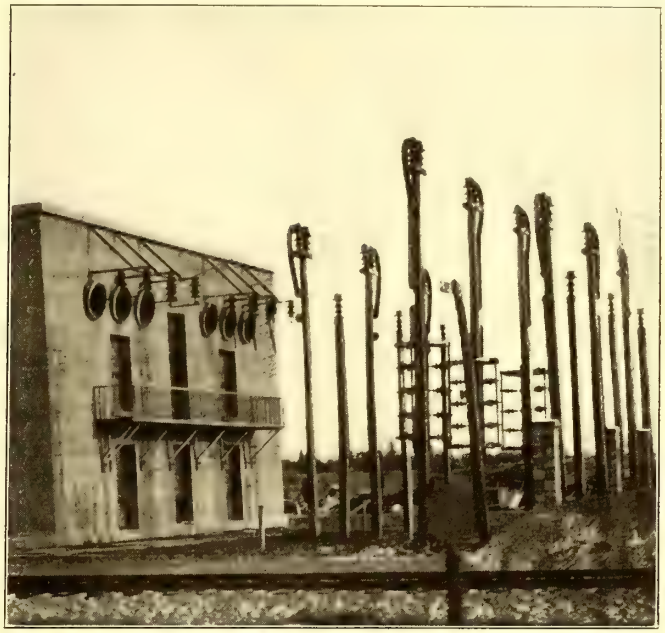
Although the Rochester Railway & Light Company possesses a miniature Niagara in the Genesee River, the latter stream has not the Great Lakes back of it, so that constancy is not one of its features. For this reason steam-driven units are kept in reserve, and having developed the water power to its economical limit, the question of carrying the ever-increasing loads was only answerable in two ways: Either the company had to install more steam-driven units or connect up to the Niagara transmission lines, passing outside of Rochester, on their way to Syracuse and the intervening towns. After careful consideration, the company found it expedient to contract with the Niagara, Lockport & Ontario Power Company to take an initial load of 4000 hp. To receive the energy and to transform it to pressures appropriate for its distribution circuits, the Rochester Railway & Light Company erected a transformer substation adjacent to the Lehigh Valley Railroad tracks at the corner of Elmwood Avenue. The building has been designed to accommodate an ultimate load of 24,000 hp.

The energy is delivered by the transmission company to the Rochester Railway & Light Company at the former's switching station at Mortimer, N. Y., at which point also energy is delivered to the Erie Railroad and from which



Rochester Power Plants—Interior of Substation No. 33, Showing Transformers and High-Tension Bus Construction Near the Ceiling

it is also sent on to Syracuse. From Mortimer the energy is brought over two separate transmission lines to the substation referred to, which is known as Station No. 33. The Niagara, Lockport & Ontario Company's switching station is located about 4 miles outside the city and 40-ft. to 50-ft. steel towers and aluminum cables run on a private right of way adjacent to the Lehigh Valley Railroad tracks, between both stations. The transmission line carries 60,000-volt, three-phase, 25-cycle current and before entering the transformer station the lines pass through protective apparatus carried on some 40 wooden poles. These poles contain three series of horn lightning arresters with air-gaps and resistance. The shortest path consists of a carborundum resistance; the next consists of a concrete column and the longest path comprises about 15 ft. of thin



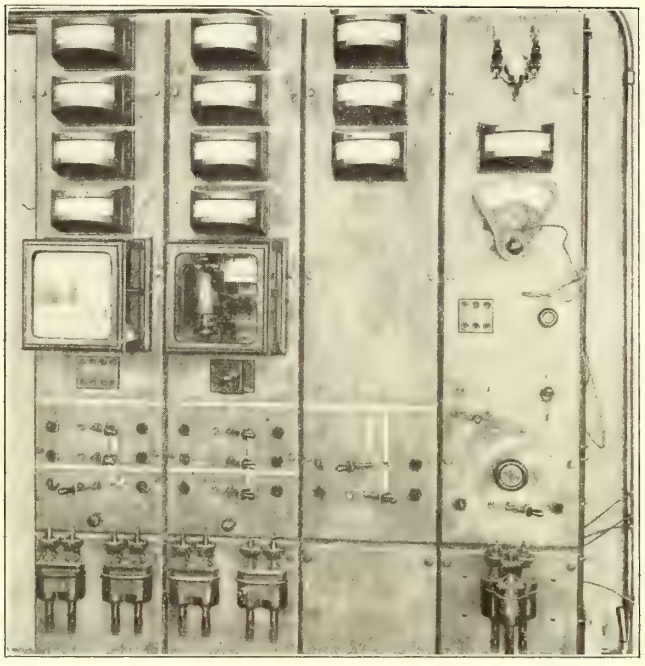
Rochester Power Plants—Exterior of Substation No. 33, Showing Incoming Niagara Transmission Lines

copper wire acting as a fuse. The lightning arresters are of a type specially designed for the Niagara, Lockport & Ontario system. The theory on which these arresters are installed is that for ordinary slight static disturbances in the line, the arrester having the lower striking e.m.f. will discharge, and since it has in series with it a comparatively high resistance, the resultant disturbance due to the current which follows the discharge will be comparatively slight. A more severe static disturbance causes the arrester having the lowest gap and the arrester having the next higher gap to discharge simultaneously, thus affording two paths to earth, the combined resistance and inductance of which is much lower than that of the first path. When both arresters discharge the disturbing effect on the system, due to the generated current which follows, is much severer than that in the first instance. For a direct lightning stroke on the line, the three arresters would discharge simultaneously; the long, thin copper wire in the case of the arrester with the highest air-gap blowing and interrupting the arc upon it, the disturbance of the circuit finally ending upon the other two arresters.

The substation building is approximately 50 ft. wide, 120 ft. long and 30 ft. high. It is built of reinforced concrete, the walls being 16 in. thick and having an 8-in. space in the middle formed by the use of terra-cotta tile. The roof is made of tile laid on steel rafters and purlins, which are left bare underneath the tiling. The window frames are of metal with self-closing sashes in case of fire and wire-mesh glass. The building is divided into three parts—a two-story inlet room at the south end, a transformer room on the east side extending from the floor to the roof, and a two-story distributing room on the left side. The latter consists of an operating room on the second floor and an entrance and bus room on the lower floor. The lower

part of the inlet room is used for water-circulating pumps, a storage battery, bathroom and storeroom. On the upper floor are two Westinghouse oil circuit breakers. Each of the two sets of three lines pass to these from the lightning arresters, entering the building through six bull's-eyes made of 36-in. sewer crocks, each closed with a double window of glass, through which passes a large porcelain tube. The circuit breakers are equipped with inverse time relays.

After leaving the circuit breakers the conductors are carried on insulators suspended from the roof rafters over the transformer room. The conductors form a loop here and are so arranged that any part of the ring bus can be isolated from any other part for repairs, alterations or additions. Practically all the conductors inside the building are bare copper or aluminum pipes. From the bus the circuit is carried to transformers which step down the voltage from 60,000 to 11,000, the pressure at whch it is delivered into the city. At present four 1000-kw, oil-and-water-cooled transformers are installed, one of which is kept in reserve for emergency use. The transformer room is large enough to contain ultimately 18 of these transformers. In this room there is a pipe trench 3½ ft. deep and about 3 ft. wide extending down the center and normally covered with steel floor plates. On either side of the trench is a standard rail, the two forming a track for a small transfer car by means of which the transformers may be run to the north end of the room, which is partitioned from the main room and provided with a 16-ton hand hoist. This arrangement was considered preferable to a traveling crane, for though slightly less convenient, the infrequency of use makes this inconvenience tolerable, as against the larger cost of a traveling crane and the obstruction that the latter would have introduced in suspending the conductors from the roof. In the pipe trench are four main pipes, a cold-water pipe, a warm-water pipe, a clean oil pipe and a foul oil pipe. The circulating water is pumped from the Genesee River to a well inside the station building, whence it is repumped through the transformer coils and discharged to the river or run over a riffle board of concrete, where the water is exposed in a thin sheet to the atmosphere and to slight evaporation. The riffle board saves the continuous lift of water from the river, which is 1500 ft. away.

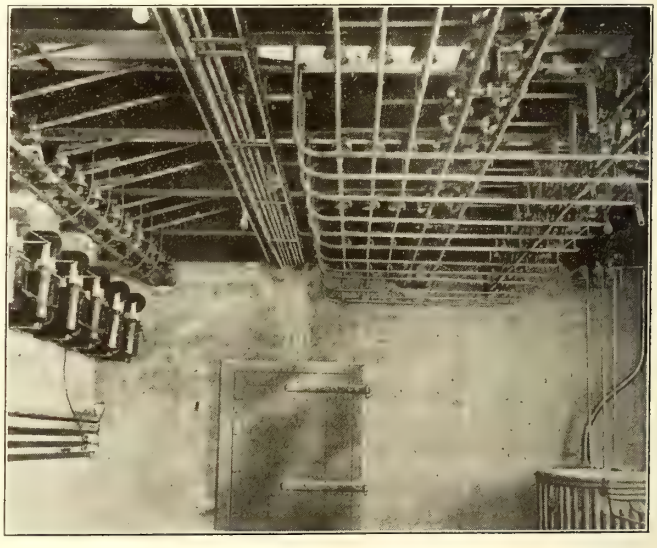


Rochester Power Plants—Front of Switchboard in Substation No. 33

In the operating room on the second floor is a tank holding enough oil to fill one transformer case. A similar tank is set into the ground floor of the inlet room, and in case it becomes necessary to repurify the oil in any transformer, a reserve supply carried in the foul oil tank is pumped through the oil dryer and filter to the clean oil tank on the second floor. A valve on the transformer is then opened and the foul oil flows by gravity to the submerged tank. The foul oil valve is then closed and the clean oil valve opened, whence the transformer case is rapidly filled from the elevated storage tank. The foul oil can then be dried and filtered in a leisurely manner by a Westinghouse outfit for dehydrating the oil.

After leaving the transformers the energy at reduced pressure is delivered to the bus room on the first floor on the west side of the building, passing upward and downward to and from oil circuit breakers located on the operating floor above, until it is finally delivered to the underground cables connecting the transformer substation with Station No. 6. The connections in the bus room are so arranged that energy can be delivered from any set of transformers to any outgoing feeder without interfering with the general scheme of operation. Aside from the switchboard and clean oil storage tank there is nothing on the operating floor except the 11,000-volt oil switches. For operating the switches when the ordinary circuit provided for that purpose is not alive a battery of 66 cells, charged for a mercury rectifier set, is installed. The building is heated electrically and for the circuits in the station, two three-phase transformers are installed; each of these is rated at 40 kw.

In the entrance room a 1000-kw, three-phase, 25-cycle transformer is installed. This steps up the voltage from 11,000 to 18,000 for transmission over a wooden pole line 27 miles long to Canandaigua, where a motor-generator set is installed for carrying the railway load of the Rochester & Eastern Rapid Railway. Aluminum wire is used on this transmission circuit.



Rochester Power Plants—Busbars Under 11,000-Volt Switches in Substation No. 33

The motorman who was responsible for the wreck on the Berlin Elevated Railway last September, described in the issue of this paper for Oct. 10, 1908, has been sentenced to 21 months' imprisonment.

RECORDING PATTERN MOVEMENTS IN BROOKLYN

The mechanical department of the Brooklyn Rapid Transit Company has developed several cards and other forms to keep accurate track of the movements of patterns as manufactured and sent to foundries at different times. The principal record is kept on the office card (6 in. x 4 in.) reproduced in Fig. 1. This gives the plan and pattern numbers, a description of the casting, with a sketch of the same on the back of the card; kind of pattern; when made and completed at the Fifty-second Street shops; weight, cost, castings, coreboxes and pieces. The foregoing items cover the permanent data relative to any particular pattern, but to trace its movements between

Patt.No. 7940 Description Brake Shoe Head, Driver.
Plan.No. 5452 Brill "Eureka" M.T. Truck.

KIND OF PATTERN	Ordered	Compltd.	Cre.Bxs.	No.Pces.	Weight	Cost		Castings of
Wood D. Shrnkge	9-2-'08	9-14-'08	0	1	11b-6oz	14	80	
Metal Aluminum	9-3-'08	10-9-'08	5	6	10 lbs	24	38	Steel

Kind	Shippg.Ord.	Rcd.at S/R	Rcpt.No.	Foundry	Ret Notice	Rcd.52d St.
Wood	9-8-'08	9-16-'08	516	Magnus	9-29-'08	10-1-'08
Metal	9-8-'08	10-9-'08	523	Johnson		

Fig. 1—Superintendent of Equipment's Office Record

Patt.No. 7940 Description Brake Shoe Head, Driver.-Brill M.T. Truck.

KIND OF PATTERN		Core Bxs.	No. Pces.	Completed
Double Shrnkge.Wood. — Gate Alum'n		W. 0	1	9-14-'08
Kind of Pattern	Sent to	A. 5 Date	6 Returned	10-9-'08
Wood	Magnus	9-16-'08	10-1-'08	
Aluminum	Johnson	10-9-'08		

Fig. 2—Shop Card Record

TRANSIT DEVELOPMENT COMPANY
MECHANICAL DEPARTMENT

52nd. St. Surface Shop. PATTERN REPORT —October 9th. 1908.

Pattern Number	Completed	Weight Lbs	Ozs	Cost		Ret.frm Foundry	Repaired	No.of C.Bxs	No.of Pces	Kind of Pattern Size	Material	No.Gtd
7940	10-9-'08	10	0	$24	38			5	6	S	Aluminum	0.

This form must be filled out and promptly forwarded to Supt. of Equipment, giving full information in every case. For Remarks use reverse side of this sheet.

Supt.

Fig. 3—Manufacturing Cost Report to Superintendent of Equipment

The Brooklyn Rapid Transit System

Brooklyn, N. Y., Oct. 9. 1908.

Messrs. I. G. Johnson & Co. Stapleton Duxpil, N.Y.

We have forwarded to you to-day via Am. Exp. the following patterns

Pattern No.	No. of Core Boxes	DESCRIPTION	Order No.
7940	5	Driver Brake Shoe Head, Brill M.T. Truck.	24100.

Very truly yours,
LINCOLN VAN COTT,
Purchasing Agent

Fig. 6—Postal Card Notification of Shipment

the storehouse and foundries from time to time, 14 lines are left under the following headings: kind of pattern, shipping order to storeroom, date of receipt of order at storeroom, receipt number sent by foundry on return postal card; name of foundry, notice to purchasing agent to return pattern on its becoming obsolete, and notice of receipt at the Fifty-second Street shops. A smaller record card (5 in. x 3 in.), shown in Fig. 2, is kept at the shops and bears the data indicated in the reproduction.

Fig. 3 shows the shop's report (5⅜ in. x 8¼ in.) to the superintendent of equipment, giving the original manufacturing details on a given pattern. Figs. 1, 2 and 3 are all printed on a Gammeter multigraph, which is used with equal success on hard or soft paper. Fig. 5 illustrates the shipping order (8¼ in. x 11 in.) sent to the storeroom when a pattern is to be turned over to a foundry. It will be noted from the text thereon that with every order the general storekeeper is given an explanation by some responsible person. Fig. 4 is a reproduction of the descriptive shipping tag (4¼ in. x 2⅛ in.), which accompanies a pattern shipment to the foundry. In addition to the tag, a double notification postcard is sent to the foundry from the office. The return half serves as a receipt.

FROM
TRANSIT DEVELOPMENT CO.
PURCHASING DEPT.
520 ST AND SECOND AVENUE BROOKLYN, N. Y.

Aluminum PATTERN No. 7940.
5 CORE BOXES — LOOSE CORE PRINTS
Driver Brake Shoe Head, Brill M.T. Truck
SHIP TO I. G. Johnson & Co.
Stapleton Duxpil N.Y.

Fig. 4—Shipping Tag

BRT
SHIPPING ORDER
ORIGINAL. For Storeroom Office
Order must be countersigned by General Storekeeper before material is offered for shipment

GENERAL STOREKEEPER:
Please ship the following Double Shrinkage Wood Pattern-

ORDER	Requisition	Casting Order	PATTERN	DESCRIPTION
#88463.			7940	Brake Shoe Head, Driver
Magnus				Brill M.T. Truck
Metal Co.				

Explain on following lines why shipment should be made.
For Aluminum casting, for Pattern.
See letter Sept 3.'08 from Supt of Equipment
to Magnus Metal Co ordering casting.

Ship to
Address:
Date Sept. 8. 1908.
Signature, Employee Requesting CHIEF DRAFTSMAN
Accept for Shipment
General Storekeeper
Date 190
Received 190
Receiving Clerk.

Fig. 5—Shipping Order

File No. 523. Oct 10. 1908.
Received from the BROOKLYN RAPID TRANSIT SYSTEM the following patterns

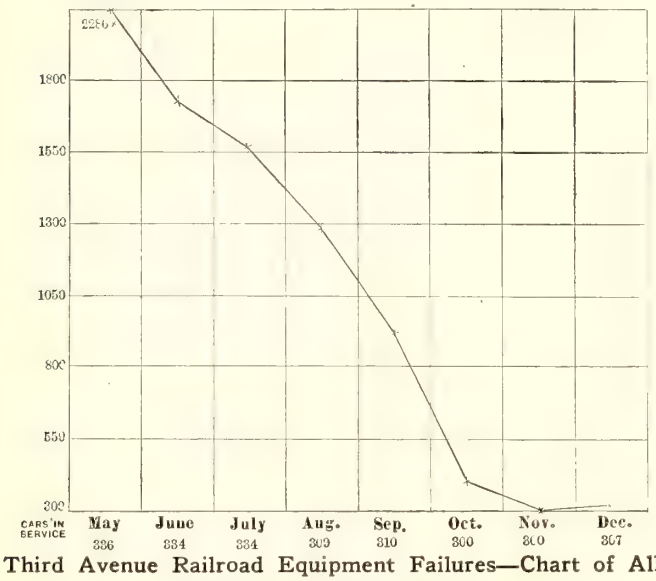
Pattern No.	No. of Core Boxes	DESCRIPTION	Order No.
7940	5	Driver Brake Shoe Head. Brill M.T. Truck.	24100.

Per
Please sign and return at once.

Fig. 7—Return Postal Card Receipt

THE REDUCTION OF EQUIPMENT FAILURES AND MAINTENANCE COST ON THE THIRD AVENUE RAILROAD SYSTEM, NEW YORK

When on Jan. 6, 1908, Judge Lacombe, of the United States Circuit Court, appointed F. W. Whitridge as separate receiver for the Third Avenue Railroad Company of New York, rapid steps were taken to provide the new organization needed for the maintenance of the rolling stock. The



Third Avenue Railroad Equipment Failures—Chart of All Failures for Eight Months

new buildings and reconstruction work of the Third Avenue Railroad Company are nearing completion under T. F. Mullaney, chief engineer. In the meantime the maintenance organization has been perfected by E. A. Maher, general manager.

To maintain the cars at the top notch of efficiency after their initial overhauling in April and May, 1908, it was determined to inspect them weekly, or at practically 800-mile intervals, and to send them into the shops for general overhauling every time they completed 10,000 miles. The new system, in combination with several improvements in car equipment parts, has brought about an enormous decrease in breakdowns from various electrical and mechanical sources. The remarkable trouble reductions in each class of apparatus are shown in the accompanying curve sheets which chronicle conditions from May, 1908, when the new maintenance forces were organized. Each set of curves also shows the number of cars actually running at the end of each month. The highest number operated was 334 in May, and the lowest was 300 in October and November.

GENERAL REDUCTIONS IN DEFECTS AND LABOR COST OF MAINTENANCE

The general improvement throughout the Third Avenue Railroad system is illustrated by the first curve, which is a summary of the troubles arising from the several electrical and mechanical sources detailed in the later curves. In May, about the time the overhauling process was fairly under way, there were 2286 failures on 336 cars, or about 6.8 per car per month; during November and December there was but one failure per car per month.

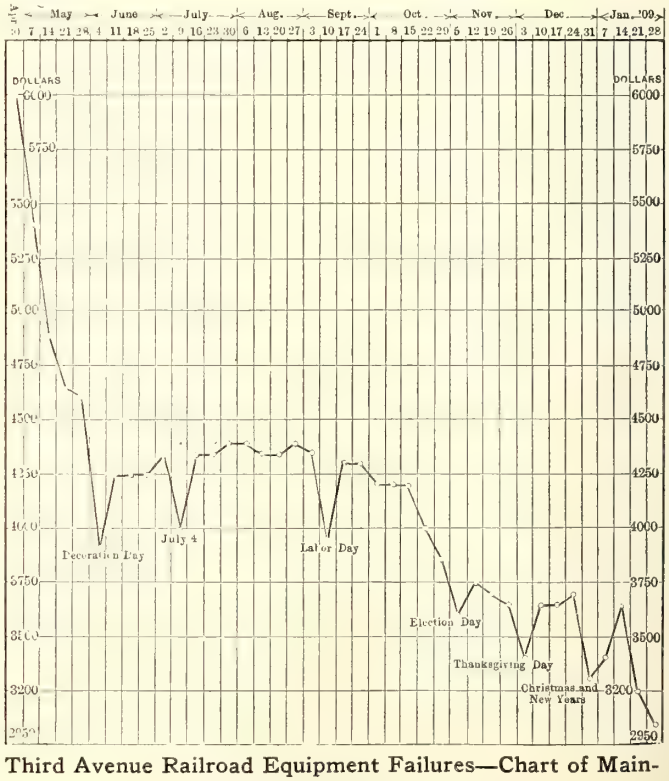
One would naturally be inclined to assume that this great improvement in the rolling stock must have been effected by spending extraordinary sums for inspection and repairs. On the contrary, the labor cost for maintenance is now only one-half of what it was last April. This is proved by the accompanying car equipment payroll curve which shows that the amounts paid out weekly for this item dropped from $6,000 in the last week of April to $3,100 in the week ending Jan. 28. The unusual depressions appearing at intervals in the general downward trend of the pay-roll curve were due to the holidays indicated.

It would be difficult to argue more strongly for the sound inspection and maintenance principles adopted by this company than merely to place these two curves side by side. This comparison certainly bears out the adage that "A stitch in time saves nine," even if the actual proportion is not so favorable as the proverbial one. The elimination of so many failures also has brought about an enormous saving in car-hours, although this item has not been taken into account in the saving of maintenance charges presented in this article.

PLOW AND BRAKE TROUBLES

Up to May, 1908, plow troubles of this railway company constituted over one-third of all equipment failures. In May, for instance, there were 896 plow breakdowns out of a total of 2286 defects from all electrical and mechanical causes. It should be remembered that a plow failure invariably means a disabled car, whereas other troubles are usually not serious enough to prevent the car from reaching the car house unassisted. This item, therefore, received special attention and with such success that by November plow troubles had been cut down to 130. Despite the severe weather during December, the total plow failures for that month did not exceed 180.

This remarkable reduction was due in part to the original thorough overhauling, but even more to betterments in the wiring connections and insulation of the plow. It was not



Third Avenue Railroad Equipment Failures—Chart of Maintenance Force Pay Roll

necessary to alter the plow shoe and spring mechanically. The leads formerly were connected up without any copper terminals and were bunched under the shoe spring in such a way that the spring constantly tended to abrade the insulation. Rubber bushings had also been used to insulate the shoe from the spring, and in time the rubber would

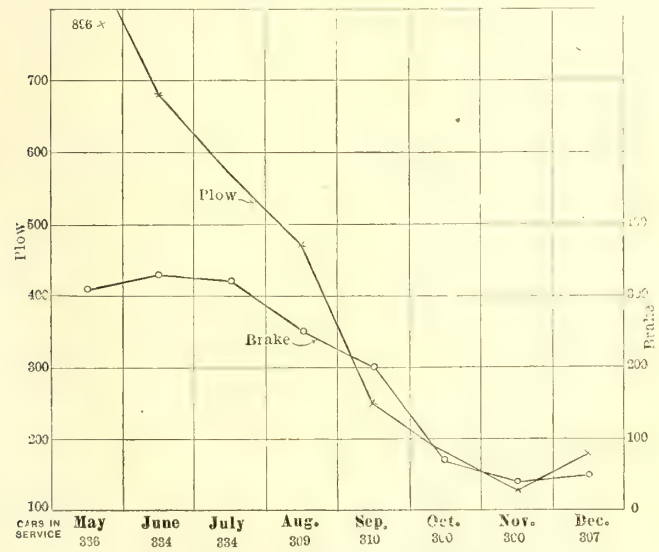
get hot, thereby causing the connection studs and shoe to loosen. Charred boards, short-circuits and fuse blow-outs have been practically eliminated by using copper terminals to secure better contact; by embedding the leads on the board in insulating compound to prevent their creeping over to the board angle-iron through carbonization; by replacing the rubber bushings with red horn fiber and insulating the studs with mica tubes, and, in general, by building up the plow in the best possible manner. By concentrating all plow repairs at the main shops under the personal supervision of an expert, absolute uniformity is assured.

The record of brake failures has been plotted on the same sheet as the plow figures. In this case, the maximum number of troubles was reached in June with a total of 330. During the summer months all cars were equipped with a specially designed inside-hung brake rigging to displace the old fork-rod, outside-hung brakes. During June and July, also, 125 new cars out of 334 cars in service were equipped with Peacock brakes, and by the end of September brake failures dropped to 200. Three months' operation with the new brakes indicated that a smaller drum would be more advantageous. After this change in drums was made, the failures dropped to 30 in November. Although they rose to 80 in December, even the latter figure is less than 25 per cent of the number of failures in the month of June. The company has decided to use the Peacock brake on the 350 new pay-as-you-enter cars.

CONTROLLER AND MOTOR LEAD CURVES

Of the controller and motor lead troubles, it may be said that they no longer exist. In December last there were just eight failures from controllers and four from motor leads, against 160 and 162, respectively, for May, 1908.

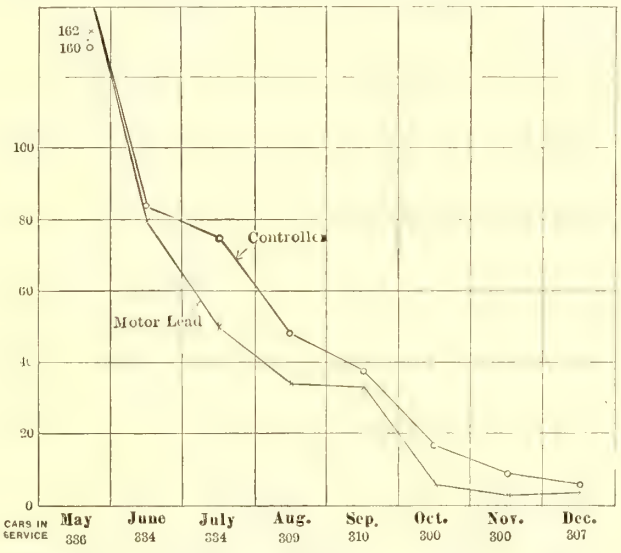
In the course of the general overhauling, all controllers were brought into the shop and stripped bare. They were supplied with new wire, new fingers and boards, completely reinsulated and given any other treatment necessary to make them as good as new. It was not necessary to change their design in any respect.



Third Avenue Railroad Equipment Failures—Chart of Plow and Brake Failures

The cars, as originally wired, had the motor circuits run in rubber hose on strap-iron hangers attached to the car cross-sill, from whence they were taped in with the motor leads without any intermediate support. Consequently these circuits were close to the car flooring at the trap doors and the connection between the sill and motor was so exposed that it was very liable to waterlogging. A great many of the circuits gave trouble because they were made of strand wire.

The re-wiring of the car circuits was done with conduit along the lines of the specifications adopted for the new pay-as-you-enter cars described in the Nov. 21, 1908, and Jan. 23, 1909, issues of the ELECTRIC RAILWAY JOURNAL. The motor circuits now are brought to the motors without touching the floor by carrying them on an iron bracket at-



Third Avenue Railroad Equipment Failures—Chart of Motor Lead and Controller Failures

tached to the cross-sill at right angles. This bracket extends quite close to the motor so that the length of suspended and exposed wire is considerably reduced. Each lead is bolted on the bracket and joined with the incoming wire by a clasp connector and a little taping, over which a sleeve is placed for protection. The leads are easily and quickly disconnected by loosening the bracket bolts, pulling off the sleeves and unwinding the trifling amount of tape. The wires now used are of the flexible type covered with 30 per cent Para rubber and triple-braid. Car-house men are not permitted to repair motor leads, but must send the cars to the shops. The remarkable drop in motor lead failures, indicated by the curves, certainly proves that the new arrangements are thoroughly satisfactory.

ARMATURE FAILURES

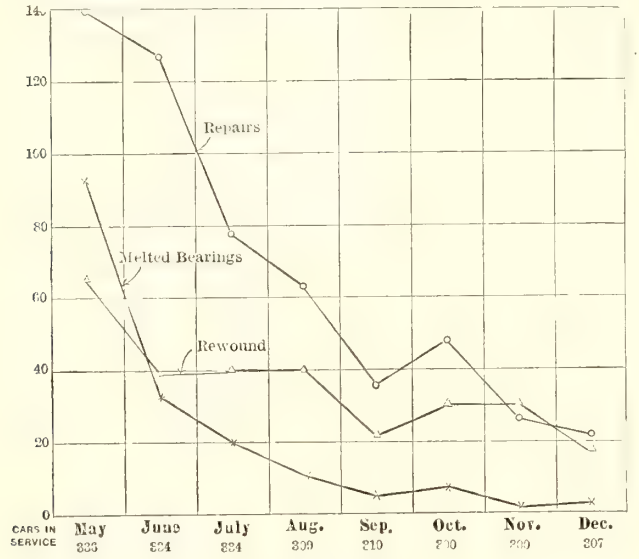
The three curves for armature failures show that general detail repairs, re-winding and melted bearings are tending to hover around zero. The main cause for this betterment is the conscientious examination of the bearings every time the cars come in for inspection. About 75 per cent of the hot bearings was caused by the wearing out of dowel pins, thereby permitting the bearings to turn in their shells. The general overhauling also brought to light a large number of short-circuited and short-weight fields and the brush-holder tension was found to vary from 1 lb. to 15 lb. New bearings, dowel pins and fields were provided and the brush-holder tension fixed at 7 lb. throughout. The inspectors give particular attention to pole clearance and use a fiber gage for this purpose when the bearings are getting dangerously low.

JOURNALS, CIRCUIT BREAKERS AND GEARS

In June, 86 cars were pulled in for hot journals and in November none at all. There were, however, 12 hot journals in December, in consequence of the breaking in of 150 pay-as-you-enter cars. These new cars are now giving as

little trouble in this respect as the old ones. The striking point about this journal record is that it has been made possible simply by thorough maintenance, as no change was made in the design, babbitt metal or lubrication of the journal boxes.

Circuit-breaker troubles reached their maximum in June, with 43. The thorough overhauling of the breakers, with the concurrent rehabilitation of the motors and controllers



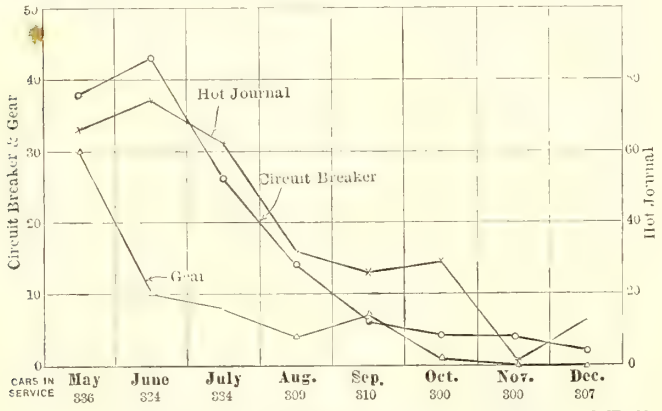
Third Avenue Railroad Equipment Failures—Chart of Armature Failures

and the adoption of periodical inspection, has eradicated almost entirely failures of this character.

Gear lubrication has been given such close attention that not a single gear failure occurred during November and December, while seven months before gears were responsible for 30 pull-ins.

ORGANIZATION DETAILS

The general inspection of all cars operated by the Third Avenue Railroad Company is now carried on in four car houses, as follows: Grand Street and East River; 129th Street and Amsterdam Avenue; 129th Street and Third Avenue, and Sixty-fifth Street and Third Avenue. The latter building group also contains the general repair shop for the entire system. The car maintenance department is



Third Avenue Railroad Equipment Failures—Chart of Failures of Journals, Circuit Breakers and Gears

headed by J. S. McWhirter, superintendent of equipment. The repair division is under the general foreman of the repair shop and the foreman of electrical repairs, both at Sixty-fifth Street, and a separate foreman in charge of each of the inspection quarters. An office staff at Sixty-fifth Street has charge of all maintenance records.

The policy of having the repair work done at one place is working out very well, as it enables the management to select specialists who can be held responsible for maintaining the standards adopted for each kind of work. Thus one man specializes in packing journal boxes, another in connecting motor leads, etc. A great deal of trouble arose in the past from ignorant and irresponsible workmanship at the car houses. Hereafter all important maintenance will be conducted at the one place where the best labor and facilities are available.

CINDER CONCRETE FOR TRACK SUBSTRUCTURE

The United Railways Company of St. Louis is experimenting with cinder concrete for track construction. It is being used on about one mile of track on which the 7-in. rails and ties are in good condition, but on which the ballast was poor. In fact, the foundation of this track before it was relaid was in such shape that the granite paving blocks would work up and down with the passage of cars and wagons and thus afforded an imperfect street surface. For this reason the experiment was tried of removing the subgrade and refilling with cinder concrete.

The work was carried on by putting in crossovers and discontinuing the use of one of the tracks in sections. This abandoned track was blocked to surface. The old macadam was then removed and drawn away for use elsewhere. In its place to a depth of 6 in. under the ties and to a height of 1 in. above the ties was placed a mixture of cinder concrete containing six parts cinders, two and one-half parts sand and one part cement. Before determining upon these proportions experiments were made to ascertain the proportion of voids in various mixtures of cinders, sand and cement. The results showed that the 6:2½:1 mixture was a proper one. It is interesting to note that this mixture, of which the body is cinders, has the same proportions as that which the company uses in making concrete with crushed rock.

Cinder concrete has an advantage for street use in that the main body of the material—the cinders—is light and can be handled with scoop shovels. It is stated that because of this condition only one-half as many men are needed to feed the mixer as would be required if rock were used. It will be interesting later to learn how well the cinder concrete withstands the street and wheel loads and whether the sulphur in the unburned coal affects the rails

STREET RAILWAYS IN FRANCE AT THE END OF 1905

The January number of the *Zeitschrift für Kleinbahnen* contains the latest statistics of the street railways of France. These are for the year ending December, 1905. The total length of track was 8744 km (5321 miles), of which 6811 km (4223 miles) were in operation, and the balance under construction or proposed. The increase in mileage over the preceding year was 638 km (395 miles). Most of the lines are meter (39.37 in.) gage. The invested capital for the 4223 miles in operation was approximately 900,000,000 francs. The French Government also assisted a number of electric railway lines in 1905 by granting subsidies amounting to about 5,000,000 francs. Freight service, in addition to passenger service, was given on 4591 km (2846 miles).

An electric railway 130 miles long has been proposed to pass through the Caucasus. Two hydro-electric stations, with a total capacity of 13,500 kw are contemplated.

CAR DEFECTS DISCUSSED BY NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on Jan. 28, with Vice-President W. D. Wright in the chair. John Lindall, superintendent of rolling stock and shops, Boston Elevated Railway Company, read a paper on "Car Defects." An abstract of the paper follows:

CAR DEFECT CAUSES

There are five important causes of car defects: First, equipment inadequate or not properly designed for the service; second, equipment not properly assembled or having shop defects; third, defective material; fourth, defective handling or operation of cars; fifth, defective inspection or maintenance. Accidents and defective track also may cause car defects.

INADEQUATE OR IMPROPERLY DESIGNED EQUIPMENT

As defective design is generally very hard to remedy after motors have been put in service, it behooves a railway company's engineers to use great care in figuring out car equipments, and to consider all factors bearing on the service expected. Abnormal conditions should receive more consideration in many instances. It appears that equipment is usually designed to meet the best conditions. The motors may meet these requirements, and are accepted, but in a short time they begin to give trouble. There is wear in the bearings, pinion and gear; the contact becomes sliding or grinding, rather than rolling; there is lost motion in the journal boxes, truck pedestals and brake rigging, and the brakes do not release as freely as before. All of this adds to the work of the motors. In addition, if the motors must go through a heavy snow storm, the strain is likely to cause trouble unless the capacity is adequate.

SHOP DEFECTS

Manufacturer's shop defects seem to be inevitable, even with careful inspection and checking. Some one has not used proper care in wiring, thus causing burn-outs. Some one has overlooked the fact that field castings left rough back of the field coils result in grounding many coils. Brushholder pins work out because they have not been properly secured. As the final elimination of such troubles lies with the manufacturer, equipment men should see that all car defects are properly analyzed and that those chargeable to the manufacturers should be brought to the attention of the latter.

DEFECTIVE MATERIAL

Material is defective if it is not the best for the purpose to which it is applied. It is easy to figure from past consumption that a saving of "so much" can be made on certain material, bought, say, at 10 per cent less initial cost than that which has been used previously. The shop test may indicate that all is well, but it frequently happens that the service results are different from those in the shop. Hence if a large quantity of the material has been delivered and paid for, there is no way of repairing the damage by the time the cause is found. It is often a difficult matter to prove that material has not met the requirements, and in the meantime who is to pay for the losses and injuries caused by breakdowns of motors and generators? The varnish maker, for example, will hardly admit that such failures are chargeable to him. It is a good plan to go slowly in changing an article that has been giving good satisfaction and make sure that the substitute really is equally as good.

IMPROPER HANDLING OF EQUIPMENT

The way cars are handled in service has a very material bearing on car defects. The maintenance and inspection committee of the American Street & Interurban Railway Engineering Association for 1907 found that in the judgment of operating men 42.6 per cent of the commutator and brushholder troubles are due to fast feeding of controllers. If this is anywhere near correct, and the same proportion holds good for failures in other parts of the electrical equipment, it is very evident that the railways can afford to spend considerable money and time in the better training and constant checking of their motormen.

DEFECTIVE INSPECTION AND MAINTENANCE

All car defects, such as brakes out of adjustment, worn-out brake chains, short motor carbons, worn-out trolley wheels, cut bearings, armature down on poles, etc., come under defective inspection and maintenance. It is the one great defect over which the car house men have direct control. To eliminate this it is necessary to have a properly organized, competent force, adequate and properly arranged shops and a complete system to work by. Mr. Lindall then described the system of defect records used by the Boston Elevated Railway Company for the past three years. He showed representative blank forms, charts of equipment failures, and the way in which the records originate and are compiled for the mechanical, operating and legal departments. This system was described fully in the STREET RAILWAY JOURNAL of April 4, 1908. Additional information, however, is outlined in the following paragraphs:

The system embraces daily reports made at car houses, record cards kept at car houses, and tabulation cards kept at the office of the superintendent of rolling stock and shops. The detailed forms include a car house log sheet, equipment records filed in tin boxes at the car houses, control, motor, truck, air brake, car body and inspection records. The inspection record by the pitman is practically a written guarantee of his work on inspection. The original records made by workmen are preserved without copying. These are checked by the foreman, and then a number representing one day's work are secured by eyelets and filed in chronological order by months. It takes but a few moments to locate any workman's card for any particular date.

In December, 1905, monthly meetings of division superintendents and car house foremen were instituted at Mr. Lindall's headquarters to compare notes and to give necessary special instruction relative to equipment. The results shown by the defect record system are always fully discussed at these meetings. As different car houses are compared, rivalry to make good records has been stimulated and general interest awakened. A definite subject is also assigned for discussion at each meeting. Among these subjects have been car brakes, motors, overhauling of open cars, overhauling of closed cars, car wiring, air brakes, gearing, shop kinks and motor gearing.

Up to about April 1, 1906, no satisfactory method of obtaining car mileage had been found, but the advantage of being able to inspect cars and make repairs on a mileage basis instead of a time basis was very apparent. A car mileage system was also necessary to make motor-mile comparisons. It had been the company's custom to keep complete records of register readings by trips, so it was arranged that toward the close of each day the starter should draw off the total trips for the cars on each route

and from a table of trip distances find the total car miles made by each car. This information is sent to the car house foreman. On individual car records the reading is made continuous, so that the last figure for December indicates the total year's mileage.

Among the matters bettered through the use of the defect records are the breakage of window glass, mechanical troubles in motor armatures, motor flashing, readjustment of resistances to improve acceleration, redesigning of brake rigging in some types of trucks, improvement of motor brushes, brushholder betterments, increase of commutator life, and replacement of old motors by modern designs. Improper operation of cars has been taken up with the inspectors and motormen instructors by using graphic methods of showing the right and wrong ways of controller handling and by explaining and interpreting automatic ammeter records.

DISCUSSION

A discussion followed the reading of the paper. John W. Corning, electrical engineer of the Boston Elevated Railway Company, described the work done with the automatic ammeter to improve car operation. E. W. Holst, superintendent of equipment of the Boston & Northern and Old Colony Street Railway companies, discussed the importance of co-operation, improved methods, efficient inspection, good workmanship and suitable material. M. V. Ayres, electrical engineer of the Boston & Worcester Street Railway Company, emphasized the easier conditions surrounding the operation of substation machinery in comparison with apparatus run on the road. D. E. Manson, manager of the Boston office of the Westinghouse Electric & Manufacturing Company, voiced the effect of reductions in maintenance cost on the net earnings of traction properties and on the improvement of railway securities.

In conclusion, Mr. Lindall stated that co-operation is a most important factor in the success of such a record system. In 1907 there were 20 per cent less defects than in 1906, and in 1908, 59 per cent less than in 1907. One additional clerk has handled the record system. Perhaps a half-hour to an hour daily is required by the foremen's work on the records. The foremen's report of defects is checked by a separate record in the hands of the division superintendent.

THIRD AVENUE CORRESPONDENCE

Frederick W. Whitridge, receiver, Third Avenue Railroad Company, New York, has had printed a volume of 429 pages containing portions of the correspondence during 1908 between himself as receiver of the Third Avenue Railroad Company and the Public Service Commission, First District. Mr. Whitridge states his reason for printing this correspondence in the preface, but many readers will hardly agree with him that all parts of it are "dreary stuff." The preface says:

The following correspondence between the Public Service Commission and the receiver of the roads forming the Third Avenue system is printed for the purpose of record and the convenience of reference.

It is pretty dreary stuff and would have been intolerable except for the opportunities it occasionally afforded for amusement, but perhaps it may, in the future, be of interest to some student of governmental regulations.

It includes only a little more than half of the correspondence. The remainder is either reiteration or entirely senseless. Page 266 et seq., comprise complaints. The letter of the commission on page 266 is a form which comes with every complaint, and for economy of space is only printed once.

The pages devoted to the orders of the commission include the orders up to No. 740, with the replies of the company. The complaints, published in the following pages, cover a variety of subjects. Among them are many in regard to noise which the Third Avenue cars make in passing around curves and over special work. In some cases, the suggestion is made that this track work be moved so as to be in front of another person's premises. All were courteously answered by the receiver, who explained the impossibility of following this suggestion, but agreed in one case to investigate whether the cars could not be run without noise or at least with only a noiseless noise. Considerable space is given to the correspondence between the company and the commission in regard to the new classification of accounts which the company's auditors evidently had difficulty in understanding and applying. At one stage, Mr. Whitridge returned to the city and found that the auditor had resigned owing to the onerous demands made upon him by the commission in this connection. As the officer was invaluable and possessed the confidence of the holders of what was left of the securities of the company, the receiver prevailed upon him to remain, after agreeing to establish a separate department whose sole duty it should be to reply to the communications of the commission.

AN ODD TRANSFER

The Waverly, Sayre & Athens Traction Company, of Waverly, N. Y., operates between Waverly, N. Y., and Sayre and Athens, Pa., the three towns forming practically one community. In Waverly the company operates a local belt line, transfers to which are given to passengers com-



Transfer Punched to Indicate Age and Sex of Holder

ing from Sayre. The latter place contains the repair shops of the Lehigh Valley Railroad, which employs a large number of men who live in Waverly. Many of these passengers would ask for transfers they did not need merely to give them to the boys who loitered around the station. These boys would then use the tickets to ride around town. To stop this abuse the company adopted a transfer on which space was left in the lower right-hand corner for the words, "man," "woman," "child." In this way the boys were prevented from using transfers punched for an adult and the annoyance this practice gave was entirely eliminated. The idea of indicating the kind of passenger is not a novel one and is rarely used because the conductors must make an extra punch. In this case it was justified because it effectively remedied a serious annoyance.

A narrow-gage electric railroad, about 14 miles long and estimated to cost $506,000, is to be built between Grossenlueder and Hanswurz, in the Frankfort-on-the-Main district. The councils of the town of Neuss have also voted for the construction of an electric railroad to connect that place with Grimmlinghausen and Neuserfurth.

FENDER AND WHEEL GUARD HEARINGS IN NEW YORK

The fender and wheel guard hearings of the Public Service Commission of New York, First District, were continued on Feb. 11 before Commissioner Maltbie.

The first witness was A. E. Kalbach, manager of the New York City Interborough Railway Company operating cars in the borough of the Bronx, New York City. Mr. Kalbach testified that the rolling stock of his company consisted of 15 closed, 15 semi-convertible and 10 open cars. These cars are not equipped with fenders, but have fixed pilot type wheel guards. His company had had very few serious accidents since the road was started in 1903 and he did not believe that any one of them would have been prevented either by a fender or a wheel guard. In one instance the fixed wheel guard had saved a doctor's life by pushing him along the track instead of permitting his body to get under the wheels. His company was desirous of experimenting with automatic wheel guards. The physical conditions on many of the routes of the company are such, however, that automatic wheel guards would probably trip often owing to irregularities in the paving and in the winter on account of snow and ice. Hence his company did not wish to decide upon any particular wheel guard immediately, but would prefer to experiment with different types.

J. L. Quackenbush, of counsel for Mr. Kalbach's company, asked Commissioner Maltbie what he thought of Mr. Kalbach's suggestion. The commissioner hesitated to express a definite opinion, but saw no objection to the company trying out two or three wheel guards, but he insisted every car must be equipped with some form of guard. He asked Mr. Kalbach if he knew how high above the rails the tripper was usually hung on automatic wheel guards. Mr. Kalbach replied 5 in. and that the wheel guard was set at about the same height. The commissioner pointed out that there would have to be a grade of 5 in. in 4 ft. to 5 ft. to cause a change in paving height great enough to trip such a device. Mr. Kalbach said that there were such places on the lines of his company, but admitted that the wheel guards could be reset from the platform and consequently such trippings were not serious. In reply to a question from Commissioner Maltbie, the witness said he thought the pilot guard was sufficient protection. He testified that in the accident case referred to the company had paid the injured doctor $3,000. Commissioner Maltbie pointed out that it would cost hardly more than $1,200 to equip the 40 cars of the company with wheel guards and said that such an investment would certainly pay for itself if it could prevent only one accident of this kind in a year.

Mr. Kalbach testified further that the cars on his company's lines sometimes ran at a speed of 16 m.p.h., but that the average speed between stops was 10 m.p.h. Mr. Quackenbush said that the damage suit referred to was due to a collision with the carriage of the doctor, and that the latter was thrown out in front of the car. Mr. Quackenbush then asked Mr. Kalbach to testify regarding the position of the company on the question of equipping its cars with projecting fenders in addition to wheel guards.

Mr. Kalbach said that he would be sorry to see the commission order fenders, because the danger would be increased rather than diminished, especially in neighborhoods where children play in the streets. They were also particularly undesirable on his company's lines because of the many curves. In laying out the lines they had been careful to provide the necessary clearances so that cars could pass safely on curves. If projecting fenders were applied these clearances would not be sufficient and cars would be compelled to stop and thus lose time or else the fenders would have to be folded up at certain places. He also thought that accidents would be increased because people were accustomed to gage the distance of the car from observation of the platform position rather than by the position of the fender. He was not prepared to say that in some cases the fender would not save people from injury, yet in other cases people would be injured on account of the fender. It would be better for the public safety not to use fenders if the cars are provided with wheel guards. The question of cost did not enter into the matter, as it was the company's wish to operate the cars in the safest manner possible.

In reply to questions by Commissioner Maltbie, Mr. Kalbach said that he had not operated cars with fenders and that it was problematical whether a fender would cause less injury to a person struck by a car so equipped running 14 miles to 15 miles an hour than would a car without a fender. Of the two classes of safety devices Mr. Kalbach considered the wheel guard the more efficient. He said that his company operated on streets having heavy trucking, such as Tremont Avenue and 180th Street. Although these streets are wide enough for trucks to be run outside of the tracks, the drivers insist on taking the rails so that cars will push the wagons up the hills. In such cases as this fenders would be a nuisance. Commissioner Maltbie said that a folding fender would serve, but humorously remarked that this condition could not be obviated unless the Public Service Commission had charge of the Police Department.

At the request of the representatives of the Westchester Electric Railway, which operates about 10 miles of track in territory under the commission's jurisdiction, the hearing on its case was adjourned to 2:30 p. m. Thursday, Feb. 25. At this joint hearing the subject will be the use of fenders in the borough of the Bronx.

J. L. Quackenbush, general attorney for the Metropolitan Street Railway Company, said that he had classified the accident statistics of that company and found that only 7 per cent of them involved in any way the question of fenders and wheel guards.

J. J. Kuhns, representing the Coney Island & Brooklyn Railroad Company, asked for further time. He wanted to watch the experiments of the Metropolitan Street Railway Company and see Mr. Quackenbush's figures on accidents. Commissioner Maltbie pointed out that the Metropolitan hearing referred only to the question of the design of safety devices to be adopted and did not hinge on the principle of fenders or wheel guards. Mr. Kuhns did not know whether such devices would be valuable on his company's lines, as the Coney Island & Brooklyn Railroad had never tabulated the different kinds of accidents as had the Metropolitan Street Railway Company.

The next witness was W. S. Menden, assistant general manager and chief engineer of the Brooklyn Rapid Transit Company. Mr. Menden was anxious to know whether the commission would order safety devices on the elevated and private right-of-way lines of the company. Commissioner Maltbie said that each line would be considered in connection with its operating conditions. Fenders or wheel-guards would not be specified, for example, if a line crossed only a few highways.

Mr. Menden had brought some statistics on the history of fenders placed on cars in Brooklyn to show what his

company had done in the past. Within the last two years the Brooklyn Rapid Transit Company had expended $100,000 to place 4000 fenders on 2000 cars. These fenders were of the Empire type and were installed after about one year's experimenting. This type of fender was not submitted at the commission's tests. The company adopted it because it was of a design that could be used anywhere. The Empire fenders replaced fenders which had been installed about 1903. These old fenders consisted of 1350 Crawford type with rope-nets, afterward replaced with wire netting, and 1000 New Sherwood type, some of which are still in use. In 1905 both the Crawford and the New Sherwood fenders were discarded because it was impossible to maintain them. Since 1903 fenders alone have cost $150,000. At present most of the fenders are of the Empire type, some 10 per cent are of the Sherwood type and other miscellaneous designs are used on freight cars.

Mr. Menden had no special data on wheel guards. He said it had been assumed that the cost of wheel guards and fenders was warranted by the saving in accident damages. His company's records showed the contrary, because fenders and wheel guards do not reduce accidents though they may in some cases help to lessen injuries. Commissioner Maltbie said that the argument in favor of such devices was not that they prevented accidents, but prevented persons from being killed or from being injured more severely.

Mr. Menden said that such cases were comparatively few. In the six weeks preceding the hearing his company had operated practically 5,000,000 car-miles, and in that period there was but one accident in which a fender or wheel guard would have been a factor. In cases where the person struck had been fatally injured there was nothing to show whether or not the initial impact was responsible. If it was responsible then fenders and wheel guards were only of sentimental value.

Commissioner Maltbie asked Mr. Menden if he meant to say that the first impact of a fender would cause death. Mr. Menden replied that it might and especially when only a wheel guard is on the car, because the bumper strikes first. He said that it was a serious question whether it would pay to have either device from the standpoint of safety alone, but there was a sentimental value which could not be neglected. Unless it could be shown that recent designs of wheel guards and fenders are an improvement over previously tried devices money could be spent to better advantage by preventing accidents in some other way. He stated that for the month of December, 1908, as compared with December, 1907, the reduction in the number of persons struck was 12 per cent; for November, 38 per cent; for October, 6 per cent; for September, 18 per cent; for August, 13 per cent; for July, 28 per cent, etc. He believed that these figures showed that the remedy lay in improving the rolling stock, track, line and carmen, as well as educating the public to be more careful. At any rate, this was his experience in Brooklyn.

Mr. Menden said with regard to wheel guards that his company had installed them on 220 cars in 1905. These guards were of the Sterling-Meaker fixed type. All but 20 of them were discarded after six months' use, as they could not be kept on the cars because of local interferences and truck vibrations. These wheel guards had to be carried rather high as they had no automatic drop. The 20 cars still carrying these guards are running on the Williamsburg Bridge. The annual maintenance cost of these guards is two and one-half times that of the installation cost. They are kept at 5¼ in. above the rails.

Referring to the general adoption of wheel guards in Brooklyn Mr. Menden enumerated a number of objections such as high pavements, unpaved streets, temporary crossovers where sewers or water mains are under construction, snow or ice on tracks and hose jumpers used in cases of fires. His company had not tried automatic wheel guards and wanted three or four weeks' time to consider their use. It had done nothing further about wheel guards since its original experiment. In reply to a question by Commissioner Maltbie, Mr. Menden said that he did not believe that his company had had more than two or three accidents in a year where the fenders were up. All the surface cars of this company are equipped with fenders carried 6 in. above the tracks. The fenders were effective in picking up persons from standing positions, but not in recumbent positions because the fender is carried so high. Commissioner Maltbie pointed out that the automatic wheel guards could be carried at any desirable height above the track and thus be easily adjusted to overcome obstructions.

The representative of the Ocean Electric Railway Company stated that his company had its 19 cars equipped with fenders. If the commission, however, ordered the wheel guards besides they would be put on, although his company had had no accident where a wheel guard would have been effective. The company does but little business in winter and has but a short summer season of heavy beach traffic.

Mr. Quackenbush, speaking for the New York & Queens County Railway Company, said that the conditions on that line were similar to those of the Ocean Electric Railway. The hearing on the Brooklyn and Long Island companies was then adjourned until 3:30 p. m., Thursday, Feb. 25.

ANNUAL CONVENTION OF THE AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION

The tenth annual convention of the American Railway Engineering and Maintenance of Way Association will be held in the Auditorium Hotel, Chicago, March 16, 17 and 18. E. H. Fritch, Monadnock Block, Chicago, is secretary of the association. In connection with the convention the manufacturers of railway appliances will hold an exhibition at the Coliseum. On the day preceding the first meeting of the Maintenance of Way Association sessions will be held by the Railway Signal Association. All of the meetings of both associations are open to engineers interested in track and roadway work. The reports to be presented by standing and special committees deal with subjects of interest to electric as well as steam railroad engineers.

Among the subjects to be presented by standing and special committees which are of interest to electric railway engineers will be the following: Roadway; ballasting; ties; rail; track; wooden bridges and trestles; masonry; signs, fences, crossings and cattle-guards; signaling and interlocking; records, reports and accounts; uniform rules for trackmen; iron and steel structures; economics of railway location; wood preservation; uniform general contract forms. The special committees to report include that on injuries to bridges and railroad structures due to flat spots on car wheels; that on injuries to signals, bridges and track due to brine drippings from refrigerator cars, and that on impact tests.

A committee on electricity has also been appointed, and undoubtedly will present a progress report. The mem-

bership of the committee is as follows: George W. Kittredge, New York Central; J. B. Austin, Jr., Long Island; W. W. Drinker, Erie; H. R. Talcott, Baltimore & Ohio; C. E. Lindsay, New York Central; G. A. Harwood, New York Central; A. S. Baldwin, Illinois Central; L. C. Fritch, Illinois Central; R. D. Coombs, Pennsylvania Terminal & Tunnel; E. P. Dawley, New York, New Haven & Hartford. The subjects which have been apportioned to this committee for consideration are transmission line crossings, clearances, insulation and protection, electrolysis, relation to track structure, maintenance and organization.

ATTITUDE OF MASSACHUSETTS COMMISSION ON QUESTIONS AFFECTING CAPITALIZATION

In the report of the Public Service Commission of the Second District, New York, of which an abstract was published in the ELECTRIC RAILWAY JOURNAL of Jan. 23, 1909, page 135, the questions of discount on bonds, working capital and allowance for promotion services were discussed with reference to the practice of the Massachusetts commissions. The following has been received on this subject from the Boston correspondent of the ELECTRIC RAILWAY JOURNAL:

"Supplementing these notes, it may be stated that the Massachusetts laws place considerable discretion with the commissions in these matters of capital issues. The laws provide that a street railway or a lighting company may increase its capital stock or issue bonds to such an amount as the Board of Railroad Commissioners, in the one case, or the Board of Gas & Electric Light Commissioners, in the other, shall determine will realize the amount which has been properly expended or will be properly required and as the board in each case shall approve for the purposes set forth by the company's petition."

The attitude of the Railroad Commission appears to be about as follows in these matters:

Discount on bonds.—It is the practice of the board to figure bonds at par, stating when approving an issue that such approval is given to the issue by the company of bonds to an amount not exceeding at par value a stated sum then named as an issue of bonds reasonably necessary and of the amount required for the purposes to which the proceeds of such bonds are to be applied. The commission may or may not decide to permit securities to be issued for discount on bonds at such future time as this question may arise as such. It is understood that the commission does not undertake to determine the price at which bonds shall be sold, but approves or disapproves the borrowing through the bonds of a fixed sum, figured at par when referring to the bonds.

Working capital.—The board has never passed upon the question of working capital.

Allowance for promotion services.—These are taken into account, it is understood, in connection with engineering and legal expenses, and legitimate expenses of development or services in connection with promotion, according to the circumstances of each individual case, considered. In all cases of finance affecting a company the board makes a special study of all conditions bearing upon the matter, treating each case individually. The latitude afforded the commission by the laws makes it difficult to assign definite policies in advance.

A measure now before the Paris Council provides for a division of profits between the tramways and the city.

COMMUNICATION

THE PROBLEM OF REDUCING ACCIDENT DAMAGES

INDIANA UNION TRACTION COMPANY,
ANDERSON, IND., Feb. 9, 1909.

To the Editors:

I have been following the series of articles published by your journal upon "The Problem of Reducing Accident Damages," by Frederick W. Johnson, with very great interest. Knowing something of Mr. Johnson's ability along this line, you certainly selected a most capable man to present this question to your readers. The result of this policy, as applied to the Philadelphia Rapid Transit Company, is also being watched with interest, and from results to date, Mr. Goshorn and Mr. Johnson should feel justly proud.

Many managers fail to see the importance and advantage of the proper instruction and education of the operating force from the very moment an applicant is considered. This is the time to begin to prevent accidents. These matters are dealt with much after the fashion of the servant girl who came into the kitchen and found the water flowing from the faucet onto the floor. She at once got the mop and bucket and began vigorously to mop up the water. The mistress, coming in, saw what was going on, and said, "Bridget, why don't you turn off the faucet?" Bridget replied, "Sure, mum, I've all I can do to keep the water off the floor."

Most companies very properly require new men to spend days, or even weeks, familiarizing themselves with the car equipment, how to handle cars, how to make temporary repairs, etc., and dismiss the question of handling and preventing accidents with but very slight attention. thus creating the impression upon the mind of the recruit that the accident feature is of little or no consequence. What little instruction is given is usually gone like a flash the moment an accident occurs, and the employee is thrust upon his own resources to do as he thinks best under the circumstances.

Suppose an emergency arises where it becomes necessary to place a green crew on a car. The motorman is told to "Keep on the schedule and not delay other cars;" the conductor, "Get your fares." They proceed on the run, their minds intent upon these last instructions. New conditions arise. The motorman gets a little nervous, but he wants to run the schedule, and he takes a chance, following the car in front too closely. The front car stops or checks to prevent striking a wagon crossing the track. The result, a rear-end collision. The cars are damaged to the extent of $100 or $200. A passenger or two may be killed; some broken limbs and other lesser injuries may result to passengers, involving personal injuries from $10,000 to $25,000. Passengers are in a panic; all want to get off the cars. The names of many are not secured. Designing persons may present fictitious claims, with favorable chances of the company settling. Which, then, becomes the more important, to "run the schedule" and take a chance, or to have had proper instruction and be ready to act in case of an emergency and properly handle the accident? Conductors and motormen are the men on the ground when the accidents occur, and it is of the utmost importance for them to understand just what to do in such an emergency.

Many times the first remedy (?) applied after a serious accident is to discharge the employee. He may have been, in a measure, to blame. He leaves the employ of the

company bitter against it, and will, if called upon to testify, put the worst version he can regarding the accident. A new man takes his place and the company takes the same chances with the new man, having to school him and run chances of his making mistakes. The discharged employee may later on get employment with some other company, which will get the benefit of all his previous training. No hard and fast rule can be laid down here, but certainly common sense and discretion should be used in such cases. Would it not be far better to administer discipline where infringements of rules occur and mistakes made that might have resulted disastrously and did not, and point out the dangers to the men, showing them what should have been done and benefiting from the experience, than to wait until after serious trouble arises and then apply the rod?

Constant vigilance upon the part of the head and subheads of the operating department is imperative in order that the cars may be properly handled, and in case of accident that the names of all witnesses and persons in interest on and off the car be secured. What does it matter if the cars are held five or ten minutes if a number of good witnesses can be secured, from which may be obtained the evidence necessary to defeat claims which are sure to follow? Five minutes' time lost is not to be compared with five good witnesses in presenting the facts of an accident to a court or jury.

Mr. Johnson is certainly working along correct lines, as well as others engaged in similar work. The idea of bringing the motormen and conductors together in classes for instruction is fine and productive of much good. A question box can be used to advantage. The men can be asked to jot down whatever they may wish to inquire about, drop the question in a box when they report, and before the class begins the questions can be assorted and classified and the important subjects given proper attention. Stereopticon slides can be used occasionally. The eye is a wider gateway than the ear to the brain. Meetings along similar lines can be had with employees of other departments, and a universal good fellowship fostered.

Claim departments have been at somewhat of a disadvantage in handling the matter of the instruction of employees regarding accidents. The operating department does not always take kindly to the even limited authority thus delegated to the claim department, a jealousy being created by the seeming encroachment upon the authority of the operating department, although in many cases it almost wholly ignores the matter of the instruction of employees regarding these questions. This is due partly from the fact that the time of the head of the operating department is largely occupied with other questions that to him seem more important.

The amounts paid out in damages occasioned by the operating department are not chargeable to that department, and it is only affected incidentally. If the items of damage caused by each department were charged directly to the department responsible therefor the head of each department would have an additional reason for keeping the expenses of his department as low as possible.

Claim departments are expected to effect a saving wherever possible in the adjustment of claims growing out of accidents, over which they rarely have any control. They are continually dealing with the vital questions concerning claims and their causes, and are in close touch with the employees concerned in them. This, if there are no other reasons, should be sufficient for the larger companies placing at the head of the claim departments men of sufficient ability to handle claims, as well as to instruct the employees regarding accidents and their causes, with sufficient competent help furnished for this very important work.

Every claim department should keep records so as to enable it to determine the locality causing the most trouble, the kind of accidents occurring, their causes, etc., so as to be able to keep them in check by oral instructions, bulletins and otherwise. In all this work the claim department should deal with these matters in a way that will make those receiving instructions feel that they are co-laborers and all are working together for the general good of the company.

Local superintendents, being in direct charge of and coming in close touch with the men under them, should clearly understand the necessity and value of prompt, clear, intelligent reports and how to procure them, and when a man has failed in some particular to drop a word of help and caution, pointing out where the work can be improved. The accident and circumstances connected therewith are the things uppermost in the man's mind at the time the report is made, and suggestions made then will not be forgotten. Do not be afraid to give a word of praise for good work done. We are all human and like to know our work is appreciated.

These questions open a fruitful field for the Claim Agents' Association. Some phases of them have at times been up for discussion. Mr. Johnson has opened wide the door to this field. Let him who wishes enter.

Ellis C. Carpenter.

FRACTIONAL FARE TRANSFER TICKET

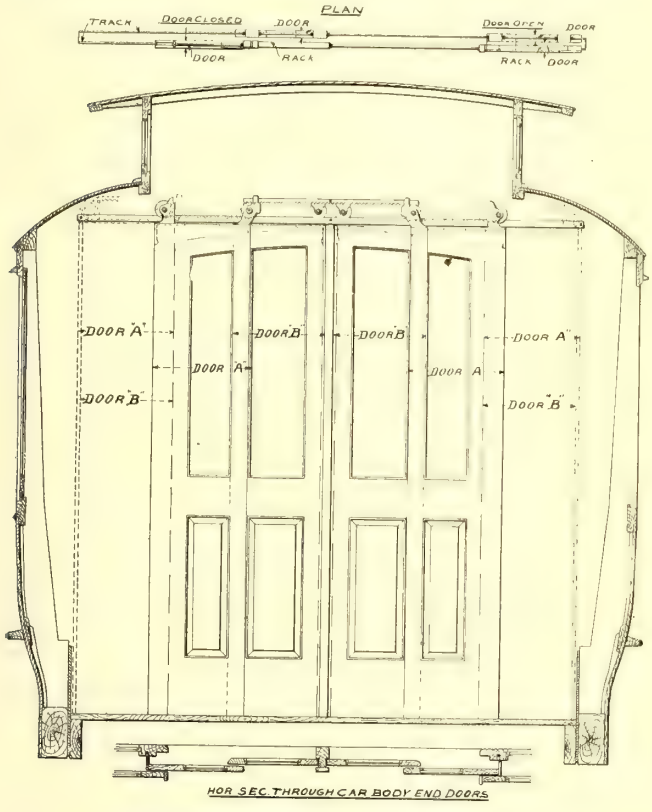
John S. Alexander, of New York, has devised a fractional fare ticket system to cover cases where a transfer charge is made between connecting lines of the same railway or those of separate companies. It is intended to sell the tickets in strips of five for five cents. The passenger desiring a transfer gives the conductor one or more of these tickets in addition to the regular fare. In this way the passenger avoids the nuisance of carrying pennies for fractional fares and the companies secure a check on their conductors, as every transfer must be accounted for by a cancelled transfer-fare ticket.

NEW CARS FOR THE METROPOLITAN STREET RAILWAY COMPANY, NEW YORK

The Dec. 5, 1908, issue of the Electric Railway Journal contained an extended description of the standard car which had just been adopted by the Metropolitan Street Railway Company, of New York. An order for 50 cars, which are of the pay-as-you-enter type, is now being completed by the Jewett Car Company, of Newark, Ohio. One of these cars as turned out by this builder is shown in the accompanying half-tone illustration.

The car bodies have a number of novel features designed to meet the conditions of congested traffic in New York. They are 46 ft. 11 in. in length over all, 32 ft. over the body and posts and have 7-ft. 5½-in. platforms. The end bulkheads have a post in the center line of the doorway and have twin doors automatically actuated on either side of the post and which slide into pockets at each side of the car. The mechanism for these doors is so ar-

ranged that one door moves alongside of the other in the pocket, thus obtaining the maximum width of opening at the doorways. This door arrangement and mechanism, which is shown in the accompanying drawing, is covered by patents issued to W. S. Wright, president of the Jewett Car Company. A pipe railing extending from the central post to the step entrance separates the exit and entrance passenger. At the motorman's end the platform rail-



Details of Double Sliding End Doors

ing is raised to the hood and thus is entirely out of the way. The platforms have a double folding-door at opposite corners. These doors are closed on the front end and are folded against the controller at the rear end of the car when in service. The opposite sides of the platform have small sliding doors under control of the motorman for exit passengers.

resembles very closely the old type to which the public has been accustomed for years, so there is little need for a campaign of education to familiarize the public with the new type. The car bodies are mounted on the Standard Motor Truck Company's maximum traction trucks.

THE DISPATCHING SIGNAL SYSTEM OF THE NEW BEDFORD & ONSET STREET RAILWAY COMPANY

During the past seven years a system of dispatching signals has been developed on the New Bedford & Onset Street Railway Company's main line between Fairhaven and Wareham, Mass., under the patents and immediate supervision of Orlando W. Hart, of Fall River, Mass., with the co-operation of the officers of the railway company. On this typical single-track cross-country line, the signal system to be described below in its application has been thoroughly tried out and has enabled the traffic to be handled with the same flexibility which obtains on a steam railroad operated under the train order system. The method of use and rules governing the employment of the signal on the road were compiled by J. E. Marvelle, division superintendent of the New Bedford & Onset company. The signal system, which is called the "Dispatchagraph," was described in the ELECTRIC RAILWAY JOURNAL of Oct. 10, 1908, page 928. It consists essentially of a transmitter in the dispatcher's office, so connected with signal stations along the road that any car or train crew can be called up at any turnout or division point by the dispatcher, and instructed by telephone. The transmitter automatically calls the desired station after it has been set for the corresponding number of that station, receives and records on a strip of paper an accurate record of the whole operation, which, while it is in plain sight of the dispatcher, is beyond his control if desired, and is accessible only to the management of the road. The tape shows the date, time and number of the signal which has been set, with an automatic answer back of the signal number, which shows that it has been set as desired. When the signal has been set it is interlocked in the danger position by a mechanism at the signal station, and it cannot be restored to safety except by the authorized parties on account of a lock in the signal case. At each signal is installed a telephone which brings each car crew calling the dispatcher



New Standard Car for Metropolitan Street Railway Company, New York

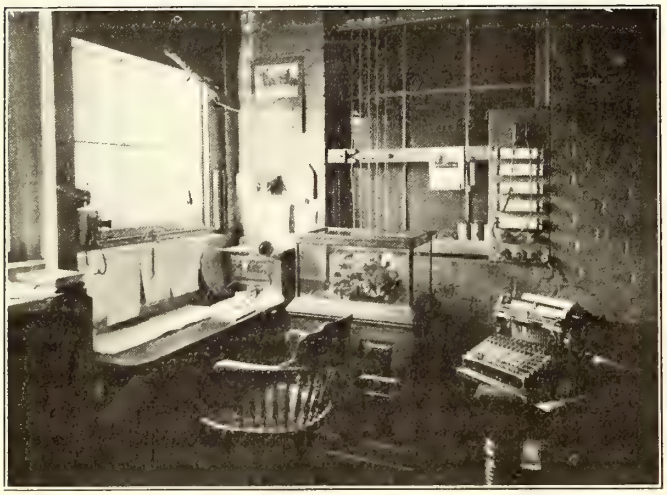
The seats are longitudinal and upholstered in rattan. At the ends of the car body they are set back 4 in. for a distance of one window, to give more room at the door openings. A folding seat and bench on each platform are installed for use on the forward end of the car; consequently there are no seats left out.

The interior arrangement and appearance of the car

into immediate communication with him. In case the signal is out of order the record indicates it either by the absence of the repeated number on the tape or, in case of a ground, a long dash is displayed on the record. The system is operated by trolley current with suitable resistances to cut down the voltage at necessary points.

The New Bedford & Onset installation consists of 15

signals of the enclosed disk type. The signals are all connected in multiple, which is a wide departure from the usual series connection of automatic and semi-automatic block signals, tending toward entirely independent service and increased reliability of transmission. The transmitter brings all the signals to the zero point before setting any

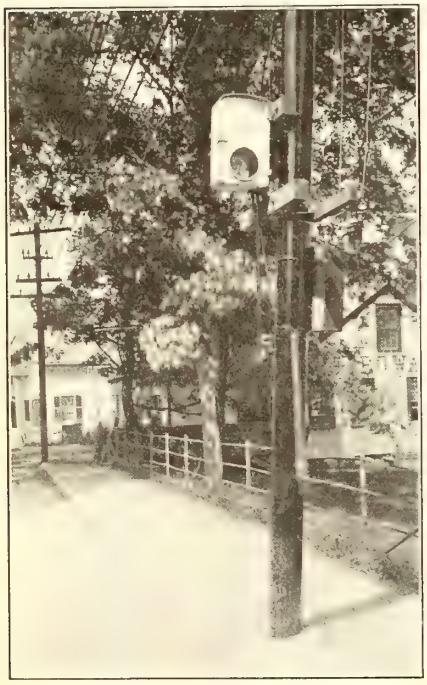


Dispatcher's Office at Wareham

particular one by automatic synchronous electrical impulses sent over the line, and after a signal has been set and mechanically locked in place the rest are brought to the neutral or zero point automatically. The date is shown by numbering the day of the year from 1 to 365. On the line of the Union Street Railway Company, of New Bedford, six similar signals of the semaphore type are to be installed soon, operating on the same principles as the disk signals of the New Bedford & Onset. All parts are interchangeable by hand, and the selectors in the signal cases, which are actuated by the transmitter at the dispatcher's office, can be removed by hand complete, and similar ones instantly substituted without any tools whatever. Views of typical equipment are shown herewith in relation to the New Bedford & Onset. The New Bedford & Onset line is normally operated from 5:30 a.m. to 12:30 a.m. A dispatcher is on duty 24 hours per day at Wareham, there being two 12-hour shifts. The usual headway between cars in each direction varies from 30 to 60 minutes, with a considerable extra traffic at certain seasons of the year. The company handles mail, express matter, and in the summer a large pleasure traffic. Since the signal system was first installed it has been considerably improved. But one wire, in addition to the two telephone wires, is necessarily installed for signal service. Simultaneous telephony and signaling are possible over the lines. The road is operated in the same way that it would be if stations were located at every siding, with an employee at these points, controlled by the Standard Steam Railroad Dispatching Code principles, with such minor modification as local traffic conditions require.

The New Bedford & Onset Railway is under the immediate jurisdiction of George P. Dole, superintendent, with J. E. Marvelle as assistant superintendent and chief train dispatcher, located at Wareham. Each side track of the road is designated as a station, each being given a name and number, both designations being necessarily given in all conversation and written matter relating to a specific siding. To illustrate, crew A, eastbound, and crew B, westbound, are due by schedule to meet at siding No. 4. Crew A become delayed by the drawbridge between New Bedford and station 1, call up and report themselves at station 1, over a certain number of minutes late, it being fixed by rule that any car becoming delayed over a certain number of minutes shall immediately notify the dispatcher, so that opposing cars may be moved up against the delayed car, thereby saving scheduled time to all others.

Crew A thus reporting themselves at No. 1 are given a train order in regular form to meet Crew B at No. 3; signal at No. 3 is usually set then as a clincher or safeguard against Crew A's forgetting their orders, should they arrive at No. 3 first. Immediately after giving the order at No. 1, the signal at No. 4 is set, and as soon as Crew B arrive at No. 4 they see the signal is down and



Disk Signal Mounted on Pole



Car Crew Reporting at Signal

immediately call for orders, and are given the same order that was given to Crew A at No. 1; the first car arriving at No. 3 is told to restore signal and wait for the opposing car, reporting the same when it is in sight. By this method the cars are correctly reported to the dispatcher so that he knows exactly what sort of time they are running on. No car is allowed to wait over three minutes at a meeting point without reporting. Thus the company obtains correct reports of the departures of cars from meeting points when they are running late. In handling the express car, line car and construction service, the company runs them wild almost wholly, working them close up to the regulars' time entirely on the double train order principle, and saving large amounts of time that would otherwise have to be wasted in running properly clear of the schedule time of superior cars.

Another use to which the system is put is in the event of putting on special timetables for one day only, change of time, putting out or taking off half-hourly cars at a different hour than the established time, all of which makes either new meeting points at certain times or omits meeting points that have been made, this having been in the past cause for much confusion, delays, and on many roads bad collisions. Under such conditions as these the signal is set at such times and places as there is a chance for blunders by crews. In this way a careless man is caught on the verge of a mistake rather than depending on a fellow employee's report, or perhaps waiting until a blunder has been made before the fact is found out.

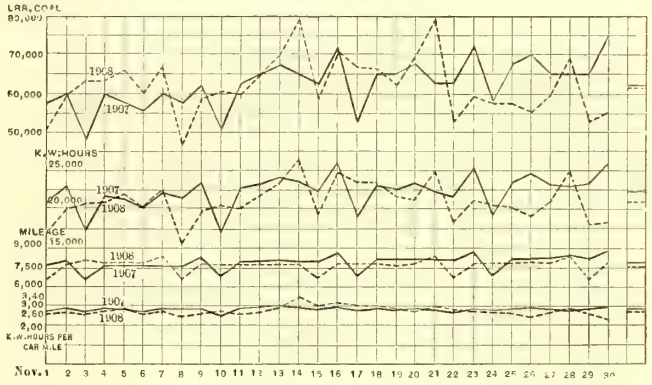
In the event of cars running as double headers, if the rear section becomes disabled or badly delayed, upon so reporting themselves to the dispatcher, the dispatcher first sets a signal ahead of the forward section, and orders them to wait, or back to clear the rear section of passengers, or drops off the rear section altogether, keeping all other cars on schedule time as conditions may require. The largest numbered signal can be set in 20 seconds. Within 5 minutes the dispatcher can call up every car on the single-track section of the road protected by the dispatchagraph. On the New Bedford & Onset with the signals set often from one to three minutes in advance of the schedule time of a car at a certain point, it will detect and report the crew that may have left that point even 30 seconds before the signal was operated. When the dispatcher has reason to suspect a certain crew of violating the rule about running ahead of the schedule time without a train order permitting such occupation of the track, he picks out certain locations where the offence is believed to be committed and sets the signal ahead of such crews as he is looking up, anywhere from one-half minute to as much in advance of the time as his judgment dictates, and if no answer is received from the signal he knows at once that the crew in question have violated the rules by either running by the signal when at danger or by leaving the time point in advance of the schedule.

The system has proved of great value in the winter season. When, on account of heavy storms, some cars are withdrawn from the line, others are delayed, and snow plows are sent out, the schedule is always entirely upset, with the whole road practically running wild. The dispatcher's signal here affords accurate and reliable control of the entire situation. In certain cases where accidents have occurred to persons in the towns situated on the line, requiring an immediate rush trip to the hospitals in New Bedford, the signal system has enabled extra cars to be started promptly and given a right of way over all opposing cars, clear through to the end of the system. Mr. Marvelle has introduced a so-called "order signal," which is carried on the front of the car in the shape of a red flag by day and a red light by night, denoting that every car met or passed, whether at regular meeting points or at other sidings, must immediately call for orders, or if on a long siding or double-track section, at the first telephone reached, and positively before leaving the junction of the single or double track. After receiving an order signal the crew cannot proceed until they receive a telephone or written order. The system has also been utilized to a considerable extent in finding lost articles on cars.

Any signal can be cut out of circuit without disturbing the rest by pulling the fuses. The system is maintained by the dispatcher acting by telephone through a track employee or lineman. The interchangeability of the equipment has been a valuable feature on this road, which is too small to afford an elaborate engineering organization. The life of the parts has shown up well, the original contact brushes of the transmitter being still in regular service at Wareham. A signal station can be installed in about two weeks in good working order.

POWER STATION RECORDS IN HARRISBURG

The accompanying diagram is a reproduction of the daily record curves prepared by the Central Pennsylvania Traction Company, of Harrisburg, Pa., to cover the operation of its power plant. There are four sets of curves, as follows: Kw-hours per car mile, mileage, kw-hours and pounds of coal. Each sheet has space for one month's operations compared with the same month of the preceding year. It will be seen from the totals and averages over the



Power Station Record of the Central Pennsylvania Traction Company

curves that the Harrisburg company suffered a reduction in kw-hours generated and mileage run owing to the hard times last year. This drop was accompanied by an increase in lb. coal per kw-hour from 2.81 to 2.94, and a loss of 4.4 per cent in the efficiency of the plant. The kw-hours are measured by separate wattmeters on each generator circuit. Line conditions improved during 1908, kw-hours per car mile dropping from 2.82 to 2.73.

By comparing the figures accompanying this curve sheet with those published in the Sept. 28, 1907, issue under the title "Low Power Costs in Harrisburg," it will be seen that this station continues to show unusually high efficiency. The generating equipment of the station consists of three 650-kw units, only two of which are in regular operation. The load factor, based on engine hours operated, is about 85 per cent. The coal used is Clearfield bituminous, which is rated at 14,800 b.t.u., and has an ash content of approximately 6 per cent.

News of Electric Railways

Cleveland Traction Situation

Judge L. E. Knappen, sitting on the United States Circuit Court bench at Cleveland last week at the request of Judge Tayler, heard arguments of counsel on the question of the expiration of the franchise on the Woodland Avenue and West Side lines. W. B. Sanders, of Squire, Sanders & Dempsey, attorney for the Cleveland Railway, and Newton D. Baker, city solicitor, for the city, presented arguments upon briefs which had already been filed. Mr. Sanders said that the consolidation of the Cleveland Cable Railway with the Woodland Avenue and West Side system in 1893, and three ordinances granted later, operated to extend the franchises of all the lines to Jan. 26, 1910, the date of the expiration of the grants to the Cleveland Cable Railway. He argued that while grants were given for the construction of the East Fifty-fifth Street crosstown line, which will expire in July, 1914, the companies were bound by contract to operate this line in connection with all the intersecting lines and interchange transfers with these lines until the expiration of the grant. Mr. Sanders stated that the grants of these intersecting lines were necessarily extended for the same length of time, as they could not otherwise be operated with the East Fifty-fifth Street line, according to the contract, and that the grant for this crosstown line affects all the intersecting lines on the East Side from Broadway to the lake. Mr. Sanders also argued that the extension of the Woodland Avenue line on Corwin Avenue in 1893 extended the time of the Woodland Avenue and West Side lines to Jan. 26, 1910, the original date of expiration being Feb. 10, 1908. The contract between the company and the city by which passengers were to be carried to any portion of the consolidated system, when the crosstown line received its grant, implied that all franchises should run to the latest date mentioned, so Mr. Sanders argued, as this is the only way in which the contract could be carried out.

Mr. Baker argued that the franchises on the Woodland Avenue and West Side lines all expired a year ago, and that the Forest City Railway had been given 3-cent grants over them, which were taken over by the Cleveland Railway when it purchased the property of the Forest City Railway, and that the Cleveland Railway can operate legally only according to the terms of those grants. He said that the case under contention is similar to the Central-Quincy case, decided by the United States Supreme Court against the company, and denied that any of the grants for extensions of tracks operated to lengthen the term of the old grants. To substantiate this claim he introduced several ordinances enacted for the purpose of extending franchises, and showed that they state their purpose specifically.

Mr. Sanders stated that he understood that the hearing was for the purpose of instructing the receivers in the rate of fare that should apply, and that it was not final. Mr. Baker contended that the hearing was final, and that the city will push it to a conclusion. It is understood that Judge Tayler will decide how the hearing shall affect the final disposition of the question.

The report of the receivers of the Cleveland Railway for January follows:

			Cents per car mile.
Gross earnings		$382,043	19.06
Operating expenses:			
Maintenance	$98,428		4.91
Transportation	179,548		8.96
General	34,109		1.70
Total		312,085	15.57
Net earnings		$69,958	3.49
Deductions from earnings:			
Neutral street railway rental	$1,008		.06
Taxes	22,847		1.14
Interest rental	38,552		1.92
Dividend rental	73,378		3.66
Total		135,785	6.78
Deficit		$65,827	3.29

This makes the total deficit for the nine months $229,678, including the returns of the Municipal Traction Company during the time it operated the system. The statement for January is made in accordance with the terms of the lease.

Judge Tayler addressed the committee of the Chamber of Commerce on street railways a few days ago. The committee will not take any further steps toward the preparation of an ordinance until the developments indicate the necessity of the work.

Chicago Railways Company's Rehabilitation Plans for 1909

The Chicago (Ill.) Railways Company plans to spend $12,000,000 in rehabilitation work during 1909. It is expected that this will complete the schedule of improvement required by the ordinance and for which three years' time was allowed. The plan, therefore, contemplates finishing the work of three years in two. The $12,000,000 available for this work will be used in rebuilding track, purchasing new pay-as-you-enter cars, erecting and improving car stations, machine shops and substations, etc. A summary of the rehabilitation work, including the new cars and buildings, as prepared by the engineering department of the company, follows:

112 miles of track, including special work	$5,040,000
350 double-truck pay-as-you-enter cars	2,100,000
New underground system	1,282,893
Completing Lincoln and Wrightwood Avenues car station	81,000
"Limits" car station	192,530
Kedzie Avenue and Van Buren Street car station	465,885
Twenty-second Street and Ogden Avenue car station	313,000
North and Forty-eighth Avenues car station	457,750
Car shops	350,000
New rotaries for substations	450,000
New trolley construction	363,840
Total	$11,096,988

Estimates for new construction include $450,000 for increasing the rotary substation capacity, $129,120 for renewing trolley and resetting 86.08 miles of poles and $234,720 for 26.08 miles of extensions. Two million duct feet of underground tile conduit will be laid and 240 miles of high tension and feeder cables will be placed therein.

Work has already been started upon the "limits" car station, which will accommodate 89 double-truck cars, with clubroom facilities, stores and men's quarters. The Wrightwood and Lincoln Avenue car station, which will be completed this year, will accommodate 95 cars, the foundation for which has been started. The Kedzie Avenue station will accommodate 291 cars and the Twenty-second Street and Ogden Avenue station, work upon which has been started, will hold 214 of the large cars. The North and Forty-eighth Avenue car station will hold 360 double-truck cars. The car shops, which are to be extended, will have a sufficient capacity to take care of all the new double-truck cars to be placed in operation.

The new substation which is being erected at Lill Avenue, near Sheffield Avenue, was described in the Electric Railway Journal of Jan. 2, 1909, page 6. With the completion of this station the company will have four substations, with a converting capacity of 26,000 kw. The new units are of 2000 kw rated capacity each.

A little more than $9,000,000 was expended by the Chicago Railways Company last year in reconstructing its lines, in the purchase of new cars, in erecting new buildings and other details of rehabilitation. Seventy-five miles of new track were rebuilt.

Continued Hearing by Massachusetts Railroad Commission on Cambridge Subway Stations

The Massachusetts Railroad Commission continued on Feb. 10 the hearing on the petition of the Boston (Mass.) Elevated Railway for approval of its plans for the stations of the Cambridge subway. The hearing was largely devoted to the cross-examination of George A. Kimball, chief engineer of the Boston Elevated Railway, by City Solicitor Pevey of Cambridge. Mr. Kimball stated that in his opinion the convenience of the public was more important than the cost of the stations, and this had been borne in mind in making the designs. When the subway service is opened it is probable that the surface car service will be diminished somewhat. Such surface cars as are run through Harvard Square will have no difficulty in transferring passengers to and from the subway trains. Travel has been diverted from the Arlington-Harvard Square lines by the way of Sullivan Square terminal, as the Washington Street tunnel provides rapid transit through the business district by means of the connecting elevated lines.

Mr. Kimball pointed out that there would be no physical

connection between the subway train tracks and those for surface cars. Surface cars can be run through the tunnel if necessary. He then gave the detailed dimensions of the passageways for the Harvard Square station, showing that in all but one the grade is downward. The train platform inward bound would be 240 ft. long. The passageway from the Mt. Auburn car platform to the former would be 140 ft. long, on a 4.5 per cent grade. Outward bound, the Boston to Mt. Auburn passageway would be 200 ft. long, with a 10 per cent downgrade. The only passage with an upgrade would be from Arlington cars to the Boston train platform, grade 1.4 per cent. The Arlington passageways would be 140 ft. long, outward bound, and 165 ft. long, inward bound. Mr. Kimball emphasized the fact that while underground passageways are intrinsically undesirable, they are not objectionable here from the sanitary or police point of view, as they are designed without sharp turns, and in all but one case 14 ft. wide. They can be easily cleaned, and are not as complex as some of the existing passages in the Tremont Street subway. The estimated cost of the Harvard Square underground station, with the approach section of the subway from Quincy Square, Cambridge, westward, is about $1,450,000.

The Brill Report

The annual report of The J. G. Brill Company, Philadelphia, was submitted by President Rawle to the stockholders at the annual meeting held at Philadelphia, Feb. 10, 1909. It is published below:

The output from the five plants owned and operated by The J. G. Brill Company for the 12 months ending Dec. 31, 1908, amounted to $3,845,174.

For the purpose of comparison, the output for the three years, 1906, 1907 and 1908, was as follows:

1906.	1907.	1908.
$6,908,346	$9,211,826	$3,845,174

After charging to repairs to buildings, machinery and tools the sum of $125,503.91, the profit on the output for 1908, amounted to	$188,830
From which has been set aside for depreciation	98,089
Leaving a net profit of	$90,741

Which consists of profit earned in the manufacture of cars, trucks and sundry material.

As shown by my report of Feb. 12, 1908, your company had a large surplus or reserve and during the early portion of the last year, and, before it was demonstrated that it would be impossible to obtain more than a comparatively small amount of work for the year, the directors declared out of this surplus, on the common stock (in addition to the regular dividends on the preferred stock) one quarterly dividend of 1 per cent and two quarterly dividends each of one-half of 1 per cent.

The surplus account, as per my report of Feb. 12, 1908, showed a balance of		$1,699,953
Less adjustment, interest and discount charges during the year.		30,644
		$1,669,309
To which must be added the profit for 1908		90,740
Leaving a surplus of		$1,760,049
Less dividends paid during year:		
Preferred stock	$320,600	
Common stock	100,000	
		420,600
Leaving a surplus on Dec. 31, 1908, of		$1,339,449

At a directors' meeting held Jan. 27, 1909, the regular quarterly dividend on the preferred stock at the rate of 7 per cent per annum, amounting to $80,150 was declared, which was paid Feb. 1, 1909. As shown above, a liberal amount has been expended for repairs and charged to operating expense, and the physical condition of the plants is excellent.

The great depression which prevailed during the year is reflected in the decreased output shown above as compared with the output of previous years. Insurance, depreciation and taxes are practically unchangeable, and it has been impossible greatly to reduce the other overhead expenses, making it necessary for this decreased output to stand nearly as much general expense as would have been borne by a normal output greatly in excess of that of 1908. It was impossible also to decrease the selling expense, but this rather increased by reason of the greater effort made necessary by the general condition of business.

During this year of unprecedented depression the financial condition of your company has been excellent, and the accumulated surplus, as above stated, has enabled the directors to pay during the year the dividends to which I have referred.

The outlook for work is much improved, although competition is still extremely keen. We have orders in hand as of Feb. 6, amounting to	$1,717,338
Danville Car Company	78,277
Total	$1,795,615

On April 1, 1908, a majority of the stock of the Danville Car Company, located at Danville, Ill., was acquired. This plant is now getting in a satisfactory running condition under the management of your company, and its output from April 1 to the end of the fiscal year amounted to $98,036. After charging $4,176 to repairs to buildings, machinery and tools, a profit was shown of $5,655, from which a sum of $4,237 has been set aside for depreciation, showing a slight net gain of $1,418. As the entire stock of this company is not owned by The Brill Company, its accounts are not included in the combined statements submitted herewith.

On Nov. 29 we had a severe fire at the Brill plant, which destroyed a large amount of lumber, together with all the dry kilns, sheds for storing lumber and some small buildings. The entire loss, which was fully covered by insurance, amounted to $176,872,83, and has been adjusted. New buildings to replace those destroyed are nearing completion, and the stock of lumber has been largely replaced.

The following is a condensed balance sheet as of Dec. 31, 1908, and also the condensed statement of the sales and expenditures for the year 1908, which show the total profits, together with the surplus, as of Dec. 31, 1908:

THE J. G. BRILL COMPANY AND SUBSIDIARY COMPANIES COMBINED BALANCE SHEET, DEC. 31, 1908.

ASSETS.

Cost of properties	$8,297,147
Material raw, in process and finished	1,510,216
Investments	69,267
Bills and accounts receivable	1,442,489
Cash	439,074
	$11,758,193

LIABILITIES.

Preferred stock	$4,580,000
Common stock	5,000,000
Bonds (John Stephenson Company)	400,000
Bills and accounts payable	438,743
Surplus	1,339,450
	$11,758,193

THE J. G. BRILL COMPANY AND SUBSIDIARY COMPANIES SALES AND EXPENDITURES FOR YEAR 1908.

Total sales	$3,845,173
Less operating, general and administration expense	3,656,343
Manufacturing profit	$188,830
Less reserve for depreciation	98,089
Profit undistributed added to surplus	$90,741
Surplus account from previous year	$1,699,954
Less adjustment, interest and discount charges	30,645
	$1,669,309
Profit, as above	90,740
	$1,760,049
Less dividends paid during year	420,600
Total surplus	$1,339,449

Extension of Chicago Franchises Recommended

The committee on local transportation of the Chicago City Council, which is noted in the ELECTRIC RAILWAY JOURNAL of Feb. 13, 1909, page 307, placed a valuation of $788,784 on the property and franchises of the Chicago Southern Street Railway, has agreed to recommend an ordinance granting the company a franchise extension for 18 years on condition that it execute an operating agreement with the Chicago City Railway, by which the latter shall operate and rehabilitate the property. This agreement would be similar to that under which the Chicago City Railway operates the Calumet & South Chicago Railway, an abstract of which was presented in the ELECTRIC RAILWAY JOURNAL for July 4, 1908, page 214. In this case, however, the committee recommends the extension of the franchise for 18 years instead of 20 years, the term of the grant to the Chicago City Railway. It is stated that it will hereafter be the policy of the city authorities to grant all surface transportation franchises so that they shall terminate in 1927, in which year the present "partnership" franchises of the Chicago Railways and the Chicago City Railway expire. In the franchise proposed for the Chicago Southern Street railway, which was formerly known as the Chicago General Railway, the division of profits, 45 per cent for the railway and 55 per cent for the city, will be made a condition of the grant as in the other existing rehabilitation ordinances. The lines of the Chicago Southern Street Railway are in the west central part of the city within the terri-

tory served by the Chicago City Railway and the Chicago Railways.

The sub-committee of the Chicago City Council has also recommended for passage an ordinance providing for the extension of the Humboldt Park branch of the Metropolitan West Side Elevated Railroad. This extension will terminate at Seventy-second Avenue, the city limits. The route lies just north of North Avenue. Immediate construction is required by the ordinance, and it is stipulated that the company shall elevate the new track as far as North Fifty-first Avenue and to Seventy-second Avenue within seven years' time, at the city's demand. The Chicago & Oak Park Elevated Railroad is seeking a franchise for a line through the same territory, and it is stated that a new surface railway may be built into Chicago from the north which will use the new elevated structure for an entrance into the city.

Cost Preparatory to Electrification of Illinois Central Railroad Into Chicago.—Louis C. Fritch, assistant to the president of the Illinois Central Railroad, who was recently appointed consulting engineer of the company to supervise the preparation of plans for the electrification of the company's Chicago terminal, is reported to have made the following statement regarding the cost of the proposed work: "From the several preliminary plans for electrifying our terminals we estimate that the cost merely for changing our tracks for suburban and through passenger trains will approximate $5,000,000 to $6,000,000. As to the total cost, we have only a general idea at this time."

Chicago Street Railway Rehabilitation.—R. H. Rice, of the engineering staff of the Board of Supervising Engineers of Chicago Traction, delivered an address before the Armour Institute of Technology branch of the American Institute of Electrical Engineers on Feb. 10, on "Some Problems Connected with the Building of a Large Street Railway System." Mr. Rice described the methods used in calculating, constructing and erecting the various parts of the distribution and return circuits now being installed by the surface railways in Chicago, and called attention to the need in engineering calculations for full recognition of the financial side of any piece of construction work.

Extension of New York-New Jersey Tunnel Sought in New York.—The Hudson & Manhattan Railroad, which operates under the Hudson River from Hoboken, N. J., to Sixth Avenue and Twenty-third Street, New York, and which has under construction a tunnel under the Hudson River between Jersey City and Dey Street, New York, has applied to the Public Service Commission of the First District of New York for permission to extend the system to the new Grand Central Station, into which both the New York Central & Hudson River Railroad and the New York, New Haven & Hartford Railroad will operate. The extension will cost about $5,000,000, and the company's engineers estimate that it can be completed within 18 months.

Meeting of the Central Electric Accounting Conference.—A call will be issued this week for a meeting of the Central Electric Accounting Conference, to be held at the Lima House, Lima, Ohio, on Saturday, March 6, 1909. At this meeting the committee on permanent organization will report and it will be decided whether the conference will be dissolved or a permanent organization effected. The committee on uniform interline blanks will make its report and will recommend for adoption uniform reports covering interline freight and passenger business, samples of the blanks having been printed and distributed to the members. The committee appointed at the last meeting to transmit requests for information concerning the new classification of accounts will report, and all questions concerning the operating revenues, operating expenses and expenditures for road and equipment, as provided by the Interstate Commerce Commission, will be discussed.

Detroit Traction Committee Meets.—The first public meeting of the committee of 50 citizens selected by Mayor Breitmeyer to consider the question of the terms of a new franchise to the Detroit United Railway was held on Feb. 4 in the Council chamber. Nearly all the speakers who were not members of the committee urged municipal ownership. Fred H. Warren, however, pointed out some of the fallacies of municipal ownership, and said that even if the citizens were overwhelmingly in favor of the plan to purchase the street railways, the city could not finance any such undertaking for many years on account of its financial condition. He urged that the committee present to the company for approval an ordinance providing for an extension until 1924 of the franchises which are to expire shortly. In 1924 the grants under which the 3-cent lines in Detroit are operated will terminate, and a blanket franchise could then be drawn covering the entire property or an alternative proposal could be made to which the city might possibly be made a party.

Improvements in St. Louis.—Robert McCulloch, who has been elected president of the United Railways, St. Louis, Mo., says that the work of improvement begun last year, and on which about $1,000,000 was expended, will be pushed as rapidly as finances will permit, and that during 1909 at least $2,000,000 will be spent on new tracks and cars. Mr. McCulloch says: "I am satisfied with the test we have given the pay-as-you-enter cars and these shall be made general throughout the city. But the cars we propose to build will eliminate any disadvantages the present cars may have. They will have larger platforms back and front to avoid crowding and enable us to put into effect our original plan of permitting smoking only on the front platforms. We are not building any cars at present, but expect to begin soon. Times have been dull and that has deterred us somewhat. The need of extending the service not only to the northwest, but to other outlying districts has been recognized by the directors for some time, but it is impossible to say when we will be in a position to carry out the plan. We may begin the extension of the Bellefontaine line this year. It all depends upon our finances."

Settlement of Paving Question in New Orleans.—At a meeting of the finance committee of the City Council of New Orleans, held on Feb. 2, the ordinance recently offered for approval by certain councilmen providing for a compromise with the New Orleans Railway & Light Company regarding the cost of paving certain streets, and Prytania Street in particular, was favorably reported. Hugh McCloskey, president of the company, stated that the agreement was a result of a series of conferences held between the Mayor, the city attorney and representatives of the company. This compromise has received the approval of the directors of the company. In accordance with the terms of the ordinance, the New Orleans Railway & Light Company will bear the expense of the city's portion of the cost of paving between the tracks, and for 1 ft. on each side the tracks on Prytania Street from Louisiana Avenue to Joseph Street, on Joseph Street from Prytania to Hurst Street, and on Hurst Street from Joseph Street to Audubon Park, a distance of 2 1/3 miles. This work is to be begun during 1909, and pavement to the amount of $75,000 must be laid before the end of 1909. The remainder of the work is to be performed continuously so that the whole pavement shall be laid on or before January, 1913.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—A bill has been introduced to compel the Hartford & Springfield Street Railway to reduce the fare between Broadbrook and Warehouse Point, a distance of 4¼ miles, from 10 cents to 5 cents. Extensions are sought to the time for building the Meriden, Middleton & Guilford Electric Railway, the New Milford & Lake Waramaug Electric Railway and the Litchfield & Torrington Tramway. Another measure makes it unlawful for an electric railway company to transport any intoxicated person under penalty of $10 fine for each offense, and extends police powers to motormen and conductors. A resolution has been introduced in the House providing that every electric railway shall issue a through ticket to each passenger to her or his destination; that fare limits shall be from the center of one town to the center of the next, and that fares shall not exceed 1 cent a mile. The measure has been referred to the committee on railroads.

Illinois.—A bill has been introduced which prohibits the issuance of free tickets, free passes, or free transportation by all railroad and railway companies, steam and electric. A fine of from $100 to $2,000 is provided for each violation.

Indiana.—The Matingly bill which increases and extends the authority of the Railroad Commission to telephones, electric light, gas and other public utilities has not yet been reported on by the Judiciary Committee of the Senate. A provision of the measure is that the commission shall appraise the "physical property and all growing and intangible values" of all public service corporations, but before determining the value finally it shall hold a public hearing on the case in question at which the representatives of the company shall be entitled to appeal from the decision of the board. The board may then, if it considers the objections valid, revalue the property. Every person, corporation and municipality coming within the provision of the act is required to file an annual statement of its earnings and its outstanding securities, etc., with the commission. Corporations securing franchise must obtain the consent of the commission before proceeding with construction work. All issues of stocks, bonds and notes must be approved by the commission. There must be no transfer of a franchise or of stocks or bonds of one company

to another without the approval of the commission. The Senate bill making it a penal offense punishable by a fine and imprisonment for an engineer or a motorman to take a crossing at grade where no interlocking plant is installed without stopping has been amended and reported favorably for passage.

Massachusetts.—As noted elsewhere in this issue, the New York, New Haven & Hartford Railroad has submitted to the Legislature its answer to the order making inquiry as to the manner in which it now holds the securities of the Boston & Maine Railroad and the several electric railways in which it is interested in Massachusetts. By many, it is expected that the answer of the company will result in remedial legislation which will correct the present confusion, especially as the report of the Attorney-General declared that the State must do one of two things—formally approve the action of the company in holding the securities of the companies or declare its charter forfeited. The legislative committee on street railways gave a hearing on Feb. 9 on the petition of C. H. Blood for legislation to establish a board of railway commissioners having general supervision of street railway companies much the same as the Railroad Commission has over railroads, street railways, etc. Mr. Blood in contending for the appointment of a separate commission for the street railways, said the growth of the street railways and the railroads in Massachusetts made it quite impossible for one commission adequately to supervise both.

New York.—Members of the special rapid transit committee of the Chamber of Commerce of New York and members of the Public Service Commission of New York were in conference with Governor Hughes on Feb. 9, regarding transit conditions in New York. While it is understood that the question of legislation affecting street railway interests in New York was discussed, no formal statements were issued regarding the purport of the conference. A bill has been introduced to require the public service commissions to make public their decisions within 60 days after the evidence and arguments in a case are concluded. William M. Ivins, chairman of the New York City New Charter Commission, says that no date can be fixed for submitting the charter to the Legislature as there is no telling how long the committee of 15 will take in discussing it. The proposed changes in the charter will probably not be made public until such time as the charter is ready for report to the Legislature.

Ohio.—It is said that Governor Harmon does not favor the Woods public utilities bill now before the Legislature. The bill provides, among other things, that the tax commission created by the bill shall fix a system of accounting in accordance with which returns shall be made by the companies to the State.

Pennsylvania.—The Legislature will reconvene on Feb. 22. As final adjournment has been fixed for April 15, only eight weeks are left for the work in hand and to come. Of the measures affecting electric railway interests which have been introduced none has been reported from committee. One of the most important is that amending Section 14 of the act providing for the appointment of the State Railroad Commission, to read as follows: "The commission shall have power to recommend the manner under existing laws in which one railroad street railway, electric railway or other common carrier may cross another railroad, street railway, electric railway or public highways at grade or above or below grade and what safety appliances and regulations should be adopted at such crossings or at existing grade-crossings of railroads, street railways, electric railways or other common carriers with other railroads, street railways, electric railways and public highways for the protection of the public and the prevention of accidents. The commission shall also have power to recommend the form in which schedules or tariffs of rates, fares, charges and distribution of cars shall be posted and published, and make such change or changes therein from time to time as shall be found expedient." It is generally believed that the bill increasing the membership of the State Railroad Commission from three to seven will not be favorably reported by the Railroad Committee. A bill has been introduced in the Senate, which provides that employees of street railway companies shall not work more than 10 hours per day, and that these 10 hours shall all be within a period of the 12 hours. The most important measure so far proposed for introduction upon the reconvening of the Legislature is an act, drawn by the attorney for the Railroad Commission and Attorney-General Todd, carrying out the recommendation of the State Railroad Commission giving that body control of the capitalization of railroad, electric railway and other common carrier corporations. The bill will make operative a clause in the act creating the commission which gave it merely powers of inquiry.

Financial and Corporate

New York Stock and Money Market

February 16, 1909.

After several days of trading which gave promise of a revival of life, the stock market relapsed again to-day into the lagging, waiting condition that has been its marked characteristic for the last month. The losses were not great, and the falling off seems to be due more to lack of buyers than any eagerness to sell. There have been no developments in railroad or industrial affairs to influence trading. The condition is one of apathy. The outside public is not investing, the commission houses are doing no business, and the majority of the trading that appears is the small dealing of floor brokers. The decision of the Public Service Commission of the Second District of New York authorizing the Erie Railroad to issue $30,000,000 of new bonds has had very little effect on the general market, but that little seems to be in the direction of depression. The rigid restrictions placed around the issue almost robs it of its value to the company, and practically serves notice on all other enterprises that every refinancing plan must be entirely beyond criticism.

Among the local traction securities there continues to be a fair amount of activity, considering the state of general business. Brooklyn Rapid Transit continues to be dealt in rather liberally, although prices have changed very little from those prevailing before the dividend announcement was made. Interborough-Metropolitan is more active than usual, and both issues, especially the preferred, have shown a disposition to advance moderately. Metropolitan Street Railway is almost out of the market.

The demand for bonds continues to be the surprising feature of the market. Every issue offered is largely over-subscribed. The new Burlington issue, which will be only $15,000,000 instead of $25,000,000, was extensively oversubscribed and was actively traded in on the Curb before the issue was made at 1 point above the underwriters' price. Call loans to-day were made at 2 to 2¼ per cent; 90 days at 2¾ per cent.

Other Markets

Traction securities have been very little thought of in the Boston market during the week. Small and broken lots have constituted the entire business. Massachusetts Electric has been more active than the others and has recorded a fractional advance.

In the Philadelphia market, Philadelphia Rapid Transit continues to be the best seller among the tractions. The quotations are gradually advancing. There was no market to-day owing to the municipal election, but the price on Feb. 15 reached 28⅜. Union Traction and Philadelphia Traction were both in the market to a limited extent at about the same figures that prevailed a week ago.

In Chicago the tractions are dull, even Subway and the various issues of the Chicago Railways being practically neglected. Only broken lots of these issues are being offered, and prices are about the same as previous figures.

In Baltimore the bonds of the United Railways Company continue to be active. Blocks of fair size change hands every day, but prices remain practically stationary. The "incomes" are quoted at 52 to 52¼, the 4s at 86 and the funding 5s at 79.

Quotations of various traction securities as compared with last week follow:

	Feb. 9.	Feb. 16.
American Railways Company, Philadelphia	*45	*45¼
Boston Elevated Railway	129	129
Brooklyn Rapid Transit Company	71	72
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a74	a74
Consolidated Traction Company of New Jersey, 5 per cent bonds	a107	a107
Detroit United Railway	61½	*61½
Interborough-Metropolitan Company	16⅛	15⅞
Interborough-Metropolitan Company (preferred)	43⅞	43½
Manhattan Railway	148½	a148½
Massachusetts Electric Companies (common)	14¼	14¾
Massachusetts Electric Companies (preferred)	69	68¾
Metropolitan West Side Elevated Railway, Chicago (common)	*16	*16
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	*42	*42
North American Company	81⅛	81⅜
Philadelphia Company, Pittsburg (common)	*41¾	*42
Philadelphia Company, Pittsburg (preferred)	44¼	*44¼
Philadelphia Rapid Transit Company	27¼	28¼
Philadelphia Traction Company	93	93
Public Service Corporation, 5 per cent collateral notes	a100	a100¼
Public Service Corporation certificates	a77	a78
Twin City Rapid Transit Company, Minneapolis, (common)	104⅝	107
Union Traction Company, Philadelphia	53⅛	*53¾

a Asked. *Last sale.

Report of Metropolitan West Side Elevated Railroad

The report of the directors of the Metropolitan West Side Elevated Railroad, Chicago, Ill., for the year ended Dec. 31, 1908, as presented at the annual meeting of the stockholders of the company on Feb. 1 compares with the previous year as follows:

	1908.	1907.
Income from operation	$1,336,039	$1,435,090
Interest on bank balances	1,014	1,216
Rental of outside property	4,982	4,523
Other income	4,130	1,080
Gross income	$1,346,165	$1,441,909
Interest first mortgage bonds	$399,960	$399,960
Interest extension mortgage bonds	151,304	125,622
Interest collateral loan	27,960	30,291
Interest equipment notes	8,643	18,817
Other interest	4,152	.....
Miscellaneous rentals	37,048	37,048
Loop rentals	257,947	261,995
Taxes, car licenses and special assessments	197,735	176,390
Total charges	$1,084,750	$1,050,123
Available for dividends	$261,415	$391,785
Dividends declared	.....	195,927
Balance carried to surplus	$261,415	$195,858

THE COMPARATIVE BALANCE SHEETS AS OF DEC. 31, 1907, AND DEC. 31, 1908, FOLLOW.

ASSETS.

	1908.	1907.
Cost of road, equipment and property	$32,265,152	$32,100,968
Capital stock in treasury, preferred	292,100	292,100
Capital stock in treasury, common	35,900	35,900
Extension mortgage bonds in treasury	983,000	1,179,000
Cash on hand and in banks	156,190	247,658
Material and supplies	52,321	77,644
Accounts receivable	62,020	47,700
Prepaid insurance	21,390	26,323
Advances, Union Consolidated Elevated Railroad	53,720	53,720
Unadjusted accounts	15,232	78,984
	$33,937,025	$34,139,997

LIABILITIES.

Capital stock preferred	$9,000,000	$9,000,000
Capital stock, common	7,500,000	7,500,000
First mortgage bonds, 4 per cent	10,000,000	10,000,000
Extension mortgage bonds, 4 per cent	5,000,000	4,500,000
Collateral loan	400,000	500,000
Equipment notes	.....	536,524
Notes payable	.....	73,722
Unpaid vouchers, payrolls and accounts	110,617	263,297
Interest coupons due, not presented	6,620	5,960
Interest on extension mortgage bonds, due Jan. 1	80,320	66,720
Dividend checks outstanding	241	474
Interest accrued, not due	171,650	173,681
Rentals accrued, not due	8,750	8,750
Taxes accrued, not due	101,873	101,873
Depreciation reserve	275,248	88,705
Balance surplus	1,281,706	1,320,291
	$33,937,025	$34,139,997

H. G. Hetzler, president of the company, in presenting the report, said:

"The mileage operated during the year has not been increased, being at this time 50.5 miles, exclusive of side tracks.

"The equipment, which consists of 225 motor cars, 183 coaches, 79 control coaches and 17 miscellaneous cars, has been maintained in first-class condition.

"The power house has been overhauled and put in thorough repair, thereby materially reducing the cost of operating.

"The terminal at Desplaines Avenue, on the Garfield Park Branch, has been enlarged, in order that the business to and from the Forest Park Amusement Park might be satisfactorily handled.

"The operating conditions on the Humboldt Park Branch have been improved by the installation of cross-over switches at Western Avenue, making it possible to store cars without blocking the station platforms or interfering with the traffic.

"The ties and guard rails on practically all of the curved track have been renewed, and continuous rail joints have been installed over the entire system, replacing angle bars, and greatly improving track conditions.

"Safety of operation has been increased by the use of a spacing signal system over the entire road and the installation of safety stop apparatus at the river bridge and at all junction points. The public has been advised of the adoption of these safety devices by an illustrated circular issued by the company.

"The feeder system on the Logan Square and Humboldt Park Branches, and between the power house and Marshfield Avenue on the main line has been entirely remodeled and greatly improved. The return circuit on the entire system has also been improved."

New York, New Haven & Hartford Railroad Replies to Massachusetts Legislature

The reply of the New York, New Haven & Hartford Railroad to the questions asked by the Legislature of Massachusetts regarding the company's interest in the Boston & Maine Railroad and its holdings of the securities of several street railway companies in Massachusetts was made public on Feb. 16. The company concludes:

"We understand it to be now contended by the Legislature that the recent decision of the court should be interpreted as holding that the company, instead of being a corporation of each of three States, and at least entitled to exercise within the State which originally chartered it, the powers granted to it by that State, is one corporation in all three States, and is authorized to exercise no powers in any instance, except as such powers may happen to be conferred concurrently by all three States.

"We do not so understand the decision made. If such, however, be the law, it will appear to any one that the situation of the company must be changed by legislation somewhere; for a doctrine that a legal person is, as to every act at the same time, subject to three different and perhaps radically divergent and antagonistic sets of laws, is incapable of practical application.

"The railroads owned by the New York, New Haven & Hartford Railroad Company are situated in Connecticut, Rhode Island, New York and Massachusetts. Much the largest part of this railroad is in Connecticut and only a relatively small portion of it is situated in Massachusetts.

"The New York, New Haven & Hartford Railroad Company was originally a corporation chartered only by Connecticut under the name of the New York & New Haven Railroad Company. Into this Connecticut corporation was merged, in 1872, the Hartford & New Haven Railroad Company, chartered by Connecticut and also by Massachusetts, about 6 miles of its railroad being situated in Massachusetts.

"By an act of 1872 Massachusetts consented to this merger and declared that as to its railroad the company should be subject as before to the laws of Massachusetts, but it was at the same time substantially declared that as to its charter the consolidated corporation was to be 'subject to the charter' of the purely Connecticut corporation.

"Since 1872 the company has again and again acted under the authority of Connecticut law without authority from Massachusetts. Most, if not all, of these acts were reported to the authorities of Massachusetts, and although the laws applicable to this matter seem to have been for many years substantially the same, no question was, until recently, raised by anyone as to the legality of these acts.

"In conclusion, the company respectfully submits that its true interests and those of the people of Massachusetts are identical, and that, while it will always endeavor to comply with such laws as Massachusetts may choose to enact, the welfare and prosperity, both of the Commonwealth and of the company, require that the legislation of the Commonwealth shall not impair but shall strengthen the company's ability to provide the public with all needed transportation facilities and advantages."

Earnings of Chicago City Railway

The Chicago City Railway reports the following earnings for the 11 months ended Dec. 31, 1908, compared with same period of 1907:

	1908.	1907.
Passenger earnings	$7,657,102	$7,460,702
Other income	160,876	101,992
	$7,817,978	$7,562,694
Operating expenses 70 per cent of gross earnings, as per ordinance requirements	5,472,585	5,293,886
Balance	$2,345,393	$2,268,808
Interest allowance, 5 per cent	1,463,089	1,116,387
Net earnings	$882,304	$1,152,421
City of Chicago, 55 per cent	485,267	633,832
Chicago City Railway, 45 per cent	397,037	518,589

Blue Ridge Traction Company, Danielsville, Pa.—The Blue Ridge Traction Company recently elected the following officers: J. K. Horver, president; H. H. Horver, secretary; C. C. Marsh, treasurer and superintendent; C. C. Marsh, J. K. Horver, Henry H. Horver, George T. Oplinger, James L. Foote, J. S. Mayer, directors.

Chicago (Ill) Railways Company.—N. W. Harris & Company and the National City Bank, New York, are offering at 101 and accrued interest, the $6,000,000 Chicago Railways Company first mortgage 5 per cent bonds recently purchased by them.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—A bill asking that the $4,000,000 bond issue of the Chicago & Milwaukee Electric Railroad maturing in 1920, be foreclosed on the ground that the Illinois corporation is insolvent, has been filed in the United States Circuit Court at Chicago. The petitioner is the Merchants' Loan & Trust Company, trustee under certain trust deeds from the company.

Easton (Pa.) Transit Company.—Governor Stuart of Pennsylvania has approved the consolidation of the Easton Transit Company and the Easton & South Bethlehem Transit Company. The Easton Transit Company now operates the property of the Easton & South Bethlehem Transit Company under lease.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—The stockholders of the Fonda, Johnstown & Gloversville Railroad at a meeting on Feb. 10 authorized an increase in the capital stock of the company from $2,500,000 to $3,500,000.

Ft. Wayne & Springfield Railway, Decatur, Ind.—A semi-annual dividend of 2 per cent has been declared by the directors of the Ft. Wayne & Springfield Railway. The directors have pledged themselves to dispose of $100,000 worth of stock by May 1, 1909, the proceeds from which will be used to build an extension to Berne. Mention of this possible extension has previously been made in the ELECTRIC RAILWAY JOURNAL.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—In the ELECTRIC RAILWAY JOURNAL of Feb. 13, page 307, mention was made of the application by the Maryland Trust Company, Baltimore, Md., trustee under the $4,000,000 general mortgage of the Newport News & Old Point Railway & Electric Company, for the appointment of a receiver for the Newport News & Old Point Railway & Electric Company. Alexander Brown & Sons, Baltimore, and Brown Brothers Company, New York, have since then issued a call for deposits of the general mortgage bonds. They have made the following statement: "We have been informed that the board of directors of the Citizens' Railway, Light & Power Company, without the knowledge of the Maryland Trust Company, has purchased $300,000 common stock of the Newport News & Old Point Railway & Electric Company and has issued its note for $120,000 therefor. The same time the Danville Railway & Electric Company has purchased $250,000 of the common stock of the Newport News & Old Point Railway & Electric Company, and has issued its note for $100,000 therefor. We are advised that if these transactions are permitted to stand, they will, to the extent of the said note, impair the interests of the general mortgage bonds. We have therefore requested the Maryland Trust Company to take such action as it may deem advisable to protect the interests of the general mortgage bondholders. While the company has not defaulted in interest payment on the bonds, we believe it desirable that all holders of the general mortgage bonds promptly deposit the same with us, particularly in view of the fact that the management, which is responsible for the action claims to represent personally a large block of these bonds."

Northwestern Elevated Railroad, Chicago, Ill.—A committee said to be composed of Ira M. Cohe, vice-president of the Assets Realization Company, Samuel Insull, president of the Commonwealth Edison Company, and Emile K. Boisot, vice-president of the First Trust & Savings Bank, is reported to have been selected to perfect a plan for merging the elevated railways in Chicago. A plan under consideration is said to provide for the leasing of both the South Side Elevated Railway and the Metropolitan West Side Elevated Railway by the Northwestern Elevated Railroad.

Taunton & Pawtucket Street Railway, Taunton, Mass.—The coupons due on Jan. 1, 1909, on the $2,000,000 of first mortgage 5 per cent bonds of the Bristol County Street Railway were not paid at maturity. The Federal Trust Company, Boston, Mass., is trustee of the mortgage securing the bonds, and it is expected that a statement will be made to the bondholders very soon.

United Railroads of San Francisco, San Francisco, Cal.—The United Railroads of San Francisco has declared out of the earnings of the six months ended Jan. 1, 1909, an initial dividend of 3½ per cent, which is at the rating of 7 per cent per annum on the $5,000,000 of 7 per cent cumulative first preferred stock. The dividend is payable on Feb. 15.

Youngstown & Ohio River Railroad, Youngstown, Ohio.—At the annual meeting of the directors of the Youngstown & Ohio River Railroad officers were re-elected as follows: R. F. Dennison, president; W. B. Whiting, vice-president; F. S. Whitcomb, secretary-treasurer; C. S. Thrasher, general manager.

Traffic and Transportation

Accident Swindler Attempts to Break Jail

Through what is alleged to have been an attempted jail delivery from the Tombs Prison, New York, on Feb. 10, there was brought to light the criminal record of Howard Remington Mercer, a well-known accident fraud swindler. Mercer, or Remington as he is known in some cities, was under indictment for grand larceny for defrauding the New York City Railway out of $4,000 on a fake accident case. It is alleged that Joseph A. Shay, a lawyer, and Walter F. Peck, alias Williamson, who was employed by Shay as an "investigator" or in other words as an "ambulance chaser," conspired to smuggle into the prison a disguise for Mercer and had an automobile outside in waiting which was to have taken him out of the city. The district attorney's office received information of the attempted jail delivery in time to frustrate the plan and the arrest of Shay and Peck followed. Shay was held in $5,000 bail after both Mercer and Peck, it is alleged, had confessed the details of the plot and had implicated Shay in their affidavits as a principal.

On Feb. 13, 1902, Harry R. Mercer was arrested in Philadelphia as a fugitive from justice from St. Louis, where he was wanted on a charge of larceny of typewriters. On March 19, 1902, he was discharged in the Court of Criminal Correction, of St. Louis, on two charges of grand larceny and was turned over to the police of Kansas City, Mo., being wanted in that city for stealing typewriters. In July, 1902, he was convicted and sentenced to four years in the penitentiary of Jefferson City, Mo. He was discharged under the three-fourths law on July 17, 1905. His register number was 5127. Theodore Mercer was arrested in Chicago Aug. 15, 1901, as a fugitive and taken back to St. Louis, where he was wanted for the theft of typewriters, and on Sept. 20, 1901, in the Court of Criminal Correction, of St. Louis, he pleaded guilty to petty larceny and was sentenced to six months in the workhouse. He was later transferred to the city hospital, from which place he escaped Jan. 21, 1902. He was wanted in Kansas City, Mo., at the time of his escape. Harry and Theodore Mercer are said to have dressed as priests in order to make the renting of typewriters easy, and they rented these typewriters under the pretence of writing sermons.

In 1906 Harry Mercer came to Philadelphia, where he opened up an office and styled himself "a public claim adjuster," and while in this city he was associated with his brother, Edgar Mercer. On Jan. 5, 1907, the Mercers brought an action against the Philadelphia Rapid Transit Company for $30,000 damages through one Carl O. F. Nordlander. Nordlander was a faker of accident claims with a national reputation. He was arrested, tried and convicted in Philadelphia on the charge of conspiracy and attempted false pretence and was sentenced to three years in the county prison, where he died. Warrants were issued for the arrest of Harry and Edgar Mercer, charging them with conspiracy and attempted false pretence in connection with the Nordlander case. Harry Mercer left the jurisdiction of the Pennsylvania courts and has since been a fugitive. Edgar Mercer was arrested and is at the present time under indictment in Philadelphia.

After Harry Mercer left Philadelphia he is said to have gone to Colorado. Some time later he returned to New York City with his brothers, Theodore and Elwood and, under the names of Harry, Theodore and Elwood Remington, it is alleged, they associated themselves with a man by the name of S. S. Stagg, on Second Avenue, New York City, at which address Stagg had carried on the artificial limb business for years. Stagg was supposed to have been in constant touch with the secretaries of relief associations of large corporations, and in this way would be advised when an accident occurred resulting in amputation, and while endeavoring to sell the injured person a leg or an arm, it is claimed he would induce them to bring an action against the company responsible for the accident. Through this channel he had the means of obtaining inside information. On Dec. 28, 1908, Harry and Theodore Mercer presented a release to the receivers of the New York City Railway Company for $4,000. This was in settlement of the claim of a young girl named Heister, who had lost a leg as a result of an accident on a Third Avenue surface car. After securing this money Harry and Theodore and their families left New York City, came to Philadelphia and then went to San Francisco, Cal., where they were arrested within 48 hours after their arrival. They were returned to New York City, where Harry Mercer is said to have made a full confession of his various transactions with various lawyers throughout the country. Among the cases alleged to have been mentioned by Harry Mercer

in his confession as being fraudulent was the case of Carrigan against the receivers of the New York City Railway Company, in which a verdict of $10,400 was recently obtained. Mercer, it is claimed, described the crookedness of this case and showed where perjury had been committed by two of the principal witnesses; these witnesses have since been arrested. One is still confined in the Tombs. He has made a complete confession of guilt and the other witness has been paroled in the custody of a detective. Mercer in his confession also cited in detail a case against the United Railways, of Albany, N. Y., in which a large verdict was secured on testimony that was bolstered up. In his statement Mercer is alleged to have implicated Attorney Joseph A. Shay as being associated with him in the above mentioned cases.

The "Amputation Bureau" conducted by Stagg and the Mercers on Second Avenue, is said to have made a practice for some time past of removing claimants to a place where those interested cannot get in touch with them. At the present time it is claimed a man by the name of John Ossino, who has a claim against the Pennsylvania Railroad Company in an action to recover for the loss of both legs, is an inmate of the house. He has entered suit for $100,000, and has been confined in the basement of the "Bureau" since July, 1908.

A detainer has been lodged against Mercer by the Philadelphia Rapid Transit Company charging him with conspiracy on the $30,000 case of Carl O. F. Norlander.

Massachusetts Commission Issues Decision in Lawrence & Methuen Street Railway Fare Case

Under date of Feb. 10 the Massachusetts Railroad Commission issued the following order relative to fares on the Lawrence & Methuen Street Railway:

"Certain residents of Methuen allege that a fare of 8 cents on the Lawrence & Methuen Street Railway is excessive and unreasonable.

"The company operates from Lawrence through Methuen to the Haverhill boundary, from Lawrence through Methuen to the New Hampshire boundary at the town of Salem, and from Lawrence through Methuen to the New Hampshire boundary in the town of Pelham. The rates of fare upon these three lines are as follows: From Lawrence to the Haverhill boundary, 5 cents; from Lawrence to the Salem boundary, 5 cents; from Lawrence to the Pelham boundary, 8 cents. The mileage of the three lines is substantially the same.

"A careful examination and study of its annual returns and financial condition indicate that the company might be justified in making an increase in its charges for transportation, if reasonable, and as far as possible distributed over all its lines. This question is not before us and we therefore do not decide it. The company, however, has arbitrarily selected one division of its system and advanced the rate from 5 cents to 8 cents. This, in our opinion, is unfair to a portion of the traveling public, for it creates a burden that bears unduly upon them. If the fares upon all lines of this company were reasonably advanced, it would appear that an increase in gross earnings could be secured by a rate upon this division of less than 8 cents. It must therefore follow that the 8-cent charge is excessive and unreasonable, and we recommend a reduction."

Decision Favorable to Company in Haverhill Fare Case

The Massachusetts Railroad Commission issued a decision under date of Feb. 10, sustaining the Haverhill & Southern New Hampshire Street Railway for the present in charging a 6-cent fare between Haverhill and Ayer's Village. A petition had been presented by the Mayor of Haverhill for a reduction to 5 cents. The board says:

"The Haverhill & Southern New Hampshire Street Railway, operating in Haverhill, has recently raised the fare from 5 to 6 cents for a continuous ride from the center of Haverhill to the New Hampshire State line.

"Complaint is made that the fare now established between the city proper and Ayer's Village is excessive and unreasonable. This village is in Haverhill, between the center of the city and the New Hampshire State line and is more than 5 miles from Haverhill Square.

"The board has adopted in this case its usual method of requiring comparative daily returns of income to be submitted by the company, and after careful examination of these returns, in connection with a study of the financial condition of the company, is unable to say that the fare is excessive and unreasonable.

"In view of a suggestion made at the hearing, of the company's intention to re-establish a 5-cent fare between Haverhill Square and the New Hampshire boundary during the season of summer riding, it may well be that if this fare is reinstalled conditions may be created that may occasion further action by the board, and the petition is therefore dismissed without prejudice."

Side-Door Train in the New York Subway

The first of the eight-car side-door trains for the New York subway, providing separate entrances and exits, was placed in operation on Feb. 16. After several preliminary trips, the train was started from the Atlantic Avenue station in Brooklyn during the rush hours for carrying passengers. The time consumed at stations during the first trips is said to have been somewhat longer than that for the regular express trains, but this is explained by the newness of the equipment and the inability of the public and the employees of the company quickly to adjust themselves to the changed conditions.

This experimental side-door train was equipped at the shops of the Interborough Rapid Transit Company in accordance with a recommendation made by B. J. Arnold, consulting engineer to the Public Service Commission of the First District of New York. An extended abstract of the report and plans of the car were published in the Street Railway Journal for Feb. 29, 1908. Soon after the presentation of that report the Public Service Commission requested the Interborough Rapid Transit Company to change over 16 cars to this design to test the desirability of the plan.

Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, when requested to express an opinion for publication as to the practicability of the car for New York subway conditions, declined to do so. Mr. Arnold said:

"As Mr. Hedley has contended ever since this type of car was proposed that it would be unsuccessful, and I have contended that it would be successful and desirable, I assume that neither of us will be considered an unbiased judge as to its success in operation. Consequently, the little pleasantries which the newspapers have reported as having occurred between us during the operation of the cars are not to be taken seriously. I think, however, that the public will appreciate the difficulties encountered by the Public Service Commission and its assistants in operating, simultaneously with many other trains, a single train diametrically opposed to the methods used on all of the other trains and with men inexperienced in its operation, whose efforts would naturally be somewhat influenced by the attitude of their superiors toward the innovation.

"As it is evident that the position that additional doors in a car will not increase its loading and unloading facilities cannot at present be sustained, the chief difference between Mr. Hedley and myself has narrowed down to the method of operating the car. He contends that passengers should be allowed to enter and leave through both doors and thus, in my judgment, maintain the same conflicting condition that exists during the rush hours with the present cars, while I contend that the new cars will permit the circulation of passengers in one door and out the other, if the instructions which I have given for operating the cars are enforced, and especially will this be the case as soon as the public and the railroad employees become accustomed to them. Furthermore, the new design will enable passengers to enter and leave the cars much more comfortably than is now possible with the present type of car having the single doors at each end.

"I also believe that the new cars will greatly decrease the station waits and therefore increase the capacity of the subway, provided the entire subway system is equipped with these cars and the facilities and conditions are made suitable for their operation, which is not the case at present.

"My contention, in answer to Mr. Hedley's statement to the effect that the guards cannot see the new doors and therefore cannot operate them properly, is that during the light hours of traffic the train guards can see the doors, and during the rush hours the platform guards should assist the train guards in operating the new doors, the same as they now assist in operating the doors of the old cars.

"If it is proved that the train guards cannot see the new doors well enough at all times as the cars are now arranged, these doors can easily be made visible at all times by providing the bulkheads, which are now solid, with glass, or by the introduction of mirrors, as is sometimes done on locomotives to enable the driver to see the rear of the train without looking backward.

"The side door, has, in my judgment, come to stay. I believe that as soon as the people become a little more familiar with it they will support my contention."

New Jersey Company Seeks Freight Rights.—The Burlington County Railway, Mt. Holly, N. J., has applied to the Township Committee of Mt. Holly for permission to carry freight. Under the present law in New Jersey providing for the granting of freight rights to electric railways, the different towns through which a company operates must grant uniform terms before a company can carry freight.

Employees' Tickets in Springfield, Mass.—The employees of the Springfield (Mass.) Street Railway are to be given cards calling for 100 rides to be used by them in traveling on the company's lines when they are not in uniform. The cards will be good for a period of three months and will be punched by the conductor every time they are offered to identify an employee. Conductors are to be instructed to enter the number of the card presented to them on their day sheet when making returns to the company.

Claim Adjuster Sentenced for Forgery in New York.—Carl H. Schwartz, a claim adjuster for the Metropolitan Street Railway, has been sentenced to serve not less than six years and not more than seven years and ten months at hard labor in Sing Sing by Judge Malone in Part I, General Sessions. The defendant had pleaded guilty to forgery. While in the employ of the Metropolitan Street Railway he secured two releases for $10, but when the vouchers were presented to the company's cashier they read for $60.

Crusade Against Spitting in New York.—Finding that the public was again growing lax in its observance of the law against spitting in public conveyances, the Board of Health of New York on Feb. 9 began a crusade against spitters, which resulted in the arrest of 200 men on the first day. Dr. Bensel, city sanitary superintendent, has detailed 44 special policemen from his department to patrol the street railway lines, for the time being at least. They will work in each of the boroughs of New York on different days. The men arrested on Feb. 9 were fined from 50 cents to $2 each.

Increase in Service on Crosstown Line in New York.—The Public Service Commission of the First District of New York adopted a final order on Feb. 9 requiring the receivers of the Metropolitan Street Railway to increase the service on the Fourteenth Street and Williamsburg Bridge crosstown line. The order requires that at rush hours a minimum of 25 cars must be run past a given point in 15 minutes, the same to be in effect by Feb. 15. By March 15 this minimum is to be increased to 30. The receivers are furthermore required to report on each Monday the condition of the traffic during the previous week. The reason for not requiring a minimum of 30 cars on Feb. 15 is the statement of the receivers that a heavier feeder must be installed before the proposed increase is put into effect.

Hearing on the Service of the Second Avenue Railroad, New York.—A public hearing was held by the Public Service Commission of the First District of New York, on Feb. 15, on the service of the Second Avenue Railroad. George Linch, the receiver of the company, said that he had done the best he could with the facilities at his command to repair and put into service the equipment turned over to him, and that plans were being considered for the construction of a new car barn. The summer equipment of the company, he said, would be ready for operation by May 31. After the hearing, Commissioner Maltbie intimated that in view of the conditions under which Mr. Linch had worked it would only be fair to him to mitigate the order of the commission requiring that 100 cars be thoroughly overhauled.

Another Accident Fakir Apprehended in Baltimore.—George W. Tragesser, Jr., Baltimore, Md., was arrested on Feb. 10 by Wm. M. Atkinson, of the Baltimore police force and Jos. J. Gilbert, special agent of the United Railways & Electric Company, Baltimore, charged with attempting to defraud the United Railways & Electric Company by means of false representation. Tragesser claimed to have been injured in a collision between two cars on Jan. 30, 1909. Investigation developed that Tragesser was not on either car nor was he in the locality where the collision occurred. He read an account of the accident in the newspapers the day following the accident and with the information which he had procured in this way was able to describe minutely how the accident took place and the damage done. The genuineness of his claim first came into question when Tragesser stated that he dipped his handkerchief in a stream of water nearby and washed the blood from his face. As a matter of fact, it was cold and dry on Feb. 10 in Baltimore, and there was no running water near the point where the collision took place. He confessed when arrested. Justice Grannan at the Central Police Station committed Tragesser for the action of the Grand Jury in default of $1,000 bail.

Personal Mention

Mr. William L. McCurdy has been elected president of the Evansville (Ind.) Railways Company.

Mr. T. F. Wickham has been elected treasurer of the Helena Light & Railway Company, Helena, Mont., to succeed Mr. G. W. Bunnell, Jr.

Mr. Sterling T. Dow has resigned as freight agent of the Maine Central Railroad at Bangor, Me., to become assistant treasurer of the Atlantic Shore Line, Kennebunkport, Me.

Mr. John M. Wilson has retired as chairman of the District Electric Railway Commission of Washington, D. C., and Mr. Henry L. West of the commission has been appointed to succeed him.

Mr. John Murphy, general superintendent of the Pittsburg (Pa.) Railways Company, has been appointed assistant to Mr. James D. Callery, president of the company. Mr. Murphy has been connected with the Pitsburg Railways Company for 18 years.

Mr. P. N. Jones, electrical and mechanical engineer of the Pittsburg (Pa.) Railways Company, has been appointed general superintendent of the company to succeed Mr. John Murphy, who has been appointed assistant to Mr. James D. Callery, president of the company.

Prof. Harold B. Smith, professor of electrical engineering, Worcester Polytechnic Institute, has been placed in nomination for a managership in the American Institute of Electrical Engineers. Professor Smith is indorsed for this nomination by Profs. Joseph O. Phelon and Albert S. Richey and by Messrs. Carl D. Knight, Francis J. Adams, Albert T. Childs and Walter D. Stearns.

Mr. Chester P. Wilson, who recently resigned as superintendent and purchasing agent of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to become general manager of the Des Moines City Railway and the Inter-Urban Railway, Des Moines, Ia., will assume these positions on March 1. Mr. Wilson has long been connected with electric railroading and his experience covers city, suburban and interurban work. At Scranton, he had charge of the high-speed third-rail line connecting Wilkes-Barre and Scranton, 23 miles distant. This road does both a large passenger and freight service. Its equipment includes 30 passenger cars, 37 freight cars and two electric locomotives. Before becoming connected with the Lackawanna & Wyoming Valley Railroad, Mr. Wilson was general manager of the Camps Bay, Capetown & Seapoint Tramway, Capetown, South Africa, one of the Wernher-Beit properties. Previously Mr. Wilson was chief engineer of the Milwaukee Electric Railway & Light Company, and at one time was general manager of the Sioux City (Ia.) Railway. He is a graduate in 1892 of Cornell, from which he also received, in 1896, the master's degree in engineering. As general manager of the Des Moines City Railway and the Inter-Urban Railway, Mr. Wilson will have charge of 152 miles of city and interurban railway operating more than 125 cars. The Inter-Urban Railway connects Des Moines, Colfax, Altoona, Mitchellville, Woodward, Perry, Herrold, Moran, Granger, Valley Junction and Norwoodville.



Chester P. Wilson

Mr. Henry M. Stine, who was recently appointed secretary of the Pennsylvania Street Railway Association, with permanent offices in Harrisburg, is a native of that city, where he was born in 1863. Mr. Stine was graduated from Harrisburg Academy, attended Dickinson College for three years and was graduated from the University of Pennsylvania in 1885. He was elected second lieutenant of Company I, Fourth Pennsylvania Volunteer Infantry, at the outbreak of the Spanish-American War and served in the United States and Porto Rico, being with this command in Porto Rico when peace was proclaimed. Mr. Stine is a member of the United States Spanish-American War Veterans' Association, the B. P. O. of Elks and Odd Fellows, and has served two terms as recorder of deeds of Dauphin County. He is very popular in Republican circles.

Capt. Robert McCulloch, vice-president and general manager of the United Railways Company, of St. Louis, Mo., was elected president of the company on Feb. 11, to succeed Mr. John I. Beggs, whose resignation, with the reasons therefor, was announced in the Electric Railway Journal of Feb. 6, page 259. It is rare in these days for any railway manager to be closely identified with the policies and active direction of a large system for so long a time as 20 years. But in the case of Capt. McCulloch and the St. Louis system the period has extended over twice that period, or for four continuous decades, with the exception of a short period during 1903 and 1904, when Capt. McCulloch was general manager of the Chicago City Railway Company during the presidency of Mr. D. G. Hamilton, with whom he had been long associated in St. Louis. After Mr. Beggs had announced that he had decided to give his time exclusively to the active management of the Milwaukee system, his logical successor as president at St. Louis was Capt. McCulloch, and the latter's selection to that office is a fitting tribute to his broad knowledge of the St.



Robert McCulloch



Richard McCulloch

Louis transportation conditions as well as to the affection and high esteem in which he is held by his fellow townsmen. Capt. McCulloch is a native of Missouri, where he was born on Sept. 15, 1841, and is a veteran of the Confederate Army, in which he served with distinction. He went to St. Louis in 1869, and in 1871 he entered the service of the Bellefontaine Railway, St. Louis, as superintendent. Subsequently he was elected secretary of the company and later its vice-president and general manager. When Mr. D. G. Hamilton and his associates purchased the Citizens', St. Louis, Cass Avenue, North Central and Union lines in 1898 and consolidated them, Capt. McCulloch was elected vice-president and general manager of the consolidated system. He has always taken an active interest and part in the affairs of the American Street Railway Association and was its president in 1896-1897.

Mr. Richard McCulloch, assistant general manager of the United Railways Company of St. Louis, Mo., was elected vice-president and general manager of the company on Feb. 11, to succeed his father, Capt. Robert McCulloch, who has been elected president of the company. Mr. Richard McCulloch was born in St. Louis County, Mo., in 1869. He attended the public schools and Washington University in St. Louis, and was graduated from Washington University in 1891 with the degree of mining engineer. While attending college he engaged in street railway work during his vacation and also took part in the United States geological survey in Missouri, Arkansas, Indian Territory, Colorado and Montana. Mr. McCulloch spent a year in Mexico in the service of the Mexican National Smelting Company in 1891-1892. Returning from Mexico he took the expert course in the shops of the General Electric Company, in Schenectady and Lynn, in 1892-1893, and in the latter year was appointed engineer for the Cass Avenue & Fair Grounds Railway, St. Louis. Later he served as electrical engineer for the consolidated management of the St. Louis Street Railway, Citizens' Railway and Cass Avenue & Fair Grounds Railways, St. Louis. He has also had charge of the electrical reconstruction of the Baden Railway, Southwestern Railway and Citizens' Railway. Subsequently Mr. McCulloch went to Europe where he engaged in important electric railway engineering work, particularly in Geneva, Switzerland. He returned to the United States in 1901 and in 1903 accepted a position under his father, Capt. Robert McCulloch, with the Chicago City Railway, and later became connected with his father in the management of the United Railways Company of St. Louis as assistant general manager of the company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***West Memphis Belt Line & Terminal Railroad, Little Rock, Ark.**—Incorporated in Arkansas to construct an electric railway, 12.14 miles in length, which is to circle West Memphis from Bridge Junction to Hopefield. Incorporators: Edwin Boysden, Wheatley; R. L. Mixon, H. F. Roleson, W. E. Ayers, Hugh Mixon, J. B. Badgett, E. E. Badgett and H. M. Pharr, Marianna; A. B. Shafer and L. P. Berry, Jr., Marion.

***Denver, Colorado Springs & Pueblo Interurban Electric Railroad, Denver, Col.**—This company has been incorporated in Colorado to build an electric railway from Denver through Colorado Springs to Pueblo. Capital stock, $1,500,000. Incorporators: L. M. Pfeiffer, William S. Binford, F. C. Lewis, Charles Lederer and A. E. Van Deusen.

***Terre Haute & Southwestern Railway, Terre Haute, Ind.**—This company has been incorporated in Indiana to construct an electric railway from Terre Haute through Vigo and Sullivan counties and to the Wabash River, where it forms the boundary line between Indiana and Illinois. Capital stock, $50,000. Incorporators: H. P. Taussig, H. C. Pugh, R. G. Watson, Robert Herkimer, S. C. McKean, H. B. Bement and Charles Minshall.

Iowa & Southwestern Railway, Creston, Ia.—This company has been incorporated to construct an electric railway between Clarinda, College Springs and Blanchard, a distance of 18 miles. Capital stock, $300,000. Officers: William S. Farquar, College Springs, president; J. N. Miller, Clarinda, vice-president; J. H. Walkinshaw, Blanchard, second vice-president; L. H. Taggart, College Springs, treasurer; A. F. Galloway, Clarinda, secretary. [E. R. J., Feb. 13, '09.]

***London & Northwestern Railway, London, Ont.**—Application has been made to the Ontario Legislature by this company which proposes to build an electric railway from London to Sarnia, and from London to a point on Lake Huron, in the county of Huron. The route of the first line is to be through the townships of London, Lobo, East Williams, Adelaide, Warwick, Plympton and Sarnia; and that of the second through London, Lobo, East and West Williams, McGillivray, Stephen, Hay, Stanley and Goderich.

***Somerset (Pa.) Street Railway.**—This company has been chartered to build a railway, 11 miles long, to be operated either by electricity or gasoline, in Somerset county, with the main terminal at Somerset. Capital stock, $60,000. Incorporators: J. A. Berkey, president; John C. Lowry, secretary; F. B. Fluck, C. L. Shover, A. K. Miller, J. C. McSpadden and A. L. G. Hay. [E. R. J., Jan. 2, '09.]

***Everett & Tacoma Railway, Snohomish, Wash.**—This company has been incorporated to build an electric rail way between Everett and Tacoma. The surveys for the route which have already been made, practically parallel the line run by J. T. McChesney and those run by the old Snohomish Valley Railway. Capital stock, $2,500,000. Incorporators: G. M. Cochran, E. Colburn, E. L. Colburn, Edgar Wright and O. E. Crossman, all of Snohomish.

FRANCHISES

San Diego, Cal.—Application has been made to the City Council by the San Diego Electric Railway for a franchise for a new extension, which will commence at Tenth Street and K Street and terminate at Thirtieth Street and R Street. The application provides that actual construction on the extension shall be started within six months after the franchise has been granted, and that the line shall be completed within one year after actual construction has been started.

Galesburg, Ill.—The City Council has granted the Galesburg-Rock Island Traction Company a 30-year franchise for the construction of its proposed electric railway over certain streets of Galesburg. W. C. McWhinney, Kansas City, Mo., is promoting the railway. [E. R. J., Jan. 2, '09.]

Joliet, Ill.—The City Council has granted the Joplin & Pittsburg Railway, Pittsburg, Kan., a franchise for the purpose of making connections to its present system in operation. The provisions of the ordinance fix the completion of the extension on Elm Street to the grounds of the Manual Training Normal school in six months from the time of acceptance of the franchise. The connections and operation on the lines to Cherokee, Franklin and the camps in the north part of Crawford county are to be com-

pleted by January, 1910. Six months after the completion of these connections the company is to build a railway connecting Mulberry with Pittsburg.

Sandwich, Ill.—The De Kalb Midland Railway, which will build an electric railway from Somonauk through Sandwich and Waterman to De Kalb, and which plans, it is said, later to parallel the Chicago, Burlington & Quincy Railroad to Aurora, and to build a spur from Plano to Yorkville, has been granted a 50-year franchise by the Sandwich Council. [E. R. J., Dec. 12, '08.]

Urbana, Ill.—The City Council has granted the Chicago, Kankakee & Champaign Electric Railway a 50-year franchise for an electric railway from the north end of Market Street to the south end. The company was also given three years in which to build the railway. [E. R. J., Jan. 23, '09.]

Sioux City, Ia.—At a special meeting held in Le Mars, Ia., on Feb. 8, the people of this town voted a 25-year interurban and street railway franchise to the Sioux City & Spirit Lake Railway. On Feb. 10 the town of Paullina voted a similar franchise to this company. Other towns which previously had granted franchises to the company were Primghar, Hartley and Spirit Lake. All of the up-county franchises of this company have been secured and deeds have been secured to more than two-thirds of the right-of-way. The line will be 108 miles in length and will run from Sioux City northeasterly to Spirit Lake. Frank Patch, president. General offices, American Block, Sioux City. [E. R. J., Jan. 16, '09.]

Boston, Mass.—The Boston & Western Electric Railroad has filed a new petition for a certificate of exigency with the Massachusetts Railroad Commission. [E. R. J., Jan. 2, '9.]

New York, N. Y.—The Hudson & Manhattan Railroad has applied to the Public Service Commission for a franchise to extend its subway system from the present terminus at Sixth Avenue and Thirty-third Street to the Grand Central Station, connecting there with the Interborough subway and the Belmont or Steinway tunnel.

Oneida, N. Y.—The Oneida Railway has applied to the Common Council for a franchise for an extension to its lines from Sherrill to Kenwood.

Sydney, N. S.—The Sydney-East Bay Electric Tramway has applied to the Council of Cape Breton for a franchise for an electric railway from Sydney to the southern end of East Bay, with branches and spurs, the whole to have a length of about 17 miles. The proposal is being supported by the Cape Breton Electric Company, and the surveys made show a route along the main highway for the entire distance. W. Crowe explained the proposals of the promoters at a recent meeting of the County Council at Sydney, and asked that a guarantee of the principal and interest of $500,000 of the company's bonds be given. A committee was appointed to investigate the company's plans and propositions.

***Roseburg, Ore.**—Milton Purdy is said to have applied to the Common Council for a 25-year franchise to build and operate an electric railway in Roseburg.

Erie, Pa.—An ordinance has been introduced in the Common Council granting the Buffalo & Lake Erie Traction Company a franchise to build a spur out onto the new dock at the foot of State Street.

Williamston, S. C.—H. H. Prince, representing the Greenville (S. C.) Interurban Railway, has been granted a franchise by the City Council. The franchise will be void after eight months if work is not begun and the line must be completed 12 months after work is begun. The proposed electric railway will connect Greenville and Williamston. [E. R. J., Feb. 6, '09.]

***Weatherford, Tex.**—The City Council has granted a franchise for a street railway to J. T. Patterson and associates of Weatherford, under the agreement that 1 mile of track shall be completed within one year and 2 miles within three years.

***Olympia, Wash.**—C. T. Morck, representing interests that plan to build an electric railway from Tacoma to Olympia, has applied to the City Council for a franchise to lay tracks on half a dozen of the principal down-town streets.

Seattle, Wash.—The City Council has granted the Seattle, Renton & Southern Railway a franchise over Third Avenue and Pine Street.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company has let a grading contract to T. T. Crawford for a 2-mile extension to be built along Huntington Boulevard from Holt to Ganesha Park.

***Burbank, Cal.**—It is stated that L. C. Brand has placed a proposition before the people of Burbank to build an electric railway in the city, providing a $30,000 bonus is raised and the rights-of-way are furnished.

Intermountain Railway, Denver, Col.—This company operated on Feb. 1 its first cars by electricity between Denver and Golden, Col., a distance of 13 miles. The railway was formerly operated by steam, and locomotives will be used for the present in hauling freight, as in the past. The road was formerly known as the Denver & Intermountain Railroad. It is said that the company has expended $135,000 in electrifying the system, buying new cars and equipment and erecting a power plant in Jefferson County, 5 miles from Denver. It owns a franchise to operate into Denver to Arapahoe and Fourteenth Streets. It also operates a spur between Denver and Barnum, a distance of 5 miles.

Charleston, Westfield, Marshall & Terre Haute Electric Railway, Charleston, Ill.—W. R. Patton, president, advises that this company proposes to build an electric railway between Charleston, Westfield, Marshall and Terre Haute. It is possible that contracts will be awarded in the near future for the construction of this projected railway. Capital stock, $5,000. Officers: W. R. Patton, Charleston, president; James Dawson, Westfield, vice-president; Seymour Hurst, Marshall, secretary; J. W. Biggs, Westfield, treasurer.

Galesburg, Aledo & Northwestern Railroad, Galesburg, Ill.—Announcement is made that this company expects to commence work on its proposed gasoline motor line this spring. It will extend from Galesburg to Alexis, Aledo and Muscatine, Ia. Capital stock, $10,000. Officers: B. F. Arnold, Galesburg, president; Capt. Frank Latimer, Galesburg, secretary. [E. R. J., Oct. 3, '08.]

Metropolitan West Side Elevated Railway, Chicago, Ill.—The committee on harbors, wharves and bridges of the Chicago City Council is considering an ordinance which will direct the removal or alteration of the bascule bridge owned and operated by the Metropolitan West Side Elevated Railway over the Chicago River between Van Buren and Quincy Streets. This bridge carries the main tracks of the elevated road leading from the west side of the city to the Union Elevated Loop. The ordinance if passed will direct the company, at its own expense, and within 90 days after the passage of the ordinance, to proceed to widen the draw of the bridge sufficiently to provide for a navigable channel between abutments of at least 140 ft.

Capital Circuit Traction Company, Indianapolis, Ind.—This company announces that it will build an electric railway connecting the following cities: Greenfield, Fortville, Noolesville, Sheridan, Lebanon, Advance, Jamestown, North Salem, Danville, Clayton, Hall, Martinsville, Trafalgar, Franklin, Marietta, Shelbyville and Fountaintown. It has not yet been decided when contracts for the construction of the railway will be awarded. Headquarters, 1019 Law Building, Indianapolis. Officers: J. N. Crabb, 1019 Law Building, Indianapolis, president; J. W. Trotter, Danville, Ind., vice-president; C. E. Worth, secretary and treasurer; J. A. Shafer, 3710 North Illinois Street, Indianapolis, chief engineer.

Des Moines & Sioux City Railroad, Des Moines, Ia.—This company which proposes to build an electric railway, 196 [illegible] Des Moines and Sioux City, has [illegible] Yor[illegible] of t[illegible] Dec[illegible]

Iowa & Omaha Short Line, Council Bluffs, Ia.—[illegible] pany is said to have awarded the contract for the building of the section of its proposed electric railway from Council Bluffs, Ia., to Traynor, 15 miles, to George W. Adams & Co., Walnut, Ia. It is announced that grading on the remaining 115 miles will be undertaken this spring. J. H. Mayne, chief engineer, Walnut, Ia. [E. R. J., Sept. 12, '08.]

Kansas City-Western Railway, Kansas City, Kan.—This company is said to have started on a number of improvements to its railway system in Leavenworth, Kan., involving an expenditure of $20,000. About half a mile of track will be rebuilt on new right of way. Four new bridges will be built. J. W. Richardson, Leavenworth, general superintendent.

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company has purchased the lines of the Girard Coal Belt Electric Railway, which runs from Girard, Kan. in a northeasterly direction through the towns of Arma and Franklin to Croweburg, with a branch to Radley and Dunkirk. Arrangements are now under way for the immediate construction of from 8 to 10 miles of track to connect this newly purchased railway with the operating system of the Joplin & Pittsburg Railway.

Winnipeg (Man.) Electric Railway.—This company an-

nounces that during the year 1908 12.963 miles of track were constructed, 3.381 miles of this being surface track with ballast, 1.935 miles of track in wood block pavement, .887 miles of track in macadam pavement, and 6.758 miles of track with concrete foundation; 1,344 new poles were erected in the extension of power and electric lighting lines.

Battle Creek, Coldwater & Southern Railway, Battle Creek, Mich.—This company has purchased 26 miles of well-graded steam railroad roadbed on a 66-ft. right of way from Battle Creek south to Coldwater, Mich. It is proposed to construct and operate an electric railway and later make extensions from Coldwater south. The company is organized under steam railroad laws. It is expected that in June the preliminary arrangements will have been completed so that material can be purchased. C. E. Flynn, president Conneaut & Erie Traction Company, Erie, Pa., is president of the new company.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company announces that it expects to build a 12-mile extension this spring from Benton Harbor, and will probably call for bids for the same. H. C. Mason, Benton Harbor, general manager.

***Buckner, Mo.**—E. J. Daniels and a delegation of Buckner citizens have asked the Independence Commercial Club to meet with them and a delegation of Lexington citizens to consider the proposition of building an electric railway from Independence to Lexington.

***Kansas City, Independence & Southeastern Electric Railway, Independence, Mo.**—This company has been formed for the purpose of building an electric railway from Independence to Holden, Mo. The surveys are now being made. Bernard Zick, president.

***Kirksville, Mo.**—It is stated that G. W. Strubhar and George E. Woodhouse, Peoria, Ill., have been in Kirksville in the interest of Eastern capitalists, who are planning to build an electric railway from Connelsville, in the western part of Adair County, through Novinger and Kirksville, to Gibbs, on the Santa Fé Railroad. The proposed railway will be about 30 miles in length.

New York, Westchester & Boston Railway, New York, N. Y.—The Public Service Commission of the Second District has given this company permission to construct its proposed third-rail electric railway from a connection with the New York subway to Port Chester, N. Y.

Ithaca & Seneca Falls Interurban Railroad, Ithaca, N. Y.—It is announced that this company is planning to begin the construction of its proposed electric railway this year. It will be about 47 miles in length and will connect the following cities: Ithaca, Trumansburg, Covert, Interlaken, Ovid, Willard, Romulus, Fayette and Seneca Falls. The power station and repair shops will be located at Ithaca. The company expects to furnish power for lighting. Jacob Rothschild, Ithaca, president.

Third Avenue Railroad, New York, N. Y.—Judge Lacombe of the United States Circuit Court has signed an order authorizing Frederick W. Whitridge, receiver of the Third Avenue Railroad, to construct a double-track extension from Fort George across the Harlem River to and along Pelham Avenue and the Southern boulevard to the Zoological Gardens in Bronx Park.

Piedmont Street Railway, Salisbury, N. C.—It is stated that this company has begun the construction of its proposed electric railway, which will extend from the central part of Salisbury to the Yadkin Valley Fair Grounds, to East Spencer and to China Grove. It is the intention of the company to have a portion of the system in operation by May 1. [E. R. J., Jan. 30, '09.]

***Durant, Okla.**—It is stated authoritatively by E. T. Haynes that a syndicate, headed by Col. J. D. Powers, W. S. Sterrett and others, will build an electric interurban railway that will connect Durant with a number of other cities and towns in Bryan County. The railway will be about 50 miles in length.

Southwestern Traction Company, London, Ont.—This company has offered to operate the municipal street railway in St. Thomas, Ont. The company asks the city to make certain improvements to cost about $15,000. The matter is being considered by the Council.

Toronto, Niagara & Western Railway, Toronto, Ont.—It is stated that this company will soon make application to the Canadian Parliament for an extension of time to build an electric railway between Toronto, Ont., and Niagara Falls, N. Y.; Toronto and Windsor and St. Catharines and Port Colborne, and for power to increase the bond issue. This proposed railway is one of those in which Mackenzie & Mann, Toronto, are interested. Plans for the proposed route were filed in May, 1907, and it was said recently that work was being done on the United States end of the route preparatory to the construction of a bridge across the Niagara River, on behalf of Mackenzie & Mann, in connection with this project. The line between Toronto and Niagara Falls will follow the route of the present power transmission line between these places.

Allentown & Reading Traction Company, Allentown, Pa.—This company has begun making the surveys for the extension of its lines from Lyons to Trexlertown or East Texas. This line is to connect with the present line of the Allentown & Reading Traction Company at Lyons and is then to run through Bowers, Hancock, Topton, Mertztown, Shamrock, Alburtis, Trexlertown and possibly East Texas. The company also intends to take out more of the curves on its present line, so as to cut down the running time between Allentown and Reading.

Conestoga Traction Company, Lancaster, Pa.—It is stated that this company, which has acquired the right-of-way and franchises of the Coatesville & Lancaster Railway, expects to put about 600 men to work March 1 on the construction of that part of the line between Christiana and Parkesburg, a distance of 5 miles. It is the intention of the company to give a through service between Lancaster and Philadelphia by July 4. It is said that eventually a working agreement will likely be entered into between the Lancaster interests and the West Chester Street Railway, which operates the road from Coatesville to West Chester.

San Antonio (Tex.) Traction Company.—This company announces that it contemplates building, in the near future, a 4-mile extension via the stock yards, to Palm Garden, a suburb.

Roanoke Railway & Electric Company, Roanoke, Va.—Work has just been commenced by this company on the extension of its line through the town of Salem. It will be about 1 mile in length, and it will also reach Lake Spring.

Walla Walla Valley Traction Company, Walla Walla, Wash.—This company, which is operated by the Northwestern Gas & Electric Company, advises that it expects to build 15 miles of new track during this year.

Milwaukee Northern Railway, Cedarburg, Wis.—It is announced that this company will double-track the line in operation from Milwaukee north to Cedarburg, and build a single-track branch from Cedarburg west to West Bend this year. The company's plans call for a line from Milwaukee north to Cedarburg, where it forks, one branch extending north to Sheboygan and the other northwest via West Bend to Fond du Lac, in all 120 miles.

Wausau (Wis.) Street Railway.—This company is said to be preparing plans for the construction of an electric interurban railway to connect Grand Rapids with Port Edwards and Nekoosa. Preliminary surveys are now being run between Grand Rapids and Nekoosa. It is the ultimate plan of the company to extend the railway to Stevens Point, Wausau and Merrill.

POWER HOUSES AND SUBSTATIONS

Hattiesburg (Miss.) Traction Company.—This company expect to increase its power plant equipment by installing two 500-kw turbo-generators and a motor-generator set for railway service.

Union Railway, New York, N. Y.—This company has awarded a contract to the Raymond Concrete Pile Company for placing concrete piles in the foundations of substation No. 2 at 165th Street and Brook Avenue, New York. J. H. Deeves & Bros., general contractors.

Walla Walla Valley Traction Company, Walla Walla, Wash.—This company is in the market for four 1000-hp water wheels, two 500-kw units, either steam or gas, for auxiliary plants, and one 500-kw unit for a hydro-electric plant. F. S. Drake, manager.

SHOPS AND BUILDINGS

Chicago, Lake Shore & South Bend Railway, South Bend, Ind.—This company has purchased a site opposite the Post Office Building and will proceed at once to erect a terminal station thereon. It is said that the building when completed will cost about $300,000.

Toronto (Ont.) Railway.—This company has completed arrangements for the construction of a car house on the west side of Lansdowne Avenue, north of Bloor Street. The plans show a brick and concrete structure, 100 ft. x 350 ft., with accommodation for over 100 cars.

Pittsburg (Pa.) Railways.—It is stated that this company is planning to tear down its Oakland car house in the near future. The car house covers 200 ft. x 179 ft. on Fifth Avenue, extending from Atwood Street to Oakland Avenue.

Manufactures & Supplies

ROLLING STOCK

Michigan United Railway, Lansing, Mich., will soon purchase four interurban cars.

Walla Walla (Wash.) Valley Traction Company expects to purchase two interurban cars.

Syracuse (N. Y.) Rapid Transit Company is reported to be planning the purchase of 25 city cars.

Hattiesburg (Miss.) Traction Company expects to purchase six motor cars with complete electric equipment.

Jamestown (N. Y.) Street Railway has purchased 10 second-hand cars from the Third Avenue Railroad, New York.

Winnipeg (Man.) Electric Railway has ordered from a Canadian car builder 30 cars, for which Brill trucks have been specified.

Third Avenue Railroad, New York, it is reported, will increase to 275 the order recently placed with The J. G. Brill Company for 200 pay-as-you-enter cars.

Chicago, Lake Shore & South Bend Railway Company has purchased one No. 1 Russell snow plow from the Russell Car & Snow Plow Company, Ridgway, Pa.

Houston (Tex.) Electric Company, which was mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 19 as planning to purchase a number of cars, has ordered 15 cars for June 1, 1909, delivery.

Portland (Ore.) Railway & Light Company has placed an order with the National Brake & Electric Company, Milwaukee, Wis., for 100 of the latest type semi-automatic brake equipments.

Kent Traction Company will soon be ready to purchase 10 cars for its new line from Tolchester to Chestertown, Md. Alva A. Lamkin, 611 Equitable Building, Baltimore, Md., is general manager.

Detroit (Mich.) United Railway, which was recently noted in the ELECTRIC RAILWAY JOURNAL to be planning to purchase 75 cars during 1909, will, it is stated, be prepared soon to receive bids for 50 city cars.

Seattle (Wash.) Electric Company will buy 30 more city cars immediately. It was announced in the ELECTRIC RAILWAY JOURNAL of Dec. 26, 1908, that the company expected soon to be in the market for this equipment.

Shore Line Electric Railway, New Haven, Conn., which was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909, as being in the market for four interurban cars, will, it is now reported, increase the order to six or eight cars, and will likely later on purchase 20 more.

Seattle, Snohomish & Everett Railway Company expects to purchase from 6 to 10 interurban cars for its new line from Seattle to Snohomish, on which construction work will soon be begun. Charles W. Kimball, 443 New York Block, Seattle, Wash., is general manager.

San Antonio (Tex.) Traction Company has ordered 10 semi-convertible cars, each equipped with four GE-54 motors, from the American Car Company, to be delivered May 15, 1909. The seating capacity of these cars will be 40. The rear platform will be 7 ft. long, with entrance step on one side only. The principal specifications of the cars follows: Wheel base, 4 ft. 6 in.; length of body, 28 ft.; length over all, 42 ft.; width inside over all, 8 ft. 2 in.; sill to trolley base, 12 ft. 1 in.; curtain fixtures, Forsyth No. 86; curtain material, Pantasote; destination signs, Hunter; fenders, American Car Company; gongs, Brill Dedenda; hand brakes, Peacock; headlights, Crouse-Hinds arc; journal boxes, Brill; markers, Brill; seats, "Winner"; side bearings, Brill; trucks, type and make, Brill No. 27 G-1.

Milwaukee & Fox River Valley Railway, Sheboygan, Wis., has placed an order for two combination passenger, smoking and baggage cars with the Cincinnati Car Company, Cincinnati, Ohio. These cars are to have an overall length of 50 ft., length over vestibule 49 ft., width overall 8 ft. 10 in., height, sill to trolley base, 9 ft. 4 in. Special equipment specified includes built-up type steel bolsters, Van Dorn No. 11 couplers, Curtain Supply Company's curtain fixtures, Pantasote curtains, two 14-in. gongs, Peacock hand brakes, hot-water heaters, Eureka 12-in. arc headlights, Lintern markers, pneumatically operated sanders, Hale & Kilburn "Walkover" seats, Cincinnati Car Company's standard steps. The cars are to have an interior finish of quarter-sawed oak, are to have monitor-deck roofs, and are each to be provided with but one vestibule at the rear of the car.

Buffalo, Lockport & Rochester Railway, Buffalo, N. Y., which was reported in the ELECTRIC RAILWAY JOURNAL of Jan. 30 as having placed an order for 15 interurban cars with the Cincinnati Car Company, Cincinnati, Ohio, has made up the following specifications for six of the cars, which are to be built for early delivery: Combination two-compartment type with an overall length of 51 ft. 6 in.; length of body 41 ft. 2 in.; width overall 8 ft. 7 in.; height, sill to trolley base, 9 ft. 6¾ in.; height from top of rail to sills 41½ in. The body and underframe are to be of the usual wood and steel construction. Special equipment specified includes steel bolsters of the built-up type, brushed brass trimmings, M. C. B. automatic radial couplers, Curtain Supply Company's No. 89 curtain fixtures, Pantasote curtains, wing dasher destination signs, Cincinnati Car Company's wooden pilots, two 14-in. pedal alarm gongs, Peacock hand brakes, Peter Smith Heater Company's hot-water heaters, Crouse-Hinds Imperial "A" head lights, mahogany interior finish, marker lamps and flags, pneumatically operated sanders, Hale & Kilburn "Walkover" seats, Cincinnati Car Company's standard wood steps, Hart's sash ratchets, emergency tools, double-fare registers, Knutson trolley retrievers, Kalamazoo snow scrapers, and rubber-floor mats for the aisles of the car. The cars are to be painted a Pullman green, and are to have monitor roofs.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., as announced in the ELECTRIC RAILWAY JOURNAL of Jan. 23, 1909, recently placed an order with the Cincinnati Car Company for 10 15-bench open cars and 44 closed cars. The open cars will have a seating capacity of 75. The underframes will be of wood and steel and the body bolsters will be of the built-up steel type. The wires will be run in armored iron conduit. There will be a running board the full length of one side of the car. Cross slat seats will be installed. The principal specifications of the open cars follow:

Wheel base .....4 ft. 10 in.	Motors, type and number, 2 West., 93-A-2
Length over all...42 ft. 2 in.	Sanders...Cincinnati Car Co.
Width over all.....8 ft. 3 in.	Trolley poles and attachments .....Shelby poles
Air brakes, Westinghouse straight air	Trucks, type and make, Standard 0-50
Curtain fixtures, Curtain Supply open car	Special devices, International R-5 duplex registers, Wilson trolley catcher.
Hand brakes ..... Peacock	
Headlights, Dayton No. 1561 dash	

The body and underframe of the closed cars will be of wood and steel. The interior will be finished in cherry. The roofs are to be of the monitor deck type. The principal specifications of the closed cars follow:

Wheel base..... 4 ft. 10 in.	Heating system, Peter Smith, No. 2-C
Length of body.33 ft. 2½ in.	Headlights..Dayton No. 1561
Length over all..46 ft. 8⅞ in.	Motors, type and number, West., 93-A-2
Width over all.. 8 ft. 4 in.	Sanders...Cincinnati Car Co.
Height, sill to trolley base... 8 ft. 10 in.	Seats.....Hale & Kilburn
Height from track to sills..... 31 in.	Trolley poles and attachments .....Shelby
Air brakes, Westinghouse S-M-2	Trucks, type and make, Standard 0-50
Curtain fixtures, Curtain Supply Co. No. 89	Special devices, etc., International registers, Wilson trolley catcher.
Curtain material...Pantasote	
Hand brakes..Peacock hand	

TRADE NOTES

W. T. VanDorn Company, Chicago, Ill., has made satisfactory tests of the VanDorn radial draw-bar and of the anti-buckling radial draw-bar attachment which the company has recently perfected under the direction of W. T. VanDorn.

Crane Company, Chicago, Ill., has placed a contract with Lanquist & Illsley Company, Chicago, for the construction of a fire-proof six-story warehouse at the corner of Canal and Fifteenth Streets. The new building is to have a ground-floor space 190 x 241 ft. and it is expected that it will cost $300,000.

Hagstrom Brothers Manufacturing Company, Linsborg, Kan., manufacturer of specialties for electric railways, telephone companies, etc., has increased its capital stock from $50,000 to $150,000. The company will soon place on the market a train location indicator, for use by electric railways and other transportation systems.

Triad Engineering & Construction Company, Goshen, Ind., has recently been organized to engage in building electric railways. The company is composed of Harry A. Butterfield, of Goshen, Ind., and A. W. Malone, and C. A. Burnett, of Warsaw, Ind., all of whom have been associated with the Winona Interurban Railway Company, operating an electric railway in Indiana.

Chicago Pneumatic Tool Company's annual report for the year ended Dec. 31, 1908, states that, owing to the depression of 1907, the volume of sales was reduced 45 per cent as compared with the previous year. Profits for the year are given as $289,625.24, and surplus carried forward as $821,564.31.

Dearborn Drug & Chemical Company announces that Herbert E. Stone has just become connected with the company as manager of sales in the Eastern department, with headquarters in New York City. Mr. Stone was formerly president of the National Association of Steam Engineers and recently manager of the Pittsburg office of the Chapman Valve Company.

Union Spring & Manufacturing Company, Pittsburg, Pa., reports making extensive sales of its Kensington all-steel journal box which was recently placed on the market. The cellar of this box is made of ¼-in. pressed steel, the cap is a steel casting and the weight of the box is said to be 10 lb. less than malleable iron journal boxes of the same size. The Kensington box is of the M. C. B. type, and is designed especially for freight-car equipments.

Lawrence Manning Engineering & Construction Company, Camden, S. C., has recently been incorporated with a capital stock of $5,000. Lawrence Manning, formerly general manager of the Owosso & Corrunna Electric Company, Owosso, Mich., is president of the company, with headquarters in the Mann Building, Camden, S. C. By its charter the company is empowered to engage in general consulting and supervising engineering and general contracting.

Power Equipment Company, Chicago, Ill., reports that the work of removing the four 5000-kw generating units from the Fisk Street power plant of the Commonwealth Edison Company, Chicago, is progressing satisfactorily. The company has charge of removing these units, and will direct the installation of an 8000-kw unit in the place of each of the smaller units. The company is also removing a 3000-hp. tandem compound twin engine from the Harrison Street plant of the same company, and will direct the sale of these and other equipments.

Crocker-Wheeler Company, Ampere, N. J., held its annual dinner of officers and salesmen last week at the Machinery Club in the Hudson Terminal Building, New York. Plates were laid for 35 guests. The managers of the branch offices brought in favorable accounts of the present situation in their respective territories with regard to the market for electrical machinery. Everywhere manufacturers seem to be willing to consider improvements, such as the electrification of their plants or the installation of further electric motors where their plants are already using electric power.

Allis-Chalmers Company, Milwaukee, Wis., states that the Memphis Consolidated Gas & Electric Company, which put an Allis-Chalmers steam turbine and generator of 1500-kw capacity in operation some time ago, has contracted for two additional units with a combined output of 3000 kw. The Cleveland, Southeastern & Columbus Railway Company, Cleveland, Ohio, has arranged to place in its power house a 1000-kw turbine unit. The Pueblo & Suburban Traction & Lighting Company, Cedar Rapids & Iowa City Railway & Light Company, Evansville Terminal Railway, and the Willamette Valley Company, Eugene, Wash., have recently placed turbines in service; and repeat orders for these machines or contracts for more than one unit have come from the Kokomo, Marion & Western Traction Company, Kokomo, Ind., and the Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Stone & Webster Engineering Corporation, Boston, Mass., has moved its Seattle office to the White Building, which it built for the Metropolitan Building Company. The White Building is an 11-story steel-frame structure 111 ft. x 121 ft. The floors are of reinforced concrete and the walls are of brick with granite and terra-cotta facing and trimmings. About 1250 tons of structural steel were used in the construction. Ground was broken on March 1, 1908, and the building was ready for occupancy Jan. 1, 1909. The Stone & Webster Engineering Corporation has recently begun the construction of a similar building for the Metropolitan Building Company, which will be known as the Henry Building. Both of these buildings are located on what is known as the "University Tract," a large section of land in the business section of Seattle, leased to the Metropolitan Building Company under favorable conditions. The White Building was constructed on the "cost plus" basis and the Henry Building is being built on the same terms.

ADVERTISING LITERATURE

Western Electric Company has issued bulletin No. 5533, on series incandescent lighting with tungsten lamps.

Buckeye Electric Company, Cleveland, Ohio, has published a folder showing the advantages of tungsten lighting as compared with arc lamps.

Frank Ridlon Company, Boston, Mass., is sending out a special bulletin of bargains in second-hand motors of all types ranging from 1 hp to 200 hp.

Industrial Progress, a monthly magazine devoted to Allis-Chalmers apparatus, contains a description of the Kokomo, Marion & Western Traction Company in its February number.

Wire & Telephone Company of America, Rome, N. Y., has issued its regular annual pamphlet, "Copper History," showing the monthly and yearly average prices of copper from 1883 to 1909.

Rodger Ballast Car Company, Chicago, Ill., is sending out an illustrated wall calendar with weekly sheets, each of which carries a half-tone of some design of Hart convertible ballast or freight cars.

The F. Bissell Company, Toledo, Ohio, has issued an a.c. switchboard bulletin covering single, two-phase and three-phase installations, as well as d.c. exciter panels. Prices are given for a large number of listed boards.

R. Woodman Manufacturing & Supply Company, Boston, Mass., has published a new and enlarged edition of its catalog on railroad ticket punches, badges, trainmen's fittings, sealing presses, counting machines, car pushers, etc.

American Brake Shoe & Foundry Company, Chicago, Ill., has sent out a pamphlet giving a list of the manganese steel castings which it can furnish. It is also prepared to supply vanadium, chrome, nickel, chrome-nickel and high carbon steel castings.

General Electric Company, Schenectady, N. Y., announces the following bulletins: No. 4650, on large shell type transformers; No. 4641, on electric light and power in the lumber and woodworking industries; No. 4642, on d. c. switchboard instruments, types D2 and D3; No. 4644, motor generators as designed particularly for searchlight service; also a booklet on fan motors for 1909.

Allis-Chalmers Company, Milwaukee, Wis., has recently issued or has under way 187 bulletins and instruction books describing the products of its various departments. These include the manufacture of prime movers of every description, electrical apparatus for alternating and direct current, pumping machinery, mining machinery, crushing and cement-making machinery, flour mill machinery, saw mill machinery, etc. Information descriptive of all of the foregoing is indexed in a convenient manner for reference.

Stone & Webster, Boston, Mass., have issued their manual for 1909, giving brief descriptions of the various properties under their management, summaries of the capitalization and earnings for 1908, and particulars regarding the securities. The securities department maintained by Stone & Webster acts for the companies in placing their securities with bankers and investors, handles securities for those who wish to purchase or sell, keeps careful and accurate quotations, and is the channel through which information concerning the companies operated by Stone & Webster and their securities is given out.

NEW PUBLICATIONS

Hendrick's Commercial Register of the United States. New York: S. E. Hendricks; 1240 pages. Price, $10.00, express prepaid.

This is the seventeenth edition of a work almost indispensable to buyers of engineering material. Its completeness may be gaged from the fact that it contains over 350,000 names and addresses and 30,000 business classifications.

Handbuch über Triebwagen für Eisenbahnen (Handbook of Self-Propelled Railway Cars). By C. Guillery, Munich and Berlin; R. Oldenbourg, 1908; 202 pages (6½ in. x 9½ in.); with index, including 93 illustrations. Price, 7.50 marks.

The subject of self-propelled cars is of even greater interest abroad than in this country, and as the installations are far more numerous, the author of this work has had the opportunity to collect and classify a great deal of data. The information relative to the American cars such as the Union Pacific has already been presented to readers of this journal, but those who are interested enough to pursue the subject in greater detail will find this work of benefit. The writer first discusses the field of the self-propelled car and some of the steam cars of the earlier part of the last century. The greater part of the work, however, is devoted to the modern cars of the steam, gasoline, gasoline-electric, storage battery and other types. The author says that all attempts to operate self-propelled cars with other than skilled mechanics have proved a failure. Such cars require at least as much care as a steam locomotive, even though the labor is not so great.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, FEBRUARY 27, 1909 No. 9

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9500 copies are printed.*

Parks and Pleasure Resorts

In years past the ELECTRIC RAILWAY JOURNAL has devoted two issues in January and February largely to descriptions of electric railway amusement parks. Following this custom, the first park number of this year was dated Jan. 30, and the issue of this week is the second and last in which articles of special interest to park managers will predominate. Only a small amount of space in the editorial pages has been given over in this issue to a discussion of park topics, as in the Jan. 30 issue the general aspects of the park situation were commented on quite fully. The parks which are described on pages 360 to 369 include the amusement resorts of two electric railway companies on the Pacific slope, one company in the Middle West and one of the largest urban and suburban companies in the East, which controls no less than 12 parks at different points on its lines. This variety of location is a good indication that the practice of operating amusement parks as adjuncts of electric railway properties for direct or indirect profit is widespread throughout the country, and is not confined to any one section or group of companies. It must be concluded, therefore, that in the opinion of at least a great many railway managers parks are a paying investment.

Park at Dubuque

Union Park, which is owned by the Union Electric Company, of Dubuque, Ia., is less than five years old, but in the comparatively short space of time since it was opened it has become the people's playground and one of the show places of Dubuque. It was started with the idea of providing for the people of Dubuque a clean, wholesome and attractive open-air resort, free from noisy excitement. There are no scenic railways, carrousels or other similar amusement devices. Instead, every detail of the natural beauty of the park site has been brought out by skilful landscape gardening, and the "outside attractions" which have been provided are of the kind which educate and appeal to the intellect. Children and their parents are encouraged to visit the park during the daytime by the installation of swings, sand piles and other equipment for youthful amusements. To attract their elders the company from the beginning has confined its effort and expenditure to providing excellent musical entertainments free of charge. These entertainments were formerly given from a pavilion surrounded by seats in an open air amphitheater. This spring a pretentious theater building is to be erected to accommodate large musical organizations, light opera companies and other forms of theatrical entertainment. It will have a seating capacity under cover of 2600 and accommodation for 3078 persons in an open-air natural amphitheater built of concrete on a side hill. A seating capacity of nearly 6000 in a park theater seems large, but last season, with concerts in the open air, the audiences ranged from 4000 to 7500. Dubuque is a city of only 45,000 inhabitants, yet on many occasions the attractions at the park drew one-sixth of the city's entire population. The idea of providing a single kind of high-class entertainment at the park has proved successful in Dubuque. It might not be as successful if tried in parks near other cities,

but if park patrons are beginning to tire of exciting and noisy "thrillers," there remains the opportunity of trying the experiment which has been the making of Union Park.

Keeping Rolling Stock Supplies Low

The larger the system, and the greater the number of car houses in service, the more important it is to cut down excessive quantities of stores. It is not easy to keep close to the zero line in the supplies of materials on hand, and there is scarcely anything more annoying or costly in the maintenance of equipment than to run short of the necessary spare parts. But it is possible to pay especial attention to the accurate requisitioning of material, the transmission of requisitions to the purchasing agent in time so that all desired bids may be obtained, and a careful watch over the supplies when they are received. This will tend to avoid the purchase of excessive quantities and the return of material to the central storehouse, when its necessity at individual car houses has been eliminated. Delays in this department of a company's service are inseparable from expense. On a road which keeps a stock of material worth $250,000 the fixed charges may amount to $100 a day, allowing for interest, depreciation due to the advancement in the art, taxes and insurance. This may easily mean that the total earnings of from six to ten cars will have to be set aside to pay the cost of stockholding, leaving the operating expenses and fixed charges on the cars, and power supplying equipment necessary for them, to be paid for by the earnings of other cars. To the average man the stock of materials kept in the car houses and mechanical headquarters of a large railway system is an impressive illustration of the company's financial strength, but there is room for a much wider appreciation of the fact that it costs money to keep supplies on hand even after they are paid for. There is room for the practice of the highest kind of judgment in this matter.

Subway Construction and Cost at Home and Abroad

With the exception of the Metropolitan and Metropolitan District railways, in London, all of the underground roads have been of the deep-tube type. It is often assumed that the reason for the adoption of this construction in London is the soft clay which underlies the city and through which it is almost as easy to pierce a tube as if one were cutting through cheese. It seems, however, from a recent discussion at the British Institution of Civil Engineers, that this is not the only or even the controlling reason.

The narrowness of the London streets has a great deal to do with the selection of the deep-tube method. In New York, lower Broadway and Elm Street are 80 ft. wide; Lafayette and Fourth Avenue, 100 ft.; Forty-second Street, 90 ft., and the upper part of Broadway, 100 to 150 ft. In London, on the other hand, it was stated that there were not over a dozen streets over 80 ft. wide, and one of the speakers knew of only three as wide as 100 ft. If one adds to this condition the rigorous protection thrown around property rights in basements and cellars under the roadway, the reason for descending far below the street level is evident. The chief objection to a deep subway is the cost and time required to convey passengers between the train platforms and the street level. The former amounts, on the Central London Railway, to about 0.2 cent per passenger, or approximately 5 per cent of the gross receipts. The capitalized value of these elevators is from £40,000 to £60,000 per mile, a large item in the cost of underground railways.

As regards the entire cost of the lines, various figures were quoted. Sir John Wolfe-Barry, past president of the Institution, thought their total cost not far from £700,000 per mile; the engineer of the Waterloo & City quoted the cost of that tube as £483,000 per mile, including the real estate purchased and equipment. The Central London, on a similar basis, was given as £631,000; the manager of the company thought that if the tube alone, lined, was considered, the cost would be £60,000 per single track, or £120,000 per double track, but another speaker thought £300,000 a closer figure under the latter conditions. It is difficult to compare these figures with those of the New York subway, because of the use of single-track tubes in London and four-track subway in New York. But taking the cost of construction for the New York subway, with its 25.7 miles of route and 76.5 miles of track, at $50,000,000, and the cost of equipment at $25,000,000, the difference between the two methods does not seem to be very great.

Safeguarding the Transfer in Cleveland

The operation of the Cleveland street railway system by receivers has given prominence to one feature of operation which is of extreme importance to companies throughout the country. This feature is the recognition by the receivers, acting under the instructions of a judge of the United States Circuit Court, and the acceptance by the public of the fact that a transfer is a liability of the company and an asset of the traveling public, and as such is entitled clearly to consideration in a computation of the cost of operation.

As this phase of the present situation in Cleveland is of interest, not only to the company directly concerned, but also to other railways which realize that the transfer generally tempts and stimulates abuse, it will be desirable to restate the facts respecting the existing conditions which govern the issue of transfers in the Ohio city. The ordinance granting the so-called "security franchise" to the Cleveland lines, which took effect when the lease of the property by the Municipal Traction Company became operative, provided that if the rate of cash fare should be lower than that which the company was authorized to charge, it might make "such charge for transfers as shall not increase the fare for a ride and transfer in the aggregate above the ticket rate of fare herein provided."

The management of the Municipal Traction Company tried various expedients designed to permit operation at a rate of fare which should correspond exactly or nearly with the expectation of "3-cent fares with universal transfers." The sweeping reductions in car-mileage which accompanied the lower rates of fare, however, displeased the public, and the decline in the unit of fare failed to develop the anticipated large increase in the number of short-haul passengers. Various experiments were made with the rates of fare, which included the elimination of various long hauls for one fare and the establishment of arbitrary charges for transfers.

All of the experiments tried in turn failed to produce the net earnings which the management of the Municipal Traction Company had anticipated. The general charge of 1 cent for a transfer was discontinued finally, under the public pressure which demanded a trial of 3-cent fares with universal transfers, until the people of Cleveland voted to reject the "security franchise," and receivers were appointed to take charge of the property. If the management of the Municipal Traction Company had been upheld by the voters of Cleveland in its control of the railway, it is probable, judging from the statements showing the imperative need of increased revenues, that a charge for transfers would have been re-established immediately.

The instructions of Judge Tayler, of the United States Circuit Court, to the receivers directed them to charge the highest rates of fare permissible under the ordinances. Since the receivers are operating the lines as one system and on some of the lines 3-cent fares were required, the result is to make the fares on the 3-cent lines when transfers are issued 2 cents above the regular rate. When the transfer is issued by a conductor on these lines 3 cents are collected from the passenger, but 1 cent is refunded when the transfer is surrendered. On the 5-cent fare lines 1 cent is collected by the conductor on the issue of a transfer, but this is refunded when the transfer is tendered for a proper ride.

The Newton (Mass.) Street Railway is charging 1 cent for each transfer issued. In speaking of the action of this company, the ELECTRIC RAILWAY JOURNAL (see editorial, "An Extra Charge for a Transfer," issue of Jan. 9, 1909) said that it would be important "because it gives a value to that which has been regarded altogether too lightly if its effect on earnings is to be given due weight by the public as well as by the street railway managers themselves." The Newton company, unlike the Cleveland receivers, retains the full charge for transfers.

The receivers who are operating the Cleveland lines have undoubtedly protected the revenues of the property by recognizing the transfer as an important element in the financial results of management.

Car Design for Rapid Transit Lines

As our readers have been aware for some time past, the task of designing cars for maximum rate of loading and unloading is an enormously difficult one. Each trial of a new type raises its own difficulties, and no form yet proposed meets all objections. The main principles involved are not particularly intricate; it is their application that is the puzzle. The first requirement for rapid loading and unloading of a passenger car is that the average distance to be traveled by a passenger in getting in or out should be a minimum. From one point of view the most desirable type of car in rapid transit service is one in which the entire side of the car opens, exposing a side aisle by which passengers can distribute themselves quickly within the car. The nearest practicable approximation to this plan is the Illinois Central type, undoubtedly the most desirable from a loading and unloading standpoint, provided the doors can be shut promptly after the passengers waiting to board the car have passed through the doors. Its time of trial comes when there is a stream of passengers boarding the train, the usual condition where trains are run a few minutes apart. In such cases a multiplicity of side doors works badly unless the train can take every one on the platform who desires to board it, or unless station guards are present to close the doors, otherwise it is very difficult for the train guards, from their isolated positions on the platforms of the car, to cut off passengers, since a late passenger will often block one of the doors in an effort to get on the train.

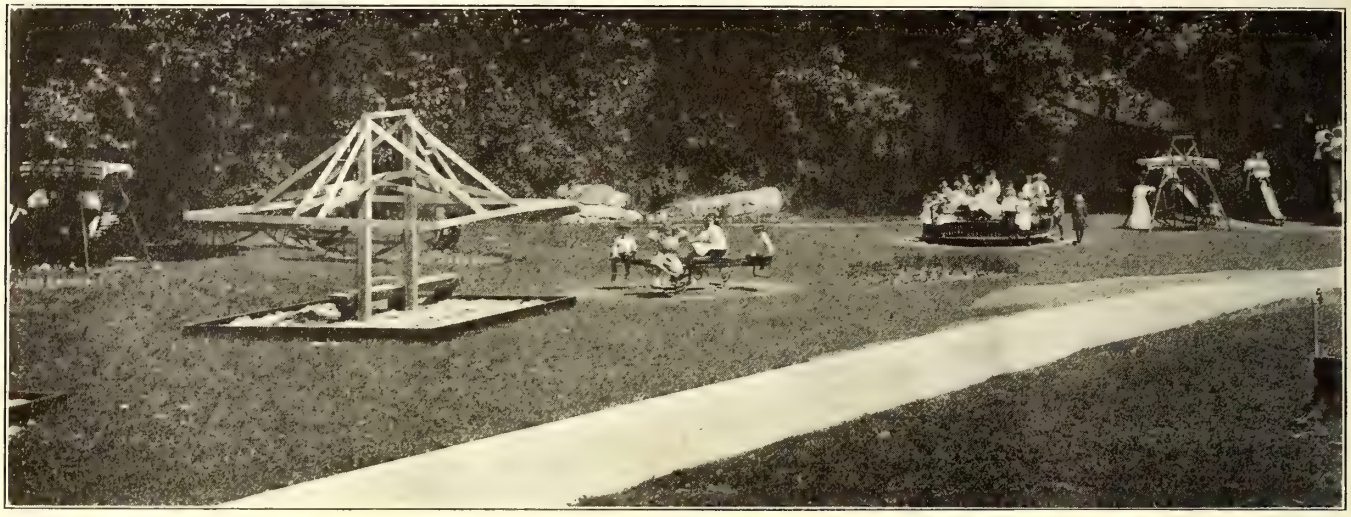
The design of car farthest removed from the Illinois Central, the ordinary end-door car, works better in rapid transit service than would casually be thought possible, partly because the guards have complete control of the entrances and partly because when passengers know that they must leave by the end of the car they leave their seats before the station is reached and collect near the door. The worst type of car for prompt loading and unloading is the open car, or the side-door compartment car without a side aisle, because there is no circulation within the car and passengers are unwilling to enter until they see a compartment that suits them.

The new subway car in New York constitutes a unique departure in car design, being based somewhat on the circulation principle of the center side-door car, such as used in Boston and elsewhere, but with both entrance and exit doors near the ends. It permits the use of the cars at curved platforms and also provides "stagnant space" in the center of the car where long-distance passengers can station themselves, away from the rush at the end doors. The success of the car, it seems to us, will depend upon whether the guards will be able to close promptly four doors, and also upon whether the circulation principle upon which the car is based can be maintained. The latter point, in turn, is contingent upon the question whether the passengers can be prevented from entering and leaving by the wrong doors, which does not seem any more difficult than with the center side doors, and also upon whether standing passengers can be kept from blocking up the exit door. This latter condition is one which, it would seem, would be fairly difficult to prevent with doors only 38¾ in. wide.

The ultimate solution, where enormous crowds have to be handled rapidly, is that of separate entrance and exit platforms on opposite sides of the car. This plan has been employed in a number of the stations of the Hudson & Manhattan Railroad. It is questionable whether any less revolutionary plan will enable a company to deal with extraordinary crowds. The whole trouble lies deeper than mere car construction, and belongs to the planning of the transportation system. How far remedial measures can be applied in the existing subway remains to be seen. We are none too sanguine regarding any proposed remedy during the real rush hours, although it may be possible to get a certain useful amount of relief at times. Perhaps when another subway is built the lessons of the present ones will be taken to heart. The trouble lies in the large number of intermediate stations, originating very heavy traffic and compelling a very rapid double movement of passengers at express stations where transfer between local and express trains takes place.

RECENT PARK IMPROVEMENTS AT DUBUQUE

During the past season a number of attractive features have been added to Union Park, owned by the Union Electric Company, of Dubuque, Ia. The main characteristics of this resort were described by L. D. Mathes, general manager of the Union Electric Company, in an article in the



Union Park, Dubuque, Ia.—The Children's Playground

Street Railway Journal for Feb. 29, 1908. Through the courtesy of Mr. Mathes the Electric Railway Journal is able to describe the results secured by the additions made last year and also to present an account of those proposed during the present season.

CHILDREN'S PLAYGROUND

The most important attraction added to Union Park during 1908 was a children's playground. The idea was suggested to the manager from reading a magazine story of the work of the Playground Association of America. The few buildings and other equipment required for the children were not expensive, but have been found to be of great value in rounding out the park attractions.

One of the features of the playground section is an attractive rustic building known as "Mothers' Rest." It is designed in bungalow fashion, is equipped with comfortable furniture, has roller awnings on all sides to be let down to keep out the rain and the sun, and is reserved for the exclusive use of the mothers and custodians of young children. Near this building are numerous amusement devices set apart for the use of children. Among them are a miniature merry-go-round on which the little folks propel themselves, thereby getting exercise as well as enjoyment; sand boxes 20 ft. x 20 ft. square, in which the children at play are protected from the sun by canvas awnings; lawn swings in several sizes and designs; toboggan slides in six sizes, and a half-dozen teeter rockers.



Union Park, Dubuque, Ia.—Toboggan Slides and Teeter Rockers for the Young People

Within the playground space is a row of six swings for those children who are more venturesome than the others and may be entrusted to entertain themselves with this simple old-fashioned amusement device. An illustration is presented showing the six swings in a row supported from timbers which are carried across the tops of seven rustic

posts. By means of this supporting frame and by using a metal chain, protected where grasped by the hands, in place of ropes, a substantial and ornamental amusement device is provided.

All around the playground section are elaborate floral designs. When the accommodations and ornamentations for the children were first completed there was some trouble from adults and boisterous youngsters abusing the equipment, but two signs reading as follows were posted, and these notices are said to have been as effective as two park policemen:

NOTICE—The amusement devices in this park are for children only. Adults will kindly refrain from the use of the same. Don't destroy the property of the company and thereby defeat our object of providing pleasure for the little folk.

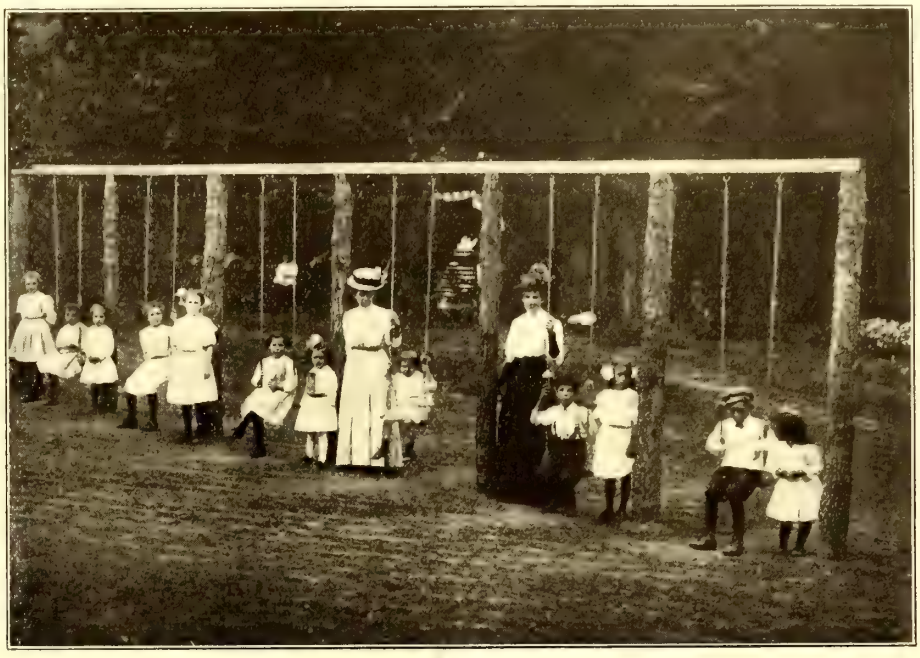
It is worthy of mention, and somewhat of a surprise to the management, that the children never invaded the flower beds. So far as known, there never was a bud or stalk maliciously broken off by young or old.

Broad concrete walks serve for thoroughfares through the grounds. At night these walks are brilliantly illuminated by tungsten lamps carried in ornamental glass reflectors and supported from steel poles of the very attractive design shown in one of the illustrations.

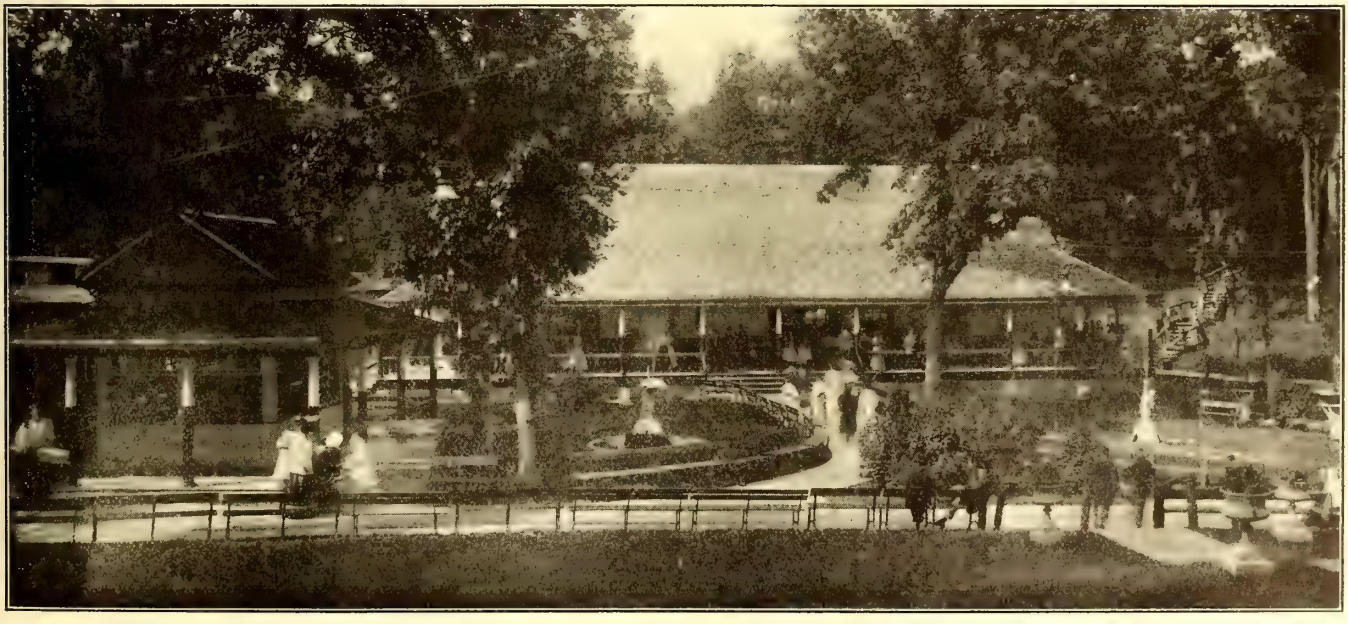
The creation of the playground feature of Union Park instantly won the commendation of the public and the city press. It is said that each child who was permitted to indulge in the pleasures of this playground was as eager to go again as "to witness the return of Christmas or to meet Santa Claus face to face." The educators and the clergy of the city were particularly strong in their expressions of approval of the playground feature.

As a result of the pronounced success of the initial playground movement the company this year is planning large additions to the facilities for the children's enjoyment. It is building a crescent-shaped wading pool which will be 150 ft. long by 75 ft. wide at the center. Beginning at one side there will be a depth of water of 1 in., increasing gradually to a maximum depth of 18 in. The floor will be cement and the bottom of the pool will be covered with several inches of clean white sand. There will be the constant inflow of a 2-in. stream of artesian water and a discharge through an outlet of the same diameter. Around the outer edge of the crescent a rustic structure will be built, affording a place where the children can be seated for the removal of their shoes and stockings and the safe storage of these articles until the return of the children.

Ideas utilized in the construction of this wading pool were obtained from Ogden Park, Chicago, a resort which is recognized as the most completely equipped children's playground in the world. While Union Park is not expected



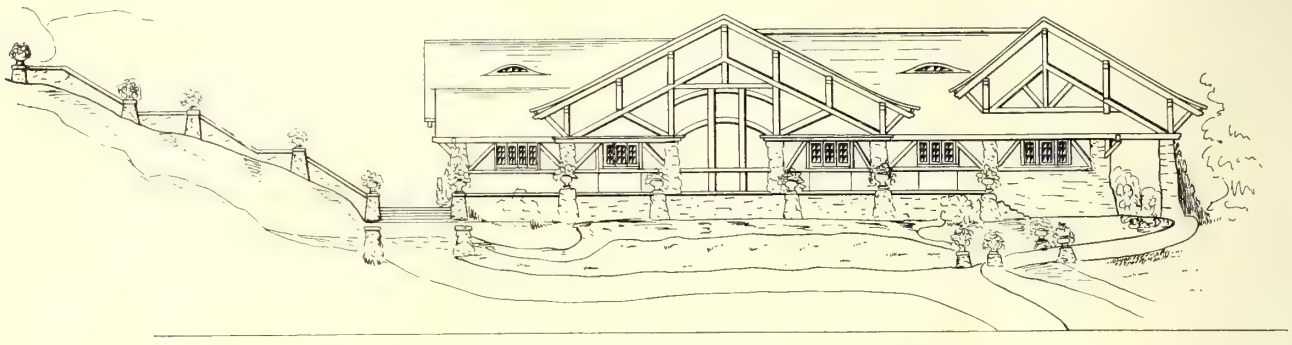
Union Park, Dubuque, Ia.—Six Swings in a Row



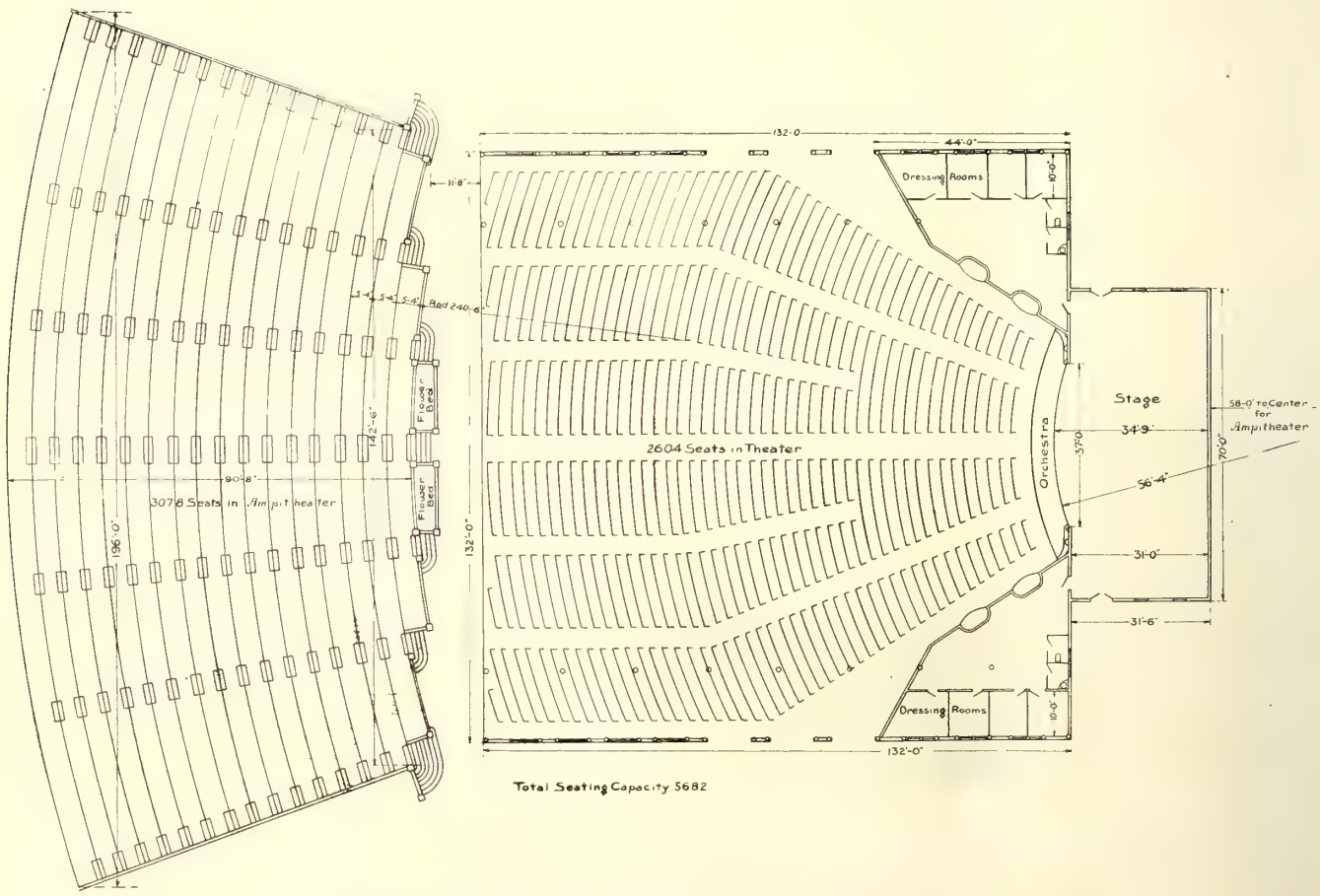
Union Park, Dubuque, Ia.—The Dancing Pavilion

to rival Ogden Park in the character of its equipment, it is said that from the standpoint of natural beauty and surroundings the park at Dubuque far surpasses that at Chicago.

The attractions of the playground at Union Park demonstrated last year that the capacity was entirely insufficient to accommodate the flocks of children and their parents or custodians who rode out to the park for the sole purpose of visiting the playground. The company is therefore erecting this year four additional buildings, also of rustic design. In their charge will be one or two women in nurses' uniforms who will undertake to care for sleepy and fretful children, thus giving the mothers freedom to enjoy the musical programs at the "Plaza" or indulge in the other beauties of the park.



Union Park, Dubuque, Ia.—Side Elevation of New Theater



Union Park, Dubuque, Ia.—Seating Plan of New Theater

THEATER AND MINOR IMPROVEMENTS

The most pretentious improvement to be made at Union Park this year will be the erection of a theater. This structure will be designed along especially attractive lines and will be of a novel type of construction.

The building will be 163 ft. 6 in. deep and 132 ft. wide. It will have a large and well-equipped stage which will accommodate musical organizations, light opera companies or any other form of entertainment that the management may elect to put on. The main floor will be of concrete with a drop of 5 ft. from the point of entrance to the stage. There will be 2604 opera chairs, and except for the two lines of posts near the wall on the east and west sides, they will afford an unobstructed view of the stage.

The south end will be entirely open, but may be closed by steel rolling doors guided by collapsible posts supported from the roof. The line of these doors is at the base of the steep hill shown in one of the illustrations. This hill will be carefully graded and covered with cement to a height which will afford accommodation for 3078 seats. The amphitheater seats will be made of solid concrete running at an angle of about 50 deg. The steps are cut back 5 ft. 4 in. with a 2-ft. rise. On each of the steps there will be a double row of hardwood slat benches with steel frames; and on every other step there will

be a station for a large rustic or cast cement, flower or shrubbery pot. The amphitheater will have a 6-ft. roughstone wall on the east and west and on three sides will be lighted with tungsten lamps set on ornamental iron posts.

The stage end of the theater will have all the equipment of a first-class play house and a special feature will be made of the dressing rooms. These will be ample in number and size, with a large outside area for trunks and excess baggage. In addition to the regular toilet facilities a shower bath will be provided. It will be seen that the company realizes that in providing such comforts it will get the best efforts of the performers. Actor folk, as a rule, are provided with shabby dressing rooms in the smaller theaters and when they see these quarters they will not fail to show their appreciation.

A Chicago specialist in theater electric lighting effects has been engaged to lay out the decorating scheme. Inasmuch as the company is in the lighting as well as the railway business, it is thought that the complete electrical equipment of the theater will be a good advertising medium and have an indirect influence toward increasing the lighting business.

Illustrations are presented showing the general arrangement of the covered portion of the theater. It will be noted that the arrangement is such that large crowds may be handled with facility. Every advantage has been taken of the natural beauties of the surroundings and as shown by the side elevation the theater building has been designed to form a feature in unison with these natural attractions. Last year the theatrical attractions played to audiences of from 4000 to 7500. At that time the seats were all out of doors and the company encountered some loss through inclement weather, which it is thought will be largely eliminated by the erection of the building described.

During the past season the company furnished entertainment at a weekly average cost of from $750 to $1,000. There was no admission charge or fee of any kind. With



Union Park, Dubuque, Ia.—Terminal Loop Station

the completion of the rustic theater a nominal fee of, say, 10 cents to 20 cents, for seats within the building will be charged, but seats in the outside amphitheater may be had free. The idea in making a charge for the attractions is that thereby the quality may be improved, the gross receipts for admission being used to defray the expense of the weekly production. It is thought that instead of meeting a weekly cost of $1,000 for entertainment the company will be able to put on a $1,500 bill and the receipts from admissions, if applied against the cost, will reduce the weekly expenses to a figure less than that of the past season. It is stated that the experience of Ingersoll Park, at Des Moines, has been that starting with a free show, the



Union Park, Dubuque, Ia.—Artistic Lighting Fixtures

management, by charging a modest price for admission, has been enabled to put on more extensive and better shows and at the end of three seasons the admissions have not only paid for the shows, but left a substantial profit.

OTHER CHANGES

Less pretentious improvements, yet those which help to make complete a most attractive resort, may now be mentioned. The company is erecting an additional greenhouse 60 ft. x 200 ft. in ground dimensions. With this new structure the company will be able to produce attractive horticultural exhibits and it is said that during the coming season Union Park will have the most beautiful and most extensive flower gardens in Iowa. The park then surely will deserve its advertised appellation of "Dubuque's most beautiful sylvan retreat—the place of recreation for all the people."

Before the park season opens on June 15 the company will have added 3500 lin. ft. of concrete walks, all of which will be illuminated with tungsten lamps on iron posts. There will be a dozen rustic buildings scattered around the hillsides among the rocks and trees for the accommodation of picnic parties who may desire tables and benches for lunching purposes; also six fountains will be built in addition to those now installed. A waterfall effect will be developed by discharging a 6-in. stream over a concrete runway 4 ft. wide with three falls from rock to rock, averaging 20 ft. each.

To quote Mr. Mathes, manager of the park: "All of the time and money which we have spent has proved entirely satisfactory to the owners of the property. The park has won fame far beyond this particular locality; its praises are sung by all those who have in the past few years visited Dubuque. It is a permanent institution which will grow in beauty and each year will bring greater returns to the company. The improvements are all of a most substantial character. A dollar has not been cut in half with the idea that it would do the work of two. The buildings are overhauled and painted each year and when the park is opened in the spring it looks as spick and span as if it had been created but the day before."

PARKS SERVED BY THE INLAND EMPIRE SYSTEM OF SPOKANE

BY CHARLES E. FLAGG, ADVERTISING AGENT, INLAND EMPIRE SYSTEM

The city of Spokane, Wash., scarcely 30 years old, has now a population of over 100,000. The topography of the city proper, as well as of the surrounding districts, lends grand natural opportunities for parks and boulevards and the city's Park Commission, of which A. L. White is president, is actively engaged in developing what will undoubtedly be a park system equal to that of any other city of like size in the United States.



Inland Empire Park System—Manito Park, Spokane

The parks already developed aggregate nearly 200 acres and are scattered through the city, the largest being Manito on the hill to the south. The beautiful falls of the Spokane River and the gorge below the city afford ideal opportunities for park development. The park board has recently asked the city for $1,000,000 for carrying out the proposed work, the plans for which have been furnished by Olmstead Brothers, the well-known landscape architects of Boston. It is proposed to build 9 miles of boulevards 150 ft. wide along the Spokane River gorge and to develop a complete chain of parks covering 2300 acres of more or less level ground and 1000 acres of hillside. The city's principal parks at present, including Manito, Liberty, Corbin and Recreation parks, are all served by the Inland Empire system.

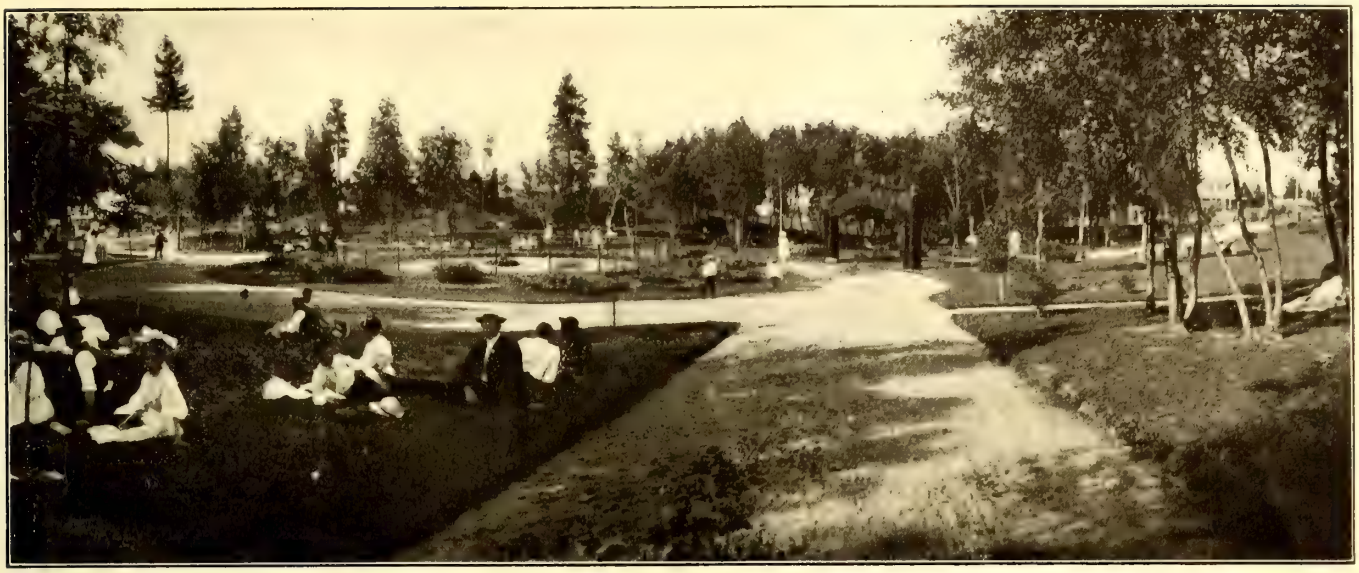
SPOKANE'S LAKESIDE PARKS

It is only in recent years, since modern means of transportation have been provided, that Spokane's magnificent lake region has become well known. Scattered about in the foothills of the Rockies in Eastern Washington and in the more rugged ranges of Northern Idaho are as charming a chain of mountain lakes as can be found anywhere. The principal resorts are served by the Inland Empire electric system with its parlor-car train service and it is not surprising that the lake traffic each year is gaining very rapidly.



Inland Empire Park System—Baseball Day at Recreation Park, Spokane

Liberty Lake is the city's nearest resort and affords the finest bathing beaches in the Spokane country. The Inland management has just laid out a 35-acre park, built a $10,000 pavilion, a 500-ft. floating pier, bath houses and various devices for bathers. The park when completed will also



Inland Empire Park System—Shaded Lawns of Manito Park, Spokane, a City Playground of 95 Acres, Reached Only by Trolley



Inland Empire Park System—Liberty Lake Park on the Cœur d'Alene Division, 17 Miles from Spokane



Inland Empire Park System—A Summer Crowd on the Spacious Lawns of Blackwell Park, Cœur d'Alene

include a baseball diamond, a running track, and tennis courts.

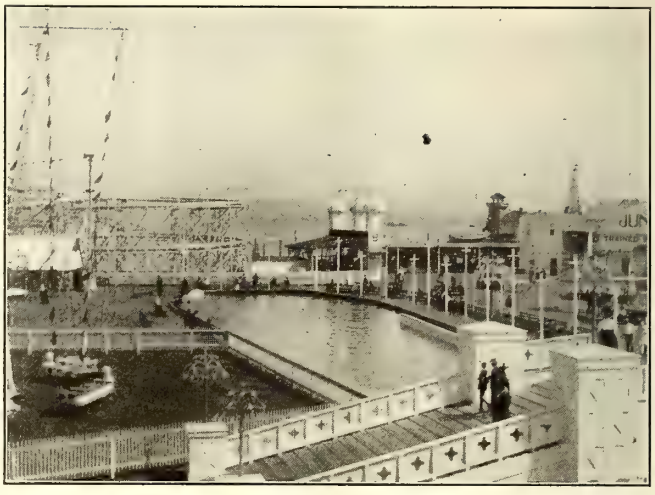
At Cœur d'Alene City, Idaho, Blackwell Park, located directly on the lake front, is a popular resort for summer excursionists. At Hayden Lake, 8 miles north of Cœur d'Alene and 40 miles from Spokane, the Inland has added many improvements to its grounds, including a golf course, tennis courts, bath houses and the Bozanta Tavern, a charming little hotel of Swiss chalet architecture, which is delightfully located on the bluff overlooking Idaho's most beautiful mountain lake.

Hayden Lake is a favorite resort for tourists and is easily accessible, as the principal transcontinental steam lines have traffic arrangements with the Inland and ticket tourists directly to the lake.

AMUSEMENT RESORTS IN SEATTLE

Until a few years ago the park needs of Seattle, Wash., were supplied almost entirely by the Seattle Electric Company, but the municipal park commission is now undertaking this work. Madrona and Leschi parks on Lake Washington, formerly owned and maintained by the Seattle Electric Company, were recently sold to the city, and a fund of $1,000,000 has been voted by Seattle for purchasing additional parks and playgrounds. The railway company states that while the parks maintained by it in the past have been very much appreciated and well patronized, it may be questioned whether this company ever will find it necessary to engage in this sort of development again. Such enterprises will be left to the care of private individuals and the municipal park commission.

At the present time the Seattle Electric Company owns but one park, which is known as Madison Park, and is on Lake Washington at the terminus of the Madison Street cable lines. This park is about 5 acres in extent, contains a large dancing pavilion, gardens, a shaded boardwalk about three blocks long, bandstand and several pavilions built out over the water. Space is rented for boathouses and other concessions. Formerly it was the custom to have band concerts several times a week at this park, but during the coming summer this form of entertainment will not be undertaken.



Seattle Parks—Circle Swing, Scenic Railway and Lagoon in Luna Park

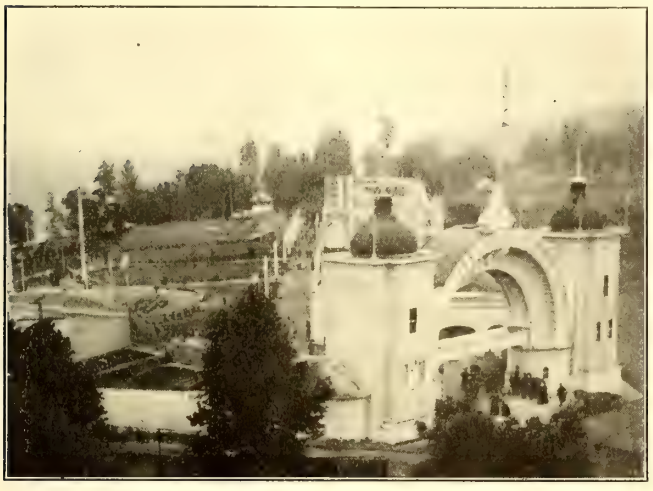
Adjoining Madison Park on the shore of Lake Washington is the White City Amusement Park, which contains attractions usually to be found in such resorts, and is operated by private enterprise. An accompanying illustration shows the entrance and affords a general view of this park. The association controlling this park is contemplating a number of improvements for the coming season.

Luna Park, the most extensive amusement resort in



Seattle Parks—A General View Facing the Chutes in Luna Park

Seattle, occupies a commanding position on a point of land at the entrance to Seattle harbor, and is reached by the Seattle Electric Company's Alki Point car line. Considerable of the patronage enjoyed by this resort also is handled by boat, which competition in the past has been



Seattle Parks—Entrance to White City, Madison Park

rather welcome than otherwise, owing to insufficient trackage available for the street railway cars. During the coming year, however, the railway company will be in better shape to handle the park business to this resort, and contemplates the operation of trains, each consisting of a motor car and one trailer, on 6-minute headway. Luna Park is operated by private enterprise, has been a fair moneymaker, and a number of improvements are contemplated during the coming year.

A few days ago local papers announced that a third amusement resort, to be known as "Fire Show Park," was to be constructed on Lake Union, about half-way between the business district of Seattle and the Alaska-Yukon-Pacific exposition grounds. This location is on the most direct route of the Seattle Electric Company between the city and the exposition grounds, and for that reason would be very advantageous to the promoters of the enterprise, but the railway company anticipates all the travel that it conveniently can handle on this line to and from the fair grounds. The Alaska-Yukon-Pacific Exposition is to be held in Seattle from June 1 to Oct. 16 of this year, and heavy travel is expected on all the city and suburban lines of this company, therefore the business which it will receive from amusement resorts will be merely incidental.

Railway apparatus and material imported by China in 1907 were valued at $10,403,860. As compared with 1906, there was a decrease of nearly 10,000 tons of rails in 1907. This is accounted for, not by a falling off in demand, but that the Hanyang Iron Works, at Hankow, are now turning out approximately that amount of rails yearly.

A recent issue of the *Municipal Journal and Engineer* contains an article by Y. Katagiri on the Osaka (Japan) Electric Railway. Osaka, with a population of 1,700,000, is the second largest city in Japan, and owns the transportation and lighting means of the city. The street railway equals 22 miles of single track. The earnings in November, 1908, were $455,640. The rolling stock comprised 100 cars, of which 70 are in daily service, and each car averages 97 miles a day. The fares range from 1 to 5 cents. Half-price workmen's tickets are good to 7 a. m.

PARKS OF THE CONNECTICUT COMPANY

BY M. J. LEARY, GENERAL FREIGHT AND PASSENGER AGENT OF THE COMPANY

All of the parks under the jurisdiction of The Connecticut Company, whether owned or leased by that company, are operated and controlled from the office of the general freight and passenger agent, at New Haven, Conn. Previous to June 1, 1908, the parks were under the control of an amusement manager, but since that time they have been handled by this department.

All contracts for vaudeville attractions, outdoor acts, band concerts, fireworks displays, billboard and newspaper advertising, program printing, tickets, etc., are looked after by this department. Experience has shown this to be the most economical and practical way to run the parks, and, while we have to be on the road most of the time during the season, a good deal of the work can be concentrated in this office. We rely to a great extent upon the judgment and interest of the local superintendents or managers of the trolley lines on which the park is located, and they all understand that they are responsible to a certain extent for the operation of the park or parks on their division, but before any changes or improvements are made such matters must be referred to this office for final disposition. In addition to personal supervision, we also require weekly reports of traffic and earnings and expenses.

At the different parks which have theaters we give vaudeville and moving pictures every afternoon and evening during the week, and in some places on Sundays. The program usually consists of four or five acts, moving pictures and piano playing. All of the theaters are rustic, open-air buildings, and a moderate admission fee is charged, ranging from 5 to 20 cents. Admission to all the parks is free. Considering these prices, the theatrical offerings are extremely good. We aim always to have the shows thoroughly moral and free from any traces of vulgarity, as this policy always gives the best satisfaction. No individual booking is done by this company, but the attractions are put on for us under contract with a booking agency, which looks after all matters in connection with the theaters and productions. Last year the contract was awarded to the Park Booking Circuit, of New York, and the consensus of opinion was that the shows were the best we have ever had, and they gave universal satisfaction. The contract for the season of 1909 has not yet been let.

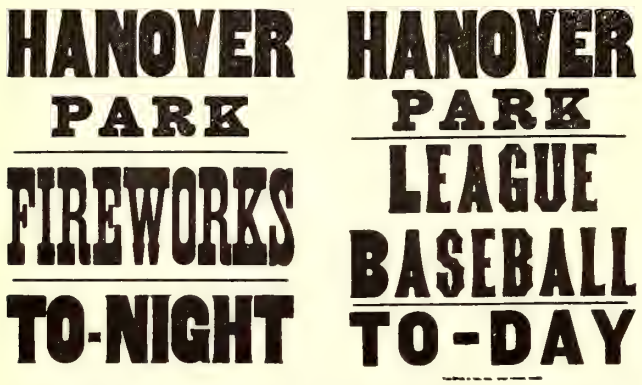
The attendance at our parks the past season has been equally as good as any other season we have had. While our patronage at the theaters and other pay amusements fell off somewhat, due to the general business depression, yet, taking the matter as a whole, we feel very well satisfied. The following paragraphs will give your readers an idea of some of the attractions at our different parks, which serve a wide range of popular taste:

SAVIN ROCK, WEST HAVEN, CONN.

This place is too well known around our part of the country to need any introduction to the public, and it is far and away the best park on our system. Owing to its location, directly on Long Island Sound, it enjoys peculiar natural advantages, for the place is splendidly shaded with large elm trees, and its nearness to the water gives it the advantage of splendid facilities for bathing and boating. One of the most attractive features at Savin Rock is the famous electric fountain, which is operated day and night

during the season. This fountain is situated in the midst of a beautiful piece of turf, surrounded by banks of flowers, and when operated by night the effect of the different colored lights thrown from below on the descending water is very beautiful, and attracts considerable attention. The band stand is also situated at this point, and our free afternoon and evening concerts last season drew large crowds.

There are a number of hotels and restaurants just outside the grove, the most prominent being the Colonnade



Connecticut Company's Parks—Advertising Posters

restaurant, which serves all varieties of shore dinners and practically anything that can be found in an up-to-date New York hotel. This restaurant is situated on a pier over the water, and is quite an attractive place. The grove is full of all sorts of concessions, such as are usually found at an amusement resort of this character. Several new attractions will be put in this coming season. None of these concessions, however, are operated by this company. We lease the ground out to concessionaires, and they put in their shows, which must, at all times, be run in a manner satisfactory to this company. We insist on this so that the park may be kept clean and respectable. Some of the attractions are "Canals of Venice," "Tickler," "Temple of Isis," "Diving Bell," "Ferris Wheel," "Merry-Go-Round," "Photograph Galleries," "Japanese Gardens," "Shoot the Chutes," "Scenic Railway" and the "Human Roulette Wheel," and numbers of others.

Band concerts, fireworks shows and other attractions are given at regular intervals. Owing to the splendid track facilities at this point, we are able to handle the largest crowds without any trouble or inconvenience.

MOMAUGUIN, EAST HAVEN, CONN.

The main attractions at this place are the Momauguin Hotel, which is located right on the water, and the splendid bathing beach. The zoo has been discontinued at this park. We give regular band concerts and fireworks shows here, which draw very large crowds.

RYE BEACH, RYE, N. Y.

This park is not owned by the railway company, but leased. The main attractions are a very good theater, dancing pavilion, skating rink, etc. We give regular band concerts and fireworks during the season. This park has a large territory to draw from, and the attendance is very heavy.

HANOVER PARK, MERIDEN, CONN.

This park is owned by the company, and we lease to one concessionaire all privileges with the exception of the theater, merry-go-round, boats and base ball diamond. There is a very fine casino, where refreshments are served, and which has a splendid floor for dancing and roller skating. There is also a first-class merry-go-round and theater, at which regular vaudeville is given during the season. It is situated on a lake, and there is good boating.

Regular band concerts and fireworks are given during the season, and the attendance is very large. The base ball field and grand stand are separated from the park proper, and professional as well as amateur games are played during the season.

WILDWOOD PARK, PUTNAM, CONN.

We do not own this park, but it is leased, and we in turn lease out the concessions just as we do at Hanover Park. The park is situated on a beautiful lake, where there are admirable boating and fishing.

The theater, merry-go-round, restaurant, shooting gallery, etc., are the main attractions. We give regular band concerts and fireworks displays at this place. The attendance is very good, and it is practically the only park in that neighborhood.

HIGHLAND LAKE PARK, WINSTED, CONN.

This park is owned by the company, and concessions are let out as at Hanover Park. It is located on a pretty lake, with good boating and fishing.

The theater, dancing pavilion, swings, splendid picnic grove and facilities, restaurant and shooting galleries are the chief attractions in addition to regular band concerts and fireworks displays.

LAUREL PARK, MANCHESTER, CONN.

This park is leased, and we, in turn, lease out concessions as at Hanover Park. There is no theater, but an excellent dancing pavilion, restaurant and good boating. This park has splendid natural advantages, and is quite a favorite resort for people in this locality. We give regular band concerts and fireworks displays at this point, and expect to have the best band in Connecticut, namely, the Governor's Foot Guard Band, at this park for practically the entire season.

WHITE OAK PARK, NEW BRITAIN, CONN.

This park is owned by the company and the concessions leased. There is a lake and good boating, as well as a theater, which will probably be discontinued next season. In addition there are good refreshment stands, a dancing pavilion and merry-go-round. This place is a favorite



Connecticut Company's Parks—Advertising Posters

resort for picnic parties, and while it has not as many attractions as some of our other parks, it is quite a resort for the people of New Britain and that locality. Band concerts and fireworks are also given here.

LAKEVIEW PARK, MIDDLETOWN, CONN.

This park is owned by the company. It is situated on a lake, has a refreshment stand, skating rink and dancing pavilion. It will probably not be operated next season.

ROTON POINT, SOUTH NORWALK, CONN.

This property is owned by the company and concessions are leased. The grounds are situated on Long Island Sound and are a favorite resort for people of Norwalk, South Norwalk and neighboring towns. Splendid shore dinners are a feature, besides good vaudeville, moving pictures, a skating rink, regular band concerts and fireworks.

LAKE QUASSAPAUG, MIDDLEBURY, CONN.

In consequence of the building of a line from Waterbury to Woodbury the company has prepared this resort, which will be opened May 29 for the first time. It is one of the most desirable and beautiful of this company's parks. The property is owned by the company. Quassapaug Park is expected to have an enormous patronage, as it is practically the only resort near Waterbury and neighboring towns.

The park is along famous Lake Quassapaug, which is noted for exceptionally good boating and fishing.

There is now a good hotel on the premises, which is to be operated next season. Among the attractions will be a merry-go-round, dancing pavilion, skating rink, photograph gallery, swings, base ball diamond, music and fireworks. The concessions are leased. A theater may be placed there later, but not this season.

PINE ROCK PARK, SHELTON, CONN.

This place is closed, and we do not expect to open it again.

OCEAN BEACH, NEW LONDON, CONN.

This property is owned by the company and concessions are let. It is situated on the ocean, and has splendid bathing facilities. Regular band concerts and fireworks are the general attractions at Ocean Beach. There is no theater. New London is the rendezvous for the fleet of the New York Yacht Club, and this serves to attract visitors. The hotel accommodations at New London also are excellent, and the fish dinners attract many people from the interior who otherwise would go to Providence. Our line to New London and the beach skirts the Thames, affording a beautiful view of the surrounding country. Again, New London has many attractive stores and shops, which serve to induce people to combine business and pleasure in one trip. Large parties frequently come to Ocean Beach over our lines from points as far distant as Willimantic, a ride of 30 miles, which consumes about three hours. A large shelter overlooks the ocean and affords picnic parties every facility for enjoying their lunches.

In 1907 the United States Patent Office received 57,679 applications for patents for inventions, or, including applications for reissues of patents and for patents for designs, 58,762 applications. Patents issued, together with reissued patents, numbered for that year 36,620. The patents that expired during that year were 25,322 in number. The States of New York, Illinois and Pennsylvania headed the list of new patents granted—New York with 5281 patents, or 1 to every 1389 inhabitants; Pennsylvania with 3471, or 1 to every 1815 inhabitants; and Illinois with 3470, or 1 to every 1388 inhabitants. In the District of Columbia one patent was granted for every 941 inhabitants, and in Connecticut one for every 987. On the other hand, such States as Alabama, Mississippi, North Carolina and South Carolina only show one patent for something over 10,000 inhabitants, the last-named having been responsible in 1907 for one patent for every 26,302 inhabitants. The patents granted to citizens of foreign countries numbered 3866.

SOME FEATURES OF COST KEEPING AND ACCOUNTING AT WILLOW GROVE PARK, PHILADELPHIA

Willow Grove Park, which is operated by the Philadelphia Rapid Transit Company, is the largest amusement park in the United States conducted exclusively by a street railway company. The park covers an area of 130 acres, and is beautifully laid out, with a lake 4 acres in extent, 30 acres of wooded groves, broad and well-kept avenues, spacious lawns and flower gardens. The distinguishing feature of the entertainment provided for patrons is the superior band and orchestral music that is furnished free of charge for the enjoyment of all who visit the park. During the season, which covers a period of 101 days, from the Saturday prior to Memorial Day to Labor Day, such high-class attractions as Sousa's Band, Victor Herbert's Orchestra, the Thomas Orchestra and Pryor's Band are engaged for from two to five weeks at a time.

The other amusements are of the highest class and of a character pleasing to the most refined tastes. Among the more pretentious attractions may be mentioned the Mountain Scenic Railway, the Roller Coaster, Venice, Coal Mine, Mirror Maze, two carrousels, Captive Flying Machine, Tours of the World, boating on the lake and a theater where carefully selected moving pictures of the most up-to-date character are exhibited. Located in the center of the large lake is a magnificent electric fountain, erected at a cost of $100,000, which always proves a strong attraction at night. An athletic field, situated near the picnic groves, is another feature which appeals to many. Three restaurants and a large soda fountain are conveniently and pleasantly located on the grounds.

Willow Grove Park is 13 miles from the center of Philadelphia and is reached by seven direct lines of street cars. It is also reached by the Philadelphia & Reading Railroad, over which road many large out-of-town excursions are run to the park on special days from points as far distant as Harrisburg and Lancaster, Pa. The park is owned and operated by the Philadelphia Rapid Transit Company, under the direction of Geo. C. Wynkoop, Jr., superintendent. Most of the amusement devices are operated by concessionaires, but the traction company operates the roller coaster, mirror maze and boats and the three restaurants. The park pays the entire cost of the special musical attractions already mentioned, and also the electric power and light furnished.

The system of records and cost keeping maintained in the office of the superintendent is elaborate in detail, and contains a number of features of interest and value to park managers. The railway company conducts the three restaurants. The first, which is called the "Casino," is located on a knoll commanding a beautiful view of the park, and is in close proximity to the music pavilion. Its spacious piazzas accommodate 500 guests, who may dine within hearing of the music. This restaurant is conducted in the very best manner, and the service and food are first-class in every respect. The prices are commensurate with the quality of food served. The second restaurant, known as the Lakeside Café, has accommodation for 750 persons at the tables at one time. It is located at the entrance of the large picnic grove, beside the electric fountain. The prices are moderate and the service very good. The third restaurant is known as the Rustic Pavilion, and is located in the upper part of the park, on the Midway. It is a well-kept light lunch café, and is especially adapted for quick service. The restaurants cater to all classes of

patrons in the matter of price and service. All of them are liberally patronized, and the company operates them at a very satisfactory profit.

The record of daily receipts is so arranged that the superintendent has on his desk every morning at 8 o'clock a comparative statement of every attraction on the grounds, showing the gross receipts for the previous day, the receipts for the corresponding day for the past six seasons, and the total for each of the years up to that period. This same detailed comparative statement he has for every special day and excursion. At 9 o'clock he receives a statement of the amount of supplies drawn by each restaurant on the previous day, giving in detail the amount of each item of supplies drawn and the percentage of the gross receipts at the restaurant the withdrawal represents. Following this, he inspects the payroll statement, which shows the labor cost for each and every department of the restaurants on the previous day, with a comparison of the cost for the corresponding days during the past six seasons. Every Friday an inventory is taken at each restaurant and a balance struck to determine accurately the profit. This weekly balance is laid before the superintendent every Saturday afternoon and a comparative statement therewith showing the restaurant's standing for the corresponding period for several seasons back. Of this frequent checking and balancing Mr. Wynkoop says the weekly balance is as essential to the park management as is the monthly balance to the merchant, as the park season is crowded into 101 days, whereas the commercial year has 365 days. It can be readily seen that with such a system no retrogressive movement can set in without immediate detection. Certain special days or certain excursions are shown to be ones to be encouraged or dispensed with altogether, the payrolls are seen to be properly regulated, and the withdrawal of supplies is kept within bounds.

The restaurant business presents a very difficult problem to every park manager, and one that he must deal with personally. For the good of the park and the proper protection of its patrons, the restaurant cannot be placed in other hands, but should be conducted by the park; the park should stand ready to lose money rather than sacrifice the interests of its patrons. The business can be made successful and profitable only by the strictest attention to details and a thorough knowledge of its requirements. The limited time of employment, the lack of permanent positions and the absence of incentive—for there cannot be much incentive to the men who are offered a three-months' job and then are cut adrift—are conditions that make it absolutely necessary for the manager of the park to know the details. New men must be secured each year, even though part of the old forces return, and the time intervening from season to season puts old and new employees out of touch with the business, and they must be drilled and instructed. The first week of the season requires the exercise of the greatest care to make it a profitable one. Much depends on the first week; the survival of carefully laid plans, and discipline will be either established or destroyed for the whole season.

Mr. Wynkoop has made a very careful study of the cost keeping methods and has analyzed closely every feature of the operation of the restaurants in his charge down to the minutest detail. The basis on which supplies are purchased is to apportion the average of daily expenditures for each item of supplies as a fixed percentage of the total amount to which the restaurant manager is limited. This total amount is based on an arbitrary percentage of the gross receipts. For example, if the daily gross receipts of the Casino averaged during the previous season $700, the percentage which can be spent for supplies is assumed at some arbitrary figure, say 55 per cent, or $385. The average daily allowance of the chef for sirloin steak is taken at, say, 18 per cent, or a total of $69.30; for tenderloins, 9 per cent, or $34.65; for butter, 3 per cent; bread, 3 per cent; fruit, 2½ per cent, and so on through the entire list. These percentages have been arrived at after a careful study and analysis of the guests' orders and total number of portions served during the several seasons past of each item on the menu. The same system is applied to the two other pavilions, the percentages, of course, differing on account of the differences in menus.

All supplies for the three restaurants are issued from a central storehouse. The company maintains a central depot near the markets in Philadelphia, at which it buys its supplies, and the supplies are delivered and receipted for at this depot, from which they are sent daily by a market car to the park. The storekeeper issues supplies only on requisition and keeps a record of the foodstuffs purchased and delivered to the managers of the restaurants. By this system of cost keeping and checking requisitions for supplies, Mr. Wynkoop has been able to show a very satisfactory profit.

The prices of food in all the restaurants are kept as low as is consistent in maintaining an excellent quality of food and the best service. A number of expedients have been tried to popularize the restaurant service. One of the most successful has been the preparation by Mr. Wynkoop of a small sheet attached to the regular menu, on which are suggestions for meals for from one to four persons to cost any amount from $1 to $10. The combinations, which are made up from items on the menu and show the prices of each article and the number of portions, are not inflexible, like the so-called "club menus" used in many restaurants. Any variation from the suggested meals can be ordered.

Close attention has been paid to many other details of conducting the restaurants. The size of the pieces of butter served with meals is carefully regulated and every portion of ice cream is exactly the same size. Every portion of any article served is duly accounted for by a checking system—that is a story in itself. In these small and seemingly unimportant details of operation lies the margin between profit and loss.

As previously mentioned, a number of out-of-town excursions are handled at the park during the season. The superintendent of the park solicits these excursions and assists in making them a success by furnishing advertising posters, hand bills and similar literature. A careful record is kept of the receipts attributable directly to the presence of excursionists in the park. A card 5 in. x 8 in. is made out for each excursion day, giving the name of the excursion, the date, day of the week, kind of weather, temperature, time of arrival and departure, name of committee in charge, number of people brought to the park, kind and cost of advertising data furnished, and the receipts of the day. Usually, these excursions arrive early in the morning, many hours in advance of the ordinary crowds of the day. When the excursion arrives at the park all the concessions are opened, and a statement of the receipts is taken at 12 o'clock noon, and again at 2 o'clock. These statements are entered upon the cards. These figures show the minimum amount of business done with the excursionists; the receipts from this source after 2 o'clock

cannot be determined, as the regular patrons have begun to arrive.

Certain days during the summer are set apart for Children's Day, Sunday School Day, Grand Army Day, etc. A card is kept for each of these days of a form similar to the cards used for excursions. The total receipts at the park on these days are also entered on a card headed "Special Day Comparisons." If the receipts on special days do not show a substantial increase over the average receipts for the corresponding day, or show a decrease from year to year, the special day is discontinued.

The large bands and orchestras which constitute the principal attraction during the season involve a heavy expense, and it is important to know their relative value in attracting people to the park. A card is kept showing the name of the orchestra or band, the period during which it played at the park, the number of days of rainy, cloudy and clear weather, the total receipts at the park during the period, and average receipts per day. A comparison of this figure of average receipts per day, when equated for differences in weather conditions, give a fairly close estimate of the value of each musical organization as an attraction to the general public.

IMPROVEMENTS IN OPERATION OF PEEKSKILL LIGHTING & RAILROAD COMPANY

Mention is made in the last annual report of the New York Public Service Commission, Second District, of improvements in operation effected by the Peekskill (N. Y.) Lighting & Railroad Company. The improvements were made as a result of a report of C. R. Barnes, electric railroad inspector for the commission, recommending various changes. A list of the recommendations made by Mr. Barnes has been given to the ELECTRIC RAILWAY JOURNAL by Stuart Wilder, vice-president and general manager of the Peekskill company, who states: "We think that all these recommendations are good, the most important being the installation of telephones along the line." The recommendations were as follows:

1. A stop sign should be placed at the top of the heavy grade on South Street, and all cars should come to a full stop before proceeding down the grade.
2. When cars are run in sections, all cars followed by another should carry signs properly illuminated indicating that fact.
3. When cars are run in sections, or extra cars are run on suburban lines, all cars followed by another should be, during hours of darkness, equipped with oil tail lights.
4. The company should provide employees with a book of rules.
5. All motormen and conductors employed in the future should be required to pass a physical examination.
6. The Verplanck & Mohegan Lake line should be equipped with telephone systems, with telephone at all switches directly connected with the company's office.
7. A cluster of lights should be burned at all meeting-point switches.
8. Highway crossing signs should be placed at all grade crossings of highway outside of village limits.

The company's attention is called to the danger incident to operation during the fall season, especially on heavy grades, caused by leaves.

A holiday card just received from the officers of the tramway department of the New South Wales Government Tramways shows that the Government is now operating 223 miles of track and that in the last fiscal year 17,521,410 car-miles were necessary in which to carry 172,020,932 passengers.

OPERATION OF THE CLEVELAND STREET RAILWAY SYSTEM BY RECEIVERS

One effect of the operation of the Cleveland street railway system by receivers has been to make available for publication various statistics, some of which have been compiled, necessarily, to guide Judge Tayler, of the United States Circuit Court, in his instructions to the receivers on the vital questions of the rates of fare to be charged. The final result of consideration of the subject of fares by Judge Tayler was the issue of an order by him directing the receivers to establish on Feb. 1 the highest rates of fare permissible under the ordinances. While there is a difference of opinion between the Cleveland Railway Company and the city of Cleveland as to the date of expiration of certain ordinances, the operation of which affects the rates of fare on certain lines, the legal questions involved have been argued before the court and a decision is expected soon. In the meanwhile lines which contribute about 65 per cent of the gross revenue from operation are charging the old rate of fare of 5 cents for a ride, or 11 tickets for 50 cents; and 35 per cent of the present gross revenue is derived from lines which charge a fare of 3 cents, provided the exact change or a disk is handed the conductor.

An additional improvement in the gross earnings of the property has been effected by the treatment of transfers by the receivers. Under the existing arrangement a passenger on one of the 5-cent-fare lines who desires a transfer is obliged to advance 1 cent to the conductor, but this charge is refunded when the transfer is surrendered; a passenger on one of the 3-cent-fare lines who desires a transfer pays the conductor, in addition to the regular fare, the sum of 3 cents, but of this amount 1 cent is refunded when the transfer is surrendered. What the system of transfers in force on the 3-cent-fare lines amounts to, therefore, is that for each transfer issued and surrendered the company receives the sum of 2 cents above the regular fare.

The number of transfers issued by the Cleveland lines amounts at present to about 31 per cent of the total number of revenue passengers, as compared with an average of about 40 per cent for the Cleveland Electric Railway Company a little while before the lease was made. From these figures it is assumed that the saving of 9 per cent in the number of transfer passengers thus indicated represents approximately the economy resulting from the elimination of unnecessary rides and the reduction of abuse of the transfer privilege, due to the fact that passengers, under the plan adopted, are unlikely, unless they desire to use the transfers, to bother about getting them.

The transfer slips in use contain no reference to the arrangements for charge and refund, which have been indicated in the foregoing. The transfers read: "Good only at point of intersection for continuous trip on first car leaving transfer point punched, on date and before time punched. This transfer is issued subject to the rules of the company, and is good only in the hands of the person to whom issued." The transfers are issued under the Stedman time-limit patent.

The receivers have added gradually to the service since they took charge of the lines until at the present time the number of car-miles run is substantially equal per day to the total reported by the Cleveland Electric Railway Company prior to the execution of the lease of the property to the Municipal Traction Company. This change represents a great improvement in the service afforded the people of

Cleveland over that which was given by the management of the Municipal Traction Company during its brief control of the property. In addition to restoring the large number of car-miles which were eliminated by the Municipal Traction Company management, the receivers have made changes in the characteristic schemes of routing inaugurated by the officials who were placed in charge of the property immediately after the lease became effective.

Brief reference has been made in previous issues of the Electric Railway Journal to some of the figures which are published herewith.

EFFECT OF GOOD SERVICE ON EARNINGS

Henry J. Davies, secretary and treasurer of the Cleveland Railway Company, sent a letter to the directors of that company on Jan. 18, 1909, enclosing a table showing the passenger receipts, number of passengers and transfers carried and number of car-miles run in December, 1907 and 1908. Mr. Davies said in his letter:

It was claimed for years by Mayor Johnson that a 3-cent fare would greatly increase the number of rides—would so stimulate travel that the passenger earnings of the road would nearly equal its earnings at the higher rates charged by us. Of course, lower fares will increase the number of passengers. Our own experiments show this. I append Table III, showing the increase or decrease, and percentages of increase or decrease, in revenue passengers in each month of 1908, compared with the corresponding months of 1907. The extent to which the reduced fare and service of the Municipal Traction Company stimulated travel is shown in the figures for July, August, September and October. The effect of better service on stimulation of traffic is shown by the figures for December.

In January, February, March and the first 27 days of April, 1908, there were carried on the roads of the Cleveland Electric Railway Company and the Forest City Railway Company 39,126,793 revenue passengers. In the same period of the previous year there were carried 42,136,038 passengers, a decrease of 3,009,245 passengers, or 7.7 per cent. April 27 was the last day on which the Cleveland Electric Railway Company operated its property.

In January, February, March and part of April, 1907, we sold tickets at the rate of seven for 25 cents. In the same months of 1908, at the rate of 11 for 50 cents. This comparison, therefore, is between operation at maximum rates in 1908 and low rates in 1907.

In July, August, September and October, 1908, the Municipal Traction Company carried 48,949,165 revenue passengers; in the same months of 1907 there were carried 47,748,153 revenue passengers, an increase of 1,201,012 passengers, or 2.5 per cent.

I omit May and June because the business of those months in 1908 was affected by the strike of conductors and motormen.

In December, 1908, operating at the same rates of fare and under the same rules as to transfers as had been put into effect by the Municipal Traction Company, but with improved service, the receivers carried 12,301,335 revenue passengers; in December, 1907, the revenue passengers were 10,809,558, an increase in 1908 of 1,491,777, or 13.8 per cent.

November is omitted because the Municipal Traction Company operated during a part of the month and the receivers during the other part.

While the number of passengers was increased by the reduced rates of the Municipal Traction Company, a combination of low rates and good service produced a still larger increase, and most of this larger increase would seem to be due to the improved service given by the receivers.

TABLE I.—OPERATIONS OF PROPERTY OF CLEVELAND RAILWAY IN DECEMBER, 1908, AND YEAR 1908, AS COMPARED WITH OPERATIONS OF CLEVELAND ELECTRIC AND FOREST CITY RAILWAY COMPANIES IN DECEMBER, 1907, AND YEAR 1907.

	December			P. C.	Twelve months			P. C.
	1907.	1908.	Increase.	Increase.	1907.	1908.	Decrease.	
Revenue passengers	$10,809,558	$12,301,335	$1,491,777	13.8	$136,283,060	$135,031,237	$1,251,823	.92
Transfers	3,726,758	3,846,250	119,492	3.21	51,939,947	40,540,736	11,399,211	21.95
Total	$14,536,316	$16,147,585	$1,611,269	11.1	$188,223,007	$175,571,973	$12,651,034	6.72
Per cent transfers	34.5	*31.2	.....	*3.3	38.11	30.00	8.11	21.28
Passengers per day	348,695	396,817	48,122	13.8	373,378	368,938	4,440	1.18
Transfers per day	120,218	124,072	3,854	3.21	145,041	110,767	34,274	23.64
Total	468,913	520,889	51,976	11.1	518,419	479,705	38,714	7.47
Passenger receipts	$490,135.20	$392,965.42	*$97,169.78	*19.83	$5,773,542.10	$4,948,192.96	$825,349.14	14.30
Receipts per day	15,810.81	12,676.30	*3,134.51	*19.83	15,817.92	13,519.65	2,298.27	14.53
Receipts per passenger (cents)	4.534	3.194	*1.340	*29.55	4.24	3.66	.58	13.68
Receipts per ride (cents)	3.372	2.434	*.938	*27.82	3.07	2.82	.25	8.14
Car-miles (revenue)	2,156,846	2,020,621	*136,225	*6.32	25,416,108	22,285,977	3,130,131	12.32
Passenger receipts per car-mile	22.72	19.45	*3.27	*14.39	22.72	22.20	.52	2.28

*Decrease.

TABLE II.—GROSS EARNINGS, CAR-MILES AND PASSENGERS CARRIED BY ROUTES—FIGURES OF CLEVELAND ELECTRIC RAILWAY COMPANY IN JULY, 1907, AND OF LINES OPERATED BY MUNICIPAL TRACTION COMPANY IN JULY, 1908.

	Earnings		Increase.		Car miles		Increase.		Passengers		Increase.	
Routes.	July, 1907.	July, 1908.	Amount.	P. C.	July, 1907.	July, 1908.	Number.	P. C.	July, 1907.	July, 1908.	Number.	P. C.
Denison	$9,324.80	.....	*$9,324.80	....	49,860	.....	*49,860	....	310,827	.....	*310,827	....
Abbey	829.54	.....	*829.54	....	4,182	.....	*4,182	....	17,390	.....	*17,390	....
Broadway-St. Clair	78,434.64	.....	*78,434.64	....	322,497	.....	*322,497	....	1,663,190	.....	*1,663,190	....
Cedar	37,620.64	$18,526.92	*19,093.72	50.75	128,596	71,333	*57,263	44.53	798,036	565,984	*232,052	29.08
Central-Denison	.....	24,508.14	24,508.14	....	.....	123,118	123,118	....	.....	781,958	781,958	....
Clifton Boulevard	10,617.72	1,604.35	*9,013.37	84.89	71,002	6,949	*64,053	90.21	222,783	34,793	*187,990	84.38
Doan (East 105th St.)	17,526.27	36,096.19	18,569.92	105.96	101,363	154,094	52,731	52.02	374,535	746,116	371,581	99.21
Euclid	62,454.45	35,480.61	*26,973.84	43.19	298,787	163,228	*135,559	45.37	1,325,399	1,074,787	*250,612	18.91
Euclid-W. 14th St.	33,469.99	.....	*33,469.99	....	154,158	.....	*154,158	....	712,480	.....	*712,480	....
Euclid Creek	3,193.23	3,170.75	*22.48	.70	5,494	5,145	*349	6.35	67,257	63,434	*3,823	5.68
Fairfield	3,672.04	3,745.02	72.98	1.99	16,064	26,497	10,433	64.95	76,878	119,252	42,374	55.12
Payne	27,322.82	.....	*27,322.82	....	82,591	.....	*82,591	....	576,104	.....	*576,104	....
Scovill-W. 25th St.	38,014.58	35,302.88	*2,711.70	7.13	137,455	139,169	1,714	1.25	800,297	1,111,275	310,978	38.86
Scranton	10,651.85	4,806.78	*5,845.07	54.87	48,092	26,466	*21,626	44.97	223,940	148,686	*75,254	33.60
Superior-West Madison	50,740.43	.....	*50,740.43	....	199,184	.....	*199,184	....	1,077,016	.....	*1,077,016	....
Union	8,809.73	5,273.88	*3,535.85	40.14	47,364	32,799	*14,565	30.75	186,332	163,290	*23,042	12.37
Wade Park-Detroit	55,067.89	.....	*55,067.89	....	230,406	.....	*230,406	....	1,176,231	.....	*1,176,231	....
Willson (East 55th St.)	34,830.45	23,576.72	*11,253.73	32.31	125,038	119,893	*5,145	4.11	742,073	662,771	*79,302	10.69
Woodland-Lorain	80,158.67	43,183.92	*36,974.75	46.13	255,152	165,536	*89,616	35.12	1,688,479	1,283,056	*405,423	24.01
Superior-Detroit	.....	57,777.72	57,777.72	....	.....	235,695	235,695	....	.....	1,559,858	1,559,858	....
Bridge	.....	30,369.27	30,369.27	....	.....	135,067	135,067	....	.....	965,634	965,634	....
Euclid Heights	.....	13,477.90	13,477.90	....	.....	61,173	61,173	....	.....	350,067	350,067	....
St. Clair	.....	31,499.20	31,499.20	....	.....	134,168	134,168	....	.....	842,259	842,259	....
Broadway	.....	25,483.03	25,483.03	....	.....	120,801	120,801	....	.....	709,194	709,194	....
Wade Park	.....	13,531.97	13,531.97	....	.....	64,515	64,515	....	.....	423,524	423,524	....
Kinsman	.....	8,040.20	8,040.20	....	.....	42,598	42,598	....	.....	241,529	241,529	....
W. 14th	.....	10,769.56	10,769.56	....	.....	57,606	57,606	....	.....	340,479	340,479	....
Total	$562,739.74	$426,225.01	*$136,514.73	24.26	2,277,285	1,885,850	*391,435	17.19	12,039,247	12,187,946	148,699	1.24

*Decrease.

STATISTICAL RESULTS

Mr. Davies enclosed with the foregoing letter a statement comparing the operations of December, 1907 and 1908. He supplemented this statement by a letter sent to the directors on Jan. 28, containing a table showing "the number of passengers carried, the number of transfers and the passenger earnings of the property in the entire year 1908, compared with the same statistics for the Cleveland Electric and Forest City Railway companies in 1907." For comparative purposes these two statements are combined in the accompanying Table I.

TABLE III.—INCREASE OR DECREASE IN REVENUE PASSENGERS 1908 COMPARED WITH 1907

Month.	Increase or decrease.	Per cent.
January	683,769*	6.35*
February	496,119*	4.93*
March	1,137,795*	9.90*
April	912,846*	8.25*
May	1,089,953*	9.38*
June	31,640	.27
July	148,646	1.23
August	126,761	1.03
September	668,955	5.87
October	256,650	2.13
November	343,230	3.06
December	1,491,777	13.80
Total	1,252,823*	.92*

*Decrease.

RECAPITULATION

Months.	1907.	1908.	Increase or decrease.	Per cent increase or decrease.
January-April	114,245,052	111,157,222	3,087,830	2.70
July-October	47,748,153	48,949,165	1,201,012	2.50
December	10,809,558	12,301,335	1,491,777	13.80

The total decrease in revenue car-mileage in 1908 as compared with 1907 is shown to have been 12.32 per cent, while the reduction in December was but 6.32 per cent, indicating that, as stated in the foregoing, the receivers had begun to restore the service afforded under the old management.

Table II, published herewith, gives statistics by routes of gross earnings, car-miles and passengers for July, 1908, as compared with the corresponding month of the preceding year. This statement is given to reveal the surprising extent of the changes in routes established by the management of the Municipal Traction Company, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL. These changes furnished one of the principal sources of dissatisfaction on the part of the public with the management which succeeded the old company.

TABLE IV.—EARNINGS AND EXPENSES OF CLEVELAND ELECTRIC RAILWAY IN JULY, 1907, AND OF ALL OF CLEVELAND LOCAL LINES IN JULY, 1908.

	July, 1907.	July, 1908.
Gross earnings	$562,739.74	$426,225.01
Operating expenses	354,772.11	282,651.56
Divided as follows:		
Maintenance, way and structures	64,463.33	38,252.65
Maintenance equipment	78,720.66	53,278.36
Total maintenance	$143,183.99	$91,531.01
Operation power plant, net	$31,767.82	$32,526.57
Operation cars	135,744.62	131,280.15
Total transportation	$167,512.44	$163,806.72
General expense	$44,075.68	$27,313.83
Per car-mile, cents:		
Gross earnings from operation	25.07	22.70
Maintenance way and structures	2.85	2.00
Maintenance equipment	3.48	2.78
Total maintenance	6.33	4.78
Operation power plant	1.40	1.70
Operation cars	6.00	6.85
Total transportation	7.40	8.55
General expenses	1.95	1.42
Total operating expenses	15.68	14.75
Net earnings from operation	9.39	7.95
Miscellaneous income	.03	.11
Gross income, less operating expenses	9.42	8.06
Taxes	1.04	1.17
Income, less operating expenses and taxes	8.38	6.89
Interest	1.78	2.03
Net income	6.60	4.86
Rental	....	3.83
Balance	6.60	1.03

The totals for July, 1908, as shown, indicate an increase of 1.24 per cent in the number of passengers, a decrease of 24.26 per cent in the gross earnings and a decrease of 17.19 per cent in the total car-miles, as compared with July, 1907.

Table IV shows the gross earnings and the principal divisions of operating expenses for July, 1907, and July, 1908, by totals and per car-mile.

HYDRO-ELECTRIC GENERATING STATION AT BERRIEN SPRINGS, MICH.

An extensive electrical generating and distribution system has recently been placed in service by the Indiana & Michigan Electric Company, of South Bend, Ind. This system is a low-head hydro-electric development, capable of producing 7200 kw, and includes two steam and four hydro-electric plants, having an aggregate capacity of 25,000 hp.

This development, situated on the St. Joseph River at Berrien Springs, Mich., is at the present time transmitting energy for the operation of about 150 miles of interurban electric railways. These include the Chicago, South Bend & Northern Indiana Railway, which extends from Goshen through South Bend to LaPorte and Michigan City; the Southern Michigan Railway, between South Bend and St. Joseph, Mich., and the line operating from Benton Harbor to Dowagiac, Mich.

The generator house is 64 ft. 7 in. x 112 ft. in plan, and is placed with its long axis transverse to the axis of the dam. On each side of it is a penstock section, 50 ft. x 98 ft. in plan, for the turbines of the development. The substructure of the generator house is of concrete, but the superstructure is of paving brick, and is covered with a copper-green tile roof carried by steel roof trusses. Space is provided in the building for four main generators, three of which have been installed. On the generator floor level are placed two 300-kw, 60-cycle rotary converters for supplying energy to the Southern Michigan Railway, the lines of which pass close to the main power house.

Wooden pole-line construction, and for a part of the distance side-arm construction, is employed for the transmission lines, the opposite side of the pole being occupied by bracket arms carrying street railway trolley wire and feeders. In cases of this kind, where the poles are 100 ft. apart, the 25,000-volt lines are on 30-in. centers. All other construction on the 25,000-volt lines is on 36-in. centers, and the 13,200-volt lines are on 24-in. centers.

As the industrial load is almost exclusively that of induction motors, the generators and transformers are designed to operate continuously at about an 85 per cent power factor. A synchronous condenser is operated continuously on the busbars at South Bend to bring the inherent power factor of about 75 per cent to between 85 and 90 per cent, which works out to the most economical condition. In the field circuit of this condenser use is made of a Tirrill regulator, which takes care of the voltage fluctuations within the range of the motor.

The 10 substations of the various street railways supplied with energy are equipped with 300-kw synchronous converters. Each of the substations of the Southern Michigan Railway contains two of these converters, since the summer traffic on this line is very heavy on certain occasions. The converters are compounded for giving as nearly as possible a straight-line voltage characteristic, when taking into consideration the line characteristics.

THE RETURN ON THE INVESTMENT IN THE NEW YORK SUBWAY

A report upon the return on the investment in the New York subway, the seventh in the series of reports on the New York subway by B. J. Arnold, was made public by the Public Service Commission on Feb. 23. The report, which is dated Dec. 31, 1908, is devoted to an analysis of the various items of revenue and expense during the past three years' operation of the present subway, the object being to determine to what extent additional subways can be constructed and operated profitably either by municipal credit, private capital or a combination of both. An abstract follows:

ANALYSIS OF EARNINGS AND EXPENSES

Table I shows a comparative statement of the car-miles, the earnings and the operating expenses for the present subway for three consecutive fiscal years, the last one ending June 30, 1908.

It will be noted that the revenue derived from "other sources," that is, from advertising, rent of power, sale of privileges, etc., amounted during the past year to 2.27 per cent of the revenue from all sources and these items are increasing in relative importance each year. It is probable that the revenue from other sources than passenger traffic may be made to amount to 1 cent per car-mile. Unless the fare is raised the only method of increasing the last item or the gross revenue from passenger traffic is to carry more passengers. This possible increase in passenger traffic may be divided into four classes:

a—Passengers who would ride counter to the rush travel, thus utilizing to better advantage than at present the returning cars.

b—Passengers who would ride during non-rush hours, thus utilizing the equipment which is on hand, but at present lying idle during a large part of the time.

c—Passengers who would ride a comparatively short distance—that is, short-haul passengers, who at present either walk or use the surface lines.

d—Passengers who would add to the present traffic during rush hours.

The object should be to increase the average income per car-mile without adding materially to the present crowding; that is, the most desirable passengers are those of the first three classes.

Nothing is to be gained by increasing the long-haul load—in fact, this part of the business unfortunately is growing rapidly. To make a comprehensive subway system pay a fair return on the investment the income from passenger traffic should average about 1 cent per passenger mile. Passengers carried more than 5 miles and thus contributing less than 1 cent per mile must be balanced by other passengers traveling less than 5 miles and thus contributing an amount proportionately greater than 1 cent per passenger-mile.

OPERATING EXPENSES

A study of the records of operating expenses as shown by Table I can be made to advantage. The total expense for maintenance, which increased considerably during the second year, has been decreased during the past year, indicating that these expenses do not necessarily increase with the age of the subway. The unit cost per car-mile of these three items of maintenance is practically independent of the number of car-miles operated and will not decrease materially as the number of car-miles increase. Items *Ba* and *C* (wages of trainmen and power supply) will also be practically constant per car-mile whatever the number of car-miles operated. Taking these last two items and adding them to the first three items we have a charge of 7.57 cents per car-mile which cannot be decreased by any appreciable amount by running more car-miles, but which can be avoided entirely every time a car can be prevented from running a useless mile. The problem therefore to reduce the influence of these charges is to run as few non-productive car-miles as possible.

Mr. Arnold then suggests three methods of reducing the non-productive car-miles as follows: (1) To construct a cut-off between Lenox Avenue and 110th Street and the Grand Central station; (2) to provide storage accommodations downtown, say, under Battery Park, and (3) to avoid running so many full-length trains to the extreme ends of the lines. To facilitate the easy make-up of trains and so to reduce this unnecessary car-mileage in future subways each car should be equipped with motors.

With the present subway these three sources of useless car-miles show a total of over 4,500,000 car-miles a year or about 10 per cent of the total number of car-miles operated. If all these car-miles could be cut off the annual saving at the rate of 7.57 cents per car-mile would amount to $320,000.

Items *Bb*, *Bc* and *D* vary inversely as the number of car-miles. Together they amounted last year to 2.48 cents per car-mile. The total of the two classes thus amounts to (7.57 + 2.48) or 10.05 cents per car-mile. Little can be done in the future operation of the present subway or in the design of future subways to cut down materially the cost per car-mile of the items of the first class. Efficient management and the design of a subway which will allow the running of a greater number of trains upon each track will cut down the cost per car-mile of the items of the second class, but this part of the expense is proportionately small.

ANALYSIS OF THE FIXED CHARGES

The annual charges are as follows: Interest on the cost of permanent way, sinking fund on investment in permanent way, interest on the investment in equipment, depreciation on equipment and taxes. All of these items can be reduced by keeping down the original cost of construction.

The approximate costs of 1 mile of single track, exclusive of equipment, power plants and electrical conductors, for different kinds of construction in the vicinity of New York City are as shown in Table II.

These figures, which, as before stated, do not include the

TABLE I.—COMPARATIVE STATEMENT OF CAR-MILES, EARNINGS AND OPERATING EXPENSES OF THE SUBWAY OF THE INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK CITY, AS GIVEN IN ITS REPORTS.

	Year ended June 30, 1906.		June 30, 1907.		June 30, 1908.	
	Amount.	Per car-mile.	Amount.	Per car-mile.	Amount.	Per car-mile.
Car-miles	31,931,073	....	37,184,940	....	44,005,213	....
Earnings:						
From transportation	$6,900,873.96	$0.216	$8,319,468.24	$0.2237	$10,020,538.18	$0.2277
From other sources	151,138.04	.0047	187,455.37	.0050	232,799.19	.0053
Totals	$7,052,012.00	$0.2208	$8,506,923.61	$0.2288	$10,253,337.37	$0.2330
Expenses:						
A Maintenance:						
a. Way	358,014.01	.0112	483,975.09	.0130	518,551.16	.0118
b. Equipment	360,628.88	.0113	706,809.06	.0190	821,744.49	.0187
c. Power plant	75,256.13	.0024	115,887.66	.0031	153,756.87	.0035
B Transporation, Operation:						
a. Wages, conductors, motormen and guards	538,795.47	.0169	664,519.95	.0179	787,068.42	.0179
b. Wages, platform men, agents, gatemen, porters	273,718.23	.0086	318,639.32	.0086	370,786.85	.0084
c. Other expenses	347,857.19	.0108	411,140.44	.0110	419,245.05	.0095
C Power supply	830,266.59	.0260	921,168.32	.0247	1,047,259.33	.0238
D General expenses	193,572.85	.0060	261,229.84	.0070	304,900.10	.0069
Total expenses	$2,978,109.35	$0.0932	$3,883,369.68	$0.1045	$4,423,313.27	$0.1005
Ratio of operating expenses to earnings, per cent	42.23	....	45.64	....	43.14	....
Net earnings	$4,073,902.65	$0.1276	$4,623,553.93	$0.1243	$5,830,024.10	$0.1325

cost of car equipment, power-station equipment or transmission system, for the reason that such investment depends upon the car-miles operated, indicate that to operate an elevated passenger road and keep the fixed charges per car-mile for permanent way within reasonable limits the passenger traffic should be about three times that which would justify a surface conduit system. To support a

TABLE II.—APPROXIMATE COSTS IN NEW YORK CITY OF RAILWAY CONSTRUCTION.

	Cost per mile of single track. From low to high.	
Surface railway (for overhead trolley)	$20,000	$30,000
Add for asphalt paving or	12,000	
Granite block paving		20,000
Cost of surface road	$32,000 to	$50,000
Cost of conduit road, including same allowances for paving	80,000 to	120,000
Elevated railroad	200,000 to	300,000
Subway	600,000 to	900,000
Tunnel under river	1,200,000 to	1,800,000

subway the travel should be about three times the minimum travel that would justify the building of an elevated road and to maintain a tunnel the length of haul must either be very short or the passenger movement through it must be of great magnitude. Due allowance must always be made for possibilities of development, but when the promise of a reasonably early growth in traffic does not exist the more expensive forms of permanent way cannot be justified from a strictly commercial point of view. Subways are eminently adapted for main-line traffic, but not for branch lines, and in general the outlying districts cannot be relied upon to support a subway until the traffic which originates in the district added to the traffic which passes through the district is sufficient to justify three elevated lines of the present type.

The cost of constructing the permanent way of a subway equal in mileage to the present subway tracks in the boroughs of Manhattan and the Bronx may be taken at $50,000,000. The cost of the necessary rolling stock and repair equipment, power house, substation, signal system and electrical distributing systems would add $25,000,000 to the investment. The performance of the present subway shows that 50,000,000 car-miles can be operated to advantage in that part of the subway on the Manhattan side of the East River tunnels—that is, one car-mile per year may be expected for each dollar invested in permanent way and two car-miles per year for each dollar invested in "equipment." Upon a large part of the cost of the permanent way the present operating company is paying interest at the rate of 4 per cent per year, which is at the rate of 4 cents per car-mile for interest charges on the cost of permanent way only. If the construction funds had been provided by a private company the interest cost per car-mile would probably not have been less than 5 cents or 6 cents. If all of the money furnished by the city for the permanent way could have been secured at 3½ per cent the cost per car-mile for this interest would be 3.5 cents.

This item of annual interest charge upon the permanent way offers more opportunities for improving the financial standing of a subway system than any other item so far discussed. For instance, with the present subway if the investment in branch lines which are operated at a loss could be eliminated or if their first cost could be charged proportionately by special assessment directly upon the property benefited by them then this interest charge on permanent way would be reduced by 30 per cent or from 4 cents to 2.8 cents per car-mile, thus effecting a saving of 1.2 cents per car-mile. Or if future subways could be built with a much greater carrying capacity in proportion to the amount invested in permanent way then this unit charge of 4 cents per car-mile for interest on permanent way can be reduced to less than 3 cents per car-mile without any change in the rate of interest carried by the present subway.

The arrangement with the city by which most of the money for permanent way of the present subway was raised provides for a sinking fund of 1 per cent per annum on that part of the investment. On a basis of 50,000,000 car-miles with an investment of $50,000,000 this sinking fund of 1 per cent per annum amounts to 1 cent per car-mile. In future subways it is not unreasonable to expect that 2 car-miles should be operated for every dollar expended for permanent way and thus the sinking-fund charge be reduced to 0.5 cent per car-mile.

INTEREST ON INVESTMENT IN EQUIPMENT

The investment for the equipment of a subway similar to the present subway in Manhattan and the Bronx may be taken at approximately $25,000,000. As this money was not raised by means of the city's credit the interest charge may be taken at 6 per cent per annum, as this is about as low as money usually costs a private corporation after paying brokerage and other expenses incidental to securing it. On the basis of 50,000,000 car-miles this interest charge upon equipment amounts to 3 cents per car-mile. As the original cost of all of this equipment increases directly as the car-miles increase the most effective way of reducing the importance of the charge for interest on the equipment must be by reducing the rate of interest. If the money for the first cost of the equipment had been raised on municipal bonds or in any other way at the same rate (i. e., 4 per cent) as the money invested in permanent way then the unit cost would be reduced from 3 cents to 2 cents per car-mile, a saving of 1 cent per car-mile. This method of financing the cost of the equipment would therefore result in a considerable reduction in the annual charges.

DEPRECIATION

In the accounting system used with the present subway the item of depreciation upon equipment is not recognized. In my opinion this policy, or perhaps lack of policy, is a serious mistake, as it is certain that if all of the surplus earnings are disbursed each year in the form of dividends and no allowance is made for depreciation there will come a time when renewals must be made either at the expense of the stockholders or at a sacrifice of the service, which can and should be maintained for future patrons of the subway system. Just how much the allowance for depreciation should be cannot be determined without a careful study of the conditions in each particular case. An investigation will no doubt reveal the fact that there are parts of the structure and perhaps also of the equipment which can be maintained up to full working value and upon which the reserve for depreciation may be neglected, but this same study will also show that there are other parts which are depreciating in such a way as to require an annual reserve to provide for eventual renewals. For instance, the wooden cars should be removed from the subway, but apparently no way of financing this loss has been adopted. These cars were the best cars that could be secured at the time the subway was designed, but shortly after they were built metal cars were developed. Of about 850 cars in the subway 500 are of this wooden or composite type. The original cost of these composite car bodies was $3,350 each and new metal bodies to replace them will cost about $5,500 each. The difference between the cost of new metal cars and the original cost new of the composite cars should be charged to capital account, but the difference between the original cost of the composite car and its scrap value as it leaves the subway should be considered a loss and be offset by a depreciation reserve.

I assume that the accounting system for the future operation of subways will conform to the accounting system adopted by your commission, and as this system includes a depreciation account, I feel warranted in recognizing this charge in this analysis.

RECAPITULATION OF POSSIBLE SAVINGS

We are now in a position to reach some conclusions regarding the design of future subways by reviewing the entire problem of making a sub-surface system of transportation pay a fair return on the investment even with the fare limited to the uniform amount of 5 cents per passenger. In the following recapitulation (Table III) the cost of operating the present subway is first shown in each case, the figures of operating expenses being taken from the record of the year ending June 30, 1908. The extreme theoretical reduction in cost that can reasonably be expected is shown in the second column, and the final column is intended to indicate the lowest probable practical limit of cost that can be attained in the operation of future subways under the most favorable conditions. All figures are given in the unit of cents per car-mile.

From the foregoing analysis it will be seen that in order to pay a profit of 6.5 cents per car-mile from the operation

of a subway similar to the present subway it is necessary to crowd the passengers in the cars so that the average income from passenger revenue amounts to 23 cents per car-mile. Furthermore, in order to maintain this profit of 6.5 cents per car-mile, which in the case of the present subway is now all disbursed as dividends, the item of depreciation on the equipment must be entirely neglected.

The second column shows that if changes are made in the methods of financing, constructing and operating subways it is possible to design and build future subways that will furnish adequate service for a 5-cent fare and at the same time take care of depreciation and interest on the investment. That the service can be adequate is indicated by the fact that the income per car-mile from passenger revenue only need not be more than 18 cents, instead of 23 cents as required under present conditions.

To produce this result the following economies must be secured:

	Saving per car-mile.
1. Reduce the investment required for permanent way by raising by special assessment on the property benefited the first cost of all branch lines. The saving per car-mile would approximate	1 cent
2. Increase the earning capacity of each dollar invested in permanent way by designing the stations on the main line on the reservoir principle, so that 60 trains an hour can run over each main line track. Practicable saving per car-mile.	1 cent
3. Effect economies in operation and maintenance and reduce relative importance of general expenses by operating more cars with same organization charges. Saving per car-mile.	1 cent
4. Raise the money for the first cost of the equipment on a basis of 4 per cent, instead of 6 per cent, either by using the city's credit or otherwise. Saving per car-mile	1 cent
5. If all the investment for both the permanent way and the equipment could be secured solely upon the city's credit, the "profit" made by the operators over and above interest charges could be justly reduced, as the operators would then assume no financial risk. With the present subway, which pays nominal taxes amounting to about $60,000 per year, about 1⅓ cents of every 5-cent fare goes toward "profit." If the city furnished the money for the equipment as well for the permanent way, then this profit could be reduced from the present rate of about 6.5 cents per car-mile, as shown in the above table, to not more than 3 cents per car-mile. At this rate the profit to the operators would amount to $1,500,000 per year on the basis of 50,000,000 car-miles. Thus the saving per car-mile to the subway system by this arrangement would amount to at least	3.5 cents

The above statement shows the relative value of the possible economies in design and operation that may be realized in connection with future subways. The sum total of all the savings amounts to 7.5 cents per car-mile, but as it may not be practicable to secure the full measure of economy indicated as possible in each case, the total saving may be taken at 6.5 cents per car-mile. As a "contra" charge it must be remembered that a depreciation reserve fund should be provided for which at least 1.5 cents a car-mile must be allowed, thus reducing the net saving to 5 cents per car-mile; that is, assuming that the above economies are effected, future subways may be maintained with a gross average income per car-mile from all sources of 19 cents, instead of 24 cents, as at present, on the assumption that no taxes are paid in either case.

If future subways are taxed upon the same basis as the present subway, which, when reduced to a car-mile basis amounts to 0.12 of a cent per car-mile, future subways would have to earn 19.12 cents per car-mile, instead of 19 cents, as above stated, but if they were taxed upon the same basis as the present elevated lines of the City of New York are taxed, which, when reduced to car-mile basis, is about 3 cents* per car-mile, future subways would have to earn 22 cents per car-mile instead of 19 cents, as above stated.

It seems to me as a general proposition that with the return upon the investment now required by private capital there is now no field in New York City for the construction of a comprehensive system of subways entirely with

*Including franchise tax which has not been paid.

TABLE III.—COMPARATIVE OPERATING EXPENSES OF PRESENT AND FUTURE SUBWAYS.

	Cost in cents per car-mile—Present subway.	Possible saving.	Future subway.
Maintenance of way	1.18	.18	1.00
The reduction is due to the possibility of operating more cars than is done at present over each track.			
Maintenance of equipment	1.87	.27	1.60
The saving shown may be accomplished by providing the most economical repair shop equipment.			
Maintenance of power plant	.35	.10	.25
Very little saving is to be expected except that due to running more cars or providing slightly less reserve machinery than has been thought best with the present subway.			
Wages of trainmen	1.79	.04	1.75
The only reduction that can be expected in this item will be due to efficiency in the management of the men and trains, and not in the reduction of the cost of labor. Every car-mile operated will require its quota of trainmen.			
Wages of station-men	.84	.34	.50
All station expenses per car-mile will become less as the volume of traffic increases.			
Other transportation expenses	.95	.40	.55
This item also diminishes as the number of car-miles increases, although the reduction cannot be expected in the same proportion as the increaes in car-miles.			
Power expenses	2.38	.20	2.18
Every car moved one mile will require approximately the same amount of power, unless the average speed is reduced. Some slight economy may be expected with increase in load.			
General expenses	.69	.25	.44
This item will become smaller as the car-miles increase, as the total expenses are divided among a larger number of car-miles.			
Total operating expenses	10.05	1.78	8.27
The total probable saving in operating expenses is less than 2 cents per car-mile, and the lowest limit to which these expenses can be reduced is 8.27 cents per car-mile. As the fullest limit of economy cannot be expected with every item in any one case, it is probable that 9 cents per car-mile represents the lowest practicable operating cost, in the present state of the art.			

TABLE IV.—COMPARATIVE FIXED CHARGES OF SUBWAY SIMILAR TO PRESENT, AND OF FUTURE SUBWAYS.

	Cost in cents per car-mile—Subway similar to present subway.	Possible saving.	Future subway.
The first column shows the results that can be obtained by operating 50,000,000 car-miles in a subway in which the permanent way cost $50,000,000 and the equipment $25,000,000, which is approximately the ratio with the present subway.			
Interest on permanent way	4	2	
This item can be limited by keeping down the investment and by operating the tracks up to their fullest limit of capacity during rush hours.			
Sinking fund for permanent way	1	0.5	0.5
This item can be reduced in the same proportion as the previous one. The 1 per cent determined upon as the rate for sinking fund with the present subway is not any too large.			
Interest on equipment	3	1	-
By reducing the rate of interest from 6 per cent to 4 per cent, a considerable saving can be effected. If the policy of providing funds for the equipment by means of the city credit could be followed, the saving in interest per car-mile would go far toward providing an adequate depreciation reserve for the replacement of this equipment.			
Total for fixed charges	8	3.5	4.5
It will be seen that the possibilities for saving are nearly twice as great with the fixed charge accounts as with the operating expense items.			
Total cost, including both operating expenses and fixed charges	18.05	5.28	12.77
The sum total of all the possible economies amounts to 5.28 cents per car-mile, or 30 per cent of the total average cost of operating each car-mile in a subway similar to the present subway. As the lowest limit can only be secured by strict economy in investment and in operation, which in some cases might reduce the quality of the service supplied, it will be better to assume a medium figure of between 14 and 15 cents per car-mile as the low practicable limit which can eventually be expected with future subways. With the present subway it will be difficult to introduce sufficient economies to reduce the total cost per car-mile to less than 17.5 cents.			

TABLE V.—RECAPITULATION OF ESTIMATES FOR FUTURE OPERATIONS.

	Cost in cents per car-mile—Subway similar to present subway.	Possible in future subway.
Income per car-mile:		
From passenger operation only	23	18
From advertising, sale of power, etc	1	1
Total gross income per car-mile	24	19
Operating expenses	10	9
Net earnings	14	10
Fixed charges	7.5	5.5
Surplus to be applied to dividends and depreciation	6.5	4.5
Depreciation at the rate of 3 per cent per year on actual investment in equipment	..	1.5
Surplus for profit	6.5	3

private capital unless the fare for the long-haul passenger is something more than the present 5-cent fare. If it were possible to establish a fare greater than 5 cents for the long-haul passenger the solution to the problem would be simple from a railroad standpoint, although complicated and disadvantageous to the public, but since the 5-cent fare is now the legal fare the real problem is how to get subways and maintain this 5-cent fare.

CONCLUSIONS

1. Raise all the money for the construction and equipment of such portions of future subways as can be shown to be profitable upon the city's credit and at the lowest possible rate of interest.

2. For such portions of the system as are clearly unprofitable let the territory, the value of which is enhanced by the construction of the subways, bear the burden of the initial cost.

3. Eliminate taxes as is now done with the present subway.

4. Extend the refunding period for the retirement of the cost of subways over as long a period as practicable.

5. Design the express stations of the main stems of such subways upon the reservoir principle so as to secure maximum capacity with minimum investment.

6. Lay out a comprehensive system of transportation and begin the construction of subways at the center of the congested district and extend outward in order to get the benefit of the short-haul profits before assuming too much of the long-haul burden and in connection with the short-haul business investigate carefully the possibilities of moving platforms for the local tracks.

7. Take advantage of specific cases where railroad companies desiring to secure terminals, the indirect value of which to them is great, may be willing to contribute largely to the cost of building portions of a comprehensive subway system.

8. Lease the operating privileges under proper public supervision to an operating company upon the basis of an agreed compensation per car-mile, the number of car-miles to be operated, which is the measure of service, to be determined by dividing the income from the traffic by the total cost of operating a car-mile, the income to be sufficient to provide for operating expenses, including maintenance, fixed charges and depreciation, and leave sufficient margin to sufficiently compensate the operating company so as to secure the highest class of skill and efficiency in operation.

FEBRUARY MEETING OF THE PUBLIC SERVICE RAILWAY SHOP FOREMEN'S ASSOCIATION

The regular monthly meeting of the Public Service Railway Company's Shop Foremen's Association was held on Friday, Feb. 19. Mr. Ricker reported progress on the subject of sand boxes. His committee was obtaining from each foreman a statement of sandbox troubles, and after analyzing all the reports would make suggestions for solving the difficulties.

President Murphy read the statement of crippled cars covering January. Some of the figures were protested by some of the foremen, who asserted that the pull-ins reported were not always actual cripples. The figures are made up from reports furnished by the transportation department and sent to headquarters before the local repair foreman can check them up. It is not unusual for motormen to turn in a car "crippled" for no other reason than that one with better motors or air brakes is available as a substitute. Mr. Feeney, representing General Manager R. E. Danforth, said that steps were being taken to have the pull-in reports verified by the shop foremen before they are sent to the main office. Mr. Ricker suggested that the report have two columns, one giving the pull-ins reported by the transportation department and the other the number determined by the inspectors after examination.

N. W. Bolen, superintendent of transportation, said he was aware of the habit of some motormen to turn in good-order cars as cripples so that they could have an excuse for getting one which would meet the schedules more easily. He was anxious to co-operate with the shopmen for the elimination of this practice, and to that end would instruct his depot masters to keep a special record of the motormen who report pull-ins. He would also arrange to have his foremen confer with the shop foremen on this matter in all its bearings.

Mr. Ossett, of the legal department of the company, then gave a brief talk on the relations which should exist between the shop department and the legal department of a railway company. He has found when personal injury cases came up for litigation that it was not easy to secure the proper evidence from the shop records to prove that the cars concerned were in good condition at the time of the supposed accident. He suggested that a report should be made on a car every time any work was done on it, even to the sanding of the steps and platform in snowy weather. Such reports should be duly signed and countersigned by the local foreman, thereby securing a document which would be admissible as legal evidence. He also mentioned the desirability of keeping close track of the names and addresses of the men. The average car house employee is of a more or less nomadic disposition, and frequently when a case comes up some months after an accident it is found that the best witness has departed for points unknown. Mr. Ossett also suggested that it would be a help to the legal department if every employee's particular class of work was specified in the shop record, as it was important at times to know just what kind of work a particular man's signature covered.

F. P. Maize, traveling inspector, said that he had looked into the cause of the trouble with sleet wheels. He had found that some of them required reaming, the hub being .003 in. smaller than the pin. This change had removed a great deal of the trouble of which the shop foremen had formerly complained. Further investigation of progress with the new gear lubricants had shown that some depots were using too much, but this would soon be corrected, and the cost of this item would decrease. In some places journal boxes were simply refilled with oil instead of being repacked. This was both poor and wasteful lubrication, as the packing should always be removed to take out the glazed portions. He had looked into complaints regarding slow deliveries, and had found that the shops were not entirely to blame. If the depots would return immediately any parts for which they had no use, it would be a great help for the shop. The outside foremen should not suppose that because one part of a piece of apparatus is worn out that the rest of it is worthless. Often enough the absence of some small but essential part hinders shipments from the shop. Melting out the babbitt from motor bearing shells when supplies do not come fast enough from the storekeeper was also an undesirable practice.

The New Orleans Railway & Light Company, in addition to the large amount of maintenance work now under way, has in contemplation the substitution of Georgia granite pavement for shells in the tracks on Magnolia Street from Sixth Street to Napoleon Avenue, a distance of about 1.11 miles of double track. Other paving work of interest to be undertaken at once is the substitution of square creosoted wooden block pavement for the asphalt pavement now in place on St. Charles Street from Common to Canal Streets.

PURCHASE OF COAL ON B. T. U. BASIS IN CLEVELAND

L. P. Crecilius, superintendent of power, Municipal Traction Company, Cleveland, read a paper on the subject mentioned above at the last meeting of the Cleveland section of the American Institute of Electrical Engineers. He stated that the cost of fuel was approximately 70 per cent of the entire power station cost in Cleveland, and that the heat efficiency of the plant was practically 8 per cent. For some time the company has been purchasing its fuel on the British thermal unit basis. Similar systems are used by the Interborough Rapid Transit Company, New York, and the Water Works Department in Cleveland. Mr. Crecilius described the method pursued by him as follows:

There are available in the Cleveland market in extensive quantities two principal grades of bituminous slack, one coming from the western section of Pennsylvania and the other from the eastern part of Ohio, the best of which is known as Youghiogheny gas slack.

For a period of about two months before the contract was put into effect the company made certain evaporative tests to determine the relative steam-making qualities of Ohio bituminous slack and Youghiogheny gas slack. These tests clearly indicated that the furnaces as constructed, and with the draft available, both Youghiogheny slack and Ohio slack can be burned with equally good results. The average chemical properties of the two kinds of slack, per pound of dry coal, are as follows:

	Youghiogheny gas slack	Ohio bit. slack
British thermal units	13,185	12,614
Ash	11.6%	13.8%
Sulphur	2.03%	3.53%
Volatile combustible matter	31.95%	36.62%
Fixed carbon	53.52%	45.55%

The relative evaporation per pound of coal as fired was 7 per cent in favor of the Youghiogheny gas slack. The inherent moisture contained in the coal in the first case is 1.52 per cent, and in the second 2.7 per cent.

Each day's consignment of coal furnished to each power plant by the contractor during the continuation of this contract is sampled by the superintendent or his authorized agent, and analyzed to determine its heating value, and the price paid by the company per ton per car of coal is based upon the table of heat value for excess or deficiency of the standard therein contained, but subject to further deductions for ash and sulphur.

A small quantity of coal is taken from at least five different places in each car received by driving into the coal a 5-ft. ram, before the car is unloaded. These quantities thus received from each car of coal of the day's consignment are thrown into a receptacle provided for this purpose and thoroughly mixed, and a properly selected sample of this mixture is taken for chemical analysis. One-half of the sample of the average mixture is labeled and held at the company's laboratory for a period of two weeks after unloading the cars. The other half of the sample taken from the average mixture is analyzed as soon as possible after being taken. No other sample is recognized.

Tests of the sample taken from the average mixture are made by the company's chemist under the supervision of the superintendent. Should the contractor question the results of the company's test (a copy of which is mailed him), the company will, if requested within three days after the copy has been mailed him, forward the other half the sample held for this purpose, to any laboratory in the city of Cleveland which may be agreed upon by the superintendent and the contractor, and have said sample analyzed by it. The results obtained from this second test shall be considered as final and conclusive. In case the disputed values as obtained in the company's test shall be found by the second test to be 2 per cent or less in error, then the cost of the second test shall be borne by the contractor; but if the disputed value shall be found to be more than 2 per cent, then the cost of the second test shall be borne by the company.

Should there be no question raised by the contractor within the three days specified as to the values of the company's analysis, the second sample of coal is destroyed at the end of two weeks from the date of unloading the cars from which it was taken. Should a second test be made of the sample of the average mixture as herein provided, then any penalties to be made will be based on the results as obtained from the second test.

Coal which is shown by analysis to contain less than 15.0 per cent of ash and 3.5 per cent of sulphur is accepted without a deduction from the basic contract price, plus or minus an amount of excess or deficiency of British thermal unit value, as herein provided. Where the analysis gives amounts for any and all elements in excess of these quantities, deductions are made from the basic contract price in accordance with the penalties provided herein, for value of ash and sulphur below given, plus or minus the amount for excess or deficiency of the standard British thermal unit value.

The so-called average mixture of the day's consignment of coal was arranged to allow the dealer the benefit of cars of coal running low in ash and sulphur to offset those having a high value. The plan also offers some advantages to the company in that, on account of having a fewer number of samples to analyze, the chemist is not hurried in his work, and can therefore devote more attention to the preparation of samples and to the checking of his determinations.

The table referred to in this section of the contract is so proportioned as to focus the attention of the dealer to supplying Ohio bituminous slack of a value ranging from 12,500 b.t.u., the standard in the contract, to 13,125 b.t.u., 5 per cent above the standard, and which to him results in the best profit obtainable. To have protection from the supply of fuel having a high British thermal unit value, and which by reason of its chemical make-up may not be entirely adapted to the stoker equipment as existing, a limit has been placed in the table above which no further premiums are paid.

To guard against a supply of low-grade, cheap coal or slack which has been kept in stock, the British thermal unit value table is so arranged that the value can fall but 10 per cent below the standard, where, by reason of the addition of penalties due to ash and sulphur on this sort of fuel, the price is cut to such an extent that only the freight charges are realized. The idea being to secure for the power plant referred to in this paper the fuel which by test has been found best adapted to the existing equipment and load conditions, and at the same time satisfactory in regard to cost.

Almost immediately after the contract went into effect a marked improvement in the cost of efficiency of the entire plant took place, accompanied by an improvement of some 8 per cent in the consumption of coal per kw-hour.

In conclusion it may be said:

(1) That the installation of the scheme of purchasing fuel on the British thermal unit value basis has been justified in this case.

(2) That, due to the difference in price as existing between Youghiogheny gas slack and Ohio bituminous slack, the latter is the cheaper fuel to use, admitting, however, the superiority of the former over the latter.

The following table shows the variation of analyses from samples taken from cars by three different methods:

	Weight of samples	B.T.U.	Ash	Sulphur
Sample taken by hand at regular intervals while car being unloaded	600 lb.	12,843	10.96	2.51
Samples from top of car	20 lb.	12,918	10.4	2.53
Samples taken by ram	20 lb.	12,777	11.3	2.56

An Italian company, with a capital of $300,000, is being organized to construct and operate an electric tramway from Biella to L'Hospice d'Oropa, and another company, with $140,000 capital, is being organized to build and operate an electric tramway from Varese to Angera. The latter line will, it is expected, be subsidized by the State, the Como Provincial Government and certain municipalities.

ROLLED STEEL WHEELS FOR THE CHICAGO CITY RAILWAY COMPANY

The Chicago City Railway Company has made arrangements for the purchase of rolled-steel wheels to be used under all of its rolling-stock equipment. Specifications for the manufacture of these new wheels have just been approved by the Board of Supervising Engineers of Chicago Traction and are presented herewith in part. An illustration is also presented showing the detail dimensions of the 34-in. rolled-steel car wheels which hereafter will be standard for all double-truck cars. This illustration has been reproduced from drawing No. 2-K-4 of the Board of Supervising Engineers. It shows not only the dimensions and contour of the new wheel, but also the position of the wheel riding on the head of the 129-lb. rail, which is standard for all the tracks of the Chicago City Railway and the Chicago Railways Companies. The new rolled-steel wheels will be manufactured by the Carnegie Steel Company.

Referring to the illustration it is noted that the rim of the wheel will have a minimum thickness of 2¼ in. The engineers of the railway company expect that with the flange and tread as shown it will be possible safely and economically to wear the tread down to a thickness of from ⅝ in. to ¾ in. with two turnings.

is stated that a saving in weight of about 500 lb. per car will be effected by replacing the present chilled-iron wheels by the new rolled-steel wheels.

A portion of the specifications covering the purchase of these wheels is presented herewith. These specifications were signed as follows: Board of Supervising Engineers Chicago Traction, Board No. 1; Bion J. Arnold, chairman and chief engineer; George Weston, representing the City of Chicago; Harvey B. Fleming, representing the Chicago City Railway Company.

IV.—Bore of wheels to be either 5¼ in., 4¼ in., rough bore, or as ordered.

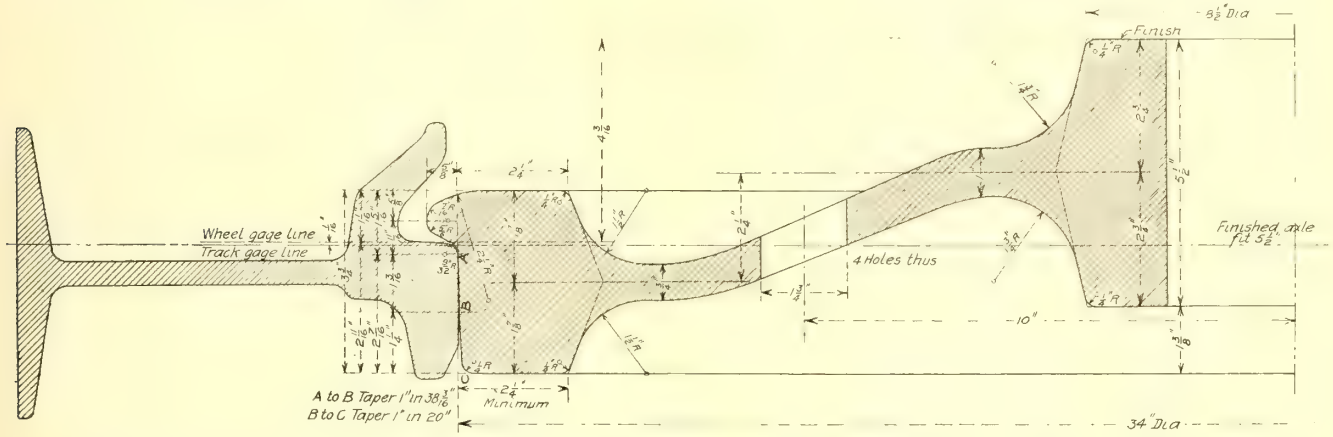
V.—The steel for wheels shall be made by the open-hearth process.

VI.—The steel for wheels shall conform to the following limits in chemical composition:

Carbon	0.65 to 0.85 per cent
Manganese	0.60 to 0.85 per cent
Silicon	0.08 to 0.25 per cent
Phosphorus	not to exceed 0.040 per cent
Sulphur	not to exceed 0.050 per cent

VII.—The manufacturer shall furnish the inspector the complete analysis of every heat from which the wheels are made. These analyses shall be made on drillings taken from the small test ingots and shall conform to the limits prescribed in paragraph VI.

VIII.—The slabs from which the wheels are made shall



Cross-Section of New Solid Steel Wheel Adopted by the Chicago City Railway Company, Showing Detail Dimensions of Wheel and Standard Rail

The first wear, it is expected, will reduce the diameter by ⅜ in. and it will require turning off ¼ in. to renew the flange and tread contour. The second wear and turning are expected to be the same in depth as the first, and then the final wear, it is thought, will reduce the rim to a thickness of ⅝ in. to ¾ in. The engineers hold the opinion that each of these three periods of wear will give a mileage equal to that now obtained with a chilled-iron wheel or, in other words, that the steel wheel will outlast three chilled-iron wheels.

As an additional economy it is planned to use the steel wheels which have been worn to the above limit under double-truck cars for replacing the present wheels used under the single-truck cars which operate on some of the crosstown lines in the southern part of the city. The axles on the single-truck cars are smaller than the standard axles of the double-truck cars and therefore when a steel wheel has reached the limit of its wear under a double-truck car it will be removed, a bushing will be inserted in the hub and the wheel will then be used in the lighter single-truck service. One consideration leading to the purchase of steel wheels for all the cars of the Chicago City Railway was the desire to reduce the weight of equipment. It

be sheared from the rolled ingot after sufficient has been discarded from its top to insure freedom from piping.

IX.—All wheels shall be free from injurious seams, cracks, flaws or other imperfections. The dimensions of wheels shall conform to the dimensions shown on drawing No. 2-K-4, accompanying these specifications, within the following limits:

(*a*) The height of flange shall not vary, according to good machine-shop practice, from that specified.

(*b*) The width of flange shall not vary, according to good machine-shop practice, from that specified.

(*c*) The throat radius shall not vary, according to good machine-shop practice, from that specified.

(*d*) The thickness of rim shall not vary more than ¼ in. from that specified and shall not be less than 2¼ in.

(*e*) The minimum width shall not be more than 1/16 in. less than the width specified.

(*f*) The diameter of bore shall not vary more than 1/16 in. from that specified and shall be rough turned to the diameter required by using not less than two cuts.

(*g*) The eccentricity between center line of tread and center of bore shall not exceed 3/64 in.

(*h*) The minimum outside diameter of hub shall not be more than ⅛ in. less than that specified.

(*i*) Eccentricity outside hub to tread shall not be greater than 3/16 in.

(*j*) The length of hub shall not vary more than ⅛ in. from that specified.

(*k*) Distance from gage line to inside face of hub must be 4 3/16 in., measured according to good machine-shop practice.

(*l*) The projection of outside rim shall not vary more than 3/32 in. from that specified.

(*m*) Black spots in the bore of wheel shall not be longer than 2 in. nor deeper than ⅛ in. and shall not be located within 2 in. from either face of hub.

(*n*) All wheels shall be gaged with a ring gage; the opening between gage and tread at any point shall not exceed 1/16 in.

(*o*) All wheels shall be gaged with a four-point ring gage and the opening between any point on gage and back face of flange or outside face of rim shall not exceed ⅛ in.

(*p*) All wheels shall be measured with a standard M. C. B. tape and have the tape numbers clearly marked or stencilled on each wheel. Wheels shall be mated as to tape sizes and shipped in pairs.

(*q*) The diameter of wheels shall not vary more than 3/16 in. from that specified.

X.—Wheels shall be stamped with maker's brand and wheel number in such a manner that each wheel may be readily identified.

XI.—The constructor will replace free of charge any steel wheels sold, delivered and manufactured under this specification which may prove defective by reason of cracking or breaking, defective material or workmanship, provided the same have received reasonable care and attention by the company and have not been used or worn beyond reasonable limits.

XII.—Both the chief engineer of the work and the engineer in charge, or their duly authorized representatives, shall have free entry to the works of the manufacturer at all times while this contract is being executed and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the wheels are being made in accordance with the terms of the contract.

All tests and inspection shall be made at the place of manufacture prior to shipment and shall be so conducted as not to unnecessarily interfere with the operation of the mill.

GOVERNOR OF WASHINGTON RECOMMENDS PUBLIC SERVICE COMMISSION

In his annual message to the Legislature A. E. Mead, Governor of Washington, calls attention to the clause in the Republican State platform pledging the party to enact a law similar in spirit to the public utilities law of New York. He says in part:

"This is a subject demanding your most careful attention. The manner of handling and regulating our public-service corporations is of the first importance, and one of the most difficult problems confronting the different States of the National Government. The reason for having these corporations governed and controlled by a special commission is that such commission is, or soon should be, an expert body, better qualified by special study and the time such commission can devote to the questions than are either courts or the Legislature. Many students of this question have concluded that such a commission should be vested with judicial powers and made a tribunal having original jurisdiction to try all public questions between the people and the corporations, providing directly for an appeal from such tribunal to the Supreme Court, to the end that the Supreme Court may have the benefit of the commission's findings and conclusions. Such a commission has been created in the State of Virginia and the Constitution and the act creating it have been lately upheld by the Supreme Court of the United States. This procedure would greatly hasten the final decisions on these important public questions, as the time consumed in taking the testimony and trying the issue before the Superior Court would be obviated.

"If you should conclude that such tribunal, if created, should possess judicial power, it will probably be necessary to have the Constitution of the State amended so as to directly authorize the Legislature to clothe such commission or commissions with judicial functions. I submit the matter to your careful consideration."

THE EXPERIMENTAL SIDE-DOOR TRAIN IN THE NEW YORK SUBWAY

The illustrations on page 381 show some of the novel features of the New York subway side-door cars, first suggested by Bion J. Arnold in a report to the Public Service Commission of the First District, New York, published in the Street Railway Journal of Feb. 29, 1908. In this report Mr. Arnold discussed the merits of side-door cars of several types, and in conclusion recommended that the present design be changed to one with two doors at each end as illustrated. It will be noted that the original end doors are now reserved for entrance only, and that they are still operated by hand levers. Departing passengers must leave by way of the new doors. Both exit and entrance doors are 3 ft. 2¾ in. over all and are 3 ft. 2¾ in. apart.

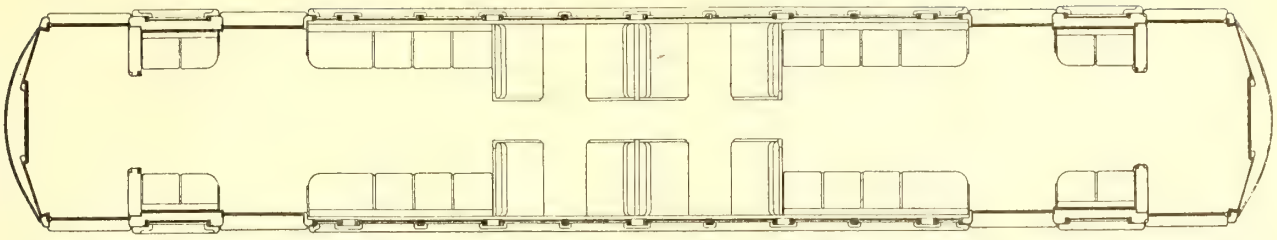
To attain the desirable freedom of movement at the car ends it was necessary to give up the longitudinal seating opposite each of the four exit doors per car. The special seats installed between the doors may be removed if it should be desirable to do so for the sake of better passenger movement. Mr. Arnold believes, however, that the losses in seating could be regained by using more transverse seats if future subways are constructed so as to admit wider cars.

The insertion of the new doors made it necessary to cut out corresponding lengths of the side sills. The latter have been strengthened by placing under the doors 5/16-in. reinforcing girders of fish-belly design, riveted to the sills. The girders are 10 ft. 9¼ in. over all, composed of an upper member 6 in. deep and a lower member 3½ in. deep. At the motor end a ½-in. x 3¼-in. brace is riveted through a 6-in. channel to the lowest point of the reinforcing girder. Other new steel work for the cars included the installation of ⅛-in. pressed steel posts for the new doors.

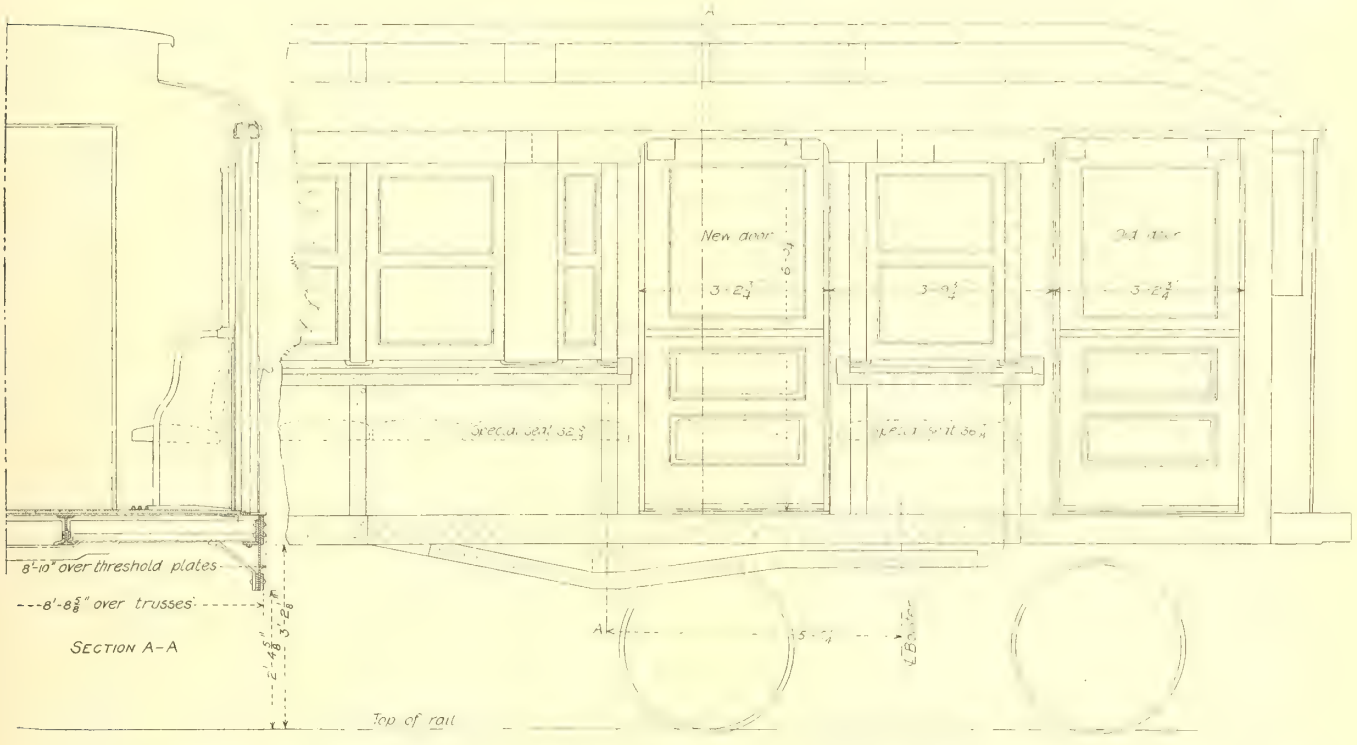
The new exit doors are pneumatically operated by the guard who controls the end grab-handle shown in the half-tone view. The door mechanism is of two types, four cars having been equipped by the Burdette-Rowntree Company and four by the Consolidated Car Heating Company. Both designs are operated at the regular train-line pressure, so nothing further than a connection to the main reservoir was needed. The shutting of the last door in the train closes a buzzer circuit leading to the motorman's cab. Current for this circuit is taken from the main circuit through resistances furnished by the Consolidated Car Heating Company. This buzzer circuit is similar to that which is being installed by this contractor on the latest pay-as-you-enter cars of the Third Avenue Railroad Company, New York.

A hearing, adjourned from Tuesday, Feb. 23, will be held on Saturday, Feb. 27, at 10:30 a. m., before Commissioner Eustis, of the Public Service Commission, on the subjects of installing more cars of this type and on proposed changes in the operation of the experimental train.

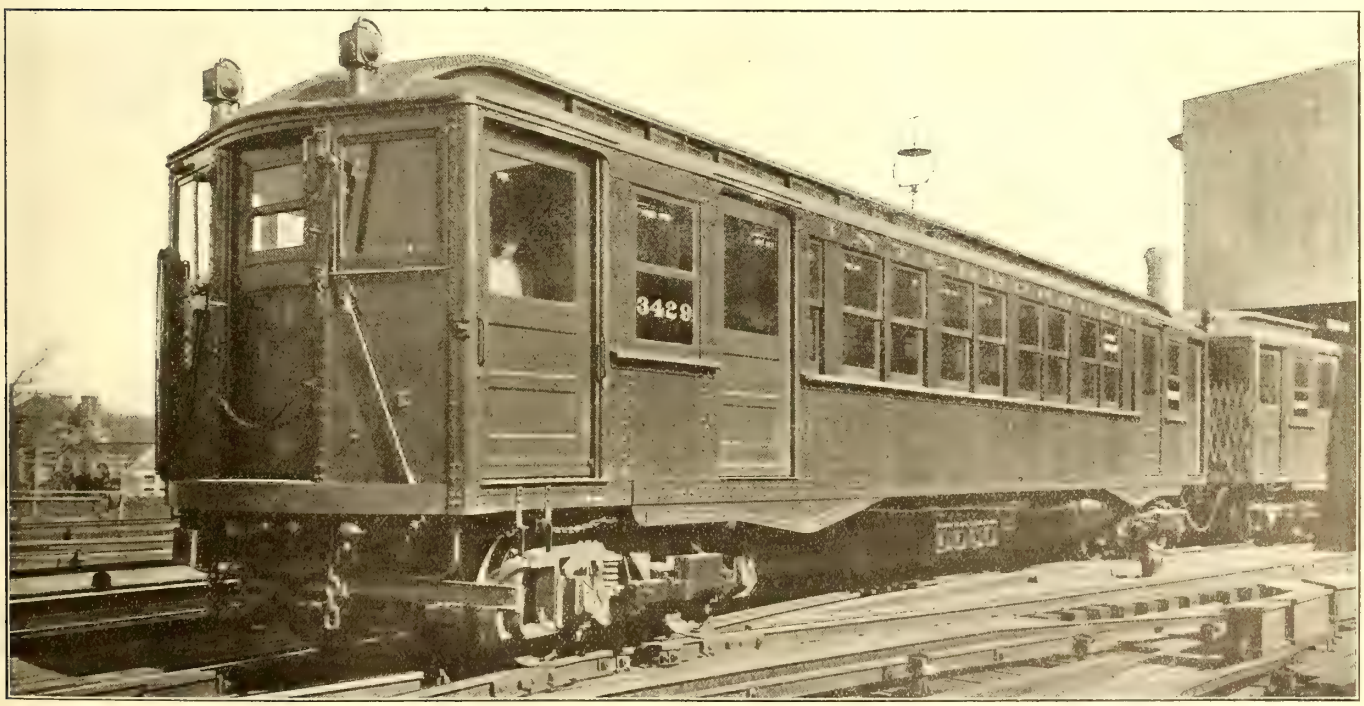
Dr. W. Wyssling, general secretary of the commission for studying the electrification of the Swiss State Railways, and his assistant, Dr. W. Kummer, have just issued their recommendations on the selection of the proper frequency for single-phase equipment. They recommend 15 cycles from both engineering and financial considerations. The Bavarian and Italian decisions in favor of 15 cycles and the American propaganda are quoted as precedents.



Seating Plan of Side-Door Cars Used on the New York Subway Experimental Train, Showing Reduction in Number of Longitudinal Seats



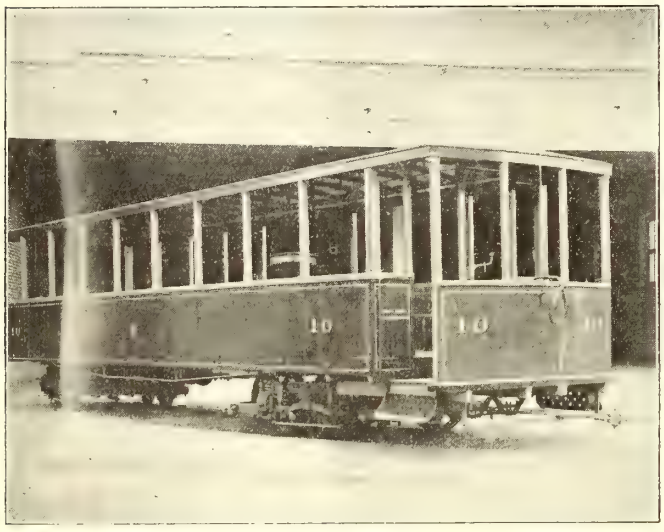
Part Side Elevation and Cross Section of Side-Door Cars Used in the New York Subway Experimental Train



One of the Experimental Side-Door Steel Cars of the New York Subway, Showing Door-Operating Devices on the End

HOME-MADE TRAILERS IN SHREVEPORT, LA.

Through the courtesy of L. M. Levison, secretary and general manager of the Shreveport (La.) Traction Company, the accompanying views are available of one of the semi-open double-truck trail cars built by this company for State fairs, baseball grounds, parks and similar special service. The bodies, which are built of native cypress and long-leaf pine, are 37 ft. long over all and 8 ft. 2 in. wide. They are of semi-closed construction, with 3-in. x



Semi-Open Car Built for Park Service in the Shops of the Shreveport Traction Company

4-in. posts framed for windows or storm curtains should they be needed. They are mounted on Brill No. 27-G-1 trucks, and are equipped with straight air brakes. The total weight of each car is about 14,000 lb. and the seating capacity 120. The seating illustrated is longitudinal, but



Interior of Shreveport Semi-Open Car for Park Service

end seats are also furnished. As the standing area is very liberal, the car is ideal for heavy traffic in the warm climate of Shreveport, where it never snows, and where the passengers are hauled comparatively short distances.

A report from Constantinople, Turkey, says that the Gresham Company, of London, has applied for a 50-year concession for constructing and operating electric railways in the suburbs of Constantinople.

COMMUNICATION

THE PROBLEM OF REDUCING ACCIDENTS

The United Railways & Electric Company,
Baltimore, Md., Feb. 20, 1909.

To the Editors:

I have read with great interest the articles written by Frederick W. Johnson, of Philadelphia, and Ellis C. Carpenter, of Anderson, Ind., which have recently appeared in the columns of the Electric Railway Journal, relating to the reduction of electric railway accidents and to the successful operation of railway claim departments. It is unnecessary to state that these articles were instructive and edifying, and coming as they do from experienced and well-known claim officials, they should be carefully studied.

The reduction of electric railway accidents to the lowest possible minimum (or their permanent elimination, if such a happy proposition is possible), the thorough and rigid investigation of all claims and suits, the prompt settlement for the lowest possible amount of all that are meritorious and the detection and successful prosecution of all accident fakers and malingerers are questions which continually occupy the mind of the claim official, and the most efficient methods to arrive at these desired results are eagerly sought. The successful claim official, although his years of usefulness may have been many and his experience in his particular line of railway duty profound, always realizes he never "knows it all" and he is eternally vigilant in his efforts to glean additional knowledge for the successful operation of his department.

It is hoped, therefore, that other claim officials will follow the example of Mr. Johnson and Mr. Carpenter and express their views from time to time in these columns upon the methods they consider most feasible for the successful operation of railway claim departments.

F. Howard W. Kidd,
Claim Adjuster.

TWO NOVEL VENDING MACHINES

A decided novelty in weighing machines is being put on the market for park and station use by the United Vending Machine Company, Cleveland, Ohio. This device is a combination of scale and phonograph, which will, upon the insertion of a coin call out the exact weight of the person standing on the platform. The voice is said to be so loud and distinct that the weighing of one person immediately attracts others to the machine. The talking scale has already been installed in a number of public places and, no doubt, has attracted the coins of many who would never think of being weighed otherwise than gratis at their local grocer's. A novelty like this should exert a strong appeal to park crowds, who derive most of their fun from the "follow your leader" principle.

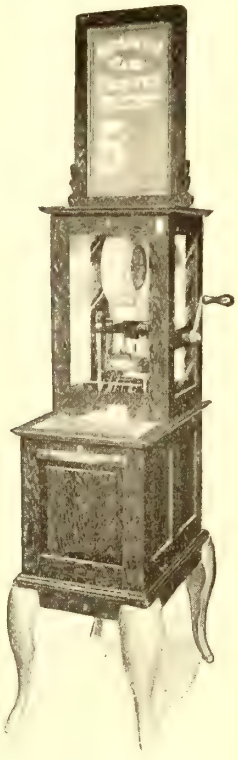
The talking scale is not made for early consignment to the scrap heap, but for permanent use. All the working parts are made of nickel-plated tempered steel. The balance beams are hung on tool-steel knife-edge bearings. The scales are built in highly polished quarter-sawed oak cabinets, ornamented with nickel-plated trimmings; they are also built in aluminum-finish weatherproof iron cases for outside and inside use. In general, this contrivance is built to withstand abuse as well as the best of ordinary scales, and in addition has a most attractive finish. The accompanying illustration represents the interior of the

machine, the cover having been removed to show the phonographic mechanism.

Another park novelty placed on the market by this company is the card-printing machine shown in one of the illustrations. This device appeals in a very effective way to the natural desire to see one's name in print. The machine can be operated by anybody, but is particularly amusing to children. The alphabet is arranged in the usual



Talking Scales

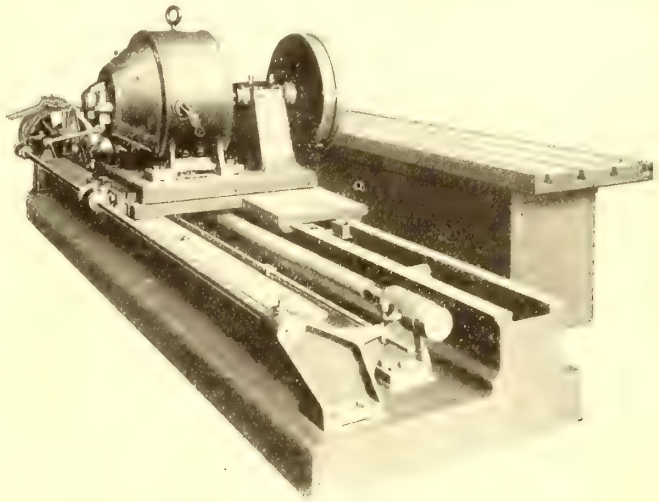


Card Printing Machine

order and is followed by punctuation marks. The machine can be arranged to give out 12 cards for 5 cents or 5 cards for 1 cent. The cost of supplies is very small, a $2 roll of card paper and accompanying ink being enough for $16 of cards. As it takes only 30 seconds to print a dozen cards, this device is capable of great earning power. The printer is mounted on a stand in a heavy glass case, which attractively sets off the mechanism. It is accompanied by instructions giving the few simple movements required to print the cards.

MOTOR-DRIVEN TRAVELING HEAD FACE GRINDER

The accompanying illustration shows a 102-in. face traveling head grinder made by the Diamond Machine Company, of Providence, R. I., and driven by a Westinghouse type "S" compound-wound, 10-hp, 1100-r.p.m., completely enclosed motor. This grinder is particularly adapted for purposes where it is necessary to grind to very exact figures any materials that are liable to be too hard to be machined. The grinding head is direct connected to the motor, which, together with a very heavy outboard bearing, is mounted on a large base moving on ways. The motor has an extended shaft to carry the grinder chuck. The work is stationary, being bolted to the large platen in front of a 22-in. emery ring, while the ring rotates and also moves slowly back and forth from end to end of the platen. The reversing is done by a hand lever when the machine is in use, but automatic stops are provided at each end of the extreme travel to prevent over-travel should the attendant neglect to reverse the feed. The maximum traverse feed of the grinder is ½ in. and is operated by a hand wheel and miter gear on the splined shaft in the front of the machine. The longitudinal travel of the grinder is obtained from the powerful feed screw shown in the illustration. Attention is called to the fact that the travel, 20 ft. per minute, is somewhat faster than might be supposed from the thread of the screw as a triple thread



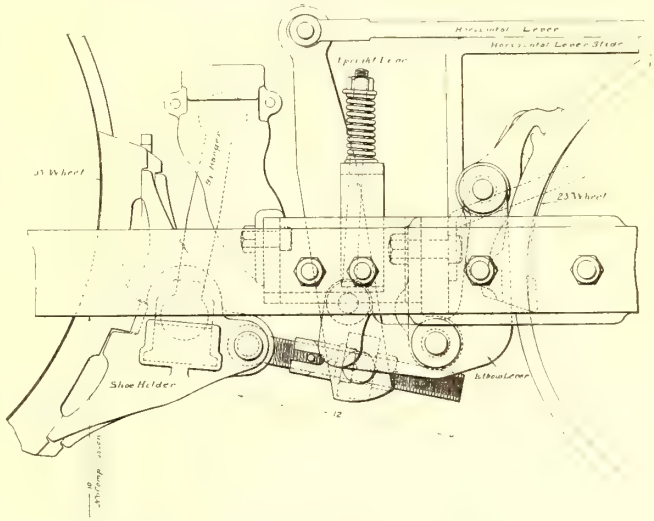
Motor-Driven Traveling Head Face Grinder

is used. The lead screw is driven by a second motor not shown in the illustration.

Where required an a.c. motor may be supplied in place of the d.c. motor. The size of the motor to operate the lead screw is dependent upon the amount of metal to be removed.

IMPROVED BRAKING SYSTEM FOR MAXIMUM TRACTION TRUCKS

The J. G. Brill Company, of Philadelphia, Pa., has recently acquired the rights for the improved method of distributing the braking weight on maximum traction trucks shown in the accompanying drawing. This arrangement was invented by J. S. McWhirter, superintendent of car



Improved Brake for Maximum Traction Truck

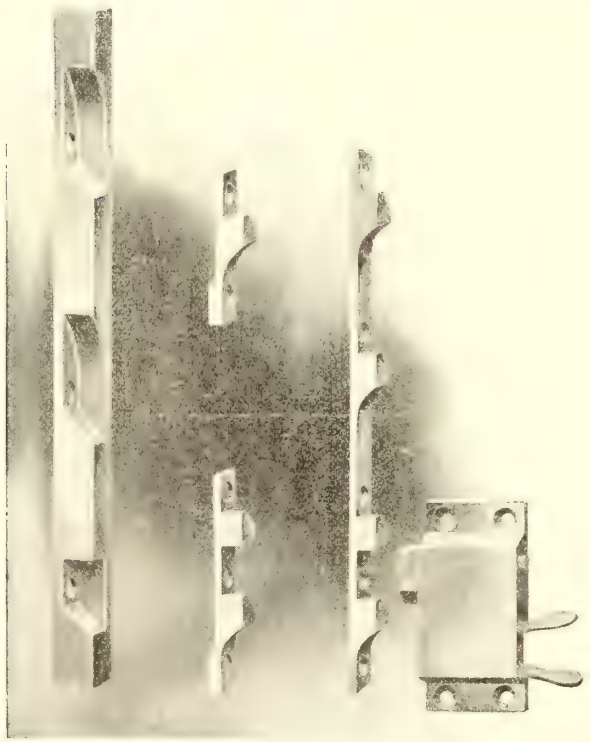
equipment, Third Avenue Railroad Company, and has been successfully applied on 543 maximum traction trucks operated by that company. It has been specified for all the new cars ordered by the same company. This is the method applied to reduce braking trouble, as mentioned in the

Electric Railway Journal of Feb. 20 in the article on maintenance trouble reduction on the Third Avenue Railroad.

The brake operates as follows: The force exerted in the right-hand direction on the horizontal lever forces the adjustable threaded rod in the direction of the driver wheel. At the same time the fulcrum, which is suspended from the bell-hanger lever, works on a second fulcrum on the elbow lever and forces the small shoe against the pony wheel. In this position 33 per cent of the braking weight is on the ponies. Variation in the position of the fulcrum suspended from the bell-hanger lever will change the ratio of braking weight. The bell-crank lever acts also as a brake-shoe hanger or support. A 9½-in. hanger supports the shoe and head of the driver wheel.

AN INNOVATION IN CAR WINDOW FIXTURES

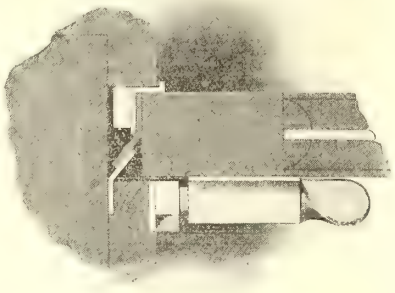
An interesting combination of side weather-stripping, dust deflectors, sash balance and sash-locking means for car windows is manufactured by the Grip Nut Company, of Chicago. From the illustrations and description it will be noted that one of the essential features is the ingenious arrangement of inside and outside flexible weather strips. The inside window stops and finish are placed away from the sash and the sash is fitted loosely, thus allowing clearance edgewise to prevent binding. The necessary opening around the loosely fitted sash is made air-tight and dustproof by the weather strips forming a flexible joint. The strips also cushion the sash broadside against the outside stops and centralize the sash between the two window jambs. It is stated that in this way friction is reduced to a minimum, an easily operated sash is provided and all rattle is eliminated.



Gravity Wedging Sash Locks of Different Designs

The gravity wedging lock is a device to prevent rattling and to keep the sash from falling. The lock bolt is beveled 45 deg. and settles into a corresponding downward and outward beveled rack. A gradual wedging of the sash against the stops in its downward movement effects a progressive stop, preventing the usual sudden jar which loosens the screws and fixtures, breaks glass, etc. The sash is securely locked against the outside stop.

Various designs of racks are made, some of which are shown in one of the illustrations. The pressed rack is a neat design as it is set in flush with the stop. The individual stops also have the anti-rattling wedge features and are reinforced at the bottom, doubling the usual support in the wood to prevent splitting and pulling out of screws. These individual stops are asserted to be as effective as continuous stops and cost considerably less. The company makes over 40 combination designs suitable for any desired construction of windows in either wood or steel cars.

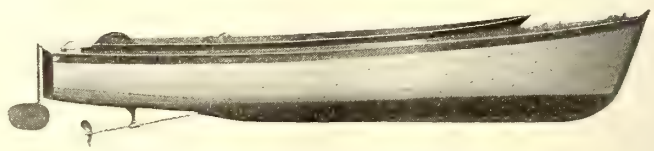


Section Through Window Post, Showing Weather Strips

STEEL BOATS FOR PARKS

In response to the demand for park boats embodying graceful outlines, safety and durability to the greatest extent, the Michigan Steel Boat Company, of Detroit, Mich., has designed and built several interesting types of steel boats for this kind of service. It is unnecessary to refer to the stability of this company's rowboats other than to mention the case where several intrepid explorers used one of these boats to go down the Grand Canyon of the Colorado River, and finished their journey with the boat still intact.

This company also makes power boats, the latest design being termed the "1909 18-ft. Express." This is fitted with double-cylinder engines of from 2 hp to 14 hp. In a trial trip with a 12-hp to 14-hp double-cylinder engine, one of the new boats made practically 20 m.p.h. for five consecutive hours. The engine is placed forward; just aft of it is a panel bulkhead, over which the steering wheel is placed in automobile fashion. Side seats accommodating four passengers are in the forward cockpit, while two large tonneau automobile seats in the aft cockpit serve for six persons. The hull is made of heavily galvanized steel cut in regular pattern strips, lock-seamed and welded together by pneumatic hammers. The boat has a V-transom stern and is fitted with air-tight compartments. When so ordered, the engine is equipped with a fuel feeder in place of a carbureter, and when this is attached the engine will run on kerosene, gasoline, alcohol or naphtha.



Steel Power Boat for Park Service

An Italian company, with a capital of $300,000, is being organized to construct and operate an electric tramway from Biella to L'Hospice d'Oropa.

News of Electric Railways

Cleveland Traction Situation

Judge Tayler of the United States Circuit Court at Cleveland has granted the receivers of the Municipal Traction Company authority to purchase 80 new motor equipments for cars now in operation. The receivers have filed a petition with the court asking for authority to rebuild the track on Superior Avenue, from Payne Avenue to Ansel Road; Payne Avenue, from Superior to East Fifty-fifth Street; Cedar Avenue, from Fortieth to East Fifty-fifth Street; Thirty-fourth Street, from Broadway to Kingsbury Run Viaduct; Scranton Road, from Clark Avenue to Paraffine Avenue; Prospect Avenue, from East Twenty-second Street to East Fortieth Street; two strips on West Twenty-fifth Street and one on Harvard Street. In all, 23 miles of line are involved. It is stated that at least 15 miles more are in need of repairs. The court will hear the petition on Feb. 26. The work thus proposed, it is roughly estimated, would involve an expenditure of $500,000.

The receivers have been given authority to pay the interest on $5,251,000 of consolidated 5 per cent bonds of the Cleveland Electric Railway and $1,000,000 first mortgage 5 per cent bonds of the East Cleveland Railroad, due March 1, as well as interest on the floating debt secured by bonds. The total will be about $151,000.

A report made by the receivers for the first 15 days of February under the increased fare shows that the receipts were $234,474, compared with $177,805 for the same period in January. The average rate of fare for the time was 4.35 cents, while for the corresponding 15 days of January it was 3.19 cents. This showing is better than the estimate made by the receivers when they asked the Council for a 5-cent fare over all the system, with six tickets for 25 cents. Then they placed the approximate average of 4.223 cents. Superintendent Bemis of the water works department stated that the average under the present arrangement would be 4.005 cents per passenger.

Mayor Johnson has issued another circular letter regarding the reports of the earnings of the company. He has eliminated from the reports of the receivers all charges except for money actually spent each month, and claims that the receipts for the quarter ended Dec. 31, 1908, exceeded the expenditures by $230,111. He says that a surplus of $9,977 would have remained after allowing a profit of $220,134 to the stockholders. The letter states that the expenditures for expenses and maintenance were $136,792 less than was shown by the reports.

Little progress has been made toward arriving at a conclusion on a franchise. While nothing has been given out by the committee which has this in hand, it is believed by many that Mayor Johnson is blocking progress by his determination to have an option clause which will permit the city to name a purchaser for the property at 110 after two years from the date of the signing of the grant.

The division superintendents of the Cleveland lines were reassigned on Feb. 20, and the arrangement of lines that existed under the management of the Cleveland Electric Railway was re-established. Charles Rohn now has charge of both the Euclid Avenue and Cedar Avenue lines; A. E. Duty has been transferred to the East Fifty-fifth Street lines, and Charles Brown, who has been division superintendent of the latter, has been made dispatcher on the Cedar Avenue line.

The case of the Central Trust Company against the Municipal Traction Company, which resulted in the appointment of receivers for the Municipal Traction Company, has been appealed to the United States Circuit Court of Appeals at Cincinnati in the hope that the Municipal Traction Company may regain possession of the property.

Attitude of Detroit Company Toward Special Franchise Committee

Under date of Feb. 11, 1909, J. C. Hutchins, president of the Detroit (Mich.) United Railway, replied as follows to M. J. Murphy, chairman of the committee on conference of the Committee of Fifty selected by the Mayor of Detroit to consider the traction situation in that city with a view to arriving at the terms of an ordinance to grant the Detroit United Railway an extension of its franchise:

"Dear Sir:—I am in receipt of your favor of Feb. 10, advising that, as chairman of the committee on conference, you have been requested to ask if this company will be willing to give certain information for the purpose of facilitating the work of the Committee of Fifty in assisting the Mayor in arriving at a solution of the street car problem. It is noted that the information particularly desired is as follows:

"The committee on extensions and rearrangements desires a conference with the proper officers of the Detroit United Railway in reference to their work.

"The committee on appraisals would like a complete inventory of the property of the Detroit United Railway within the city limits, both tangible and intangible.

"The committee on costs of service would like the permission of the Detroit United Railway to place an expert accountant, with possibly one assistant, at work on the company's books to enable the committee to arrive at the cost of service; and also desires all information relative to stocks, bonds and mortgages.

"And you ask to be advised whether this company will be willing to accede to the request of these committees, and at what time and in what way it will be convenient for us to see representatives of the various committees.

"I beg to assure you that we will willingly do everything in our power to facilitate the work you have in hand. I feel that the custody of the interests I represent is as much in the hands of the citizens of Detroit as in my own, and I much appreciate the efforts of your committee in these matters. The work of the several committees is so interlaced that the work of any one committee depends much upon the work of the others. I understand it to be the purpose of the general committee to engage the services of expert engineers and actuaries to recommend the principles upon which a study of this problem is to be made and to perfect the details of the inquiries to be made. Doubtless this will result in the formation of well-defined plans for the prosecution of the work and under which all confusion and repetition may be avoided.

"We will be very glad, indeed, to meet with your committee and the committees named in your letter, or with the entire Committee of Fifty for a discussion of these matters in any way it may be arranged and at such time and place as will suit the convenience of the committees.

"Again assuring you of our desire to place your committee in position to make its inquiry thorough and to facilitate its work in any way that we can, I am, Yours very truly."

Winona Interurban Railway Moves Offices.—The general offices of the Winona Interurban Railway, which have been at Winona Lake, Ind., since the line was opened, and the offices of the Winona Light & Water Company will be moved to the Rigdon Hotel Block, Warsaw, Ind., which has been leased for five years. H. S. Dickey, general superintendent of the company, has announced that cars will soon be put in operation on the Peru Division between Warsaw and Mentone.

Organization of the Wisconsin Society of Engineers.—The first annual meeting of the Wisconsin Society of Engineers will be held at the Engineering Building at the University of Wisconsin at Madison, Wis., on Feb. 24, 25 and 26. Twenty-one papers are to be presented. Among them is one by F. G. Simmons, superintendent of way of the Milwaukee Electric Railway & Light Company, on the electric interurban roads of Wisconsin. Prof. W. D. Pence will read a paper on the organization of the engineering staff of the Railroad Commission, and B. W. Mead one on the development of hydraulic power and hydro-electric plants.

New York Subway Loop to Be Modified.—The Public Service Commission of the First District of New York proposes to submit to the Board of Estimate of New York a plan for widening the six tracks on that part of the bridge subway loop from Pearl Street to the Brooklyn Bridge. It is estimated that the additional property needed to be condemned for the six-track station planned near the bridge will cost about $1,000,000. The expense of constructing the two extra tracks will be about $550,000, and the strengthening of the subway to bear the weight of buildings on the parts of the site not required for the new municipal building will cost about $325,000.

Bonus to Employes of British Columbia Electric Railway.—The British Columbia Electric Railway, New Westminster, Vancouver and Victoria, B. C., recently announced that the bonus for the year to be given to the employees in accordance with the profit-sharing plan begun in 1903, will be $66.78 for each employee. This will involve a distribution of about $45,000. The amount divided among the men is

one-third of the balance after 4 per cent has been paid on the common stock of the company. The previous payments to each employee were as follows: 1903, $25; 1904, $35; 1905, $40; 1906, $45; 1907, $63. In order to participate in the distribution, service in the employ of the company from July 1 of the previous year to the date of distribution is necessary.

Chicago Street Railway Rehabilitation and Consolidation.—In rehabilitating the tracks of the Chicago City Railway and the Chicago Railways the downtown terminals with few exceptions have not been rebuilt. The reason has been given that were each road to rebuild terminal tracks to suit its particular needs and then a consolidation be effected a considerable investment would be rendered useless for unified operation. The first cost for rebuilding the downtown terminals is placed at $1,500,000 and those advocating a merger of the two properties state that a large part of this investment will be useless for unified operation. The Board of Supervising Engineers, Chicago Traction, has decided that, inasmuch as the two companies are not in immediate prospect of coming to an agreement regarding consolidating, it will order that each company proceed with the rehabilitation of its downtown terminals for separate operation.

Exhibition of Railway Appliances at Chicago.—An exhibition of appliances used in the construction, maintenance and operation of railways will be held at the Coliseum, Chicago, Ill., from March 15 to March 20, inclusive, under the direction of the Road & Track Supply Association, which heretofore has held a small exhibit of models and drawings in the parlors of the Auditorium during the annual meeting of the American Railway Engineering & Maintenance of Way Association. The main floor of the Coliseum contains 45,317 sq. ft. of floor space, of which 32,517 sq. ft. will be devoted to exhibits and 12,800 sq. ft. to aisles. In addition to this, exhibits will be shown in the annex to the Coliseum, which contains 9582 sq. ft. of floor space, of which 6138 sq. ft. will be devoted to exhibits and 3444 sq. ft. to aisles. Applications for space should be made to John N. Reynolds, secretary-treasurer of the Road & Track Supply Association, 160 Harrison Street, Chicago, Ill.

City Street Railway Inspection Bureau Proposed for Cincinnati.—As a result of a discussion of the subject of street railway inspection by the members of the Street Railway Committee of the City Council of Cincinnati and a number of others, it is possible that a street railway municipal inspection department may be established, with a chief inspector and a number of assistants, whose duty it shall be regularly to inspect and approve the equipment of the street railways operating in Cincinnati. J. B. Foraker, vice-president of the Cincinnati Traction Company; Starbuck Smith, of the Federal Improvement Association; former Councilman John James, President Laidlaw and William Wallace, director of the Board of Public Service, and others were present. Mr. Foraker pointed out that the personal element entered into the subject, and that it was impossible in selecting employees to judge how any particular man would act in an emergency. A false move by an employee at the crucial moment will precipitate disaster, despite the fact that the man may have at his command equipment that is perfect.

Storm Interferes with Traffic in West.—The snow and sleet storms which were general throughout the Central West during the week beginning Feb. 14 seriously interfered with the operation of both electric railways and steam railroads. Conditions were perhaps worst in and about Cleveland, which seems to have been the centre of the storms. On Feb. 15 and 16 northern Ohio was covered with a coating of snow and ice, with the result that some of the electric railways abandoned their schedules for a time on account of broken trolley and feed wires and trees across the tracks. The Lake Shore Electric Railway operated practically on schedule between Cleveland and Lorain, but west of Lorain it encountered much trouble and one car was delayed for several hours. The Cleveland, Southwestern & Columbus Railway had to suspend operating entirely on one of its branches for several hours. The Northern Ohio Traction Company, Cleveland, Painesville & Eastern Railroad, the Ohio Electric Railway and most of the other systems also reported trouble at various points. The storm extended south as far as Lexington, Ky., and seriously handicapped the Lexington & Interurban Railway for a brief period. Railroad trains were many hours late, being compelled to proceed slowly because of the crippled condition of the telegraph lines.

Continued Hearing on Cambridge Subway Stations.—A continued hearing on the design of the stations in the Cambridge subway was held by the Massachusetts Railroad Commission on Feb. 18. Cambridge was represented by Mayor Wardwell, City Solicitor Pevey, City Engineer Hastings and W. B. Parsons, New York, consulting engineer. The Boston Elevated Railway was represented by its counsel, Frederic E. Snow; C. S. Sergeant, vice-president, and George A. Kimball, chief engineer. Plans for the stations at Harvard and Central Squares and Sixth Street were submitted to the board by the city and explained by its representatives and compared with the plans prepared by the company. The entire day was devoted to an exhaustive discussion of the former plans with cross-examination by the Boston Elevated Railway. The company showed in general that the plans submitted by the city were liable to result in severe congestion on platforms; have much less total traffic capacity than those prepared by the road; are liable to encroach on the private grounds of Harvard University; are open to the objection of allowing passengers to make round-trip journeys without the payment of a second fare; are ill-adapted to the turning of the subway trains at the end of the run near Harvard Square; are liable to be productive of congestion on stairways; are uncertain as to the possibilities of expansion, objectionable on account of their effect in two stations in limiting the movement of surface travel by vehicles and pedestrians, indefinite in cost of construction through the effect of land damages in offsetting closer relations of cars and trains at single platforms and involve troublesome arrangements of turnstiles to prevent the movement of traffic in the wrong directions.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

California.—A bill has been prepared for introduction which provides for the construction of railroads with money furnished by the State, the roads to be leased for private operation. Senators Wright, Campbell and Stetson have all introduced railroad measures affecting steam railroads, one of which increases the jurisdiction of the commission.

Connecticut.—The Railroad Committee of the Legislature has adopted a set of rules which will limit the amount of stock and bonds to be issued by electric railways to a fixed sum. Hereafter it is also proposed to fix a limit for the utilization of a grant and then not to extend this time. Hereafter every application for a renewal of rights will be acted upon separately. A resolution has been introduced in the Senate amending the charter of the Windsorville & East Hartford Street Railway Company, to allow the company to construct an electric railway from the northern terminus of its existing rights in Broad Brook to the Connecticut State line, passing through East Windsor, Ellington and Somers.

Illinois.—The first really significant bills affecting the electric railways are expected to be introduced shortly. A series of six bills already drawn give the Railroad and Warehouse Commission power to compel the establishment of through routes, to regulate the rates to be charged on such routes, jurisdiction over express companies, the right to compel the placing of switches at junction points, and authority to regulate the increase of capital stock or bonds issued by railroad companies. Of these bills the one relating to the issuance of stocks and bonds is considered the most significant.

Indiana.—The bill to compel the separation of grade crossings is being opposed by the interurban electric railway interests, as it would impose most of the cost of each separation upon the electric railways. A. W. Brady, president of the Indiana Union Traction Company, appeared before the Committee on Railroads and said that the bill was unfair to the electric railways. Representatives of the electric railways also were in conference with the Railroad Commission regarding the bill. A hearing was held on the trespassing bill, which makes it a misdemeanor to walk railroad tracks. While the general opinion prevailed that a measure of this kind would perhaps reduce the number of accidents to trespassers, the opinion was expressed that it would work a hardship to many railway employees who now are in the habit of walking to and from their work over the railway. The House bill providing that passengers who are compelled to stand a distance of 8 miles shall not be obliged to pay more than half fare was reported for indefinite postponement. The House, however, refused to accept the report, and the bill was passed to engrossment. In view of this action, it is thought that the bill will pass the House. It is not expected to pass the Senate. An employers' liability bill has been introduced in the Senate. It relates more particularly to common carriers. A similar bill has been introduced in the House.

Kansas.—The hearing before the Senate committee on the public utilities bill, introduced by Senator Hamilton, brought out a number of defects in the measure which it was concluded to rectify at once, and the bill is being re-

drawn. The Republican party was pledged to utility legislation, and Governor Stubbs recommended action, as previously noted in the Electric Railway Journal. Despite this, there is very little enthusiasm for the Hamilton measure. After giving a hearing to those opposed to the bill the committee extended an invitation to those in favor of it, but no one appeared to urge its passage. The opinion has been expressed that the measure should include only the public utilities of cities of the first class. Governor Stubbs, however, is understood to be opposed to limit the measure in this way.

Maine.—The committee on taxation of the House has two bills before it which affect public service corporations. One provides that corporations shall be taxed upon their physical valuation; the other provides that the present tax measure be amended so as to increase the tax rate. Both the Boston & Maine Railroad and the Maine Central Railroad have appeared before the committee in opposition to the measures.

Massachusetts.—The Committee on Street Railways has reported favorably upon the bill authorizing electric railway companies to transport military supplies and equipment over their lines, subject to the regulation of the Railroad Commission. The bill accompanying the petition of Hugh H. O'Rourke for legislation requiring street railway companies to use fenders on their cars has also been reported. Leave to withdraw has been reported by this committee on the bill to require street railways to equip their cars with apparatus for applying hot sand, and on the bill to require the Boston Elevated Railway to equip its elevated structure with exits. Unfavorable report has also been made on the bill accompanying the petition of Mayor Hibbard of Boston for legislation to provide for the maintenance and repair by street railway companies of reserved or park spaces in highways. The committee has reported favorably on the bill to allow the Old Colony Street Railway to operate its cars on the tracks of the Fore River Shipbuilding Company, of Quincy, Mass.

Michigan.—Senator Snell has introduced a bill in the State Senate fixing all passenger rates on interurbans in the State of Michigan at 1 cent per mile, and providing a penalty for violation of the law.

New Hampshire.—The bill authorizing electric railways to carry freight came before the House Committee on Feb. 10. Representatives of a number of electric railways and of the Boston & Maine Railroad were present. The Boston & Maine Railroad, through its representative, expressed itself as being in favor of the measure now under consideration.

Ohio.—Senator McKee has introduced a bill which gives the Railroad Commission authority over all stock, bond and note issues of all railway, street railway and interurban railway companies where the life of such issues are of greater duration than one year. It also provides that all bond issues for improvements shall be approved by the commission, and that where companies merge, their combined capital stock shall not aggregate a greater amount than the sum of their individual capital stocks. For the purpose of securing information regarding these matters the books of the companies shall be open to the commission. The Woods tax commission bill has been re-committed to the tax committee of the House. It is said that before the bill appears before the House again an effort will be made to give the commission full control of the franchise privilege, provided for in the bill. The House has passed the Edwards bill, which provides that police and firemen shall be carried free by electric railway companies.

Utah.—A bill has been introduced in the Senate in accordance with the recommendations of Governor Spry to create a public service commission to supervise the operation of steam and electric railways and other public service corporations. The commission is to consist of three members, to be appointed by the Governor with the consent of the Senate. The members themselves are to select their own chairman. The salary of each commissioner is to be $3,500 a year, and the offices of the commission to be at Salt Lake. The commissioners are to be appointed for a period of six years, but one member of the first commission is to serve until Feb. 1, 1911; another until Feb. 1, 1913, and the third until Feb. 1, 1915, thus bringing about the appointment of a new commissioner every two years. The commission is to report each year to the Legislature. As presented, the bill gives the commission authority to compel the railroads to file tariffs and schedules with it in accordance with a form of report which the commission shall prescribe. The authority is also to be vested in the commission to readjust rates when in the opinion of the commission they are discriminatory.

Financial and Corporate

New York Stock and Money Market

The collapse in the stock market which occurred to-day was the sharpest and most extensive since the panicky times of the fall of 1907. While the breakdown in the price combination of the steel manufacturers is correctly held responsible for having started the present demoralization, there are many other developments which have contributed to the weakness of the entire list. It is pretty well understood that the dividend-earning capacity of Steel common relies upon the excess profits which that organization can make. With ordinary business and ordinary prices, the Steel corporation can pay its fixed charges, earn its 7 per cent dividend on the preferred and lay up a little surplus; it must have either extraordinary business or extra good prices to allow it to earn a reasonable dividend on the $508,495,200 of common stock. Many of the holders of these shares evidently came to the conclusion that with the price at 50 it was a good time to dispose of their holdings, and the liquidation in this issue within the past two market days has been tremendous. Even after the market closed to-day Steel was sold on the outside at prices lower than the closing figures on the Exchange floor.

The liquidation, however, did not stop with steel shares; railroads were also weak, especially Reading, which recorded a decline of more than 10 points for the day. This was attributed to the report that the United States Supreme Court had adversely decided the commodities case. While this proved to be untrue, the fact that the court did, in three important cases, decide against corporations, strengthened the belief that the adverse decision is coming. Liquidation was general all through the list and the total sales were more than 1,500,000 shares. The traction shares were weaker, but inactive.

The money market continues to be fairly easy and rates are reasonably cheap. Bonds are still eagerly taken and investment money always appears to be plentiful. The quotations to-day were 1¾ to 2¼ per cent for call loans and 2¾ to 3 per cent for 90 days.

Other Markets

In a Boston market that was generally weak and uncertain, the traction issues to-day showed considerable firmness. Trading in these securities was not extensive, but prices showed no disposition to recede. Boston Elevated and Boston Suburban preferred were more in evidence than the others.

In the Chicago market, only odd lots of traction shares have been offered during the week and there has been practically no interest indicated. Even the various series of Chicago Railways were out of the trading. Prices are firm at the levels that have prevailed for several weeks.

Traction issues have been rather active during the past week in the Philadelphia stock market, and to-day showed some disposition to sell lower in sympathy with the general weakness of the market. Philadelphia Electric and Rapid Transit, which were the leaders in the trading, have each lost in price during the week and each shows more selling pressure. Union Traction is also lower.

In the Baltimore market, the bond issues of the United Railways Company continue to be the leaders in public interest. The 4s seem to be especially in demand and prices, in consequence, are a trifle stronger. There were rather heavy sales to-day at the flat price of 86. Traction stocks are neglected.

Quotations of various traction securities as compared with last week follow:

	Feb. 16.	Feb. 23.
American Railways Company, Philadelphia	*45¼	46
Boston Elevated Railway	129	129
Brooklyn Rapid Transit Company	72	67⅞
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a74	a76
Consolidated Traction Company of New Jersey, 5 per cent bonds	a107	a107
Detroit United Railway	*61¼	62
Interborough-Metropolitan Company	15⅞	13½
Interborough-Metropolitan Company (preferred)	43½	38
Manhattan Railway	a148½	*148½
Massachusetts Electric Companies (common)	14¾	14
Massachusetts Electric Companies (preferred)	68¾	*68¾
Metropolitan West Side Elevated Railway, Chicago (common)	*16	*16
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	*42	*42
North American Company	81⅜	78
Philadelphia Company, Pittsburg (common)	*12	41⅛
Philadelphia Company, Pittsburg (preferred)	*44¼	*44¼
Philadelphia Rapid Transit Company	28¼	26
Philadelphia Traction Company	93	*93
Public Service Corporation, 5 per cent collateral notes	a100¼	a100¼
Public Service Corporation certificates	a78	a80
Twin City Rapid Transit Company, Minneapolis (common)	107	103½
Union Traction Company, Philadelphia	*53¾	51¾

a Asked. *Last sale.

Annual Report of the Capital Traction Company

The report of the Capital Traction Company, Washington, D. C., for the year ended Dec. 31, 1908, follows:

CAR EARNINGS.

Passengers	$1,827,625	
Freight	1,296	
Mail	2,889	
Total car earnings		$1,831,810

MISCELLANEOUS EARNINGS.

Advertising	$9,000	
Rent of land and buildings	360	
Total miscellaneous earnings		9,360
Total gross earnings from operation		$1,841,170
Less operating expenses (43.07 per cent of gross earnings)		793,141
Net earnings from operation		$1,048,029

MISCELLANEOUS INCOME.

Interest from deposits for taxes, interest and insurance reserve	$1,627	
Income from securities owned by insurance reserve	6,145	
Other miscellaneous income, including rent of land and buildings not used in connection with operations	7,032	
		14,804
Gross income less operating expense		$1,062,833

DEDUCTIONS FROM INCOME.

Taxes	$94,830	
Interest on funded debt	126,000	
Renewals (Chevy Chase line)	70,117	
		290,947
Net income		$771,886

DEDUCTIONS FROM NET INCOME.

Dividends	$720,000
Surplus for year	$51,886
Surplus at beginning of year	128,901
Surplus at close of year	$180,787
Number of passengers carried at 4 1/6 cents	34,057,267
Number of passengers carried at 5 cents	8,055,702
Number of passengers carried on commutation tickets	567,252
Total number of revenue passengers	42,680,221
Transfer passengers	15,331,824
Total number of passengers	58,012,045

The balance sheet as of Jan. 1, 1909, follows:

ASSETS.

Construction	$8,306,636
Equipment	4,714,566
Real estate	1,921,242
Insurance reserve	128,000
Extension (joint work C. T. and A. & P. R. R.)	110,000
Reserved for accrued taxes and insurance	48,808
Reserved for accrued interest on funded debt	10,500
Cash balance Dec. 31, 1908	112,244
	$15,351,996

LIABILITIES.

Capital stock	$12,000,000
Bonds	2,520,000
Bills payable	533,000
Tickets unredeemed	58,900
Accrued taxes and insurance	48,808
Accrued interest on funded debt	10,500
Profit and loss surplus	180,788
	$15,351,996

George E. Hamilton, president of the company, in presenting the report, said in part:

"The rebuilding of the Chevy Chase line, long contemplated, became absolutely necessary and accordingly this work was entered upon in September, 1908, and will be completed by July, 1909.

"On May 23, 1908, an act was passed by Congress authorizing the extension of street railway lines to the Union Station: Requiring the Capital Traction Company to make certain extensions in the eastern section of the city, and giving to the Interstate Commerce Commission the power and authority to compel all street railway companies in the District of Columbia to 'supply and operate a sufficient number of cars, clean, sanitary, in good repair, with proper and safe power, equipment, appliances and service, comfortable and convenient, and so operate the same as to give expeditious passage, not to exceed 15 m.p.h. within the city limits or 20 m.p.h. in the suburbs, to all persons desirous of the use of said cars, without crowding said cars.' Under this act the approaches to the Union Station to be used and operated jointly by the several companies are being constructed by the several companies jointly, and this joint construction is now nearly completed. The Capital Traction extension from Florida Avenue to Seventh Street N. W., by way of New Jersey Avenue to the Union Station, is now well under way and will, it is expected, be in operation by March 1, 1909. The eastern extensions on Florida Avenue, from New Jersey Avenue N. W. to Eighth Street east, on Eighth Street east southwardly to Pennsylvania Avenue and on F Street from Eighth Street east westwardly to the Union Station will be begun March 1, 1909, and for these eastern extensions materials have been contracted for and all necessary arrangements made to complete the work within the time limited by Congress.

"To meet the new conditions created by the act referred to, 39 pay-as-you-enter cars have been ordered for urban service, 15 pay-within cars for use on the Chevy Chase line, and the 12 double-truck semi-convertible cars, already received and in use on the Fourteenth Street line, will, it is expected, be equipped with pay-as-you-enter appliances. The 66 cars ordered will be in operation during the year.

"To accommodate and operate this new equipment, it became necessary to make an addition to the car barn at the Navy Yard, and for this a half-square of ground adjoining the old barn at this point has been purchased. Additions to power plants were also required, and accordingly a new substation has been built on company's property in Square 635, and the power station and equipment at the Grace Street power station materially increased.

"To provide for the greater safety of passengers and to avoid the cost of claims and litigation, the company is not only considering approved safety appliances in the purchase of new cars, but it has, during the year, inaugurated a merit system under which a substantial bonus may be earned by every conductor and motorman for each year of continuous, efficient and satisfactory discharge of duty in the operation of cars."

Cleveland, Painesville & Eastern Railroad Company

The Cleveland, Painesville & Eastern Railroad, Cleveland, Ohio, reports earnings as follows for the year ended Dec. 31, 1908:

	1908.	1907.
Gross earnings	$295,811	$296,317
Operating and taxes	167,297	157,196
Net earnings	$128,514	$139,121
Interest charges	87,999	86,552
Surplus	$40,515	$52,563

The balance sheet as of Dec. 31, 1908, shows:

ASSETS.

Cash	$3,612
Current assets	122,228
Investment	3,654,068
Prepaid accounts	4,490
Securities owned	159,245
Stores	16,245
Willoughbeach park	24,790
	$3,984,678

LIABILITIES.

Capital stock	$2,000,000
Bonds	1,631,000
Accident fund	13,304
Bills payable	49,620
Current liabilities	108,998
Surplus	181,757
	$3,984,678

E. W. Moore, president of the company, in presenting the report, said in part:

"During the past year large expenditures have been made in maintaining and improving the track and roadway. In addition to general track renewals all bridges and culverts were gone over and placed in good condition.

"Eight of the old cars have been rebuilt. All cast iron wheels have now been replaced by rolled steel wheels, 16 cars having been equipped during the past year.

"Notwithstanding the business depression of 1908, the season at Willoughbeach Park has been very satisfactory. The net earnings for the season of 1908 were $1,922 as against $1,447 for the season of 1907, an increase of $475.

"It will be observed that the gross earnings show a decrease of only $506 over the previous year, which is largely accounted for by the fact that this property is located in a residential section and therefore not so much affected by industrial conditions. While the statement shows an increase in operating of over $10,000, same is accounted for by the large expenditures made in the maintenance of track, roadway and equipment, so that the general physical condition of the property is better now than at any time in the history of the company."

Franchise Tax Valuations in New York City

The State Board of Tax Commissioners completed its special franchise tax valuations for New York City on Feb. 18. The total valuation for the year 1909 amounts to $486,-

213,500, as compared with a total of $492,492,970 for 1908, and a total of $466,855,000 for 1907. Among the principal assessments in New York City for this year, as compared with the assessments for last year, are the following:

	Final. 1908.	Tentative. 1909.
Brooklyn City & Newtown Railroad.	$3,000,000	$3,000,000
Brooklyn Rapid Transit System.....	55,437,900	56,212,100
Coney Island & Brooklyn Railroad..	2,750,000	2,750,000
Hudson & Manhattan Railroad.....	6,900,000	8,000,000
Long Island Electric Railway.....	475,000	475,000
Manhattan Railway.....	78,500,000	78,500,000
New York & Queens County Railway	2,386,200	2,385,800
Richmond Light & Railroad Company	500,000	684,800
Interborough Rapid Transit Company	24,012,000	24,012,000
Third Avenue Railroad.....	19,562,000	19,396,000

Fort Smith Light & Traction Company, Fort Smith, Ark.—The Fort Smith Light & Traction Company has called for payment on March 1 at 105 at the office of the Knickerbocker Trust Company, New York, trustee, 31 of its 10 per cent gold coupon notes dated March 1, 1907, having a par value of $100 and 10 of the par value of $1,000.

Hudson & Manhattan Railroad, New York, N. Y.—The Guaranty Trust Company, New York, N. Y., has brought out $920,000 5 per cent car trusts of the Hudson & Manhattan Railroad. The bonds are dated March 1, 1909, and are due in semi-annual amounts of $46,000, payable on Sept. 1 and March 1 till 1919.

Joplin & Pittsburg Railway, Pittsburg, Kan.—The Joplin & Pittsburg Railway has purchased the property of the Girard Coal Belt Electric Railway, which operates from Girard, Kan., in a northeasterly direction through Arma and Franklin to Croweburg, with a branch to Radley and Dunkirk.

Lincoln (Neb.) Traction Company.—The Lincoln Traction Company has been formed under the laws of Nebraska with $1,500,000 of preferred stock and $2,000,000 of common stock to consolidate the Lincoln Traction Company and the Citizens' Railway Company. The directors of the company are W. E. Sharp, C. T. Boggs, M. W. Woods, C. S. Allen, J. W. McDonald, Paul F. Clark, Thomas Auld, George J. Woods, J. H. Smith, M. L. Scudder and J. E. Miller.

Louisville & Eastern Railroad, Louisville, Ky.—Negotiations are being conducted with the holders of the construction notes of the Louisville & Eastern Railroad with a view to transferring their holdings to the Louisville Traction Company, which now holds most of the stock and bonds of the Louisville & Eastern Railroad.

Mahoning & Shenango Valley Railway & Light Company, Youngstown, Ohio.—At the annual meeting of the Mahoning & Shenango Valley Railway & Light Company, N. McD. Crawford, O. T. Baunard, and E. N. Sanderson, New York; James Parmalee and Myron T. Herrick, Cleveland; P. F. Miles and T. H. Given, Pittsburg; Alexander McDowell, Sharon, and George Johnson, New Castle, were elected directors of the company. Officers were re-elected as follows: N. McD. Crawford, president; Leighton Calkins, secretary; A. C. Rogers, treasurer.

Manistee Light & Traction Company, Manistee, Mich.—A committee of bondholders of the Manistee Light & Traction Company, consisting of Charles A. Stone, Arthur Wainwright, Fred A. Bradlee, Boston, Mass., has called for the deposit with the City Trust Company, Boston, Mass., of the $600,000 of outstanding first mortgage bonds of the company under the terms of the deposit agreement dated Jan. 16, 1909. The company defaulted in the payment of the interest on its bonds due Jan. 1, 1909, and in the payment of taxes on its property due Jan. 1, 1908, and Jan. 1, 1909, and is now in the hands of a receiver.

New Orleans, La.—The Hibernia Bank & Trust Company has decided to exercise its option on $2,400,000 of 4½ per cent bonds of the New Orleans Railway & Light Company. These bonds form the collateral for a $2,000,000 loan contracted by the company on June 30, 1908, which wiped out its floating indebtedness.

Winnipeg (Man.) Electric Street Railway.—At the annual meeting of the stockholders of the Winnipeg Electric Street Railway held in Winnipeg on Feb. 10, the following directors were elected: William MacKenzie, William Whyte, D. D. Mann, Sir William Van Horn, A. M. Manton, F. M. Morse, N. Sutherland, D. B. Hanna, and R. J. MacKenzie. The report for the year ended Dec. 31, 1908, showed gross receipts of $2,206,094, as compared with $1,722,406 for 1907; operating expenses of $1,088,872 for 1908, as compared with $775,731 for 1907, and net earnings of $1,117,122 for 1908, as compared with $946,675 for 1907.

Traffic and Transportation

Hearing by Massachusetts Railroad Commission on Boston & Worcester Six-Cent Fares

The Massachusetts Railroad Commission gave a hearing on Feb. 16, on the petition of the Mayor and City Solicitor of Marlboro, Mass., regarding the increase in the rate of fare on the Boston & Worcester Street Railway from a 5-cent to a 6-cent unit. Similar petitions by the Selectmen of Southboro and South Framingham were heard at the same time. John T. Burnett, formerly secretary of the Boston Elevated Railway, who represented Southboro, stated that while the Selectmen of that town object to a 6-cent fare, they feel that it may be necessary for the company to impose the 6-cent fare and prefer to leave the whole question in the hands of the commission.

W. M. Butler, president of the Boston & Worcester Street Railway, conducted the case for the company. He stated that the directors and officers felt that it was necessary to increase the fare in order to secure a revenue sufficient to pay the cost of operation and fixed charges, including depreciation in particular, and a reasonable dividend. In 1905 the surplus of the company was $20,679; in 1906 it was $25,238; in 1907, $14,951, and in 1908, $1,418. During 1908 the company did not earn its dividend of 6 per cent by about $7,000, and the shortage had to be made up from the small total surplus remaining in 1907. The road has been in complete operation about five years and no charge has as yet been entered for depreciation. Meanwhile the road has been well maintained, but Mr. Butler said that it would be impossible to continue the present standard unless a depreciation account was begun.

Regarding the lines of the company in Marlboro, where objection has been raised to the establishment of a 6-cent fare, Mr. Butler submitted a table showing the financial condition of the Marlboro Street Railway from 1890 to 1903, when it was taken over by the Boston & Worcester Street Railway. In seven of the years covered the company had a deficit, and in 11 of the 14 years no dividend was declared. In one year 4 per cent was declared; in another 2 per cent, and in a third 1 per cent. One year the operating expenses were greater than the net earnings and in general the net earnings were from $3,000 to $5,000 per year. The total investment increased from about $107,000 in 1890 to $233,000 in 1902. No charges for accidents were taken into account in these figures, and nothing has been allowed for depreciation. When the Marlboro Street Railway was taken over the Boston & Worcester Street Railway spent more than $60,000 in Marlboro and Hudson to put it in proper condition. Hence the propriety of raising the fare in that locality.

The Marlboro cross-town line is maintained at a large annual cost to the company for the convenience of its patrons. A table was presented showing that in December, 1908, 2206 trips were made on this route. On 1387 of these trips from 0 to 5 passengers were carried; on 455 trips, 6 to 10 passengers; on 165 trips, 11 to 15 passengers; on 93 trips, 16 to 20 passengers; on 59 trips, 21 to 25 passengers; on 16 trips, from 26 to 30 passengers; on 4 trips, 31 to 35 passengers; on 1 trip, 36 to 40 passengers; on 2 trips, 41 to 45 passengers; on 3 trips, 46 to 50 passengers, and on 22 trips, over 50 passengers. The company has continued the practice of carrying workingmen at morning, noon and night for 3 1-3 cents without transfer, in spite of the increase of fare. At this point Mr. Butler recalled that, while the total cost of the Marlboro Street Railway was about $233,000, it was sold at receiver's sale to the Boston & Worcester Street Railway for $105,000, illustrating a depreciation of $128,000 in from eight to ten years.

The company endeavored to make the fare increase as reasonable as possible by providing that there should be no change in the price of round-trip tickets existing between different points on the system; by selling books of 50 tickets at a cost of $2.75, or 5½ cents per ride, at the principal ticket agencies of the road, and finally, by selling 6-cent tickets for the convenience of patrons who desired not to be burdened by handling the extra cent required. The increased cost of wages and materials justified the increase in fare. No figures were presented to show this condition on the Boston & Worcester Street Railway, but it was pointed out that this road, like all others, has suffered from a constant tendency toward higher operating expenses. The company has 78 miles of track; has never paid more than 6 per cent dividends, and needs a substantial depreciation fund.

Arthur E. Stone, auditor and general passenger agent of the Boston & Worcester Street Railway, stated that the

earnings on the Marlboro cross-town line averaged $1.04 per car-hour. The cost of operation on the road as a whole was $2.50 per car-hour. Without considering interest and taxes, a careful estimate of the cost of operation on the Marlboro cross-town line gave $1.25 per car-hour as a minimum, or about 20 cents per car hour more than the receipts. This means a loss of about $1,400 per year, not considering interest or taxes. As about 22 per cent of the passengers carried on the Marlboro cross-town line ride on workingmen's tickets at 3 1-3 cents each, it is evident that the trips in which the traffic is heaviest are generally the low-revenue runs. Under the 6-cent fare the average rate per mile figures from 1.5 cents downward in the different zones. The Marlboro cross-town line is about 1.5 miles long.

Mr. Stone presented a table of fares on the Boston & Worcester Street Railway fixed by the directors on Dec. 17, 1908. From Boston to Worcester (Newton-Brookline line to Lincoln Park, Worcester), in each direction through running, there are nine local fare collections of 6 cents each. Between the Newton-Brookline line and South Framingham, in either direction, there are four zones of 6 cents each. Between Natick Common and the Newton-Brookline line are three zones, 6 cents each; between any point on the Marlboro cross-town line and Hudson, and anywhere in Marlboro, 6 cents, and in 14 local-fare limits on the system the rate is 6 cents. The through fare in either direction between Boston and Worcester is 45 cents. Round-trip tickets are sold at 80 cents over this route. There are corresponding round trips of lower fare, dependent upon the distance, in a general way, between different points on the system. Ten, 20, 30 and 50 ride tickets are also on sale between certain points, and strip tickets are on sale for public and normal schools. The single cash fare unit is 6 cents.

James F. Shaw, president of the American Street & Interurban Railway Association, who built the Boston & Worcester Street Railway, testified that after the Marlboro Street Railway was taken over the system was practically rebuilt, $60,000 being expended on track and line work and $35,000 on the power station in Marlboro. The regular cars operating on this portion of the system are practically new, old cars being used as extras only when traffic is very heavy. In Framingham, between the New Haven crossing and the Southboro line, the Boston & Worcester Street Railway has expended more than $400,000 in street construction and land damages, and before the double tracking is completed half a mile of line will have to be built that will cost more than $100,000, including land damages. A new car house in Framingham cost $35,000 and within the last four years the company has expended more than $500,000 on its main power plant in Framingham; in fact, more than $1,000,000 has been spent by the company altogether in Framingham during the last four years, and $250,000 has been expended for street improvements in Southboro in connection with the double tracking of the line through the town. Street improvements on the entire road aggregate $1,250,000, or an average of 56 cents per passenger. Mr. Shaw called attention to the fact that the interest charge on the street improvements alone is $62,500. As a separate organization the Marlboro Street Railway could not pay dividends and give proper service.

Chairman Hall raised the question of agreements between the municipal authorities and the predecessors of the Boston & Worcester Street Railway and emphasized the importance of determining whether any contracts, if such exist, estop the company from putting in issue the reasonableness of the rate. He suggested that counsel supply the board with certified copies of the orders of location bearing upon the case in the different towns, and submit briefs and argue the case on March 18. The hearing was then continued until that date.

President Winter of Brooklyn Rapid Transit on City Fares

E. W. Winter, president of the Brooklyn (N. Y.) Rapid Transit Company, was asked recently by the Electric Railway Journal for an expression of his views regarding the question of fares on city railways. He said:

"The fact must be recognized that transportation is a commodity and that it must be paid for on the basis of what it costs the seller. It is as foolish to furnish for 5 cents a ride as long as is now supplied over some routes as it would be for a merchant to buy calico at 5 cents and sell it for 4½ cents. Some plan must be hit upon which will be at once fair to both passenger and company. I think this should start with a reduction in the transfer privilege. The electric railway companies give out more transfers than are needed because it is human nature to accept anything offered for nothing, even if the person accepting the transfer knows he cannot use it. These excess transfers are often given away, and we have to carry another passenger for the original 5 cents.

"The plan tried successfully in Newton, Mass., of charging 1 cent for each transfer, looks feasible. This is not hard on the passenger and it relieves the company of carrying many people for nothing.

"The cost of transportation is not usually considered by the public. Our own Coney Island business looks like a rich harvest. On the contrary, it is done at a loss if the entire year be balanced up. The great trouble with it is that we are nearly always running long trains of empty cars in one direction or the other. The ride which a person may take on the New York subway for a single fare is too long. Long trips have to be averaged up with the short rides to see a profit in the haul. If enough people were to take advantage of the opportunity to ride from Atlantic Avenue to the Bronx or Van Cortland Park the Interborough Rapid Transit Company would soon be in trouble, for it costs more than 5 cents to carry a passenger that distance. On the lines of the Brooklyn Rapid Transit Company about 3½ mills of every nickel paid in represent net earnings—4 cents and 5 mills are represented in transfers, operating expenses and charges."

Central Electric Railway Accounting Conference

C. B. Baker, secretary of the Central Electric Railway Accounting Conference, has issued the following notice:

"A meeting of the Central Electric Accounting Conference will be held at the Lima House, Lima, Ohio, at 11:00 a. m, Saturday, March 6, 1909. All members are urged to attend this meeting, as the committee on permanent organization will make a report at this meeting and it will be decided whether the conference is to be abandoned or regularly organized to carry on the work for which it was originally formed two years ago.

"The committee on uniform blanks will present a report and will furnish samples of the proposed planks to all members for their consideration and adoption.

"The committee appointed at the last meeting to handle all questions concerning the classification of operating revenues, operating expenses and expenditures for road and equipment under the Interstate Commerce classification, will also present a report showing the result of their efforts.

"All accounting officials of electric railway lines, both interurban and city, in the Central States, are invited to be present at this meeting and to join the conference, as the work accomplished during the past two years shows that much good can be done by the earnest co-operation of accounting officers of electric railway lines in bringing about uniformity in accounting methods and settlement of interline accounts."

Massachusetts Commission Decides in Favor of Athol & Orange Street Railway in Fare Case

The Massachusetts Railroad Commission has issued an order dismissing the petition of citizens of Athol, Mass., relative to service and reduced fares on the Athol & Orange Street Railway. The board says:

"The petition contains two requests; first, that the board recommend additional car service between the upper and lower villages in Athol, and, second, that the board recommend a workingman's ticket between these villages at a price less than a 5-cent unit rate.

"After the filing of the petition the company made certain changes in its time table, and the petitioners did not desire to be heard upon that aspect of the case. The sole question, therefore, to our consideration, is whether recommendation should be made that a workingman's ticket be installed by the company at a rate of less than 5 cents per ride. No recommendation of this character has ever been made by the board, and a careful review of the facts leads us to the conclusion that none should be made in this case."

An account of the hearing held on this petition was printed in the Electric Railway Journal of Jan. 16, 1909.

The Gateway Route.—At the meeting of the directors of the Indianapolis & Louisville Traction Company, Louisville & Northern Railway & Lighting Company and the Indianapolis, Columbus & Southern Traction Company on Feb. 18, it was decided hereafter to designate the lines of the companies as "The Gateway Route," this title to be used on all literature and traffic circulars of the company.

Inter-Urban Railway, Des Moines, Issues Time Table.—A new time table has been issued by the Inter-Urban Railway, Des Moines, Ia., covering the company's lines between Des Moines, Altoona, Mitchellville, Colfax, Granger,

of all the different divisions and the schedules of local and fast freight on the Beaver Valley and the Colfax divisions are given. Attention is called to the interchange freight arrangements of the company and the joint through rates on all classes of commodities established with the principal railways entering Des Moines. The publication is concluded with a map of the system.

Pacific Electric Railway Files Tariff.—The Pacific Electric Railway, Los Angeles, Cal., has filed tariffs for interstate traffic with the Interstate Commerce Commission. The freight traffic of the company is increasing steadily. The company recently delivered 90 cars of machinery for a sugar factory in Santa Ana. This shipment originated in Canada and was turned over to the Pacific Electric Railway at Los Angeles by the San Pedro, Los Angeles & Salt Lake Railroad. Since the opening of its La Habra line the Pacific Electric Railway has done a large business in carload lots of fruit which are turned over to the steam railroads at Los Angeles for shipment east.

Bridge Rush Hour Service in New York.—Bridge Commissioner Stevenson, of New York, has issued a statement regarding the traffic on the Brooklyn Bridge surface lines for 1908, showing that there was an increase of 13½ per cent in the number of cars operated across the bridge as compared with 1907 during the hour between 5 p. m. and 6 p. m., the height of the rush hour. The average number of cars operated in this hour was 305. A new maximum monthly average was established in April, when an increase of 18 per cent over the same month of the year previous was shown. During April the average number of cars which crossed the bridge in the hour indicated daily was 318. The minimum increase in December was 1 per cent.

New Fare Tariff on the Schenectady Railway.—The Schenectady (N. Y.) Railway has filed with the Public Service Commission of the Second District of New York a new schedule of tariff rates on the interurban lines from Schenectady to Troy, Albany and Ballston. The change is to take place on March 1 and at that time the company will put into effect the old commutation tickets for the regular passengers on the routes mentioned. Excepting these, cash fares will be collected under the same system which is at present in effect—5 cents in the city limits and the remainder outside of the limits. The sale of six tickets for 25 cents will also be discontinued. The new schedules follow: Between Ballston and Schenectady after March 1, 25 cents each way, with no round-trip tickets; between Albany and Troy and Schenectady, 25 cents each way, and no round-trip tickets; between Schenectady and Ballston, 25 cents each way, instead of 30 cents. A monthly commutation rate of $10.40 is to be established between Schenectady and Albany, Troy and Ballston.

Appeal from Finding of New York Commission Before Court of Appeals.—The appeal in the certiorari proceedings brought by Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, New York, against the Public Service Commission of the First District of New York, came up for argument before the Court of Appeals on Feb. 8. This is the case growing out of the attempt of the commission to fix a joint rate of 5 cents divided between the Metropolitan Street Railway and the Central Park, North & East River Railroad for a ride over lines between Thirty-fourth Street and 116th Street. After the companies had failed to obey the order directing them to agree upon a reasonable joint fare, the commission in October fixed a fare of 5 cents. The two companies thereupon obtained writs of certiorari to review the proceedings of the commission. The commission then made a motion in the Appellate Division to quash the writs, but the motion was denied, and the commission appealed to the Court of Appeals.

Service in Lexington, Ky.—In a recent souvenir edition of a Kentucky newspaper, the Lexington (Ky.) Railway presented a large advertisement outlining the service which it offers and the improvements which have been made recently in its railway and lighting departments. During the year ended Dec. 31, 1908, the company carried about 3,500,000 passengers, an increase of 57,000 over the number carried in 1907. It is stated that the normal increase should have been 170,000, but that on account of economies by the public during the business depression the expected increase was not realized. During 1908 750,732 car-miles were run, an increase of 10 per cent. Considerable track has been rebuilt with 80-lb. rails and rock ballast, and extensions have been laid. The company expects to complete the rebuilding of its city cars this spring. Similarly, improvements have been made in the electric lighting and ice businesses operated by the company. The interurban lines carried 1,418,305 passengers during 1908. Of this number, 25,036 rode on school tickets. A new car shop is nearing completion.

Annapolis Reawakened by Electric Railway.—"The Reawakening of Annapolis" is the title of an interesting illustrated feature article written by John S. Mosby, Jr., for the Washington *Post* of Feb. 7, 1907. Mr. Mosby says very pertinently that few cities in the United States combine the old and the new in such striking contrast as does Annapolis. It is ideally located on Chesapeake Bay, and is not indebted alone to the old and the new military academies for its prestige, as seems to be the impression in places distant from it and Washington and Baltimore. After the Revolution Annapolis outstripped many other cities for a time, but with Washington as the seat of the national government and the progress made by Baltimore, it gradually was outstripped itself by these cities. Mr. Mosby says: "The awakening kiss was given to Annapolis when the Washington, Baltimore & Annapolis Electric Railway was placed in operation, and it is just to credit to the Washington, Baltimore & Annapolis Electric Railway, whose line first established quick and comfortable communication with the city, a large part of the quickening in every line of business and industry that Annapolis has felt during the past year. It is hardly 10 months since the first car, rolling down the main street of the old town, brought to it a gospel of glad tidings of great joy. But since that time things have happened. Every line of business has improved, everybody in Annapolis feels better, and a good many of them feel richer. Annapolis has 'arrived.'"

New Transfer System in Buffalo.—The International Railway, Buffalo, N. Y., is soon to put into effect a new system of transfers, to be known as the "destination transfer." Under the new system, passengers will be required to ask for transfer to the line of ultimate destination instead of for the intermediate or connecting line, as is the present custom in case an intermediate line has to be taken. The transfers issued when the fare is paid and punched for the line that will carry passengers to their destination line will be collected on the intermediate lines and the transfers issued by the intermediate line will be punched for the same line of ultimate destination as was punched on the original transfer. The names of all the lines will be printed on the face of the new transfers, and the transfer junctions and regulations will be printed on the back. Thus passengers will be permitted to choose an intermediate line where two or more routes are operated between the line on which the fare is paid and the line of ultimate destination. This will frequently save time, as it will be possible for passengers to take the first connecting car of any intermediate line. Since Jan. 1 passengers in Buffalo desiring to transfer have been required to request transfers at the time of paying fare. Formerly transfers were issued by conductors whenever asked for and were even distributed at junction points, causing unnecessary annoyance and delay, especially during rush hours. The new system will prevent "looping," as no transfers will be issued beyond the destination shown by the original transfer.

Hearing on Service of the Springfield (Mass.) Street Railway.—The Massachusetts Railroad Commission gave a hearing on Feb. 19 on the complaint of citizens of Springfield regarding service on the lines of the Springfield Street Railway east of Oak Street and State Street and St. James Avenue. The company was represented by Bentley W. Warren, counsel, and H. C. Page, general manager. Mr. Warren read a letter from L. S. Storrs, president of the company, which stated that there is a certain basis in fact for the demand for improved service in this district. So far as justified there are two grounds for improvement recognized by the company. One is the need of additional rolling stock and the other congestion in traffic on Main Street during certain hours when travel is heaviest. It was generally agreed among the petitioners that more cars would greatly improve the situation. Mr. Storrs stated in his letter that the company could advantageously use at least 12 additional double-truck closed cars, costing $70,000. At present the company has a floating debt of about $500,000. If it could obtain authority to fund this floating debt by an issue of bonds and also obtain authority to issue additional bonds it would purchase the equipment needed. The only remedy in prospect for the congestion on Main Street is a different routing of cars during rush hours. Mr. Storrs said that the advice of the commission regarding additional locations or changing the routes of some of the existing lines of cars would be of material assistance as a guide to the local authorities. Mr. Page pointed out that the company has 58 closed single-truck cars and 70 double-truck closed cars. Of these three is a fair average of those out of service at any one time. The regular schedule calls for 78 cars and the peak traffic for about 125 cars. The company will be glad to confer with citizens about practicable schedules. The commission took the case under advisement and will make its usual investigation.

Personal Mention

Mr. Samuel Riddle has resigned as general manager of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. Mr. Riddle has been connected with the company for two years.

Captain William B. Rockwell has been appointed general manager of the Syracuse & Suburban Railroad, Syracuse, N. Y. Capt. Rockwell was formerly general manager of the Syracuse, Lakeshore & Northern Railroad, Syracuse, N. Y.

Mr. H. M. Littell, assistant to the general manager of the Pacific Electric Railway, Los Angeles, Cal., will hereafter, in addition to his other duties, exercise full jurisdiction in all matters pertaining to the maintenance of operated tracks and structures of the company.

Mr. J. M. Bramlette has been appointed superintendent of construction of the Northern Construction Company, Leslie, Mich. Mr. Bramlette was formerly superintendent of construction of the Chicago & Milwaukee Electric Railway and previous to that was general superintendent of the Michigan United Railways, Lansing, Mich.

Mr. Chester P. Wilson was erroneously reported in the last issue of this paper as having accepted the position of general manager of the Des Moines City Railway and Inter-Urban Railway companies. Mr. Wilson's title is general superintendent of these companies. Mr. Wilson's appointment in no way interferes with the position of Mr. A. G. Maish, who is general manager of the Des Moines City Railway Company.

Sir Clifton Robinson, general manager of the London United Tramways Company, Ltd., is the subject of a sketch on "Men of the Day" in a recent issue of "Vanity Fair." He is spoken of as having probably done more than any other living man to make it easy for the millions of London toilers to sleep outside of the city limits in pure air amid healthful surroundings, and is described as being fond of all outdoor sports and motoring. An excellent portrait accompanies the article.

Mr. P. N. Jones, whose appointment as general superintendent of the Pittsburg (Pa.) Railways Company was announced in the Electric Railway Journal of Feb. 20, 1909, was born near Springfield, Ohio, in 1865, and was educated at the Ohio State University, from which he was graduated in 1892 as a mechanical and electrical engineer. In the same year he became a shop apprentice with the Short Electric Railway Company, Cleveland, Ohio, with which he remained until the company was absorbed by the General Electric Company. He then engaged in experimental work with the Lincoln Electric Company, Cleveland, Ohio, for a time, becoming attached in May, 1904, to the staff of the Westinghouse Electric & Manufacturing Company, Pittsburg. Mr. Jones remained in the mechanical department of the Westinghouse Electric & Manufacturing Company five years and then became identified with the commercial department of the company as salesman. On Jan. 1, 1903, he was appointed manager of the Cleveland office of the company, and on April 1, 1903, was made sales manager for the Pittsburg district, from which position he resigned on Oct. 1, 1905, to become electrical and mechanical engineer of the Pittsburgh Railways Company, in charge of power stations and equipment. Mr. Jones is a member of the Engineers' Society of Western Pennsylvania and is an associate member of the American Institute of Electrical Engineers.



P. N. Jones

Mr. A. W. Berresford, of Milwaukee, has been nominated by a number of his friends as a candidate for one of the four managers of the American Institute of Electrical Engineers to be elected this year. In a circular signed by 16 representative members the statement is made that it is of advantage to the institute that representation in the board of managers should be as widely distributed geographically as practicable, consistent with the ability of its members regularly to attend its meetings, and that Mr. Berresford is fortunate in this respect, because, while a resident of the Middle West, his business connections require his being in New York at regular intervals, which may be made synchronous with the monthly meetings of the board of managers. Mr. Berresford has had 16 years of engineering and business experience, beginning with his graduation from Cornell University in 1893, and extending to his present position of general manager of the Cutler-Hammer Manufacturing Company. He is a member of the national committee of the International Electrotechnical Commission, was a member of the standards committee at the time the present rules were formulated, has served for the past two years on the membership committee, and is a member of the circuit breaker committee of the National Board of Fire Underwriters.

OBITUARY

Eli Halderman, who was well known throughout Indiana as a contractor and builder of street railways in the early days of the industry, died at Indianapolis on Feb. 18. He organized and was president of the first street railway in Marion, Ind., which is now part of the system of the Indiana Union Traction Company, and also was connected with the company that built the interurban railway between Marion and Summitville.

Edwin Reynolds, formerly consulting engineer of the Allis-Chalmers Company and at one time mechanical engineer, second vice-president and general superintendent of the Edward P. Allis Company, Milwaukee, is dead. Mr. Reynolds' engineering practice extended to almost all branches of engineering, but he was especially well known through his work in steam engineering and in connection with the Edward P. Allis Company, which was merged into the Allis-Chalmers Company. During the time of Mr. Reynolds' connection with the Edward P. Allis Company the "Reynolds-Corliss" engine grew from the small unit of 80 hp to 100 hp into the 5000 hp to 10,000-hp engine. Mr. Reynolds was born in Mansfield, Conn., on March 23, 1831, and after attending the country school at that place was apprenticed at 16 years of age to learn the trade of machinist at Mansfield. Subsequently he worked as machinist in shops in Connecticut, Massachusetts and Ohio, and in 1858 became superintendent of the shops of Stedman & Company, Aurora, Ind., which built engines, sawmills and drainage pumps for the Mississippi plantations. In 1867 Mr. Reynolds entered the employ of the Corliss Steam Engine Company, Providence, R. I., and in 1871 became superintendent of the company, a position which he retained until 1877, when he became associated with the late Edward P. Allis in Milwaukee and began the development of his own inventions. Mr. Reynolds was one of the leaders in the introduction of compound and triple-expansion engines in factories and power houses, and is said to have been the first to build a low-speed direct-coupled type of engine and generator. Mr. Reynolds was also interested in general business affairs, and during his connection with the Edward P. Allis Company was a stockholder and director of the German-American Bank, Milwaukee Boiler Company, Central Improvement Company and the Badger State Long-Distance Telephone Company. The University of Wisconsin conferred the honorary degree of LL.D. on Mr. Reynolds.

NEW PUBLICATIONS

Land and Business of Engineering and Contracting. By C. E. Fowler, C. E.; New York; McGraw Publishing Company; 1909; 152 pages (9 in. x 5½ in.) and index. Price, $2.50 net.

This work summarizes the legal relations of contractor and engineer, presents several types of specifications and reproduces a large number of forms useful in estimating cost of work.

Practical Calculations of Transmission Lines. By L. W. Rosenthal, E. E.; New York; McGraw Publishing Company; 1909; 93 pages (9¼ in. x 6 in.). Price, $2.00 net.

The increase in the mileage of the average electric railway and the growing popularity of hydro-electric transmissions make this book of timely interest. The formulas are comparatively simple and the tables are well arranged for easy reference. One chapter is entirely devoted to d.c. railway distribution and is accompanied by several examples. Single-phase railway problems are also considered.

Shop Tests on Electric Car Equipment. By E. C. Parham and J. C. Shedd. New York; McGraw Publishing Company; 1909; 115 pages (7¼ in. x 5 in.) and index. Illustrated. Price, $1.00 net.

There is no end to the making of theoretical books, but the kind which tell how to do things are not crowding each other very hard. The present work is based on long railway testing experience in various shops. A catechism in the last pages of the book will be found useful for rehearsing the reader's knowledge of the methods described.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***San Diego & El Cajon Valley Interurban Railway, San Diego, Cal.**—This company has been incorporated to build an electric railway from La Mesa Springs northeast through Alta to a point near Lakeside, a distance of 15 miles. Directors: William B. Gross, Edward Fletcher, Pasadena; Thomas Ballantyne, El Cajon.

Terre Haute, Merom & Southwestern Traction Company, Terre Haute, Ind.—This company has been incorporated in Indiana to construct and operate an electric railway from Terre Haute to Merom, connecting intermediate towns in Vigo and Sullivan County. The railway is partly completed, several miles of rails having been laid. Capital stock, $10,000, which is to be increased to $200,000. Directors: D. M. Roberts, W. S. Roney, J. F. Enusch and G. S. Patterson.

***Androscoggin Railroad, Lewiston, Maine.**—A bill has been introduced in the Legislature incorporating this company, which proposes to build a street railway in the towns of East Livermore, Livermore and Turner from the terminus of the Auburn & Turner Railroad in Turner to some convenient point in East Livermore. Capital stock, $300,000. Incorporators: Hewitt M. Lowe, Turner; John A. Jones and Albert M. Kavanaugh, Lewiston; Harry Manser, Auburn; Frank W. Brigham, Boston.

Missoula (Mont.) Street Railway.—This company has been incorporated in Washington to build an electric street railway in Missoula. The City Council has just granted the company a 50-year franchise. Capital stock, $100,000. Directors: J. R. Wharton, W. A. Clark, Jr., and W. M. Bickford, Butte; S. R. Inch, Missoula, and C. B. McBroom, Spokane, Wash. [E. R. J., Jan. 16, '09.]

***City Traction Company, Oswego, N. Y.**—This company has been incorporated in New York to build and operate an electric railway from Oswego to Seneca Hill, in Oswego County. Capital stock, $550,000. Directors: C. B. Benson, Minetto; William Nottingham and Clifford D. Beebe, Syracuse; Harold C. Beatty, Skaneateles.

***Crook County Water, Light & Power Company, Bend, Ore.**—This company has been incorporated in Oregon to build an electric railway from Redmond to Prineville, also to build and operate power plants. Capital stock, $50,000. J. H. Jackson, Redmond, president.

FRANCHISES

***Dothan, Ala.**—Col. A. J. Smith will, it is reported, apply for a franchise for a street railway which will be extended via Cottonwood and Cottondale to Marianna, Fla., and via Echo and Clopton northward, possibly to Eufaula.

***Los Angeles, Cal.**—The City Council has passed an ordinance granting to H. F. Vollmer a franchise for a double-track electric railway from Fifty-fourth Street and Hoover Street westerly along Fifty-fourth Street to Dalton Avenue.

Geneva, Ill.—The City Council has granted a 50-year franchise to the Chicago, Wheaton & Western Electric Railway. The city receives $30,000. The company proposes to build an electric railway which will reach the region north of Wheaton, and will connect the Aurora, Elgin & Chicago Railroad with West Chicago. [E. R. J., Oct. 17, '08.]

Monmouth, Ill.—The City Council has passed an ordinance granting the Rock Island Southern Railroad a 40-year franchise for an electric railway over North Street, South Main Street and the public square.

Seymour, Ind.—The County Commissioners have ordered another election in Jackson Township, the township in which Seymour is situated, to vote on the question of a subsidy to aid in the construction of the Brownstown Water, Light & Traction Company's proposed railway between Seymour and Brownstown, a distance of 11 miles. The tax proposed is 1 per cent, which would raise about $40,000 in the township. [E. R. J., Jan. 16, '09.]

Pittsburg, Kan.—The City Council has granted the Joplin & Pittsburg Railway a 30-year franchise for a street railway in Pittsburg. [E. R. J., Feb. 20, '09.]

Baltimore, Md.—The Maryland Electric Railways Company has applied to the City Council for a franchise in Baltimore to connect with the Baltimore & Ohio Railroad and enter Camden Station.

Great Falls, Mont.—By a vote of 292 to 100, the freeholders of Great Falls have granted to G. Calvin Bower and his associates a franchise for a street railway over certain streets of Great Falls in connection with their proposed electric railway between Great Falls and Choteau. [E. R. J., Jan. 30, '09.]

Vernon, N. Y.—The Town Board of Vernon has granted a franchise to the Oneida Railway to construct a street railway from Sherrill to Kenwood.

Portland, Ore.—The Portland Railway, Light & Power Company has applied to the Council of Fairview for a 30-year franchise for its branch to run through Fairview.

Bedford, Pa.—An ordinance has been passed by the City Council granting the Altoona, Hollidaysburg & Bedford Springs Railway a franchise for a street railway over certain streets of Bedford. The company plans to build an electric railway connecting the three cities named in the title. About 18 miles, from Altoona to Roaring Springs, are under construction. [E. R. J., Jan. 16, '09.]

Temple, Tex.—The City Council has granted a franchise to Max Ellser and associates of New York, N. Y., to construct and operate an electric street railway in the city of Temple for a period of 30 years, work on same to commence within eight months from date of passage, and the line to be in operation within 18 months from the time construction is begun. The City Council of Waco recently granted a similar franchise to the same parties. The intention of the parties is to construct an interurban railway connecting Temple and Waco. [E. R. J., Feb. 13, '09.]

Salt Lake City, Utah.—The Utah Light & Railway Company has applied to the County Commissioners for a further extension of its franchise to build its proposed extensions to Bingham Junction and Gandy.

***Pasco, Wash.**—J. B. Hubrich has applied to the City Council for a franchise for a street railway system, guaranteeing to have cars running within one year from granting of franchise. It is planned to operate gasoline motor cars.

Seattle, Wash.—The corporations committee of the City Council is said to have practically concluded its detailed consideration of the subway franchise asked by W. S. Boody and W. L. Dudley, who claim that Lloyd, Ettlinger & Company, of London, are their backers. The committee decided to accept the new plan of routes asked by the promoters subject to the approval of City Engineer Thomson and A. V. Bouillon, superintendent of public utilities. The life of the franchise was definitely extended from 50 to 65 years, the city to take over all but the rolling stock of the system at the end of that time. [E. R. J., Nov. 28, '08.]

TRACK AND ROADWAY

Bentonville, Ark.—It is stated that the Western Surety & Investment Company, Minneapolis, Minn., has established its headquarters at Bentonville and is making preparations to begin the work of constructing the electric interurban railway from Bentonville to Joplin, Mo., then to Gentry, Tarrytown, Springdale and back to Bentonville. [E. R. J., Jan. 23, '09.]

Denver, Colorado Springs & Pueblo Interurban Electric Railroad, Denver, Col.—This company, which was recently incorporated to build an electric railway between Denver, Colorado Springs and Pueblo, announces that surveys are now being made and it is the intention to start construction early this spring. Office, Cooper Building, Denver. [E. R. J., Feb. 20, '09.]

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—It is stated that this company has closed an agreement with the Washington Railway & Electric Company in Washington, whereby the interurban cars will be permitted to run downtown to within a block of the Treasury building.

East Pensacola City Company, Pensacola, Fla.—This company will receive bids until March 10 for the construction of a wooden railway trestle about 1400 ft. long. The company expects to begin work about March 1 on its proposed street railway from Pensacola to East Pensacola, a distance of 1½ miles. Office, 231 Brent Building, Pensacola. [E. R. J., Feb. 6, '09.]

Athens (Ga.) Electric Railway.—It is stated that this company has decided to double track a large portion of its line on Prince Avenue and to build three blocks of new line in order to perfect its street railway system.

Spokane, Wallace & Interstate Railway, Wallace, Idaho.—Wm. J. Hall writes that this company has made the final surveys and has secured considerable right-of-way for the electric railway it proposes to build between Wallace, Wardner, Burke, Mullan, Cœur d'Alene, Idaho and Spokane, Wash., a distance of about 100 miles. No contracts have been awarded as yet. It is planned to begin construction this year. The track, which will be single, will

be laid with 70-lb. rails. Direct current will be transmitted at 1200 volts. Ne definite arrangements have yet been made in regard to the furnishing of power for the operation of the system. The repair shops will be built at Wallace. The company expects to operate 24 passenger, 2 express motor and 118 freight cars, also 4 50-ton electric locomotives for freight service. Amusement parks will be established at Osburn, Mission and Cœur d'Alene. Capital stock, authorized, $3,500,0000; issued, $100,000. General office, Wallace. Officers: F. F. Johnson, Wallace, president; Alfred Page, Wardner, vice-president; Wm. J. Hall, Wallace, treasurer; H. F. Robertson, Wallace, chief engineer.

Evansville, Suburban & Newburgh Railway, Evansville, Ind.—It is stated that this company has plans under consideration for extensions to its system to Chrisney and Lynnville. In return for the building of these extensions, the townships through which the railway will pass have voted favorably on the granting of a 2 per cent subsidy to the company. Operation will be begun with steam service which will handle both freight and passenger cars. Later, as business justifies, these lines will be electrified.

Indianapolis & Western Railway, Indianapolis, Ind.—It is stated that this company, which operates an electric railway between Indianapolis and Danville, is not only planning to complete its extension to Amo this summer, but will also extend it on southwest from Amo to Sullivan, a distance of 75 miles. The proposed extension would run through Stilesville, Broad Park, Belle Union, Cloverdale, Bowling Green and Clay City.

Wicomico Electric & Power Company, Salisbury, Md.—This company is reported to have organized for the purpose of building an electric railway from Salisbury to Nanticoke, a distance of nearly 25 miles. Bids have been received but contract has not yet been awarded. Officers: Marion V. Brewington, president; L. W. Dorman, vice-president; H. James Messick, second vice-president; Jesse D. Price, general manager; William M. Cooper, treasurer; Mark Cooper, secretary. [E. R. J., Dec. 12, '08.]

Kansas City & Southeastern Traction Company, Kansas City, Mo.—This company, which proposes to build an electric railway between Kansas City and Jefferson City, has increased its capital stock from $180,000 to $5,000,000. Charles A. Sims, president. [E. R. J., Jan. 30, '09.]

Kansas City & Olathe Electric Railway, Kansas City, Mo.—It is stated that this company is planning to extend its railway from its present terminus at Shawnee, Kan., to Topeka by way of Lawrence. The line was originally projected by way of Olathe, but in order to shorten the line the final survey was changed to run west several miles north of Olathe. The road is now built and in operation from Rosedale, Kan., to Shawnee, a distance of 7 miles, with the power plant located at Merriam, Kan. The mileage of the completed line will be 66 miles. The survey takes the line from Shawnee to Mill Creek, a distance of 5 miles, for which the contract for construction has already been let. From Mill Creek it runs in a southwesterly direction to Eudora and through the south limits of Lawrence, and then by way of Clinton, northwesterly to Topeka. A branch line is to be built from Mill Creek to Lenexa, where connection will be made with the Missouri & Kansas Interurban Railroad, now in operation between Kansas City and Olathe. Provision also has been made for extending the line from Rosedale to Argentine and Kansas City, Kan., with a line down the Kaw River valley from the proposed Seventh Street bridge, across the Kaw River, to the State line on the east bank of the river. F. P. Dickson, Gumbel Building, Kansas City, president.

Springfield (Mo.) Traction Company.—This company, which proposes to extend its system from Springfield to Carthage, 60 miles, has its engineering corps in the field surveying the proposed route. The surveyors have reached a point about 18 miles west of Carthage. The route being surveyed now is known as the northern route and passes through Lawrence County and does not parallel a railroad.

New York, N. Y.—The Public Service Commission, of the First District, has ordered the New York & Queens County Railway to show why it should not double track the lines between Flushing and Jamaica and between Flushing and College Point. The hearing is ordered for March 1.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company has recently started operating its extension from Baldwinsville, N. Y., north to Fulton, 15 miles, and will probably build a further extension from Fulton northwest to Oswego, about 20 miles, during this year.

Crescent Electric Railway, Vade Mecum, N. C.—It is announced that this company will let construction contracts in March. The company itself proposes to do most of the work. The railway will extend from Winston-Salem to Stuart, Va., via Rural Hall, Capella Gap, Vade Mecum, Moore's Springs, Piedmont, Danbury and Sandy Ridge, N. C., a distance of 68.9 miles. Surveys are made, right-of-way secured, and about 20 miles are ready for track-laying. H. P. MacKnight, Southern Pines, N. C., chief engineer. [E. R. J., Oct. 31, '08.]

***Lawton, Okla.**—It is stated that James M. Sims and C. L. Carson, St. Louis, Mo., and W. D. Todd, Warren, Pa., are planning to build an electric railway to connect Lawton and its new additions with Fort Sill and a nearby summer resort in the mountains. It is said that a franchise will be asked at once, both the City Council and the people at a special election having to take action, and active work will begin within 60 days. The length of the railway will be about 15 miles.

Schuylkill Railway, Girardville, Pa.—This company advises that it is having the final locations made for an extension of its railway from Shenandoah to St. Clair, near Pottsville, a distance of about 9 miles. Construction is to be started early this spring. J. H. Eby, Lancaster, will be engineer in charge.

Mercer County Street Railway, Greenville, Pa.—This company, which proposes to build an electric railway from Greenville to Mercer and Sharon, has purchased the charter of the New Castle-New Wilmington Railway, including the franchise of New Castle and 11 miles of right-of-way between the two towns. Under this charter the company proposes to extend an electric railway directly to Greenville and from Greenville to Conneaut Lake, with a Sharon-Mercer line intersecting at Big Bend. The main line will be 44 miles long and the intersecting line 16 miles. Officers: F. P. Filer, Mercer, president; S. D. Downs, Greenville, vice-president; L. W. Orr, Mercer, secretary and treasurer. [E. R. J., Jan. 9, '09.]

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company expects to place contracts during the next two weeks for about 2 miles of rails for city extensions.

Pittsburg (Pa.) Railways.—This company has just opened for traffic its new extension from Pittsburg to Washington.

Pittsburg & West Virginia Railway, Pittsburg, Pa.—Announcement is made that it is the intention of this company to construct an electric railway from Fairmont, W. Va., via Morgantown, Point Marion, Smithfield, Fairchance and terminating at Uniontown, with a branch or line running from Morgantown through Mount Morris, Waynesburg and terminating at Washington, Pa., with an additional branch running from Waynesburg via Rice's Landing, Millsboro, Brownsville, California and terminating at Allenport, in Washington County, making a total length of about 140 miles. The company proposes to construct a local line in Grafton, W. Va., consisting of about 5 miles, which will be the key for the future extension from Fairmont via Grafton to Clarksburg. At Fairmont the railway will connect with the Fairmont & Clarksburg Traction Company's line south to Clarksburg, a distance of 33 miles. At Washington the new line will connect with the Wheeling & Elm Grove Railroad Company's line, now building from Wheeling. At Allenport, Pa., the Pittsburg & West Virginia Railways Company's line will connect with the Pittsburg Railways Company's Charleroi line, giving an outlet to Pittsburg down the Monongahela valley. It is stated that within 30 days the company will begin surveying the route. W. E. Hildebrand, Pittsburg, is the promoter of the project. The engineering end will be in charge of James Ryan, Pittsburg. Among those interested in the enterprise are: J. C. Sturgess, David Elkins, E. M. Grant and J. L. Lyons, Waynesburg. The Pittsburg & West Virginia Railway Company is incorporated under the laws of West Virginia for $3,000,000, giving the privilege of carrying both freight and passengers, and with right of eminent domain.

Seattle-Everett Interurban Railway, Seattle, Wash.—This company, together with the Everett Railway, Light & Water Company, has contracted with the Stone & Webster Engineering Corporation for the construction of an interurban railway from Halls Lake to Everett, a distance of 13 miles. There is already built a 9-mile section of interurban railway between Seattle and Halls Lake and this, together with the new section, will form a through interurban connection between Seattle and Everett. The Seattle Electric Company will provide the connecting line between the interurban at the city limits and its own system. The road will be built entirely on private right-of-way. Catenary overhead construction will be used and current will be supplied from a substation to be located half-way between the Freemont substation of the Seattle Electric Company in Seattle and the power station of the Everett Rail-

way, Light & Water Company in Everett. The Freemont substation receives current from either the Puyallup water power plant or the Georgetown turbine station. From this substation the current will be carried at 13,000 volts to the new substation for the interurban. The present arrangements provide for improvements in the present line from Seattle to Halls Lake as well as all the work involved on the new section.

POWER HOUSES AND SUBSTATIONS

Russellville Water & Light Company, Russellville, Ark.—This company, which has taken over franchise of Russellville & Ozark Mountain Light & Transit Company, has awarded a contract to Fred Wilson, Pine Bluff, Ark., for the construction of a power station and dam on the Illinois River near Russellville, where there is a fall of 22 ft. The dam, when completed, will be 400 ft. wide, with a 25-ft. head of water. Four turbine wheels will develop about 500 hp. The company expects to equip its present power station with additional machinery, including one 150-kw generator to be used in conjunction with a 100-kw machine now in service. [E. R. J., Nov. 28, '08.]

Bangor Railway & Electric Company, Bangor, Maine.—It is stated that this company has plans under consideration for a new dam to be built during the coming summer to take the place of the old wooden dam that is now in service at the power station in Veazie. The new dam, according to the present plans of the company, will be of concrete and will cost between $75,000 and $100,000. It has not been decided whether to build a hollow dam or one of mass concrete. It will be about 500 ft. in length and will extend straight across the river. There will be no spillway as in the present dam, the feature being eliminated in the contemplated design.

Rochester Railway & Light Company, Rochester, N. Y.—This company has let a contract to the Westinghouse Electric & Manufacturing Company for three 1000-kw, 60,000-volt, stepdown transformers to be placed in Station No. 33, in Elmwood Avenue. These transformers will be used to reduce the voltage from Niagara Falls from 66,000 to 550 to be transmitted by underground cable to operate the street railway in the city. The station has an output of about 6000 kw. A contract was also placed with the General Electric Company for a 136-ton, 3000-hp frequency changer. The set consists of two 3000-hp generators, one of 25 cycle and the other of 60 cycle.

Lehigh Valley Transit Company, Allentown, Pa., will install an additional 5000-kw turbo-generator in its power station at Allentown, Pa.

Corry & Columbus Street Railway, Corry, Pa.—This company advises that it is in the market for a generator and gas engine.

Wautaga Electric Company, Johnson City, Tenn.—This company expects to place contracts during the next three weeks for two 120-kw motor generator sets.

SHOPS AND BUILDINGS

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass.—This company announces that it will build a new car house in the near future. F. L. Reed, manager.

Cincinnati (Ohio) Traction Company.—This company has completed the work of reconstruction of its car house at Vine Street and Rochelle Street.

Portland Railway, Light & Power Company, Portland, Ore.—This company's car shops at Twenty-third Street and Washington Street were partly destroyed by fire on Feb. 9. The entire carpenter shop was destroyed. The damage is said to be about $25,000.

Youngstown & Ohio River Railroad, Youngstown, Ohio.—It is stated that this company has purchased land in Youngstown as a site for a passenger station, freight house and yards.

AMUSEMENT PARKS

Kankakee (Ill.) Electric Railway.—This company advises that it has placed a contract with the Breinig Construction Company, Terre Haute, Ind., for the construction of a roller coaster.

New Orleans Railway & Light Company, New Orleans, La.—This company is said to have under contemplation plans for taking over the management of a new lake resort, being the old Spanish Fort, situated on Lake Pontchartrain directly across the lake from the resort now under control of the company known as West End. It is not intended to operate Spanish Fort during the present summer, as it will be necessary to build a new track which it is contemplated will tap the West End line at a point near West End and run down the lake shore to the old fort. It is said that the company proposes to make a number of improvements in developing the new resort.

Manufactures & Supplies

ROLLING STOCK

Detroit (Mich.) United Railways denies that it is planning to receive bids soon for 50 city cars, as reported in the issue of Feb. 20.

Philadelphia (Pa.) Rapid Transit Company has purchased from the Pressed Steel Car Company 10 steel passenger cars for subway service.

Pittsburg (Pa.) Railways Company is having one pay-as-you-enter car built by the Niles Car & Manufacturing Company, Niles, Ohio.

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass., will purchase a combination car equipment for hauling standard freight cars.

Oklahoma (Okla.) Railway Company is reported to have placed an order for 10 cars with the American Car Company, St. Louis, Mo.

Portland Railway, Light & Power Company, Portland, Ore., is reported to have lost five of its cars by fire recently, when part of its shops were burned.

Southern Railway, Light & Power Company, Nashville, Tenn., has placed an order with the St. Louis Car Company for two car bodies, each 21 ft. in length.

Municipal Traction Company, Cleveland, Ohio, has been authorized by Judge Tayler, of the United States Circuit Court at Cleveland, to purchase 80 new motor equipments for cars now in operation.

Wausau (Wis.) Street Railway is in the market for one interurban car. It is reported the company will buy a total of three cars this spring through the Knox Engineering Company, 1410 Fisher Building, Chicago.

Emigration Canyon Railroad, Salt Lake City, Utah, has purchased two motor and two trailer cars from the American Car Company, St. Louis, Mo. The company will probably purchase two additional trailers this spring.

United Railways Company of St. Louis, Mo., has built in its shops at St. Louis one steel passenger car, 47 ft. 2¾ in. in length, and will build other cars of the same type at its shops as soon as financial arrangements can be made.

Omaha & Council Bluffs Railway, Omaha, Neb., which company was preparing specifications for 25 cars, as announced in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909, has begun the construction of these cars in its shops at Omaha.

Beaumont (Tex.) Traction Company is having five double-truck, 25-ft. cars built by the St. Louis Car Company. That this company would buy these equipments was mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909.

Spokane & Inland Empire Railroad, Spokane, Wash., will use the 10 cars which it was reported in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909, to have ordered from the St. Louis Car Company on the lines of the Spokane Traction Company.

Milwaukee & Fox River Valley Railway Company, Fond du Lac, Wis., which was reported in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1908, to be in the market for cars, has ordered two 50-ft., three-compartment interurban cars from the Cincinnati Car Company.

Blue Hill Street Railway Company, Canton, Mass., suffered a loss of $150,000 on Feb. 21 when its central car house and repair shop was destroyed by fire. Twenty electric passenger cars, 16 of which were of the heavy, semi-convertible type, were burned, besides snow plows and work cars.

Texas Traction Company, Dallas, Tex., is having one combination work car and locomotive built by the St. Louis Car Company, St. Louis, Mo. Mention of the proposed purchase of this car was made in the ELECTRIC RAILWAY JOURNAL of Nov. 21, 1908. The car will be delivered in March.

Spokane, Wallace & Interstate Railway Company, Wallace, Idaho, will begin work this year on an interurban road 100 miles long, between Wallace, Idaho, and Spokane, Wash. It expects to order 24 passenger cars, 2 motor express cars, 118 freight cars and 4 50-ton electric locomotives. William J. Hall, Wallace, Idaho, is general manager.

San Francisco, Oakland & San José Railway, Oakland, Cal., in addition to the 10 interurban cars which are nearly completed and the 5 new cars being built in the shops of the Oakland Traction Company, will construct at the Emeryville shops 20 more cars. The company will also immediately commence constructing several motor cars at its Oakland shops.

Rock Island Southern Railroad, Monmouth, Ill., which was reported in the Electric Railway Journal of Jan. 2, 1909, as having placed an order for 17 combination baggage and express cars and eight trailers with the St. Louis Car Company, St. Louis, Mo., has changed the order to 20 passenger and five combination passenger and express cars. These cars are each to have an overall length of 57 ft.

TRADE NOTES

Electric Service Supplies Company, Chicago and Philadelphia, has removed its Atlanta office from 107 Forsythe Street to 1630 Candler Building.

C. W. Leavitt & Company, New York, N. Y., announce that on March 20 they will remove their offices to the Hudson Terminal Building, 30 Church Street, New York.

Oliver Roto Company, Chicago, Ill., has been incorporated with a capital of $10,000 to do a general electric business. G. Raymond Collins, C. A. Fry and Hugh A. Caperton are the incorporators.

Perry Ventilator Company, New Bedford, Mass., has received the order for ventilators for the new cars of the Syracuse, Lake Shore & Northern Railroad Company which were recently ordered from the Cincinnati Car Company.

Lord & Burnham Company, Irvington-on-Hudson, N. Y., has opened a branch office of its ventilating department in the Heed Building, Philadelphia, in charge of Albert H. Bates, who has been representing the company from the factory.

Northern Equipment Company, Chicago, Ill., has been incorporated with a capital of $20,000 to engage in the manufacture and sale of steam power and electrical appliances. The incorporators are Charles M. Clark, R. Blom and F. Cederberg.

The Rail Joint Company, New York, has begun the manufacture of a modified design of the Continuous rail joint adapted for frogs, switches and guard rails. It has been successfully applied in a number of installations during the past year.

Chicago Contracting & Engineering Company, Chicago, Ill., has been incorporated with a capital of $30,000 to install and operate power and heating plants, and to operate machine and repair shops. The incorporators are John M. Blakely, Arthur B. Wells and H. H. Talcott.

Ohmer Fare Register Company, Dayton, Ohio, has recently received 16 patents for improvements on fare registering and recording machines. All of these patents cover inventions of John F. Ohmer, singly or jointly with other inventors. The Patent Office records show that more patents have been issued to John F. Ohmer than to any other inventor of Dayton.

American Specialty Company, Chicago, Ill., in a note in the Electric Railway Journal of Jan. 16, was erroneously reported to have sold its business on Jan. 1, 1909, to Warren Webster & Company, of Camden, N. J. Warren Webster & Company took over the business of the American Engineering Specialty Company on that date. The American Specialty Company is still in the field.

Independent Pneumatic Tool Company, Chicago, Ill., has appointed Manning, Maxwell & Moore, Seattle, Wash., its exclusive representatives for the sale of Thor pneumatic tools and appliances in Washington (excepting Clarke County) and Alaska. It has also appointed the Portland Machinery Company, Portland, Ore., exclusive agents for its tools and appliances in Oregon and Clarke County, Wash.

George B. Dusinberre, Cleveland, Ohio, who is well known to the electrical fraternity both as a consulting engineer and on account of his former connection with the Westinghouse Electric & Manufacturing Company, has recently been appointed sales agent for the Middle West for the American Electric Fuse Company, Muskegon, Mich., and for the Duplex Metals Company, New York. Mr. Dusinberre will continue to make his headquarters in Cleveland and has moved his office to 414 Prospect Avenue.

Dorner Railway Equipment Company, 806 Great Northern Building, Chicago, Ill., reports that it has been designated to act as agent for the sale of the open and closed cars that have been replaced by the new pay-as-you-enter cars on the various lines of the Chicago Railways Company. The company also reports that it has sold to the Menominee & Marinette Light & Traction Company, Menominee, Mich., four GE-54 motors and four K-10 controllers, and that it has sold two National air-brake equipments to the Sheboygan Light, Power & Railway Company.

Wonham, Magor & Sanger, New York, have taken over the business of Wonham & Magor, and have moved their offices from 29 Broadway to 30 Church Street, New York. The firm acts as representative for H. K. Porter Company, locomotives; Verona Tool Works, track tools and unit locks; Whiting Foundry Equipment Company, cranes and cupolas; Continental Car & Equipment Company, dumpcars; American Automatic Switch Company, automatic switches and signals, and is exclusive agent in North and South America for the "H. B." universal life guard.

Western Electric Company's sales organization, at its conference in Chicago, held a dinner of old-time employees on Jan. 29. Those who attended the luncheon and the dates they entered the employ of the company are as follows: E. W. Bennett, 1874; J. C. Cannon, 1877; F. B. Uhrig, now Western district supervisor of the company, Kansas City, 1881; D. L. Harmon, now a banker at Indiana Harbor, Ind., 1883; C. D. Wilkinson, manager of the Minneapolis house, 1886; William Carpenter, of the Walworth & Neville Manufacturing Company, 1887; R. C. Hearsley, 1888, and E. S. Holmes, now manager of the Indianapolis house, 1890.

William Pestell, formerly superintendent of motive power, Worcester Consolidated Railway, has become associated with the sales department of the Allis-Chalmers Company and will represent that company at Boston. Mr. Pestell has had a long electric railway experience. From 1892 to 1901 he was associated with the Lynn & Boston Street Railway Company, now the Boston & Northern, as electrical engineer. From this road Mr. Pestell went with the Worcester Consolidated Street Railway Company as superintendent of motive power and machinery, and remained there from 1901 until 1903. In the latter year he accepted an offer from J. G. White & Company, New York City, and was assistant mechanical engineer of that firm for two years. He resigned in October, 1905, to accept the office of president and general manager of the Worcester Steel Foundry Company, Worcester, Mass., which he held until recently. While with the Worcester and Lynn companies Mr. Pestell served on several engineering association committees. He has also contributed important engineering articles to the technical press.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, publishes in the February issue of its monthly bulletin a number of illustrations of its catenary construction as installed on several lines.

Frank Ridlon Company, Boston, Mass., has issued a list of available second-hand motors and generators and measuring instruments. The motors include many 500-volt machines suitable for shop installations.

Murphy Iron Works, Detroit, Mich., are publishing a pamphlet with a large number of illustrations showing the Murphy furnaces in paper mills. This type of furnace, of course, is also suitable for electric railway power houses; in fact, they are in use by a number of large railways, among them being the New Orleans Railway & Light Company.

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., announces the following publications: No. 1165, for motors for 1909; No. 1148, mercury rectifier battery charging outfits; No. 1158, electric motor friction brakes. Pamphlets are also being issued on the type A mercury rectifier, suction sweepers and small direct-connected generating sets of Westinghouse generators and American Blower Company's engines.

Crocker-Wheeler Company, Ampere, N. J., has published a list of its engine-type d. c. generators, giving the names and addresses of companies and individuals using these machines. Industrial plants, street railways, railroad and other machine shops, office buildings, stores, schools and residences are included. In several items no address is given, these representing U. S. battleships equipped with Crocker-Wheeler generators.

Wonham, Magor & Sanger, New York, have issued the first American publication on the "H. B." life guard. This is the wheelguard which has been adopted as the standard for all of the electric lines of the Third Avenue Railroad Company, New York, and is one of those in use by the Metropolitan Street Railway Company, New York. A description of this device was published in the Dec. 26, 1908, issue of the Electric Railway Journal.

Ingersoll-Rand Company, New York, announces the following publications: Form No. 3011, "Duplex Steam-Driven Compressors;" form No. 4002, "Rock Drills;" form No. 9002, "Air Receivers, Pressure Tanks and Moisture Traps;" form EE-36, "Small Power-Driven Air Compressors;" form 21-A, "Electric-Air Rock Drills and Channelers;" form 36-A, "Compressors;" 47-A, "Rock Excavating Machinery;" 74-B, "Pneumatic Pumping Systems;" AA-37, "Steam-Driven Straight-Line Two-Stage Air Compressors."

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MARCH 6, 1909 No. 10

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.

LONDON: Hastings House, Norfolk St., Strand.
Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9500 copies are printed.*

Responsibility for Failure of Overhead Wires

The complaint filed for a recent suit for damages against the Brooklyn Rapid Transit Company, tried in the Appellate Division of the Supreme Court, New York, takes one back to the middle ages, or what seems nearly to be them, in electrical matters. The statement that the railway company "by its use of the said electric current did knowingly and wrongfully jeopardize the lives and limbs and persons of people lawfully upon said highway whenever the said electric wires for any cause became unprotected, broken or torn away, or the said current was allowed to escape therefrom," is a strong reminder of the days when the overhead wire was usually referred to in lay circles as the "deadly trolley." But the complaint in the Brooklyn case also said that the defendant was a domestic corporation "duly organized and existing and engaged in operating street railroads in the borough of Brooklyn." This latter claim was accepted by both the defendant and the judge, and as the judge explained that "duly" in that connection meant "lawfully," he held there was no question about the legality of the occupation in the street by the company's structures. Moreover, a New York State statute provides that presumptive evidence of the legality of the location of any railroad or of its motive power is established after one year's use. Consequently, as the wires were broken by the falling walls of a building which was on fire, and as the plaintiff did not charge the railway company with negligence in their maintenance, the court held that the action should be dismissed. In other words, in New York State a railway company which is lawfully occupying the highway must guard against its own negligence, but is not obliged to insure every person who passes under its wires against the breakage of these wires from causes which are unavoidable or are occasioned by the negligence of a third person.

Public Morality and Street Railways

Under this title Mr. Whitridge, receiver of the Third Avenue Railroad Company, discusses in the current issue of the *Century Magazine,* some of the evils under which railway companies are suffering, and considers these evils to be "a good deal more than the just penalty of the sins of their financial fathers." One of them is the development and abuse of the transfer system, which the author considers has done more than any one thing to debauch the conscience of the people. Another is the way in which individuals avoid the payment of fares by deceiving conductors, sometimes tacitly and at other times openly. According to the author, when the pay-as-you-enter cars in which it is difficult to follow this practice were installed on Fourth Avenue there was an immediate increase in the travel on Lexington Avenue, probably caused by people who resented being called upon to pay their fares as they entered and desired their old opportunities to ride free. Still another evil is the accident faker and his partner, the shyster lawyer. Another is the municipal inspector appointed by the ward politician and paid by the railroads to do nothing for his salary except to give the greater part of it up to the boss. Finally Mr. Whitridge includes in his list of burdens, which is as long as that in Ecclesiastes, the Public Service Commission, who, he says, have enough

good intentions to pave whole blocks down below, but it is fortunate that they do not have to sue the city for their expenditures on a *quantum meruit*. He fears that if they reach out for the power of regulating the purchases made by railroads, as now seems to be the intention, the effect will be disastrous. Mr. Whitridge might have made the aspect even gloomier by touching upon the increasing cost of material and supplies, which has probably done more than any other single cause mentioned in his list to affect adversely railway companies whose fares are fixed, but it is gratifying to learn that he considers the future full of hope. Conditions are improving in many directions, especially so far as the relations of the companies with their employees, their patrons and the press are concerned. Even the public service law, with all its demerits, guarantees strict supervision of railway finances, and so avoids some of the dangers in the past. Consequently, Mr. Whitridge thinks that although the reorganized companies in New York may in time recede from the standard set by the receivers, the condition will never be as bad as it formerly was.

Removing Steel Wheels from Axles

Many users of steel wheels have experienced difficulty in removing wornout wheels from axles. The new wheels are put on with the usual pressure of from 40 to 50 tons, but when an attempt is made to press them off it is often found to be impossible to start them with as much as 200 tons' pressure, even after heating the web and hub. In many cases where axles with small journals are used the axle bends outside of the wheel and the axle and both wheels must be relegated to the scrap pile. The explanation of this curious and exasperating behavior of steel wheels probably lies in the nature of the two metal surfaces in contact around the wheel fit. Chilled iron wheels contain a large percentage of graphitic carbon, which is itself a permanent lubricant. It is also possible to give the hole in the hub of a cast-iron wheel a very smooth finish on the last cut in the boring mill. With steel wheels the surface of the hub is composed of a series of ridges or tool marks, which interlock with the similar ridges on the surface of the axle after the wheel is pressed on. The constant pounding of the wheel produces an intimate contact between the fibers or grains of the two steel surfaces, which in time is almost as unbreakable as a weld. It is difficult to expand a steel wheel with a torch sufficiently to break apart this contact, because the cubical expansion of steel is not great and the diameter of the wheel fit is quite small compared to the diameter of a steel tire, for example. In the shops of the United Railways of Baltimore a simple and positive method of removing steel wheels was discovered some time ago. This company had experienced extreme difficulty in removing steel wheels from axles, and twice broke a wheel press in the operation. The ingenious plan was then tried of drilling two ¾-in. holes diametrically opposite through the hub on the inside where the fitting pressure was greatest. The wheels and axle were then put into the wheel press and, while a moderate pressure was applied, hardened tapered plugs ¾ in. in diameter at the small end and ⅞ in. in diameter at the large end were driven with sledges into the two holes. This produced sufficient mechanical stress and distortion in the metal of the hub to break the "weld" between the wheel and the axle, and a pressure of only 100 tons to 125 tons was required to start the wheel off. No damage is done to the axle by this method, and it has the advantage of being a simple expedient which can be used in any shop, large or small, at an insignificant cost.

Periodical Examination of Trainmen

It is a difficult task so to train a large—or even a small—body of employees so that each will do the proper thing when an emergency arises. But a distinct advantage has been gained when this result has been accomplished, not only because the managing official knows that individual conditions will be cared for, but the crew of every other train, as well as the dispatcher, will feel certain of the action to be taken by other car crews interested. The frequency of trains on electric roads, the quietness with which they run and sometimes the electrical weakness of the telephone-dispatching system—all emphasize the desirability of the thorough training of car crews, not only for regular operation, but for action at those times when it is impossible either to reach the dispatcher or to see nearby objects and approaching trains.

The trainmen's examinations of the Lake Shore Electric Railway are cited as an example of how one road is making every effort not only to teach the car crews to be fully observant of all the details of operation, but also to obtain thorough records of each man's ability. Once each year the trainmen are examined as to their knowledge of the rules, the equipment and the condition of their sight, hearing, etc. The linemen, who maintain the distribution wires, are also periodically examined so that they may work in unison with the train crews in time of emergency. The superintendents of transportation hold the examinations at the various car stations. The chief dispatcher at the same time examines the men regarding accidents and fully emphasizes the great need for complete detailed reports from them of all such unfortunate occurrences.

The periodical examination of all the men in train service as here outlined requires about six weeks' time. All of the necessary apparatus for making the physical and mental tests are carried on a car which is run to the different headquarters and it is planned to hold the examinations so that they will not interfere with the regular duties of the trainmen. A detailed record is kept showing the standing of each man and certificates of proficiency are given to each. These certificates are signed by the examiner and by the man examined and are in duplicate so that the company has available at all times the results of these examinations in a condensed form and one which has been acknowledged by the trainmen examined. This practice, if followed from year to year, will result in a most valuable collection of records. The periodical examinations not only give the company a clear insight into the trainmen's knowledge of the rules, but also force the men to prompt themselves in the details of operation. The combination of these two should bring about a harmony of operation so necessary for the safe conductance of high-speed traffic.

The Traveling Master Mechanic

One of the most persistent problems which faces the car maintenance department is that of obtaining from division depots the same grade of minor repairs as from the shop. On compact city railways prevention may be found better than cure, since the cars can be brought to the shops for expert attention, but this method is not applicable on intercity systems with widely separated division quarters. On lines of the latter type the shops are often over half a day's journey from many of the terminals, and, besides this handicap, some of the divisions are so small that it would be a hardship for them to lose the services of even one or two cars for a day longer than necessary. It follows, then, that some other expedient than centralization is required to insure that the rolling stock on isolated branches will be repaired in conformity with shop standards.

The Public Service Railway, which operates about 663 miles of city, suburban and interurban lines in territory covering over half of the State of New Jersey, has met this condition by creating the office of traveling inspector. An important duty of this official is to make "surprise" visits throughout the system to study the inspection and repair methods in vogue at different places, and then to point out how betterments can be made. These trips are not entirely haphazard, as the objective of many journeys is determined after a study of the comparisons of troubles recorded by months. Should a certain division show an unusual number of hot journals, controller burn-outs, or the like, it would be pretty safe for the traveling master mechanic to consider such signs of trouble as an invitation to call. Trained as he is in the detection of trouble from causes which are not apparent to the division foreman, he is in a position to diagnose the case, find whether the remedy should be of a mechanical or electrical nature, and then leave a prescription to be taken during his absence to effect a cure.

Another important duty of the traveling master mechanic is to instruct the outside men in the use of new equipment or changes in methods. One personal demonstration is worth a dozen circulars of instructions and orders; besides, the instructor is likely to come around almost any time to see if the work is being properly carried out. The traveling master mechanic is also a valuable intermediary between the division foreman and the shop departments. The former look to him for the removal of delays and errors in the supply of materials, and the latter expect him to see that the divisions do not order unreasonable quantities of material and that they promptly return old parts for new.

The success of this unique office must depend very largely on the character of its holder. He must be diplomatic enough to instill his ideas without arousing hostility and must be fair enough in his reports to the general manager to lay due stress on the influence of any adverse conditions which prevent one depot from doing as well as another. When the traveling master mechanic carries out his duties in this spirit there is every reason to believe that he will become a potent factor in the improvement of car maintenance methods and of great assistance to all.

Decisions on Alleged Negligence in Car Construction

One of the recommendations made by the standardization committee of the last convention of the Engineering Association related to the possibility of reducing the effect of collisions between cars of different heights by arranging the bumpers so that they would engage each other. It is interesting to note that a recent decision of the Court of Appeals of New York State turned upon this point. It was a suit for damages brought by the administratrix of a motorman on the Hudson Valley Railroad Company in 1905 who had been killed in a collision between two cars of the company. The platform of the car on which the motorman who was injured was standing was lower than that of the other, so that the interurban platform rode over the platform of the city car. The question arose as to whether such construction was negligent, and the trial judge instructed the jury to decide this point. The Court of Appeals held, however, that the law did not impose a duty upon a street railway company which operates its cars singly to have the platforms on every one so constructed as to be the same height, although where cars are run in trains, as on steam railroads, such an obligation may exist. To assume otherwise, the court says, would be to require every electric car in the State to be of a practically universal platform height. Again, "the service which motormen and conductors are called upon to perform in the management of electric street surface railway cars operated singly involves no such elements of danger as appertain to the duties of brakemen on steam railroad trains; and hence there is no occasion to impose upon the employer the duty to maintain the same safeguards against injury. The employer's obligation in this respect is to be measured by the danger reasonably to be apprehended, as indicated by practical experience." The court did not consider that this required the supply of bumpers of equal elevation, "or, indeed, with any buffers at all to guard motormen against injuries in consequence of probable collisions."

The extended use of electricity requires courts in these days to be versed in technical as well as mechanical subjects. A somewhat similar case to that cited, namely, one involving the question of negligence or non-negligence in car construction, was recently decided by the Supreme Court of Minnesota, and related to the efficiency of the ground on a controller case. The St. Paul City Railway Company, against whom the case was brought, not only employed the usual ground, but in this particular case also attached to the back of the controller an auxiliary brace which was connected to the air-brake frame. In spite of this fact, a motorman claimed that he got a sudden shock while holding the controller handle in one hand and the air-brake handle in the other, and that, as a result, the car ran into a curve at full speed and was derailed. The company claimed that the motorman was asleep at the time, or just prior to it. Experts for the plaintiff had made tests of the ground connection the day after the accident with a magneto, and also with bell and dry battery, and claimed that the connection was defective. But tests made by the defendants' experts with the trolley circuit indicated that the casing was properly grounded. The chief interest in the case lies in the conclusion of the

court that, as the controller was of standard type and made by a reputable manufacturer and had been inspected frequently, the accident was one that could not be guarded against, even if it had occurred as claimed by the plaintiff. The law does not expect railway companies to build their own cars or equipment. All they can do is to buy those which can reasonably be expected to be safe, and then to give them such examination as is usual and practicable.

The Effect of Good Service in Cleveland

The effect of the quality of service rendered by a street railway has received an impressive illustration in the present situation at Cleveland. It is the quality of service rendered that determines, finally, the judgment of the majority of the people in a community concerning the efficiency of the management of a street railway. If the service is good, the management should receive, if not praise, at least immunity from persecution by a majority of the persons served; if the service is poor, the condemnation that is visited is certain to be sure and relentless.

For years the people of Cleveland, when the lines in that city were operated by the Cleveland Electric Railway, had what could probably be termed good service. Then there came a period of hostile city administration, developing hostility on the part of the public, while the near expiration of some franchises offered an opportunity of which full avail was taken by those who held the principal elective offices in the city government at the time. It is not necessary to recount the steps leading up to the lease of the property of the Cleveland Electric Railway by the so-called Municipal Traction Company and the ensuing history, except to state that changes and deterioration in service followed rapidly after the execution of the instrument whereby the control of the lines was lost by the old company and assumed by Mayor Johnson and his friends. Whatever the reasons were—lack of sufficient revenue, inexperience, weakness of administration or organization, failure to appreciate at their true importance the difficulties of operation of a street railway—or whether they were all or part of these causes, the fact remains that the service declined woefully. During this brief period some people had low fares; others, because of arbitrary re-routing of cars, paid more under the new administration than they had under the old. The overcrowded cars and the infrequent service given on some lines bore testimnoy to the sharp reductions in the number of car-miles run, which were proved later when the figures showing the results of operation were published.

After the collapse occurred, because the people decided at the referendum that they were heartily tired of the experiment, the daily newspapers of the city of Cleveland, voicing the opinion of the public, announced emphatically that good service was desired before low fare. Judge Tayler, of the United States Circuit Court, in a letter to the receivers now operating the property under his direction, stated that to the extent of the equipment, power and funds at their disposal, "good service must be given." The receivers, therefore, operating with the highest rates of fare permissible under the ordinances, have increased the service materially over that which was afforded during the temporary management of last year. As service in the public mind is good or poor by contrast, the service afforded by the Cleveland lines is now approved by the people, just as the verdict passed on the service rendered by the Municipal Traction Company management last year was one of disapproval. While Mayor Johnson has been quoted as saying that the service now is wasteful because of the large increase in car-mileage, this conclusion is not shared by the public of Cleveland.

It is, of course, not only in the number of cars operated or in their proper routing that good service lies; while those factors are important, there are many other features which a wise management will impress constantly upon the employees if a real effort is to be made to give a service which will not only be good, but will make the traveling public realize that it is good.

Street Railways and the Magazines

Recent legislation looking to the establishment of public service commissions in different parts of the country seems to have stimulated the publication in the popular magazines of a flood of articles upon the "excessive profits" being made by railway and other public service corporations, just as the period of insurance legislation a few years ago created a demand for literature on different phases of that topic. As a variation from the other classes of fiction contained in these magazines the articles are interesting, but if they are accepted by their readers to be a portrayal of facts, they are extremely misleading. Many of the alleged evils do not exist and most of the suggested improvements, if made, would not only bankrupt the railway company, but would be an actual detriment to the service. In probably no other large industry are helpful ideas more quickly recognized and applied. Electric railway engineering is a modern development, and managers have had to adopt so many improvements and make so many changes in methods and apparatus during the last two decades that they are very far from assuming the conservative position regarding new inventions that characterize older organizations. But this fact is often overlooked by the magazine writer, who believes because he has seen some device, the double-deck car, for instance, or a particular type of fender, in use in Europe, that the same device would be equally desirable in this country, and that it is not employed here because the men operating the different properties are ignorant of it or are unwilling, through short-sighted parsimony or prejudice, to change their methods.

It is intimated in an article which appeared in the last issue of "Charities and the Commons" that these are the reasons that deter the managers of the Pittsburgh Railways Company from adopting the double-deck car, the Liverpool fender and many other alleged improvements. Like other contributions of the same kind which have appeared recently, this article is based upon the premise that the railway company has large net earnings (in this case 12.55 cents per car mile) after paying its taxes, and that some of its profits should be diverted to a better service and equipment. We wonder whether the steel interests which have made Pittsburgh what it is would be content with the returns upon their investment in that industry with which

the railway company has had to be satisfied. Although very conservatively capitalized, the railway company during the past five years has not been a paying investment, and the only reason why the Philadelphia company, the controlling company, has been able to maintain dividends of 6 per cent on its stock is on account of the profits made on its natural gas and lighting investments.

The improvements suggested in the article include, as we have already stated, the introduction of double-deck cars, which we have previously shown to be utterly unsuitable to American climate and which are rapidly going out of use in all parts of Europe except Great Britain; the reduction of fares in the center of the city, because it is said that in Berlin one can ride 13 miles for 2½ cents, and in London 11 miles for 2 cents; the installation of the plow type of fender used in Liverpool; and the construction of a suspended railway similar to that between Barmen and Elberfeld, in Germany. In spite of the fact that this type of construction has been in use in a little German town for eight years without making any progress so far as the adoption of the idea is concerned in any other city, it is considered suitable for Pittsburgh, even if it has to be installed by the municipality, because the Brooklyn Bridge Railway, 1½ miles long, "was operated by public trustees most successfully for a number of years with a 2½-cent fare."

Finally, we learn that the troubles of the transportation situation in Pittsburgh are more deep rooted than the railway system. According to the author, "the ideal city is the longitudinal one with the factories on the leeward side." If the people would only live to the windward side of the factories and walk to their work daily the rush-hour trouble would be abolished and individuals would be much more healthy.

Subway Operation on a 5-Cent Fare

The report of Mr. Arnold, containing his conclusions concerning "The Return on the Investment in the Subway," of which an abstract was published in last week's issue, is the climax of a series of important studies. Discussing the revenues and expenses which determine the profitableness or unprofitableness of the enterprise, Mr. Arnold concludes in this report that the real problem of rapid transit in New York City is how to provide additional rapid transportation facilities with the 5-cent fare. The necessity of not departing from the present fare unit is a condition that is imposed by statute, and therefore a factor upon which all calculations must rest.

The principles underlying the conclusions reached by Mr. Arnold should be regarded as applicable in some respects to other urban transportation problems involving the length of haul permitted by existing lines for a single rate of fare fixed by franchise requirements or by law. It is shown in the report, for instance, that the long-haul part of the business has already become too great a burden, and that the desirable course of action is to increase the short rides. The tendency of the long-haul passengers to absorb the facilities, diverting the possible short-distance riders to other systems of transportation or to the sidewalk, is one which exists in other lines than the New York subway; and its effect, in the desire for increased gross earnings, has not always been considered with proper care. Mr. Arnold shows the advantage of increasing the non-rush-hour traffic, the short-distance travel and traffic that would be counter to the rush travel. This last advantage has been secured by the New York subway, to some extent, by its extension to Brooklyn, although this line increased the length of ride for a single fare.

The discussion regarding the suggested elimination of useless car-mileage, partly by the construction of a cut-off and in part by operating changes, applies as much, in principle, to prospective additional subways as to the existing property. Since one of the objects of the report is to ascertain economies which might be effected either in the present or in future subways, and such economies are essential if a condition of profitable operation is to be maintained, emphasis may be given to the conclusion that the various changes outlined would eliminate 10 per cent of the present aggregate car-mileage.

Passing from the analysis of operating expenses and their classification of variable and unvariable, it should be observed that in considering the fixed charges Mr. Arnold states that under New York City conditions a subway costs approximately three times as much to build as the present elevated roads. Subway travel should therefore be three times the minimum travel that would justify the construction of an elevated road, and subways should be reserved for main-line traffic. This portion of the report can be studied to advantage by the citizens and municipal authorities of other cities, some of whom seem to have gone crazy on the subject of subways. It is doubtful whether even New York, with its immense crowds and peculiar configuration, can afford subways.

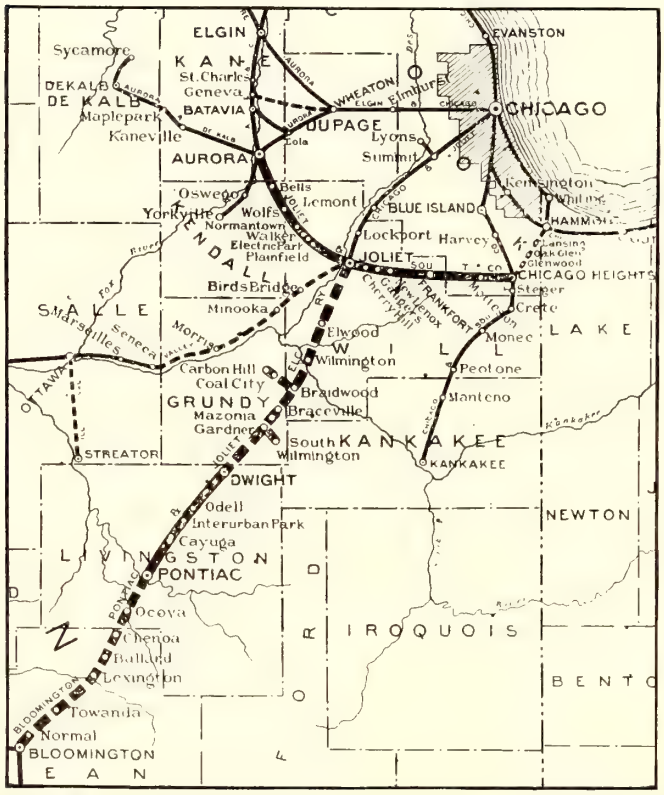
After considering this point and concluding that fully 30 per cent of the investment, with the present subway, is in branch lines which are operated at a loss, Mr. Arnold suggests that if the first cost could be charged proportionately by special assessment directly upon the property benefited, the interest charge on permanent way would be reduced. A plan of this nature would presumably add to the cost of the property thus improved, but since it would would add greatly to the value, it is not clear what deterrent effect, if any of material importance, it would have on the ultimate improvement of the real estate. Of course, the legal aspect of this plan remains to be determined.

Mr. Arnold discusses the advisability of making provision for depreciation upon equipment, and classes it as a fixed charge, rather than as an operating expense. He speaks of the creditable practice of the Milwaukee Electric Railway & Light Company, concerning which full explanation was made by Mr. Beggs in his testimony last week before the Railroad Commission of Wisconsin.

The solution of raising the fare for the long-haul passenger is recognized by Mr. Arnold as complicated and disadvantageous to the public; but among the recommendations which are made as the result of the long study that preceded the compilation of the report is the elimination of taxes, as is now done with the present subway. It is through relief from taxation that many earnest observers believe the final settlement of the serious problems confronting traction companies will be reached.

EXTENSIONS OF THE JOLIET & SOUTHERN TRACTION COMPANY

In 1906 the Joliet & Southern Traction Company obtained a 50-year franchise in Joliet, covering about 7 miles of city streets converging at the center of the business district. The street routes thus obtained radiate in four directions from a terminal which has been secured in the center of the city, and these routes are well suited as entrances for interurban lines. Already the route through the northwestern quarter of the city of Joliet is used by the cars of the Joliet, Plainfield & Aurora, an interurban line owned by the Joliet & Southern Traction Company, and the route to the eastward is used by the interurban cars of the new Chicago Heights division of the Joliet & Southern system, which has just been put into operation. Later it is expected that the route through the southwestern quarter of the city will serve as an entrance for interurban cars from the Illinois Valley Railway lines of the McKinley syndicate, and the route ex-



Joliet & Southern—Map of System and Proposed Extensions

tending directly south from the center of Joliet will accommodate the cars of the interurban line which it is proposed to build from Joliet to Dwight. From there it will connect with the Bloomington, Pontiac & Joliet Electric Railway, owned by the Joliet & Southern Traction Company, which proposes later to connect Pontiac with Bloomington, thereby making possible an interchange of passenger traffic with the 800-mile traction system of the McKinley syndicate and affording the Illinois Traction system an outlet toward Chicago.

After the Joliet & Southern Traction Company had obtained the excellent franchise from Joliet it completed the purchase of the Joliet, Plainfield & Aurora Railroad, and then undertook, during the past year, the construction of a new line from Joliet directly east through New Lenox, Frankfort, Matteson and Chicago Heights to Hammond, on the State line between Illinois and Indiana. The latter road is now in operation from Joliet to Chicago Heights, 24 miles. This eastern extension when completed will connect important manufacturing centers tributary to Chicago which heretofore were offered but poor passenger service except by passing in and out of Chicago.

Chicago Heights, the present eastern terminus of the new extension, is a manufacturing city of about 15,000 inhabitants, and is now served by the following electric lines: Chicago Heights Street Railway, Chicago & Southern Traction Company, running north and south to Chicago and Kankakee, and the Joliet & Southern Traction connection to Joliet and Aurora. The contemplated extension from Chicago Heights to Hammond, Ind., will serve to connect the great steel plants at Joliet, Chicago Heights, Hammond and Gary, the latter connection being made by way of the Chicago, Lake Shore & South Bend Railway, now in operation from Hammond through Gary to South Bend. Hammond is a city with a population of 30,000, situated 20 miles southeast of Chicago. Already it is served by 17 steam railroads and by the Hammond, Whiting & East Chicago Electric Railway, the Calumet & South Chicago Railway, and the Chicago, Lake Shore & South Bend Railway. Lying between Chicago Heights and Hammond on the route of the Joliet & Southern extension are four smaller cities, the residents of which at present do their trading in Chicago Heights.

CONSTRUCTION OF EASTERN EXTENSION

The extension of the new line from Joliet to Chicago Heights has been carried on during the past year, and cars have just been put into operation. From the city limits of Joliet to New Lenox the company has a 50-year franchise on the highway, allowing it all the privileges of a private right-of-way, with no restrictions as to speed or freight. From New Lenox to Chicago Heights there is a private right-of-way 50 ft. wide, and on this right-of-way a very substantial track has been built, using 60-lb. rails and continuous joints and ballasted with clean gravel. There are two important pieces of construction work in this roadway. One is a 145-ft. through-truss bridge, spanning the Michigan Central tracks as illustrated, and the other is a long viaduct, by means of which the electric line crosses the tracks of the Michigan Central and the Illinois Central railroads at their intersection in Matteson, 3 miles west of Chicago Heights.

The private right-of-way leads to within half a mile of the business district of Chicago Heights and the connection with the Chicago & Southern Traction electric line from Kankakee and Harvey to Chicago. The entire 24-mile stretch of track from Joliet to Chicago Heights is protected with automatic block signals, with blocks averaging 2 miles in length. This apparatus was furnished by the United States Electric Signal Company, West Newton, Mass.

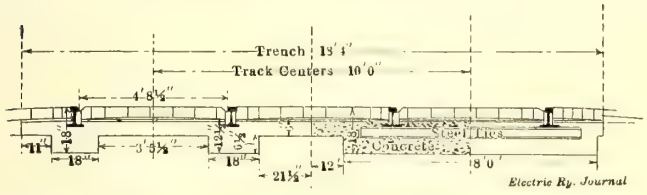
Current for operating the Chicago Heights division is purchased from the North Shore Electric Company, and is converted in a substation of the railway company located at Frankfort, 14 miles east of Joliet. The equipment of this substation includes two 350-kw rotary converters. A 400,000 circ.mil feeder parallels the No. 000 grooved trolley for the entire length of the line. The overhead work is supported by Ohio Brass Company fixtures carried on wooden pole bracket construction.

WESTERN DIVISION

The western division of the Joliet & Southern system comprises the road formerly known as the Joliet, Plainfield & Aurora. This line is 22 miles in length and connects

the cities included in its name. Within the present year it is expected that interests affiliated with the Joliet & Southern Traction Company will electrically equip the Aurora, De Kalb & Rockford road, 27 miles long, which has been operating a gasoline car service between Aurora and De Kalb; then through electric interurban service will be operated from De Kalb by way of Aurora, Joliet and Chicago Heights to Hammond, Ind.

It is asserted by the management that the Joliet, Plainfield & Aurora division offers a good exampde of how an electric line will benefit its surrounding territory. During



Joliet & Southern—Section of Standard Track Construction in Paved Streets

the four years in which this road has been in operation the selling price of real estate along the line has increased from $10 to $50 an acre. The merchants in the town of Plainfield, midway between Aurora and Joliet, state that business has increased from 50 to 200 per cent. It is known that rents have largely increased and that the impetus given the growth of the town has brought about the construction of many new houses.

CITY TRACK CONSTRUCTION

Within the city of Joliet all the street track of the Joliet & Southern company is laid with 80-lb. high T-rails resting on Carnegie steel ties and a foundation of concrete 12 in. deep. A diagram on this page shows the details of construction of the double-track structure with steel ties. For purposes of construction oak ties were placed alternately with steel ties. The oak ties served to hold the rails in line and gage while the concrete was being placed. The steel ties are spaced 10-ft. centers, and the excavation is so shaped that each tie is enclosed in a beam of concrete 18 in. wide by 12 in. deep and 8 ft. long. Under each rail there is a concrete beam of similar dimensions, while the beams under the two rails are tied together, not only by the steel ties, but by a floor of concrete 6 in. thick. Brick paving with specially molded filler and stretcher blocks is used throughout the city.

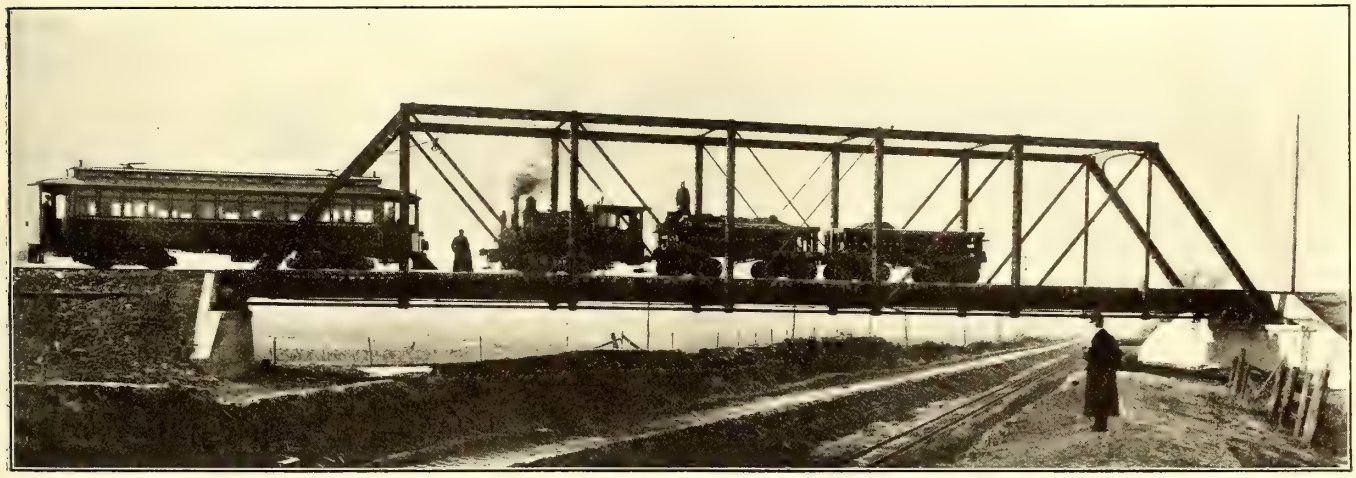
TERMINAL BUILDING

Mention has been made of the terminal building now under construction in the very center of the business district in Joliet. This building comprises two adjoining structures, a train shed 44 ft. wide by 110 ft. long and a three-story substation and office building 42 ft. wide by 50 ft. long. Both structures are of red brick. The train shed is entirely enclosed and covers two tracks extending the full length of the building. These tracks are placed near the center line of the building, so that ample space is available on one side for a loading platform for inbound freight and on the other side for outbound freight. Driveways of ample width provide for teaming the freight directly to and from the loading and unloading platforms. With this arrangement of track and platforms all the freight handling can be carried on under cover, and yet the largest cars can be brought directly into the terminal. This section of the terminal facilities is now completed, and contracts have been let for the office building to adjoin.

Floor plans are presented showing the arrangement of the office and substation building. In the basement accommodation will be provided for the car crews and for the heating plant. A fireproof vault 9 ft. square extends from the basement to the roof, and has entrances from each floor. The street floor is subdivided into a substation 42 ft. x 20 ft. and a waiting room 28 ft. wide by 42 ft. long. The second floor is subdivided into a large office for the auditor and four smaller rooms for executive offices. The third floor is similarly divided, and will be occupied by the engineering department. Passenger cars will load and unload on the tracks in front of the station, and an ornamental roof has been provided covering the sidewalk at the front of the building, so that protection will be afforded passengers during inclement weather.

NEW CARS

Five combination baggage, passenger and smoker cars are being built by the American Car Company for through service on the interurban lines. All five cars will be of similar design. Each is 45 ft. long over all and 8 ft. 8 in. wide. The floor plan given on page 405 shows the seating arrangement of the car and exhibits the principal dimensions. In the main passenger compartment will be 14 double seats, all but two of which will be reversible. In the smoking compartment are two fixed double seats and six reversible-back seats, and in the baggage compartment will be a folding seat accommodating two persons. All the seats in the main and smoking compartments will have high backs and arm rails, and will be upholstered in leather.



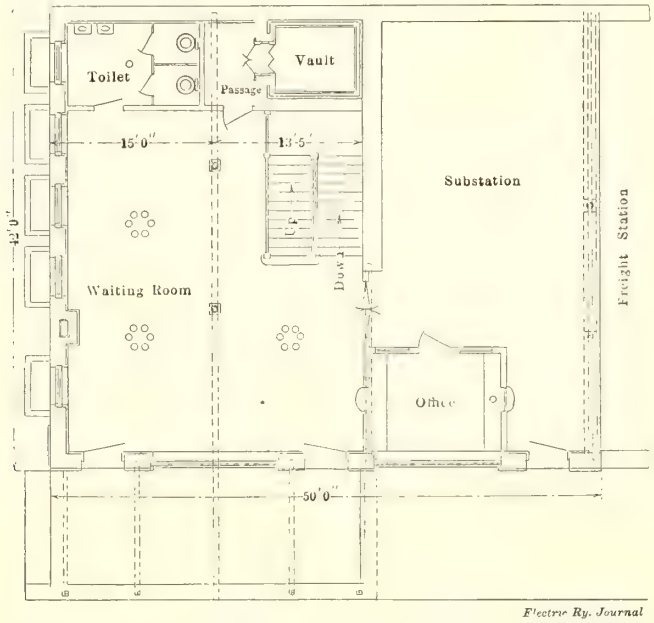
Joliet & Southern—Long Through Truss Bridge over Michigan Central Tracks on Chicago Heights Extension

The interior of the car will be trimmed in plain mahogany, having no raised or sunken panels to catch dust. The detail ornamentation will be of hollywood inlay. The cars will be illuminated with dome lights and with frosted sidelights, one at each seat.

Attention is called to the arrangement of the ends of the cars. Each car is designed for double-end multiple-unit operation, and 24-in. swinging doors are provided at both ends for passage between cars. At the baggage end of the car there is a sliding door on one side for handling the baggage and on the other side for use when this end of the car is at the rear is a similar sliding passenger door with three steps below. Considerable floor space is saved by the elimination of the bulkheads, and more than half of the space of the baggage compartment as arranged for in this type of car ordinarily could be used only as platform space.

The passenger compartment at the opposite end of the car from the baggage room, not having any bulkhead, is provided with a motorman's cab built in one corner. A narrow emergency door through the side of the car is available for the motorman. Entrance to the motorman's cab from the body of the car also may be had by means of a creep door in the interior partition of the cab. When this end of the car is running forward the 2-ft. 6-in. swinging door for passenger entrance is closed and a removable seat accommodating four persons is let down over the steps, thus materially increasing the seating capacity of the car by accommodating passengers in the space ordinarily used as a vestibule.

Mechanically and electrically the new cars will be up to date in every way. The body will be carried on two Brill No. 27 E-1 trucks with 4½-in. axles. The wheel base of the trucks is 6 ft. and the distance between truck centers 26 ft. Each car will have four 40-hp motors controlled by type M equipment and provided with couplers for train

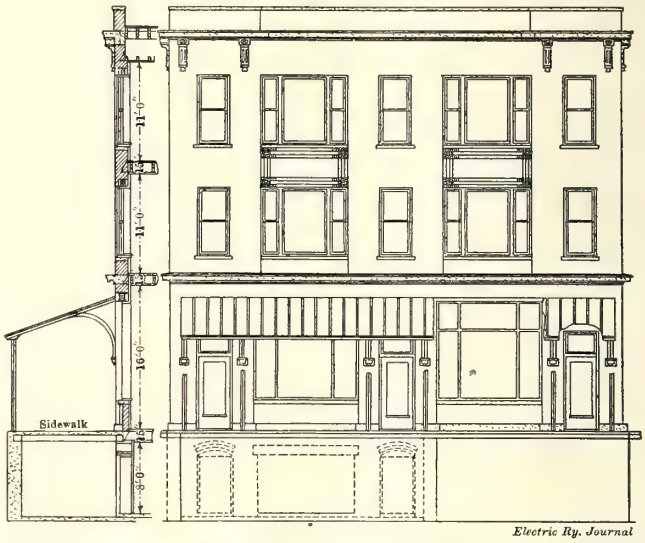


Joliet & Southern—Plan of Ground Floor of Terminal Building in Joliet

operation; rolled steel wheels 33 in. in diameter with 3-in. tread and 1-in. flange will be used. Tomlinson couplers will serve for connecting cars for train operation. The air-brake equipment will be supplied by the National Brake & Electric Company, and will be designed for train control with the latest automatic features. Among the specialties chosen for these cars are Ohio Brass sanders, Cooper hot water heating system, Forsyth No. 88 curtain fixtures, continuous parcel racks, pressed steel bumpers, locomotive type pilots and Pantasote curtains.

FINANCIAL

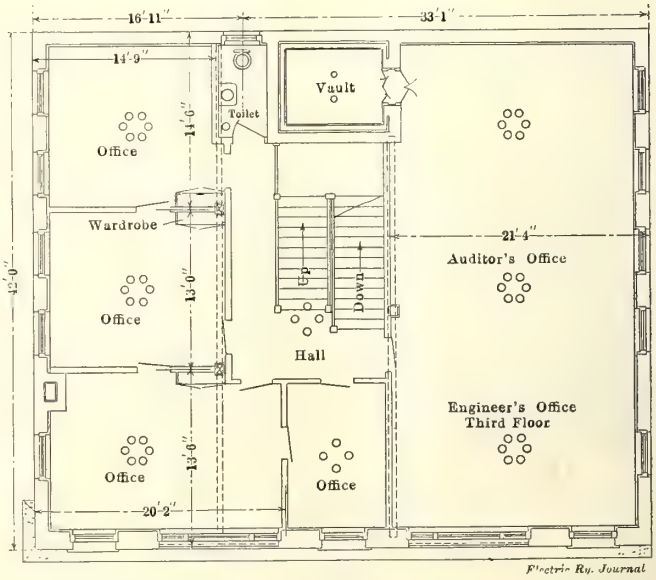
It is of considerable interest to note that the Fisher Construction Company, which has built the Joliet & Southern lines, has raised local money to the amount of $5,000 per mile by selling bonds of small denominations to the



Joliet & Southern—Elevation of Terminal Building in Joliet

patrons of the 24-mile extension from Joliet to Chicago Heights. The mileage of this division was apportioned among the towns according to the population at the various centers, and bonds to the amount of $5,000 per mile were taken over and sold at par by the bond department, assisted by committees of local men in each town.

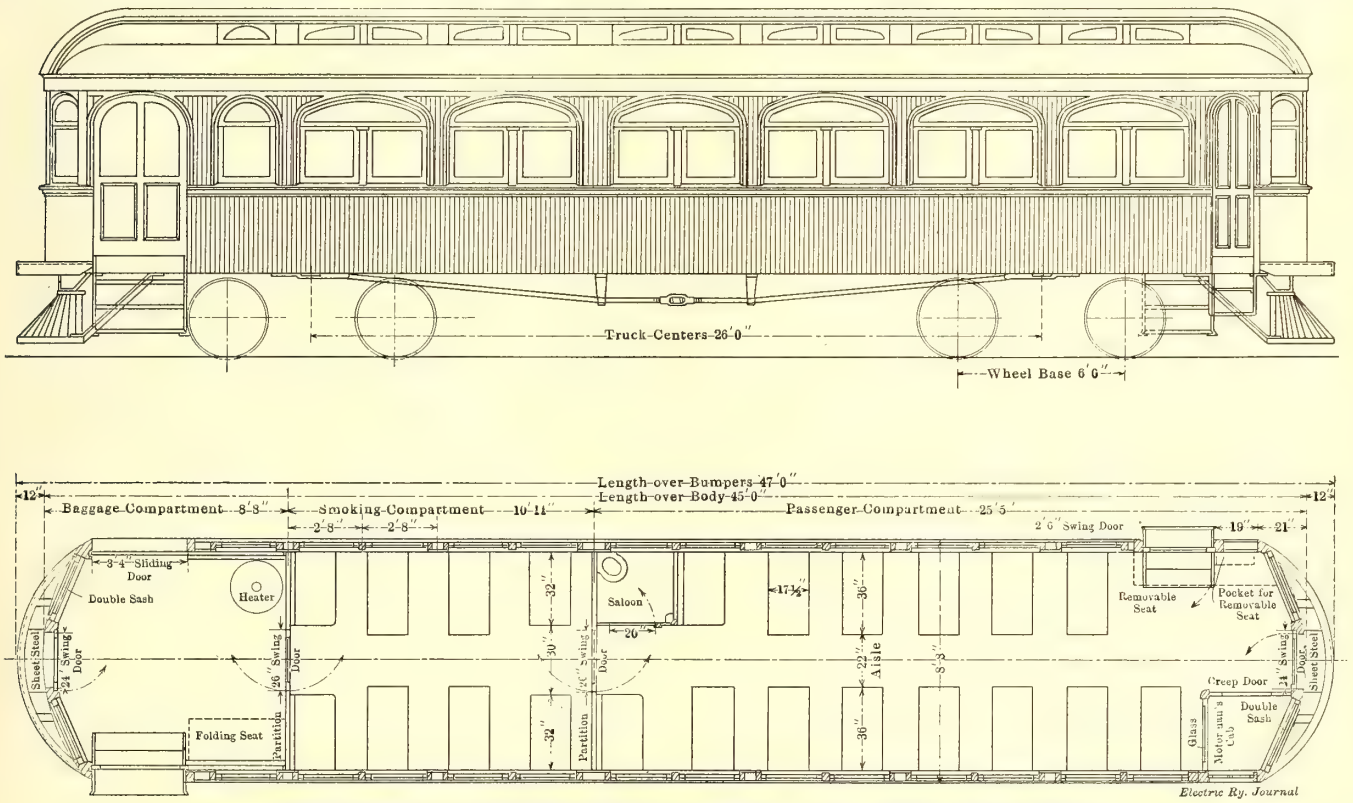
Realizing the value of an interurban line to the community it serves, H. A. Fisher, president of the Joliet &



Joliet & Southern—Plan of Offices on Second Floor of Terminal Building in Joliet

Southern Traction Company, concluded that those whose property and business were to be largely benefited by the construction of the new road should and could properly be induced to invest money for the purpose of obtaining the road. It had been shown on the Joliet, Plainfield & Aurora division that property values had increased $10 to $50 per acre, and that business in the local towns had been ac-

celerated; and so, even in a year of financial depression, Mr. Fisher undertook to raise the necessary amount of money for starting construction by selling bonds along the route. No stock or other donations of any sort accompanied the bonds, which were sold only at par. Meetings were held and the scheme outlined to the public. It was stated that money to the amount of $5,000 per mile was needed as a local endorsement of the road, so that bankers could be induced to loan the balance necessary for construction and to put the new road in operating condition. The plan of selling bonds clearly stated that one-third of the money would be paid over to the builders when the grading had been completed; one-third when the rails had been laid, and the remaining third when the road was in full operation. In this way the local investors were assured that the property more than represented the value of their bonds at the time the money was paid. The construction company contracted to complete the 24-mile extension within a year. After local capital had been interested as here outlined, committees were appointed in each of the towns and the work of solicitation was carried on successfully.



Joliet & Southern—Plan and Elevation of Standard 45-ft. Interurban Car

BOND DEPARTMENT

As a result of the success in raising local money on the Chicago Heights division during a year when practically all construction was stopped on account of financial conditions, a bond department has been permanently established in connection with the future extensions of the Joliet & Southern road toward Bloomington. The following contract between the road and the purchasers of construction bonds will describe the method used for collecting money:

This Agreement Witnesseth, That the Joliet & Southern Traction Company, of Joliet, Ill. (hereinafter designated the "Company"), has bargained and sold and hereby agrees to deliver to ..... of ..... (hereinafter designated as the "Purchaser"), on the terms and conditions hereinafter expressed, one First Mortgage five per cent Gold Coupon Bond of the Joliet & Southern Traction Company, of One Hundred Dollars ($100.00) denomination, secured by mortgage dated January 2, 1907, with the American Trust & Savings Bank, Chicago, as Trustee, and the Purchaser hereby agrees to pay to the Company for said bond, at the office of Henry J. Weber, Trustee for this transaction, at the Will County National Bank, Joliet, Ill., the sum of One Hundred Dollars ($100.00), as follows: Five Dollars ($5.00) payable in advance, and Ten Dollars ($10.00), or more, per month, until said purchase price is paid in full.

It is agreed that all moneys received from this contract will be paid to Mr. Henry J. Weber, Trustee, who will deliver it to the Company on receiving Bonds of the Joliet & Southern Traction Company therefor.

The Company agrees to pay 5 per cent interest on all payments made under this contract, beginning the first of the month following each payment. Payments made on or before the fifth of the month draw interest from the first of that month. Interest will be computed semi-annually, on the first day of February and the first day of August in each year, and will be credited on purchase contract.

If the monthly payments shall be more than two (2) months delinquent, the Company may at its option issue to the purchaser in exchange for this contract, a "Certificate of Paid-up Value" to the amount paid by purchaser, less Five Dollars ($5.00), said certificate to be negotiable and payable on or before five years from date, and to bear five per cent interest, payable semi-annually in cash by the Company. These certificates may be redeemed at par and accrued interest at any time by said Company within five years from date of certificate, and the Company hereby agrees and guarantees to cash such certificate, including interest thereon, on or before five years from date thereof.

The Trustee will receive all monthly payments from the purchaser under this contract and endorse the same on the contract. The Trustee will also receive the interest paid on the Bonds held in trust and credit to the purchaser the interest on payments made him on the contract, and when the full amount of the contract price has been paid, the Trustee will deliver the Bond to the purchaser on surrender of this contract. The Trustee also will pay to holders of "Certificates of Paid-up Value" the interest due on the first days of February and August, from the interest received on Bonds held by him in trust, for the guaranty of this contract.

The Trustee may retain any "Certificate of Paid-up Value" when presented for interest payments by paying to the party presenting same its face value and accrued interest.

Executed in duplicate this ..... day of ....., A. D. 190..

The Joliet & Southern Traction Company.
By .....
President.

Attest:.....
Secretary.

.....
Purchaser.

The trusteeship of the construction bonds has been placed with the American Trust & Savings Bank, Chicago, and one of the officials of the local bank in Joliet acts as collector for the money to be used in purchasing bonds of small denominations.

NEWSPAPER ADVERTISING AND CONTRACT FORM OF THE ILLINOIS TRACTION SYSTEM

The Illinois Traction System has started an extensive and successful advertising campaign in the dailies and other papers in its territory to call attention to the superiority of its passenger and freight service. This work is in the hands of John H. Ryan, advertising manager of the system. Mr. Ryan's plan is to begin with an advertisement calling attention in a general way to the large number of daily trains operated from the home town to other localities; to the absence of dust, dirt, smoke and cinders, and to the advantages of the freight service. This



Reproduction of Illinois Traction System Newspaper Advertisement

type of advertisement is reproduced from a Springfield paper, and will serve as an example of those published in other journals in this territory. This announcement is to be followed by a series giving the passenger and freight rates and bringing out in various ways the superiority of the electric over the steam service. "Readers," of course, will be an important part of the publicity operations. One of the first published described the fast through trains and, in particular, the accommodations for ladies. In this notice the company also made a $10 cash prize offer for the best title submitted for its fast train service. This offer has proved itself an excellent advertising scheme, as hundreds of replies are being sent every day to B. R. Stephens, general traffic manager.

In view of the large number of newspaper contracts made by the Illinois Traction System, it has been deemed of interest to reproduce the advertising agreement in full.

Notice.—Return promptly in duplicate.

ILLINOIS TRACTION SYSTEM.

Advertising Agreement for 1909.

B. R. Stephens, General Traffic Manager,
Illinois Traction System, Springfield, Ill.

Dear Sir: The undersigned, publishers of the ....., a newspaper published at ..... in ..... County, State of Illinois, and having a circulation of ....., solicit an advertising contract with the Illinois Traction System and accordingly hereby agree to publish for said system, from Jan. 1, 1909 (or from date of this agreement, if after Jan. 1), to Dec. 31, 1909, advertising matter as follows: We agree to publish in every issue of this newspaper during the time shown above the local time card of the Illinois Traction System, and such display advertising as may be furnished from time to time by its general traffic manager or his assistant, said advertising matter to be placed in display columns and to aggregate one-quarter of column in each regular issue of the publication mentioned above, said quarter of a column to be equivalent to ..... inches in each issue, or an aggregate of ..... inches for the time covered by this agreement.

In full payment for such advertising the undersigned agrees to accept non-transferable $10 advertising tickets or non-transferable trip advertising tickets at regular tariff rates to the value of $....., subject to the following conditions:

1. The above mentioned transportation will be good only between points wholly within the State of Illinois, and must not be used in connection with or as part of an Interstate trip, as such use is in violation of the Amended Interstate Commerce Act, as constructed and announced by the Interstate Commerce Commission in Tariff Circular No. 2-A, dated Sept. 15, 1906, covering the issuance of Interstate transportation.

2. Tickets are not transferable and are only to be issued to and used by persons who are wholly engaged in work for this publication and who have no other business, and to members of their families who are entirely dependent upon them for support.

3. Tickets will not be requested for other persons than bona fide employees and immediate members of their families and will not be sold, loaned or transferred under any circumstances, and if any one of the tickets issued is sold, loaned or transferred all unused tickets will be forfeited and this agreement cancelled. The conditions specified on such tickets are hereby made a part of this agreement.

4. Tickets not used during the year cannot be used thereafter, and failure to use them during the year will be a waiver on any claim against the Illinois Traction System on account of the above described advertising service.

5. It is expressly agreed and understood that the Illinois Traction System may at any time revoke this agreement, discontinue the advertising matter being carried and reclaim the transportation issued.

It is agreed that should the publication of our paper be discontinued we will promptly return to the general traffic manager of the Illinois Traction System all unused tickets, and that in the event of this publication changing ownership during the time covered by this agreement we will arrange with our successor to fully carry out the terms thereof and will return to the general traffic manager for their use all unused tickets in our possession at the time the paper is transferred and promptly notify you of such transfer.

It is agreed that no claim for compensation will be made for advertising in excess of or other than that covered by this agreement without special arrangement with the general traffic manager of the Illinois Traction System for additional advertising or for advertising of a different nature than that called for above.

It is agreed that during the life of this agreement a copy of each issue of our paper will be furnished free to the general traffic manager of the Illinois Traction System at Springfield, also to the Illinois Traction System agent at ..... station, and should it be requested, to the division superintendent of the Illinois Traction System within whose district the above newspaper is located.

It is further agreed that the following regulations of the Illinois Traction System regarding the issue of editorial transportation shall be made a part of this agreement:

Requisitions for transportation due on account of this agreement must be made in writing by the individual who signs this agreement. They must, in all cases, state what connection the person for whom transportation is requested has with the publication; otherwise requisition will be returned for such information.

Signed, subject to the acceptance of the general traffic manager of the Illinois Traction System, at ..... this ..... day of ..... 1909.

Accepted: .....
For the Illinois Traction System. Publisher.

.....
G.T. M.

Form of Agreement with Newspaper Publishers for Advertising the Illinois Traction System

Payment is entirely in transportation, good only in the State of Illinois, on account of interstate commerce rulings. Nevertheless the newspapers have been very willing to sign the agreement on these terms, and over 100 of them are now publishing the company's advertisements.

With the consent of the Prussian Ministry of Public Works, an electric railway is to be constructed between Cologne and Düsseldorf, the trains to make the journey of 40 miles in 40 minutes. According to the plan submitted by the builders, there will be no terminal stations, but the trains will be run through the streets into the center of the towns.

THE PARA TRAMWAY AND LIGHTING SYSTEM

The City of Pará, the official name of which is Belem, is the capital of the State of Pará, and is located on a plain having an elevation of about 50 ft. above the Pará River, the ground sloping to the river front. The city is situated at a point distant about 120 miles from the mouth of the Amazon River, on a branch known as the Pará River. The Amazon here is about 60 miles wide, but is obstructed by hundreds of islands. The best, in fact, the only reliable, channel for steamer traffic is known as the Pará channel, and on this account the entire traffic of 20,000 miles of navigable rivers in the Amazon district must pass through this channel. Large ocean steamers are able to anchor within one mile of the present docks, while all the smaller steamers, of which there are a large number, can come in and moor alongside. At the present moment the port works are being developed and the channel deepened, and this improvement will undoubtedly prove of the greatest benefit, both to the State and to the City of Pará.

The City of Belem was founded in 1615. In 1819 the population was estimated at 24,000, but, owing to serious outbreaks of yellow fever, it had diminished to 15,000 in the year 1848. In 1890 the population was estimated at about 70,000, and at the present time may be taken as being about 150,000.

The old part of the city, which represents the business section, has very narrow streets and the buildings are plain, though substantially built of brick, plastered and usually of two stories. The newer part or residential section has many wide streets, most of which are lined with trees. As the city is situated practically under the Equator, it has necessarily a hot climate, but generally speaking, the health of the inhabitants is good. During the winter season, owing to the excessive amount of moisture, the climate is more trying than during the summer season, which is drier. As is well known, the mainstay of business in Pará is the rubber industry, the finest quality of rubber produced in the world being known under the name of "Pará rubber."

The tramways, which were formerly operated by mules, had an extent of 33 miles of single track, all owned by one company called the Urbana Company, although portions were laid to different gages. The electric lighting was supplied by two companies, the Urbana Company furnishing all the public and also commercial lighting and the Paraense Company furnishing private lighting only.

In the year 1905 a concession was obtained for a period of 99 years for the purpose of electrifying the tramways. This concession and the old mule tramways were purchased by the Pará Electric Railways & Lighting Company, Ltd., of London, and a contract awarded to J. G. White & Company, Ltd., of that city, for the complete reconstruction and installation of the tramways and lighting.



Para Tramways—Old Track and Excavation for New Track on Rua C. Joao Alfredo

TRACK CONSTRUCTION

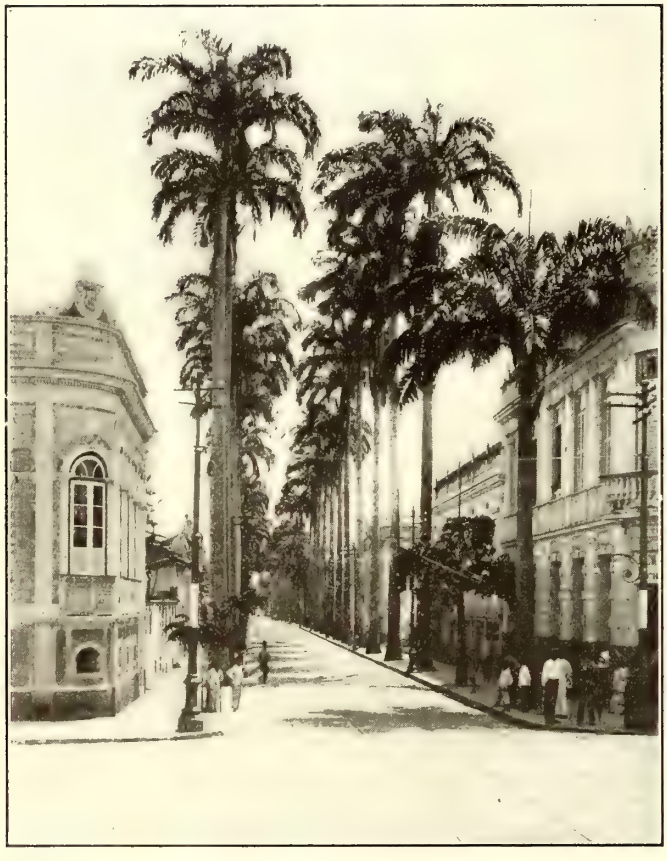
The total length of track constructed for electric working is 55,060 m, of which 26,000 m of single track are laid in paved streets and 21,600 m in unpaved streets, all with girder rail. A further 7400 m of single track were laid in unpaved streets with 70-lb. T-rails. Tie construction was employed throughout the whole of the work. The rails for straight track were British standard section No. 1, weighing 90 lb. per yard. At curves under 150 m radius British standard, section No. 1-C of 96 lb. per yard was employed. On all paved streets thermit joints were used, tiebars being spaced 7 ft. 6 in. apart. On unpaved streets continuous joints were employed with two 8-in. concealed bonds per joint. The track is laid to a gage of 4 ft. 8½ in. The 90-lb. rails consist mostly of 45-ft. lengths, while the heavier rail is in 33-ft. lengths. All the girder rail was supplied by the North Eastern Steel Company, Ltd., of Middlesbrough.

The track is cross-bonded at every 100 m and inter-track bonds are spaced 200 m apart. All crossings are bonded with two 8-in. concealed bonds and two long bonds 14 ft. long. All switches are bonded with two 21-in. bent bonds and two long bonds 15 ft. long with a cross bond 15 in. long across the toe of the switch.

The ties, which are made from a very hard Brazilian wood called "massaranduba," are spaced 2 ft. 6 in. from center to center. Their dimensions are 2 m x 0.22 m x 0.11 m. The ties rest on stone ballast of a depth of 0.10 m, and this ballast is brought up to the level of the top of the ties on all paved streets. In unpaved streets the ties rest on the same depth of ballast, but the ballast is brought to the level of the head of the rail and well rammed. The granite paving blocks which were used were shipped from Lisbon.

All the special work used on the work was manufactured by Hadfield's Steel Foundry Company, Ltd., of Sheffield. The switches, which are automatic, were made to a length of 10 ft. 6 in. with 100 ft. radius of curvature, the tongues being of manganese steel. The open mates are made of best toughtened cast steel with manganese steel inserts. The raised floor of all the open switches was 9/16 in. below the head of the rail. The standard straight crossings are all 1 in 4½, iron-bound, and built up of British standard section No. 1, the length of all crossings being 9 ft. In curved crossings the straight legs are built up of British standard section No. 1 rail and the same rail is used on all curved legs with a curvature radius exceeding 150 m. On all curved crossings under 150 m radius, the rail is British standard section No. 1-C.

As stated before, the ground upon which the city stands is practically level, but there is one short grade of slightly less than 2 per cent. The smallest radius curve on the whole of the work is 10 m.



Para Tramways—Completed Track in Paved Street



Para Tramways—Exterior View of Power House

OVERHEAD CONSTRUCTION

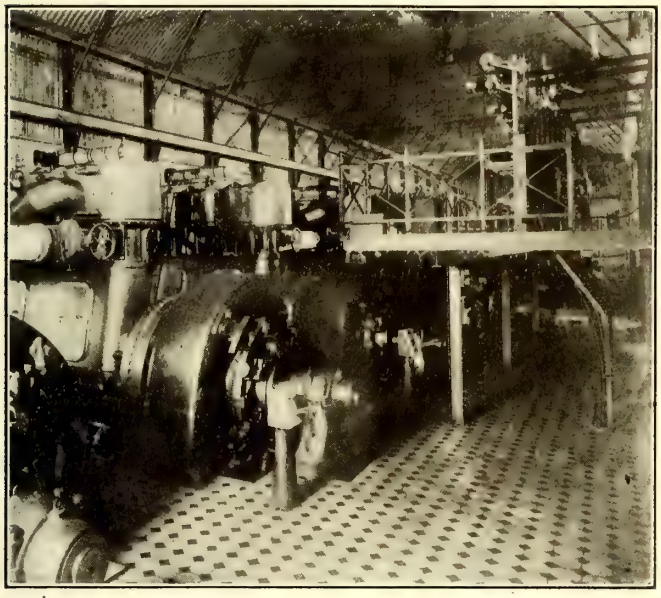
With the exception of 4 km of center-pole construction and 3 km of side brackets the whole of the overhead work consists of span construction. The junctions are made with 7/12 S.W.G. galvanized mild steel span wire. Tubular steel poles are employed throughout. Of these there were at the beginning of the work about 1400 in the city, which were used for carrying the lighting wires, and where possible advantage was taken of their presence for the purpose of carrying the overhead work for the tramways. In addition to these a further 1350 British standard poles, 31 ft. long, were imported from Glasgow. The feeder and section boxes were furnished by Estler Brothers. The trolley wire, which is of No. 00 B. & S. grooved type, was supplied partly by W. F. Dennis & Company and partly by the National Conduit & Cable Company, Ltd. It is divided by section insulators into 1000-m lengths. The cables which carry the current to the overhead lines are about 12 miles in length. They are all suspended from toggle insulators on channel-iron cross-arms, erected on the poles above the spans and brackets. These cables are stranded and are of three sizes, viz., .55 sq. in., .45 sq. in. and .33 sq. in. They are twin braided with strong braid, each braid being separately served with weather-resisting preservative compound.

POWER HOUSE

The power house is located on the south side of the river Guajara and has a width of 67 m extending 143 m from the front back to the river. It is a substantial building, steel framed, with an oval corrugated-iron roof over each part. The original building, which was erected some 15 years ago on the same spot, was built so as to permit of installing additional engines, boilers, etc., when required. The engine room measures 11 m x 50 m, the boiler room 13 m x 50 m and the entire building covers 1200 sq. m of

ground. The chimney is of brick, 45 m high, and with an internal diameter of 3.76 m. Coal is loaded direct by means of a 10-ton crane from lighters lying alongside into derrick trucks, which are then run and tipped into the boiler house or the coal is stacked in a yard provided for this purpose.

The old equipment used for electric lighting consisted of 300-hp high-speed engines and direct-connected generators.



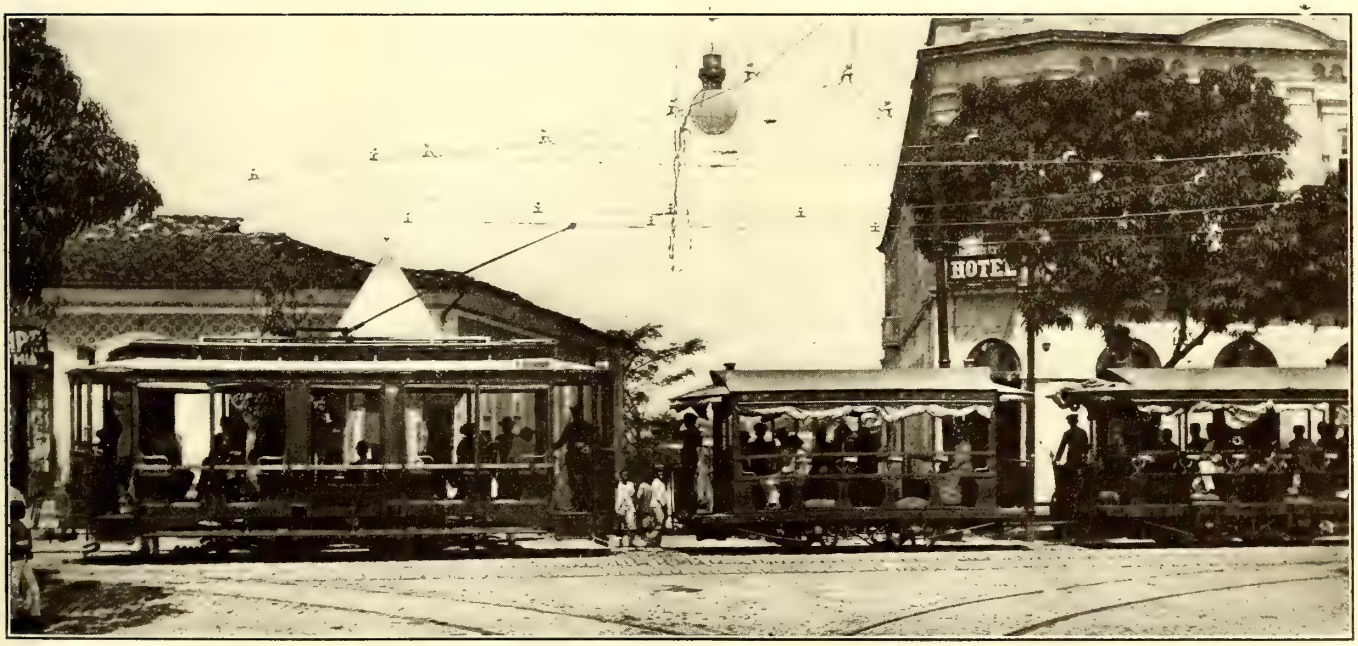
Para Tramways—Interior of Engine Room in Power House

The new equipments, supplied by J. G. White & Company, Ltd., consist of four Babcock & Wilcox marine type boilers, each with a heating surface of 2368 sq. ft., and a grate area of 56 sq. ft. Each boiler is capable of evaporating 10,000 lb. of water at hotwell temperature into steam at 180 lb. per square inch gage pressure. Each boiler is fitted with an integral superheater by the same makers, with a heating surface of 440 sq. ft., capable of raising the temperature of the steam at 180 lb. per square inch gage pressure to 500 deg. Fahr. There are three sets of steam-driven cross-compound air pumps with jet condensers supplied by the Worthington Pump Company, Ltd.

There are two 8-in. x 5¼-in. x 10-in. horizontal duplex boiler feed pumps, each capable of pumping 5000 gal. of water per hour against a steam pressure of 180 lb. There is also one feed-water heater of 100 sq. ft., capable of raising the temperature of 5000 gal. of water per hour to 75 deg. Fahr. when dealing with 4000 lb. of exhaust steam per hour. In addition there is one complete purifier and filter plant.

This plant supplies steam to three triple-expansion, three-crank, three-cylinder, vertical Belliss & Morcom engines, each of 585 hp when running at 330 r.p.m., capable of carrying 25 per cent overload for two hours and 50 per cent overload momentarily. These are direct connected to three 400-kw compound-wound Dick, Kerr direct-current generators. There are also two triple-expansion, three-crank, three-cylinder, vertical Belliss & Morcom engines, each of 585 hp, running 333 r.p.m., each direct connected to one E.C.C. standard, single-phase generator of the revolving field type, working at 2200 volts, 50 cycles. The regulation of these machines at 0.9 power factor is 8 per cent rise in volts from full load to no load. Temperature rise guaranteed by makers after 24 hours' run at full load not to exceed 30 deg. C. The steam consumptions per horse-power guaranteed for the engines with a margin of 5 per cent at the makers' works with steam at 155 lb. per square inch, superheated to a total temperature of 500 deg. Fahr. at the engine throttle valve and condensing with a vacuum within 4 in. of barometer, are as follows:

25 per cent overload	14 lb.
Full load	13.5 lb.
Three-quarter load	13.5 lb.
One-half load	14 lb.



Para Tramways—Overhead Construction and Three-Car Train, Made Up of New Motor Car and Two Old Cars Used as Trailers

Guranteed permanent variation in speed from full to no load does not exceed 3 per cent.

There is also one 40-hp Belliss & Morcom compound engine, running at 625 r.p.m., direct coupled to one 25-kw compound-wound exciter dynamo, giving 200 amp at 125 volts, supplied by the E.C.C.

Formerly there was a separately driven steam pump for

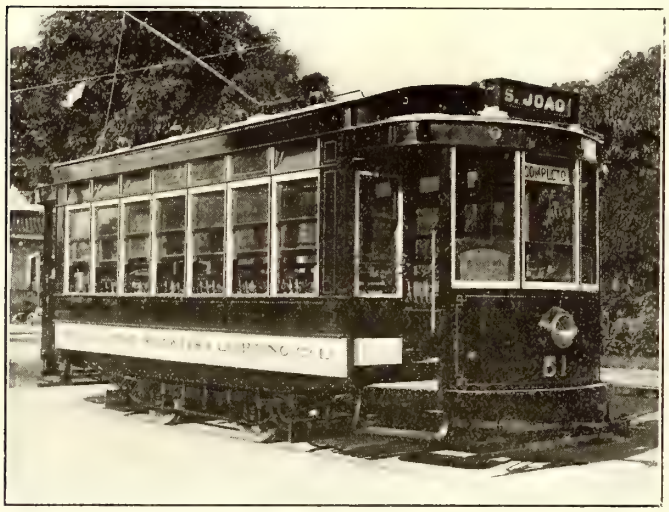
pumping the water from the river for the boilers and for condensing purposes. In its place has been installed one 10-in. centrifugal pump direct coupled to an 18-hp motor running at 584 r.p.m. Water is delivered at the rate of 2000 gal. per minute to a series of settling tanks made of brick and having a capacity of 1500 cu. m. The water being rather muddy, these tanks are cleaned out every six months.

SWITCHBOARD

The switchboard gallery is built of steel framework and stands 8 ft. above the engine-room floor. The floor of the gallery consists of 6 in. of concrete covered with tiles. The switchboard contains all the necessary panels for the railway and lighting loads. The oil switches, isolating switches and lightning arresters are supported on the underframe of the switchboard gallery. The whole of the switchboards were supplied by Ferranti, Ltd.

CAR HOUSE

The car house is situated in the Estrada de Nazareth facing north and south and has an entrance both at the back and at the front. It is steel framed and covered with corrugated iron throughout. It measures 127 m x 37.5 m and contains 10 tracks, six of which have a pit running half



Para Tramways—One of the New Motor Cars

its length. The rails over the pits are supported on iron columns. The rails in the entrance and car house are A.S.C.E. 70-lb. T-rail. The floor and pits are concreted and floated over with 2 in. of cement floating. There are 10 entrance tracks on the south side and five on the north, so that switching is facilitated. There is a carpenters' shop, with a capacity for eight cars, and a paint shop for six cars. In addition there are electrical, machine and smithy shops.

CARS

The cars, which are 70 in number, are of four different types, as follows:

Three combined baggage and second-class vestibule open cars, supplied by the Brush Electrical Engineering Company, and six of the same supplied by the United Electric Car Company, Ltd.

One first-class open vestibule car, supplied by the Brush company, and 23 of the same supplied by the United Electric Car Company, Ltd.

One second-class vestibule open car, supplied by The J. G. Brill Company. Twenty of the same class by the Brush company and 14 first-class double service cars supplied by the United Electric Car Company, Ltd.

In addition to these there are two palace cars built by the United Electric Car Company, Ltd., lavishly upholstered and fitted with mahogany tables and swinging arm chairs. One of these cars is intended for the use of the Governor and the other for the use of the Mayor of Pará.

The trucks for all the above cars were supplied by the Brill Company and are of the 21-E type. The wheel base is 6 ft. except in the case of the palace cars, which have a wheel base of 7 ft.

Each car is equipped with two GE-67 motors, three-turn armatures, 40 hp, at 500 volts. The controllers are the B-18 type with one set of handles, magnetic blow-out, circuit breaker, etc. Each car is fitted with Hudson & Bowring's lifeguard. The length of the palace cars is 20 ft. 8 in. over the car body, 30 ft. 3 in., including platform, and 31 ft. 7 in. total length over fenders. The ordinary double-service cars have a length, including platform, of 26 ft. 6 in., the length of the car body being 18 ft. 7 in. The vestibule open cars have a length, including platform, of 26 ft. 2 in., the length of the car body being 17 ft. 4 in.

FEEDER SYSTEM

At present the high-tension lighting circuits are all run overhead, the voltage of 2200 being transformed down to 120 volts by means of transformers fixed on the poles. All the high-tension feeders have now been put underground.

The total length of cable laid was approximately 14½ miles and was supplied by Callender. The conductors are of the concentric type. The cables were made for a working pressure of 2200 volts and were tested at the makers' works with a pressure of 10,000 volts for 30 minutes between conductors and 2200 volts for 30 minutes between outer conductor and earth; and when actually laid in Pará withstood satisfactorily 4000 volts for 30 minutes between conductors and 1000 volts for 30 minutes between outer conductor and earth. The concentric cables were laid in standard salt-glazed stoneware troughing with bridge pieces of different sizes to suit the cables. The troughing was filled in with Trinidad bitumen and the whole covered over with hard-glazed stoneware bricks.

There are being installed under ground 33 cast-iron transformer tanks of varying capacity and located in suitable positions about the town. The high and low tension switches are mounted in cast-iron pillars placed above ground adjoining the pits. The pillars were furnished complete by Ferranti. Distribution will be on the three-wire system with 240 volts across the outers.

According to a recent United States consular report, the development of water power for industrial purposes in Brazil is causing an increased importation of iron pipes and fittings. The installation of electric power stations, the substitution of horse traction by electric on many tramways and the installation of electric lighting in important Brazilian towns have also created a heavy demand for electric apparatus, dynamos, motors and devices for electric lighting and power in that country. As North American, English and German capital has been used, supplies have been almost exclusively derived from the countries of the investors. The imports of dutiable goods of this class in 1907 were nearly treble those in the previous year, amounting to 7371 tons, valued at 12,225,862 milreis, as against 2840 tons, valued at 4,344,823 milreis. The imports of electric machinery were 4742 tons and of electric cables, 2629 tons. In the import returns the figures of imports from the United States are largest, that country taking 60 per cent of the total; in 1907 this amounted to 2881 tons of motors, apparatus, etc., and 1521 tons of electric cables. The United Kingdom takes second place with 828 tons of motors.

SINGLE-PHASE ROLLING STOCK FOR THE LONDON, BRIGHTON & SOUTH COAST RAILWAY

On Jan. 31, 1909, the London, Brighton & South Coast Railway made a public trial trip on its South London single-phase division, which is 9 miles long and extends from Victoria to London Bridge. The running time between these points is to be 25 minutes, instead of 36 minutes by steam.

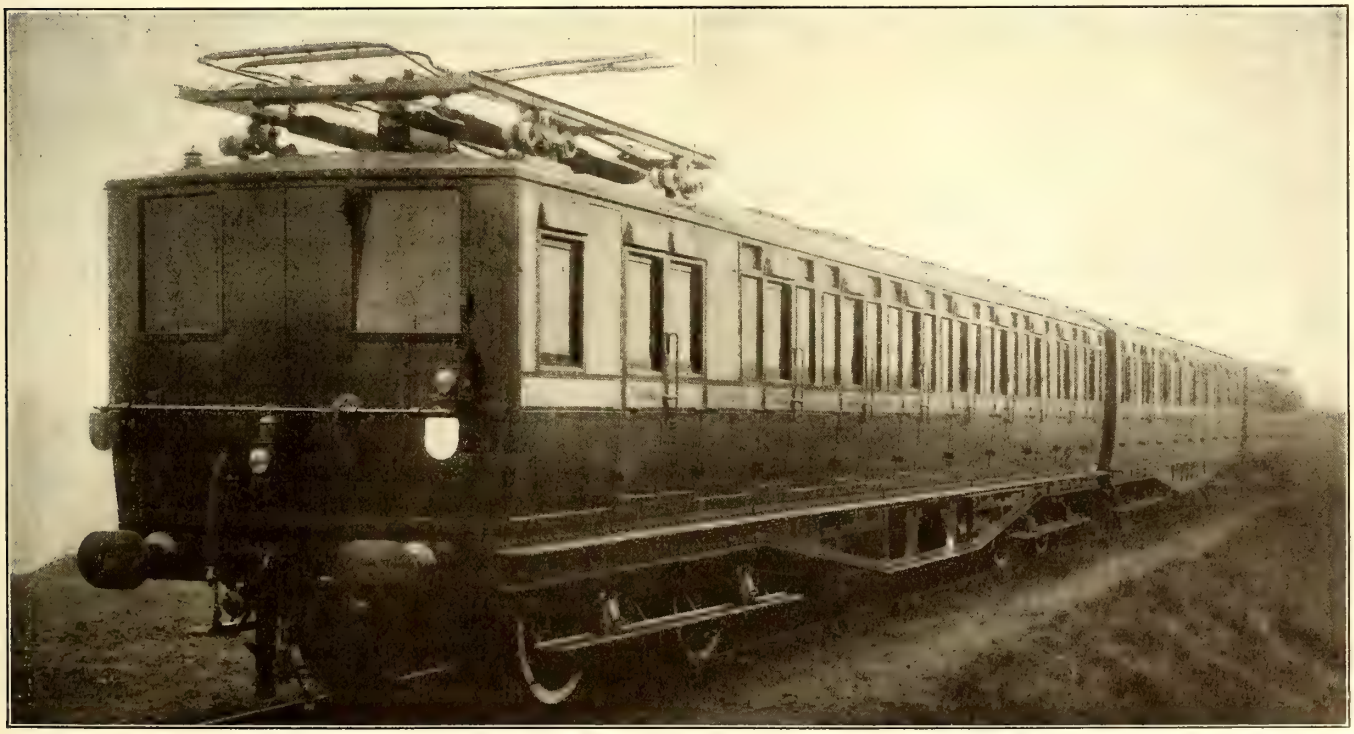
The rolling stock used for this service consists of eight trains, each made up of three coaches. The first and last cars are for third-class passenger service and carry four 120-hp Winter-Eichberg single-phase motors. They have eight passenger compartments, with a normal seating capacity of 66 and a maximum of 72. The center car is a trailer, and is entirely for first-class passengers. It has nine compartments, with a normal seating capacity of 56 and a maximum of 74. The over all length of every coach is 6 ft., and the distance between truck centers is 41 ft. The over all width is 9 ft. The cars are mounted



London, Brighton & South Coast Railway—Passenger Compartment of First-Class Car



London, Brighton & South Coast Railway—Smoking Compartment of First-Class Car



London, Brighton & South Coast Railway—Train of Two Motor Cars and Intermediate Trail Car on the Single-Phase Division

on pressed steel trucks of 8-ft. wheel base with 42-in. diameter wheels.

The motorman's compartment is placed in a corner of the brakeman's section of the motor cars, and is so arranged that the motorman is entirely separated from the brakeman. When not in use, the compartment is locked, leaving the outside hand brake to be operated by the brakeman. Current is supplied by sliding bows at 6700 volts. The high-tension apparatus is enclosed in a fireproof steel compartment, which can only be opened when the current is off the line. The lighting and control circuits are at a potential difference of 300 volts.

The door arrangement of the cars is of the side-door type with side corridors, which are so arranged that one-half their length is on opposite sides of the car, as will be apparent from the accompanying illustrations. Each compartment is lighted by two holophane globes, each containing two 10-cp lamps. Package and umbrella racks are provided over the transverse seats.



London, Brighton & South Coast Railway—Motorman's Cab and Transformer Compartment at the Right

For fire protection two mechanical fire extinguishers are installed in each car, but the risk from fire is very small, as the sides, roof and bottom of the cars are entirely covered with sheet aluminum. The bottom of the car, moreover, is covered with heavy asbestos sheeting. The space between the double floor is covered with slag wool.

The entire electrical and mechanical equipment was carried out according to the designs and under the direct supervision of Philip Dawson, electrical supervisor of the London, Brighton & South Coast Railway Company. The cars and trucks were made by the Metropolitan Amalgamated Coach & Wagon Company, of Saltley, Eng., in accordance with Mr. Dawson's designs. The control apparatus was furnished by the British Thomson-Houston Company and the power brakes by the Westinghouse Air Brake Company.

CALCULATION OF THEORETICAL SECTION FOR STEEL TIES

At the November meeting of the Street Railway Association of the State of New York the subject of T-rail construction in paved streets was discussed by a number of speakers. B. E. Tilton, now engineer of maintenance of way of the Cleveland Railway Company, referred to some computations which he had made in an effort to derive the theoretically economical section modulus of steel ties and the proper spacing of ties for track construction using a minimum weight of steel per mile. The details of these calculations have been furnished this paper by Mr. Tilton with the following explanation:

O. E. Selby, bridge engineer of the Chicago, Cleveland, Cincinnati & St. Louis, in a paper presented at the March, 1907, meeting of the American Railway Engineering & Maintenance of Way Association, outlined a theoretical method of designing track in which the elementary parts, such as rails, ties, ballast and sub-grade, may be likened to the parts of a bridge structure, girders, piers, footings and foundations. In general, this same plan has been followed by Mr. Tilton in making his computations for street railway track, using steel ties. It was impossible, however, to assume a uniform load on the tie as was used by Mr. Selby in the case of wooden ties. The wooden tie, on account of its elasticity, will adjust itself to inequalities of the ballast, thus giving a uniform load per unit of area. The steel tie, on account of its rigidity, will not adjust itself to inequalities in the ballast and therefore an arbitrary assumption of points of support for the tie was made.

Beginning with the rail, this member of the track structure was considered as a continuous beam. A maximum safe unit stress of 15,000 lb. per square inch was assumed and calculations were made showing the section of T-rail required for supporting a superimposed load equivalent to the weights of both city cars and interurban cars, with various spacings of ties from 20 in. to 48 in. The loads assumed were as follows: The weight of a city car was taken as 50,000 lb. This gives an axle load of 12,500 lb. and a wheel load of 6250 lb. The weight of an interurban car was taken as 100,000 lb., which gives an axle load of 25,000 lb. and a wheel load of 12,500 lb. These dead loads were increased by 100 per cent to allow for impact.

Table I shows the T-rail section expressed in terms of its weight (pounds per yard) required for track with ties spaced from 20 in. to 48 in. apart and subjected to the load of a city car and of an interurban car. Two standard steam railroad bridge loadings are also included for the sake of comparison. It will be seen that for city cars the rail section required varies from 36 lb. per yard for 20-in. tie spacing to 65 lb. per yard for 48-in. tie spacing. The total weight of rail per mile required in the case of the lighter section is 56.5 tons and the total weight per mile for the heavy section is 102.1 tons. Using the loads equivalent to the weights of the city and interurban car, the rail section varies from 57 lb. per yard to 103 lb. per yard and the weight of rail per mile from 89.5 tons to 161.8 tons.

In considering the design of the steel tie it was assumed that with a concrete sub-structure the only way in which the tie could act as a simple beam would be for the concrete to shrink from under the tie directly by the rail. It was further assumed that with the maximum amount of shrinkage of the concrete the span of the tie as a beam would not exceed 24 in., or 12 in. on each side of the rail. Inasmuch as the rail acts as a continuous beam, it was as-

sumed that with the maximum conditions of loading, each tie would support only half of the wheel load. In the case of the city car, having a wheel load of 6250 lb., the dead load on the tie would be 3125 lb. Adding 100 per cent for impact, the maximum load on the tie would be 6250 lb. With the interurban car weighing 100,000 lb., the maximum load on the tie would be just double this amount or 12,500 lb.

Using the same safe unit strain of 15,000 lb. per square inch and a span of 24 in., the section modulus of a steel tie capable of supporting the load and impacts of an interurban car was found to be 5, and using the load imposed by a city car, the section modulus was found to be 2.5. The weight of a tie of the same form of section as the Carnegie steel tie and having a section modulus of 5 would be 12.95 lb. per foot. The Carnegie steel tie designated as M-25 has a section modulus of 5.6 and weighs 14.5 lb. per foot. The Carnegie M-24 tie has a section modulus of 2.5 and weighs 9.5 lb. per foot.

TABLE I—ESTIMATED WEIGHT OF RAIL PER MILE REQUIRED FOR VARIOUS TIE SPACINGS AND LOADINGS.

Tie spacing, in.	Wheel load, lb.	100 per cent impact, lb.	Total load, lb.	Moment.	Section modulus.	W'g't of rail, lb. per yd.	W'g't of rail, tons per mile.
20..	6,250	6,250	12,500	46,875	3.12	36	56.5
24..	6,250	6,250	12,500	56,250	3.75	42	65.9
30..	6,250	6,250	12,500	70,313	4.68	47	73.8
36..	6,250	6,250	12,500	84,375	5.62	52	81.6
42..	6,250	6,250	12,500	98,437	6.56	58	91.1
48..	6,250	6,250	12,500	112,500	7.50	65	102.1
20..	12,500	12,500	25,000	93,750	6.24	57	89.5
24..	12,500	12,500	25,000	112,500	7.50	65	102.1
30..	12,500	12,500	25,000	140,626	9.36	77	120.9
36..	12,500	12,500	25,000	168,750	11.24	85	133.5
42..	12,500	12,500	25,000	196,874	13.12	94	147.6
48..	12,500	12,500	25,000	225,000	15.00	103	161.8
20..	25,000	25,000	50,000	187,500	12.50	90	141.3
24..	25,000	25,000	50,000	225,000	15.00	103	161.8
20..	30,000	30,000	60,000	225,000	15.00	103	161.8
24..	30,000	30,000	60,000	270,000	18.00	113	177.5

TABLE II—WEIGHT OF STEEL TIES PER MILE OF TRACK FOR VARIOUS SPACINGS.

Tie spacing. in.	Weight of ties, tons per mile. M-24.	M-25.	Theoretical.
24	79.6	119.6	106 6
30	63.6	95.7	85.4
36	53.0	79.7	71.1
42	45.5	68.3	60.9
48	39.8	59.8	53.4

NOTE.—M-24 section weighs 9-5 lb. per ft., or 67.5 lb. per 7-ft tie. M-25 section weighs 14.5 lb. per ft., or 101.5 lb. per 7-ft. tie. Theoretical section weighs 12.95 lb. per ft., or 90.5 lb. per 7-ft. tie.

TABLE III—TOTAL WEIGHT OF RAIL AND M-25 SECTION TIES PER MILE OF TRACK FROM TABLES I AND II.

Tie spacing, in.	Weight of ties per mile, tons.	Weight of rail per yd., lb.	Weight of rail per mile, tons.	Total weight per mile, tons.
24	119.6	65	102.1	221.7
30	95.7	77	120.9	216.6
36	79.7	85	133.5	213.2
42	68.3	94	147.6	215.9
48	59.8	103	161.8	221.6

TABLE IV—TOTAL WEIGHT OF RAIL AND THEORETICAL SECTION TIES PER MILE OF TRACK FROM TABLES I AND II.

Tie spacing, in.	Weight of ties per mile, tons.	Weight of rail per yd., lb.	Weight of rail per mile, tons.	Total weight per mile, tons.
24	106.6	65	102.1	208.7
30	85.4	77	120.9	206.3
36	71.1	85	133.5	204.6
42	60.9	94	147.6	208.5
48	53.4	103	161.8	215.2

Table II shows the weight per mile of track of steel ties 7 ft. long and of the M-24, M-25 and theoretical sections, using a tie spacing of 24 in., 30 in., 26 in., 42 in. and 48 in.

Table III shows the total weight per mile of rails and ties using M-25 section ties weighing 14.5 lb. per foot with a tie spacing varying from 24 in. to 48 in.

Table IV shows the total weight of rails and ties per mile using the theoretical tie section with a modulus of 5 and a weight of 12.95 lb. per foot. The data of Tables III and IV have been plotted graphically in Fig. 1. It will be seen that for both the M-25 section and the theoretical section the minimum weight per mile is obtained by using an 85-lb. rail and a 36-in. tie spacing. There is a marked difference, however, in favor of the theoretical section. Using the M-25 tie the total weight of ties and rail per mile is 213.2 tons, whereas the total weight with the theoretical tie section is 204.6 tons per mile, a saving of 8.6 tons per mile. At current prices of $28 to $30 per ton, this is equivalent to a saving of about $250 per mile in favor of the theoretical section tie.

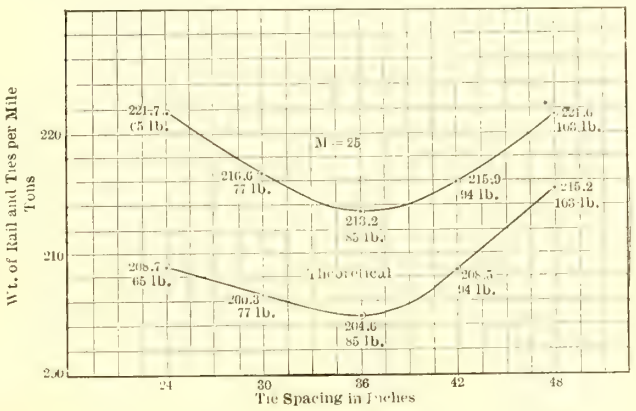


Fig. 1—Weights Per Mile and Tie Spacing

REMARKABLE WHEEL-TURNING RECORD MADE IN THE SHOPS OF THE THIRD AVENUE RAILROAD COMPANY

On Jan. 12 of this year the Third Avenue Railroad Company made a capacity test of a Niles-Bement Pond wheel lathe, No. 12965, installed in its Sixty-fifth Street shops three weeks before. By the happy combination of skilled workmen with a good lathe and modern tool-steel cutters there were turned 24 pairs of wheels in 9 hours and 37 minutes. This was far in excess of the lathe builder's guarantee and proved that with two machinists and one helper an average of 20 pairs a day may confidently be expected. At present one machinist and one helper average 14 to 15 pairs of wheels every day. In view of the remarkable maximum attained in this trial it may be of interest to give a complete record of the successive turnings in connection with the conditions under which the work was done.

The wheels were rolled by the helper along a concrete floor on which rails have not yet been laid to a short overhead track carrying a 2000-lb. Yale & Towne chain hoist. With this hoist the wheel sets were set in the lathe by the two machinists, one of whom was the manufacturer's representative. The wheels were of Schoen solid steel or Midvale steel-tire design, all of 2-in. thread and flanges 1¼ in. wide by ⅝ in. deep. The speed of the lathe was observed by a representative of Herman Boker & Company, of New York, the company which furnished the Novo tool-steel cutters. Employees of the Third Avenue Railroad Company secured all the other data given in the table on page 414, which shows, among other things, why the wheels were turned and how much metal was removed.

According to the accompanying table the average time of handling a set of wheels was only 5.4 minutes and of turning them but 18.6 minutes. The machine was in actual operation for 77½ per cent of the entire working period. The average volume of metal removed every operation was 9.97 cu. in.

A power consumption test was made several weeks after this trial, with the following result for a ¼-in. cut: Average of volts × amperes = 7120 watts. Time for turn-

ing out pair of wheels, 23 minutes. $7120 \times 23 = 163{,}810$ watt-minutes, or $\frac{163.8}{60}$ kw-hours.

This shows an approximate power consumption of 3 kw-hours. Assuming a general power consumption of 3½ kw-hours at 1½ cents per kw-hour, the cost of turning one set would be 3¾ cents. The lathe is driven by a 20-hp Westinghouse motor.

The lathe itself embodies several recent improvements,

Wheel set.	Reason for turning.	Time handling, min.	Time turning, min.	Original diameter, in.	Finished diameter, in.	Metal removed, cu. in.
1.	Sharp flanges	6	23	32⅛	31¾	9.42
2.	Sharp flanges	6	21	32⅜	32⅛	6.32
3.	Sharp flanges	8	15	32¾	32½	6.38
4.	Flat wheel	7	26	32¾	32⅜	9.55
5.	Sharp flanges	5	17	32½	32¼	6.35
6.	Sharp flanges	5	19	32¼	32	6.30
7.	Flat wheel	5	15	32¾	32¼	12.85
8.	Sharp flanges	5	20	32⅝	32⅜	6.36
9.	Sharp flanges	5	18	32¾	32¼	12.85
10.	Sharp flanges	4	16	32⅝	32¼	9.60
11.	Sharp flanges	7	23	29⅞	29½	8.80
12.	Sharp flanges	5	16	30	29½	11.75
13.	Sharp flanges	6	16	30⅜	29¾	15.10
14.	Sharp flanges	4	15	30¼	29¾	11.85
15.	Sharp flanges	3	15	29¾	29¼	11.60
16.	Sharp flanges	5	21	30	29½	11.75
17.	Sharp flanges	5	20	29½	29⅛	8.72
18.	Sharp flanges	5	20	29⅝	29	14.50
19.	Sharp flanges	6	23	30¼	29⅞	9.05
20.	Sharp flanges	7	20	30⅜	29⅞	11.90
21.	Sharp flanges	4	16	30¼	29¾	11.85
22.	Sharp flanges	6	15	30	29¾	5.90
23.	Sharp flanges	6	19	31	30⅝	9.10
24.	Sharp flanges	5	18	29⅝	29⅞	11.50
		130	447			239.25

particularly the new tool clamps which permit tools to be clamped by a single screw. This is a very important point, as the best wheel turning practice makes it necessary to change the tools frequently, using a roughing tool, a scraper for the tread and forming tools for the flange. In the latest Niles lathe designs various sizes of bushings are provided for the different sizes of wheel journals. These bushings fit on the journals, and are clamped by chucks in the heads. The wheels are driven at their circumference by sure-grip drivers, which engage the tire directly, the saw teeth of the drivers being forced directly into the tires by screws. This design permits each driver to be adjusted independently, so that each does its share of the work.

POWER STATION LOG FRAME

An ingenious method of keeping the power station log clean is employed in both the water and steam power stations of the Twin-City Rapid Transit Company. The records are kept on a long roll of paper and as the log for each day is completed it is torn or cut off from the upper part of this roll and filed in the usual way. The frame which holds the roll is very similar in shape to a desk and is supported at a convenient height by being fastened to the wall or to one of the columns of the building. All of the paper is kept below the top of the desk except the upper part on which the records for the day are being made. This part of the paper is carried between the top of the desk and a sheet of glass in which there is a horizontal slot the width and height of a horizontal line on the paper. The arrangement, therefore, is very similar to that of duplicate cash record pads which are sometimes used in retail stores. After one set of readings is recorded on the log the paper is moved upward to expose the next line. The advantage of the glass covering is that it protects the paper of the log from becoming soiled while the entries are being made upon it.

PURCHASE OF COAL ON THE B. T. U. BASIS IN CLEVELAND

An abstract was given in the last issue of the paper read by L. P. Crecelius, superintendent of power, Municipal Traction Company, Cleveland, on "The Purchase of Coal on the B. T. U. Basis by the Municipal Traction Company." Owing to the lack of space in the issue of last week, a report of the discussion was not included.

Following the reading of L. P. Crecelius' paper, an interesting discussion took place as to the best manner of selecting samples for analysis. Mr. Crecilius described his plan of taking samples with a ram. This is a tube with the wall at one end sharpened to a cutting edge, while the other end is closed. At intervals bolts have been driven through the tube to form a resistance, so that the slack will not pack too tightly. About 20 lb. of coal is taken with one filling of the ram. The coal thus taken from several places in each car of a consignment is ground down until it will pass through a 100-mesh sieve. The samples taken from this mixture are placed in 2-lb. tin cans, but the briquette prepared for the calorimeter weighs about half a gram.

H. W. Woodward emphasized the importance of purchasing coal on the heat unit basis, especially when the mines from which it is received are scattered over a wide range of territory, and discussed the contract used by the city for the water works department in 1907. He said that the basis was fixed at 13,625 b.t.u., and that all coal showing a value of less than 11,500 b.t.u. was put in a class to itself. Coal showing a value of 13,500 b.t.u. was paid for at the rate of $1.79 per ton, and the price varied from that to $1.50, as the value decreased to 11,500. The analyses of the various consignments received during each month are averaged and the coal paid for according to the average value thus found. Every car of coal received by the water works since 1902 has been tested, and the contracts are made now so that the quality must be kept up. Mr. Woodward further stated that his office made tests for thirteen manufacturing concerns in Cleveland during the year 1904, upon which they afterward based their contracts. These tests showed the values to be all the way from 13,500 b.t.u. to 11,500 b.t.u., with ash varying from 11 per cent to 20 per cent. In many cases the manufacturers were paying as much for coal of a lower quality as for that of a better grade.

Dr. Smith, professor of mining engineering in Case School of Applied Science, said that concerns which buy their coal on a calorific value basis are getting the best of the fuel, while the others are taking what is left. He showed a number of instruments used in testing and explained their use.

Professor Fernal, of the Government Testing Department, said that manufacturers will have to come to the use of inferior coals some time, as the supply of good coal is becoming exhausted. However, practically any coal can be used to advantage if furnaces are adapted to it. He said that the testing plant had been experimenting with some coals that are now of no commercial value, such as culm piles, roofing slabs and other refuse. These were used in the gas producer installations, but it was found that roofing slabs from certain districts that were supposed to contain 30 per cent of ash, actually showed only 10 per cent. The centralization of power plants at the mines and the use of poorer qualities of coals will be the questions to consider for the future. In Germany Pro-

fessor Fernald said he saw gas producer plants operating with coal said to contain 60 or 70 per cent of ash. A plant in a peat bog in Holland furnished energy for lighting and other purposes for a town near it. It is estimated that there is enough peat to run 100 plants of the size of the Interborough Rapid Transit plant 100 years, he said. Professor Fernald referred to the statement that the Cleveland station shows 8 per cent efficiency at the switchboard. This is an excellent showing, as the best result he had known was at the plant of the Interborough Rapid Transit Company, which shows 10½ per cent efficiency at the busbars. Professor Fernald discussed gas producer plants, and stated that the average efficiency is 13½, while in steam plants the average is 5 per cent. In other words, 1 ton of fuel in a gas producer plant will show an efficiency equal to that produced by 2¾ tons in a steam plant up to 250 hp.

E. P. Roberts, of the Roberts & Abbott Company, Cleveland, said that several years ago estimates had been made on a large plant to furnish current for all the electric roads running out of Cleveland, and to be located at the mines. At that time they showed economy, and this would probably be even more the case at present.

C. W. Ricker stated that in Cleveland and other Ohio cities it has been necessary to insist upon a cleaner production of coal in order to reduce the smoke to a minimum. This stands in the way of some other considerations in purchasing coal at this time, although the stoker problem is being worked out in a way that will avoid this more and more all the time.

Mr. Texter explained his method of checking calorimeter tests in order to arrive at the most exact results. To do this several tests must be made, and then by the use of a fixed standard of comparison the results may be checked satisfactorily.

COST OF INJURIES AND DAMAGES IN CLEVELAND

During the proceedings in the United States Circuit Court at Cleveland in November, 1908, in connection with the application of the Central Trust Company of New York for the appointment of receivers for the Municipal Traction Company testimony concerning the cost of injuries and damages was given by Henry J. Davies, secretary of the Cleveland Railway.

In the course of his testimony on this subject Mr. Davies, under examination by A. C. Dustin, attorney for the Central Trust Company, said that the statements made to him by the Municipal Traction Company showed for May, 1908, a deficit, after deduction from the gross earnings of operating expenses, taxes, interest upon bonds and floating debt and rental, of $54,906.74; for June, 1908, a deficit of $23,829.07; for July, 1908, a surplus of $19,696.32; for August, 1908, a surplus of $6,975.23.

D. C. Westenhaver, attorney for the Municipal Traction Company, cross-examined Mr. Davies, asking whether the strike of employees of the lines in May, 1908, affected the earnings favorably or unfavorably. Mr. Davies said that the figures showed that the strike affected the earnings unfavorably. In response to another question, Mr. Davies said that the effect of the strike, after its conclusion, would last only until the public was sure that there was no danger in riding upon the cars.

Mr. Westenhaver asked what the effect would be as a result of the difficulty of breaking in a new set of employees. Mr. Davies replied: "To bring the new men to a state of efficiency equal to that of the men who were employed by the Cleveland Railway Company would, I should think, take many months, if not years." While the men were new and inexperienced, not only the receipts and earnings, but also the cost of operation would be affected. When asked how the cost of operation would be influenced Mr. Davies replied: "First, I should think there would be more likelihood of accidents to passengers and others. Secondly, it would affect the cost of maintenance; for an inefficient, inexperienced motorman will do more to wear out motors or injure them than one who is experienced."

Mr. Dustin asked Mr. Davies if it was not true that "the better the police protection during a strike and immediately following, the less influence the strike would have on the traveling public;" and Mr. Davies said he should think so. Mr. Dustin asked about the character of the police protection secured by the traveling public during the last strike and Mr. Davies said it was "the best ever afforded in any city during a strike."

When called to the stand again Mr. Davies testified that in 1905 the Cleveland Electric Railway expended in the settlement of accident claims and expenses in connection therewith $156,323.46; in 1906, $180,458.06, and in 1907, $220,442.41. These amounts are exclusive of attorneys' fees.

It was also stated by Mr. Davies that "it was our custom, before the making of the lease, to charge to expense a certain amount per car-mile for accidents, and in addition, a certain amount per passenger carried, including transfers. Some accidents have relation to the number of car-miles run, rather than the number of passengers carried; such accidents as collisions between cars, collisions of cars with vehicles and pedestrians, and other accidents have relation rather to the number of people carried; such accidents as people falling in getting on and off cars. So that, in estimating each year and each month the probable cost of accidents, we put it upon both bases."

A table was submitted by Mr. Davies, showing the total expenditure for injuries and damages, including attorneys' fees for a period of six years, the percentage of gross earnings, the car-mileage, the number of rides and unit costs. This table is published herewith.

Statistics filed in court on behalf of the Municipal Traction Company during the same proceedings showed that the charges on account of accidents and damages made in the accounts from Jan. 1 to Sept. 30, 1908, amounted to $135,434.92, of which $52,231.41 was on account of damages and accidents sustained in 1907 or prior years.

The lease of the Cleveland Railway lines to the Municipal Traction Company provided for the creation of an accident reserve fund to take care of expenses of this nature. This fund was to be provided by the following charges to operating expenses: 0.7 cent per car-mile during the first year; 0.8 cent per car-mile during the second year; 0.9 cent per car-mile each year thereafter until readjusted.

COST OF INJURIES AND DAMAGES, CLEVELAND ELECTRIC RAILWAY, 1902 TO 1907, INCLUSIVE.

Year.	Amount.	Per cent of gross earnings.	Car-miles.	Cents per car-mile.	Rides.	Cents per ride.
1902...	$131,977.14	3.038	19,588,190	.674	116,059,278	.114
1903...	152,083.49	3.309	20,534,795	.740	134,937,590	.113
1904...	184,011.16	3.884	20,076,611	.917	135,243,493	.136
1905...	183,092.59	3.453	21,499,968	.852	147,807,604	.124
1906...	195,477.68	3.323	23,182,108	.843	167,732,739	.117
1907...	236,306.41	4.125	24,728,645	.956	182,662,846	.129
Total.	$1,082,948.47	3.54	129,610,317	.836	884,443,541	.122

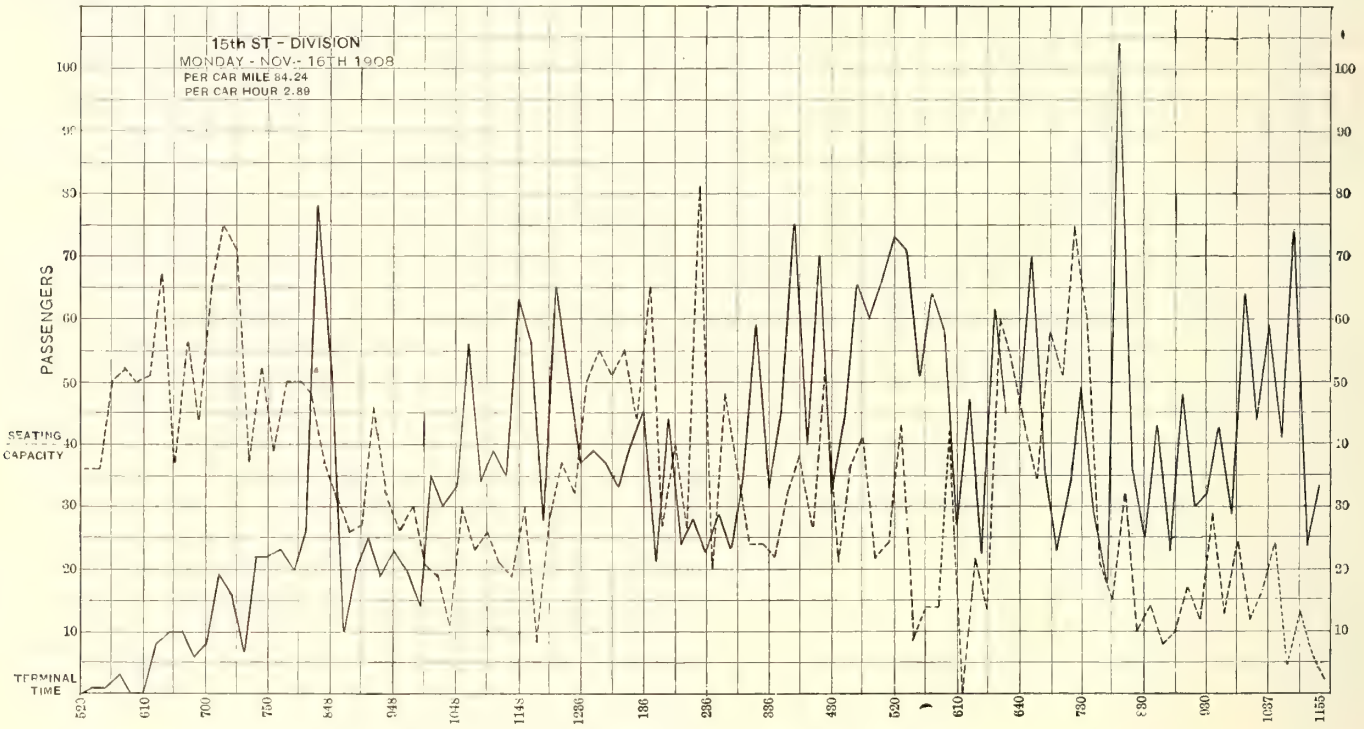
Note.—The foregoing statistics relate to the total expenditures charged to Account No. 33, "Damages," and to Account No. 34, "Legal Expenses in Connection With Damages." The expenditure of $1,082,948.47 for the six-year period was divided as follows: Account No. 33, $947,908.29; Account No. 34, $145,040.18. The charges to Account No. 33 during the period averaged 0.731 cent per car-mile, the average charge per car-mile for the two accounts being, as shown in the table, 0.836 cents. The charges to Account No. 33 in the period averaged 3.098 per cent of gross earnings

PREPARING SCHEDULES FROM TRAFFIC CURVES

BY D. A. HEGARTY, TREASURER AND GENERAL MANAGER, LITTLE ROCK RAILWAY & ELECTRIC COMPANY

During the discussion on Ernest Gonzenbach's paper, "How Can a Small Road Best Promote Traffic and Increase Its Revenue," at the 1908 convention of the Transportation & Traffic Association, the writer referred briefly to the method of making up traffic diagrams as a basis for schedules used by the Little Rock Railway & Electric Company and other properties operated by Ford, Bacon & Davis. In view of the interest shown by those present, he has been led to offer the following extended explanation of the method which has been found to save a great deal of time and worry in making out schedules.

The accompanying diagram shows the method of recording the traffic carried each day on each division of the Little Rock Railway & Electric Company and used for making schedules in order to handle the traffic satisfactorily. The black line represents outgoing cars and the dotted line incoming cars. The time given on the bottom of the diagram shows the leaving time at terminals of outgoing and incoming cars. The numerals on the sides of the diagram denote the passengers.



Method of Charting Passenger Loads in Little Rock

We take as a basis the seating capacity of the cars running on the division. For instance, the curves are for the Fifteenth Street division of the road, and cars running on this line have a seating capacity of 40 each, as will be seen by referring to the diagram used as a base. All peaks over the seating capacity show the standing load carried.

It will be noted that one of the peaks shows that the car leaving the Union Depot terminal at 7:45 p.m. carried 104 passengers, but in reality that number was not on the car all at one time. As this line has for one terminal the Union Railroad passenger station, we get considerable traffic arriving at the station, which goes to the leading hotels along this line between the depot and the main street. Often we will have a standing load at the depot of people going no farther than the hotels. When the car reaches Main Street, we get another standing load composed of people going from the business section to their homes. Our traffic diagrams are made up from the register readings to find the actual direction in which the traffic is moving. When we wish to get the number of passengers on the cars at certain times, we supply the conductors with cards, on which they note the register readings at designated points.

We have a traffic inspector stationed at the corner of Main and Markham Streets, which is the beginning of the business section of the town, and the best point where one can note the numbers of the two classes of riders mentioned. This man counts the passengers, thereby giving us an exact idea of how the traffic is moving, so that while the register shows the peak load, we know by consulting the traffic inspector's card that this load consists really of two loads instead of one, as a person would naturally infer from looking at the traffic sheet.

We find that in making out our schedules to relieve the congestion shown on this division we have been able to give satisfactory service to our patrons with a minimum amount of car mileage; in other words, running short headway when the traffic is heavy and lengthening the headway when the traffic is light.

As will be seen from the diagram of this division, from 5:20 a. m. until 8:12 a. m. we operate on a 10-minute headway, which more than cares for the outgoing traffic, but gives us standing load on incoming traffic of people coming from their homes to places of employment.

From 8:30 a. m. to 3:48 p. m. we have a 12-minute headway, except at the noon hour, when we double-head the cars, using tripper cars to take care of the noon traffic.

From 3:48 p. m. until 7:30 p. m. we operate on a 10-minute headway to take care of the peak load, people returning home after business is over.

From 7:30 p. m. to 9:54 p. m. we operate on a 12-minute headway.

From 9:54 p. m. to 10:52 p. m. we operate on a 15-minute headway.

From 10:52 p. m. to 11:30 p. m. we operate on a 20-minute headway.

From 11:30 p. m. to 11:55 p. m. we operate on a 25-minute headway.

Of course, we take proper care of any event of importance which will increase the traffic, but for the regular running of our cars our schedules are made up by this method on all divisions of the road.

RECENT STREET RAILWAY RECEIVERSHIP DECISIONS IN NEW YORK

BY HOWARD C. LAKE, OF THE NEW YORK CITY BAR

The advance sheets, dated Feb. 11, 1909, for Volume 165 of *The Federal Reporter,* pages 453 to 504, inclusive, contain a large number of decisions referring to numerous phases of the operation and control of the surface railways of Manhattan and Bronx boroughs, New York City. The decisions, all in the United States Circuit Court, Southern District of New York, were handed down at intervals between Oct. 19, 1907, and Jan. 2, 1909. The Electric Railway Journal has referred briefly to these decisions in its news columns from time to time, and I have been invited to summarize them from a legal standpoint.

It will be recalled that in September, 1907, the New York City Railway Company, which operated by leases the Metropolitan system, which in turn had a lease of the Third Avenue Railroad Company and its constituent lines, was thrown into the hands of Receivers Adrian H. Joline and Douglas Robinson upon the application of the Pennsylvania Steel Company and other foreign creditors. The proceeding, which was admittedly a friendly one, was instituted in the United States Circuit Court for the Southern District of New York State, a federal tribunal having been chosen because of the diverse citizenship of the parties. Newspaper readers will doubtless recall the unsuccessful attempt of William S. Jackson, then Attorney-General of New York State, to upset this proceeding and install the receivers, appointed later by the State court, in possession of the property. The Attorney-General appealed finally to our highest tribunal, but without successful result.

The 25 decisions which we are about to discuss cover about twice that number of pages in the *Reporter,* and were all written by Hon. E. Henry Lacombe, Circuit Judge, who brought to this difficult task of advising the receivers and deciding the various questions of control and operation many years of legal and judicial experience. Judge Lacombe's diligent study of traffic conditions in the metropolis and the able manner in which he has, single-handed and alone, administered this trust merits and will receive commendation.

Aside from the first decision, which relates to the necessity of immediately repairing the system, and a few opinions on miscellaneous matters, the decisions may be grouped under three heads, which have to do, first, with matters arising from accident suits and the giving of transfers; second, the priority and purpose of receiver's certificates, and third, the assumption, determination and cancellation by surrendering the property of the leases of the roads.

PRIORITY OF MORTGAGE OVER ACCIDENT CLAIMS

With regard to matters arising out of the suits brought by injured persons, three decisions were handed down. At the time of the appointment of the receivers the various railways had many thousands of suits and claims pending and undecided. The court calendars were clogged—so much that it then took more than two years to reach a case for trial after it was put upon the calendar. The receivership caused considerable consternation among the injured and their attorneys as to the value of their claims and possible judgments. Rumors were frequent that they would finally be worth but a few cents on the dollar. To determine the justice of the many suits Judge Lacombe ordered that they might be prosecuted to judgment in the court where they had been begun, or they might be proved before special masters appointed by him, whose determinations were, of course, subject to appeal. The claims upon which the suit had been begun were disposed of in this latter manner, and reduced to judgments.

An application in equity was made in the spring of last year, the real object of which was to obtain a ruling by the court as to the status of claims for damages resulting from accidents which happened, before appointment of receivers, from negligent operation of the railways by the defendants, or either, or both of them. "There is no objection to determining the question submitted at this time," writes Judge Lacombe; "indeed, an early determination of it will presumably be to the interest of all parties. The proposition that claims for torts committed during the operation of the road prior to receivership should be given a preference over the claims of secured creditors has been often presented to the federal courts." It was unnecessary, he continued, to add anything to the exhaustive discussion which is found in the opinion in St. Louis Trust Co. v. Riley (70 Fed., 32), with the reasoning and conclusions expressed in which he fully concurred. A short quotation from the opinion in the St. Louis case follows:

It is indispensable that the operation of a railroad be uninterrupted in order that the travel and traffic of the public may be accommodated, and in order that the franchises of the railroad company may be preserved from forfeiture. Hence the wages of employees, who might otherwise cease from their work, the amounts due to connecting lines of railroad, that might otherwise cease their business relations with the managers of the mortgaged property, and the claims for supplies and materials necessary to keep the mortgaged railroad a going concern may, in proper cases, be paid out of the earnings during the receivership, or out of the proceeds of the sale of the mortgaged property, in preference to the mortgaged debt. * * * But a claim for damages for the negligence of the mortgagor lacks the indispensable element of a preferential claim. It is not based upon any consideration that inures to the benefit of the mortgage security. Wages, traffic balances and supplies produce or increase income and preserve the mortgaged property. Repairs and improvements increase the value of the security of the bondholders. But the negligence of the mortgagor neither produces an income nor enhances the value of the property. The wages, traffic balances and claims for materials and supplies accrue under and pursuant to the contract between the mortgagor and mortgagee that the former will properly operate the railroad. The damages for negligence accrue in violation of that contract and for a breach of the duty of the mortgagor to operate the railroad carefully. Many preferential claims are for property or services that were necessary to make or keep the railroad a going concern, necessary to its operation. The negligence that is the foundation of this claim did not tend to keep the railroad in operation, but, if repeated and continued, would inevitably stop it. It was not necessary, but was deleterious, to its operation. For these reasons this claim for damages cannot, in our opinion, be allowed a preference over the mortgage debt in payment out of the income earned by the receivers appointed under the bills for the foreclosure of these mortgages.

Of course, those who obtained judgments against the receivers for damages resulting from accidents happening on the railway during their operation of it as officers of the court were desirous of promptly collecting their money.

The court was petitioned in a test case for leave to issue execution against the receivers, who had meanwhile taken an appeal, feeling confident that in a hearing in the State Appellate Court they would secure a reversal. The motion was denied upon the authority of an old case, and it was clearly decided that a federal court has the sole right to control the disposition of property and the distribution of funds in the hands of its receivers.

One other decision upon the so-called "accident business" was made. Prior to the appointment of the receivers, whenever a judgment (usually in an action for tort) was entered against the railway and the company desired to review it upon appeal, a surety company bond was obtained and filed to stay execution. As such judgments were from time to time affirmed after the appointment of receivers the surety company was compelled to pay the same, and it petitioned to be reimbursed on the theory that by giving such bonds it prevented interference with the property by levies under execution. Authority was found for denying the petition, and it was held that the surety company did not rank as a preferred creditor in the insolvency proceedings against the company with creditors having claims for supplies furnished to keep the road in operation.

TRANSFERS

Transfer questions presented other difficulties. One man was the attorney for hundreds of persons who sued for the statutory penalty for refusing transfers. He filed with the Special Master an omnibus notice in behalf of all. Upon request of the Master for instructions, objection to the notice was sustained, Judge Lacombe deciding that each claim should be separately presented, duly verified, to be separately considered and disposed of.

The other transfer decision holds that the receiver will not be required to continue at a loss an existing system of transfers not required by law or contract, and that it is not sufficient ground for refusing permission to discontinue such transfers that the company's franchise may be thereby forfeited, where, after due notice to them, none of the parties interested in such franchise objects. But it was urged that the owners of abutting property, having given their consents to the extension of the line, had rights deserving of protection. The court held, however, that there was no obligation to continue a system of transfers with another company where no conditions were expressed in the consents. Finally, it was decided that the receiver would not be required to continue an arrangement by which the companies furnished power and the use of their tracks to an independent company without compensation.

LEASES

Some half-dozen decisions have to do with leases, their assumption, construction and cancellation by the receivers. The receivers were operating a number of lines under lease, and they petitioned for instructions as to whether they were required to continue to operate any such lines at a loss. It was held that they were not, and where it appeared that the rental was excessive, or the lease otherwise unprofitable to the estate, the receivers were directed to cancel the same. In another instance it was decided that the validity of a lease of street railway lines could not be determined summarily on a motion by tort creditors of the lessee made in a creditor's suit, but could only be questioned in a suit to which all parties in interest should be made parties.

A considerable part of a certain leased railroad was converted by the lessee at its own large expense from a horse to an electric line, and different cars were placed thereon. Such cars were held not to be substitutes for the replaced horse cars which were transferred to other parts of the lessee's system. The lessor company was unsuccessful in its attempt to recover the cars.

Another decision is to the effect that where the receivers continued to operate one of the leased lines after the time for which rent was paid, but within a reasonable time elected not to continue the lease and returned the property to the lessor, they should account to it for the net receipts of such operation for the time during which no rent was paid.

In still another case, where the receivers decided to surrender the line and the rent was in default, the lease provided that all property passing thereunder should be maintained in good repair by the lessee, including all cars and other items of equipment, and on termination of the lease by default or otherwise should be returned, except such as had ceased to exist, as to which the substitutes therefor provided by the lessee, with all increments and additions and all improvements and betterments on the property, should pass to the lessor, which substitutes should be equal in value to the property for which they were substituted. At the time the property was surrendered there was a quantity of coal bought by the receivers for the lessee in the power house of the leased line, for use generally in furnishing power for the system. This could have been removed, but by agreement was turned over to and accepted by the receiver for the lessor without prejudice to the rights of either party. There were also other items, such as oil and repair parts, adapted for use generally on the different lines and bought for that purpose with general funds of the receivership, stored on the leased property, as well as repair parts adapted for use only on the special design of machinery in use in the power house of the leased line. In this case it was held that such of the latter class of items as were bought by the lessee before the receivership had been so appropriated to use on the leased line as substitutes for worn-out parts as to pass to the lessor under the terms of the lease, but that as to the coal and general repair parts there was no such appropriation, and the receivers for the lessee were entitled to recover for the same.

POWERS OF STATE COMMISSION

When the receivers took possession of the property the Metropolitan was operating a crosstown line under a lease. The State statutes provide that in such case transfers should be exchanged, and this was done. Thereafter operation under the lease ceased, and the line was returned to its owner, an independent corporation. No statute required an exchange of transfers in such a case, and such exchange was thereupon terminated. The Public Service Commission then issued an order to show cause why transfers were not continued and why some joint tariff should not be established. Great public interest had been aroused in this midsummer discussion, and the receivers, naturally and promptly, sought instructions as to whether they should obey the order. They were not directed to do so, as the exchange could only be made at a serious loss, and the power of the newly constituted commission was doubtful, as the question of such power had not been adjudicated by the State courts. The receivers were, however, directed, in the event of any proceeding being brought by the commission, "to appear in any State court and co-operate in every way to secure a prompt determination of any questions presented."

MISCELLANEOUS DECISIONS

Of the miscellaneous decisions one was to this effect:

The fact that receivers were appointed by the federal court, who have been operating a leased line, does not draw to that court jurisdiction of a suit to foreclose a mortgage on such line after the receivers have elected to surrender the lease and have offered to return the property to the lessor.

One other decision seems of interest and importance. It was substantially to the effect that a receiver appointed for the property of a street railroad company in a foreclosure suit will not, unless in case of strong necessity, be authorized to discontinue the operation of cars over a portion of the line covered by its franchise, where the effect would be to forfeit its franchise, even though the track over such portion is owned by another company to which he must pay rent and its operation would be unprofitable.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

The hearing of the Milwaukee fare cases, involving principally the demand of the city of Milwaukee that the Milwaukee Electric Railway & Light Company establish a 3-cent fare, was resumed by the Railroad Commission of Wisconsin on Feb. 24. John I. Beggs was a witness on behalf of the company at several of the sessions, which were held in the school board assembly room, City Hall, Milwaukee.

The Railroad Commission was represented by the three members—Prof. B. H. Meyer, chairman; Halford Erickson and John H. Roemer. The city of Milwaukee was represented by John T. Kelly, city attorney, and Lester C. Manson, assistant city attorney. The company was represented by George P. Miller and Edwin S. Mack, of Miller, Mack & Fairchild, Milwaukee, general counsel, and W. J. Curtis, of Sullivan, Cromwell & Curtis, of New York, general counsel for the North American Company. John I. Beggs, president and general manager of the Milwaukee company, and C. N. Duffy, comptroller, were present.

At the morning session of Feb. 24 various agreements and stipulations were made between counsel. Mr. Manson regretted that Prof. W. D. Pence, engineer for the commission, was unable to be present, as he had expected to examine Professor Pence as to the basis of distribution in the valuation of the property between the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company. Several real estate agents were called to testify for the city regarding the value of the land on which the public service building is located at the time it was bought, in July, 1899, the value on Dec. 30, 1901, and the present value. They testified that the land was worth $250,000 to $275,000 in 1899, had increased to $350,000 to $360,000 in 1901, and was worth $425,000 to $450,000 at the present time. The construction of the public service building had increased the value of surrounding property materially.

TESTIMONY OF MR. BEGGS

Mr. Beggs, when called to the stand as a witness, was examined first by Mr. Curtis. Mr. Beggs traced his connection with the electrical properties, in the operation and management of which he has been interested for about 20 years. He has been either president or general manager, or both, of the Milwaukee system for 12 years or more. His first connection with electric railway properties was as western manager of what was formerly the Edison General Electric Company, which installed many of the electrical equipments on roads 20 years ago. In 1895 Mr. Beggs was asked to go to Milwaukee in an advisory capacity in the joint interest of the Deutsche Bank, the General Electric Company and the North American Company. At that time he was giving a great deal of attention to the affairs of the Cincinnati Edison Company. The Milwaukee property had been in the hands of receivers, and after the receivership had been terminated the property was not earning enough to pay the interest on its scaled-down bonds. Having given it as his judgment that certain results could be attained in the property he was called upon to make good the opinion he had expressed.

The real development of the property had been begun about 1889, when the contracts for installation of the electrical equipment passed through the office of Mr. Beggs as western manager of the Edison General Electric Company. It was the idea of Henry Villard to consolidate the Milwaukee properties and equip them electrically at that time. Mr. Beggs thought the Milwaukee property was the first large one in the country to be created on a comprehensive basis as a consolidated electric lighting and railway company. Mr. Beggs described the character of the construction, considered high-class at the time, which included 56-lb. girder rail, and spoke of the efforts of the manufacturing company to interest railways in the substitution of electricity for horse or cable power. While the reconstruction and equipment of the Milwaukee property required about three years, the work was not completed, and Mr. Beggs took off some strap rail in 1897, after he became active in the company. A great amount of the capital required for reconstruction came from Germany, as the work had to be done largely with foreign funds, owing to the difficulty of interesting capital in this country.

BENEFITS TO CITY FROM CONSOLIDATION

Mr. Beggs discussed the benefits to the city of Milwaukee resulting from the consolidation and electrical equipment of the lines. The advantage through reductions in fares had been marked. In 1889, to reach points that are now accessible for one ticket, it was necessary to pay three fares, and to reach a great many points it would have been necessary to take five lines. The longest ride for 5 cents then was 4 miles; now, for a 4-cent ticket, a passenger can ride 11 to 12 miles.

Various illustrations were given, and Mr. Beggs said that although the public forgot such benefits very quickly, the lines were made much more direct. Mr. Beggs discussed his efforts to establish through lines between districts in which there was a community of interest, as between the residential sections in the northeast and the west sides of the city. He knew of no city in the country where a more careful effort had been made to establish lines of this nature. The extension of lines had made the surrounding territory accessible easily and quickly, and had made it possible to utilize low-priced ground, creating a city of homes and reducing the slum districts. The new lines of railway had always been in advance of the development of the city. The time required to make trips was reduced by about one-half. Originally no transfers were granted, and when the companies were consolidated transfers were given as a voluntary concession until the passage of the new franchise. The single-fare point was also extended as a voluntary act on the part of the company.

The company has tried to maintain the highest rate of

speed of cars consistent with safety of the passengers. Mr. Beggs spoke of the roadbed as the best that engineering skill and care could give, and of the action of the company in changing its equipment with the development of the art, long before it was worn out. As long as he is in charge and responsible for the property he expected to keep up with the development of systems, and to lead at times. The development of the system was all that had made it possible for the city to grow. Mr. Beggs gave illustrations of the development in different districts as a result of the speed and reliability of the service. The extensions had relieved congestion everywhere, had been a wholesome and sanitary influence in the city, and would increase, in time, the average life of the citizens. Development of the street railway system had changed the character of the city, which had improved until it now had a metropolitan air. What made Milwaukee a manufacturing city had been the policy of the company in extending its lines to outlying districts, where low-priced property could be bought for factories and additions. One of the motives leading to the creation of West Allis had been the service to be given by the street railway company. Mr. Beggs thought there was no manufacturer in the city who would not testify to the liberality with which the company had extended lines.

LARGE PROPORTION OF TICKET BUSINESS

Considering the manner in which the system of fares of the Milwaukee company is used by the public, Mr. Beggs said that the fares were the lowest in the United States. The people are very frugal and many are foreigners accustomed to husbanding small amounts carefully. About 81 per cent of the business of the Milwaukee lines is done on tickets which are sold at the rate of six for 25 cents or 25 for $1. Mr. Beggs said that the general rate for a street railway ride was 5 cents, and that rate would be much more general in the future than in the past. He knew of no street railway in the United States of the standard and affording the conveniences of the Milwaukee company that was charging a lower rate of fare or was entitled to charge less.

The standard track established by Mr. Beggs in Milwaukee 12 years ago had been followed in other cities. There was no equipment of which Mr. Beggs had any knowledge that was better than that of the Milwaukee company, which had been one of the first to use four motors with each car and to adopt double-truck long cars. The service on the Milwaukee lines was as frequent as any afforded in any city in the country and more frequent than in most. One of the problems resulting from the consolidation of various lines was that there was too much track in certain places. The development of the city had been such as to render almost imperative additional tracks, however, in the center of the city, which would make the service better. These facilities only the city could give.

Mr. Beggs also spoke highly of the character of the employees of the company. Though the discipline was reasonable its need was respected, and the employees were led to feel that it was necessary for the comfort and protection of the public. The company had had no labor difficulties of any kind in 12 years. Mr. Beggs thought the employees generally were contented, happy and prosperous. Their employment was steady and sure and the compensation good. No employee need go to a pawnshop, as the company would loan money to employees in need. The treatment of employees by the company made them cheerful and enthusiastic. This treatment was carried out, first, from a humanitarian standpoint, and, second, to induce the men to give their best service. Mr. Beggs did not wish to exalt himself, but did wish to exalt the men. Employees were promoted on merit. Every employee in the claim department must have been promoted from the platform of a car. Mr. Beggs did not believe in the practice of placing attorneys in the claim department.

LIBRARY AND OTHER BENEFITS

An auditorium in the public service building provided a place of entertainment for the employees and their wives and children. Among other benefits of this nature the company provided shower baths, billiard rooms and bowling alleys, and it would furnish soon a reading room and circulating library. An annual outing was given in the summer. The effort was to make the positions desirable; if they were not desirable the employees would give indifferent service. The company had no pension system, but intended to create such a system, and also to establish a beneficial organization.

A great many improvements were planned. The company would have to have four large new car houses. It was now beginning the construction of what was intended to be the most modern car shop owned by any electric railway. Illustrations were given of extensions which Mr. Beggs believed it would be desirable for the city to permit. Power facilities must be increased very largely. Several years ago plans were prepared for the installation of large reciprocating steam engines, but Mr. Beggs had learned confidentially of the development of Curtis steam turbines, and had abandoned the plans for installation of the engines. Otherwise the company would have expended $2,000,000 to $3,000,000 for apparatus that would have been obsolete at this time. This statement was made to illustrate one of the problems that every public service corporation had to confront. The company had been experimenting for two years with the a.c. and d.c. system, but its experiments had been conducted largely at the expense of manufacturers. The a.c. system would be perfected eventually, Mr. Beggs believed, because it was a commercial necessity. With its perfection a large additional amount of apparatus would have to be secured.

As to the difficulties of raising capital, Mr. Beggs said that it had been necessary until the last two or three years to get almost every dollar outside of Milwaukee. Within this period, however, a few hundreds of thousands of dollars of bonds had been sold in Milwaukee. The company sold its 4½ per cent bonds a year ago at 83; the highest price at which it had sold bonds issued under the same mortgage was 95.

The general attitude of the city authorities toward the property was very antagonistic, Mr. Beggs thought, and contrary to the position which the business community believed the city should hold. Ordinances had been passed intended to harass the company. Two other railways [the Chicago & Milwaukee Electric Railroad and the Milwaukee Northern Railway.—Eds.] had entered Milwaukee, paralleling some of the lines of the local company, and thus diverting a certain part of its business. The Milwaukee company, therefore, had neither an actual nor a legal monopoly of transportation in the city. The business which had been taken by the new interurban lines was the most profitable held by the Milwaukee company, because it was short-haul traffic. The short rides made the existence of the system possible; if all the passengers rode as long a distance as 7 miles the company could not begin to carry them for a 5-cent fare. The profitable

business of a street railway must help to pay for that which is unprofitable.

Criticising an editorial in a daily newspaper, Mr. Beggs said that an official of a public service corporation must be able to stand public abuse without dying under it. Mr. Beggs then described the organization, naming the heads of the various departments, and said he felt very proud of the organization of the company.

The largest advantage in the consolidation of the Milwaukee properties had accrued to the city. The consolidation had permitted better service to be given, had reduced general expenses and had produced economy in power and the ability to use the entire power capacity of the property where it might be most needed at any time.

DEPRECIATION AND RESERVES

Mr. Beggs discussed depreciation. He said that the wear began with the first wheel run over the road or the first revolution of the generator or engine, and was going on all the time, although it might not have to be made good for a long period of years. Depreciation due to obsolescence or inadequacy was illustrated by a reference to cars. The cars on the West Side line became both obsolete and inadequate long before they were worn out. A better type was developed. The motors were discarded long before they were worn out. The cars cost $2,000 to $3,000 apiece and were sold for $5 each. The depreciation comprised, therefore, not only the actual wear, but the displacement of the entire car; but whether the failure was due to wear, obsolescence or inadequacy, the cars could not be sold for enough to provide for their replacement. The rail had included, when Mr. Beggs assumed the management, some weighing 56 lb. No one had realized what the effects of the pounding of motors on the joints would be, and the rails did not last long.

Mr. Beggs spoke of the establishment of the depreciation reserve fund, and said that perhaps a better term for it would be the maintenance reserve. Mr. Beggs had stated in 1896 that the property was in bad condition physically, and in January, 1897, he established the practice of setting aside $15,000 a month, or $180,000 a year, equal to 15 per cent of gross revenue. That sum was charged to expenses, month by month, until, as the gross earnings increased, this appropriation amounted to 10 per cent of the gross revenue. This sum had been set aside in monthly installments ever since, but was not sufficient, and Mr. Beggs had so stated to his directors. Mr. Beggs spoke about the tendency to increase the weight of cars, and said the special work at Third Street and Grand Avenue, the corner of greatest congestion in the city, would not last over six or seven years. He did not know when it would ever be possible to increase the rate of dividend; the money was needed to make good the losses due to wear and tear, to say nothing of obsolescence. Heavier equipment should be provided on some lines. To be conservative, the company should set aside in this fund 15 per cent of its gross earnings. Some people would argue that the amount should be 18 or 20 per cent, but Mr. Beggs would say he could do with 15 per cent.

IMPROVEMENTS

The subject of improvements was taken up when the examination of Mr. Beggs by Mr. Curtis was resumed on the morning of Feb. 25. Mr. Beggs said that to avoid making improvements in a hurry was a part of general administrative ability. It was as necessary to know what not to do as to know what to do and how and when to do it. Mr. Beggs then discussed further the plan for the construction of a power house, which was abandoned when he learned of the approaching development of the steam turbine, as already stated. He had felt for several years that the next step in the economy in generating power would be through the gas producer engine, and on that account was still postponing the construction of a large power plant. In speaking of the changes in the art in 20 years, Mr. Beggs said that the old plant installed in Milwaukee in 1890 or 1891 was the highest type of steam engine and generating plant constructed anywhere in the world at that time. Following that was the Corliss engine and then the steam turbine. Besides delaying on account of the prospect of development of the gas producer engine, Mr. Beggs said that the State was devoting a good deal of attention to the development of water power and the conservation of energy. On the site of the present Commerce Street plant three plants had been constructed and two on Oneida Street. One plant was obsolete and inadequate before its completion. Mr. Beggs showed how rapidly the early plants had become obsolete or inadequate, disappointing expectations. It was hoped to have some water power within a short time and that would help for one or two years, but the company would have to estimate on an increase of power of 10 per cent a year.

The situation affecting power houses described substantially every feature of the business, Mr. Beggs said.

There had been less change in overhead material than in almost any other. The weight of rails had increased due to recognition of the severity of the service and the heavier equipment. At the time the system was built a great deal of the rail weighed 40 lb. or 45 lb. The first rail laid on the interurban system, 11 years ago, weighed 56 lb., while the present standard required 80-lb. rail. In the first reconstruction of the Wells Street line 72-lb. rail was laid and in the last three or four years nearly all the rail on that line had been relaid, the weight being 97 lb. Changes in track had been made to provide for the heavier electrical equipment. Mr. Beggs discussed the development of the cars to the present standard and said that the company contemplated putting on some new cars this year of the pay-as-you-enter type. In the design of these cars an effort had been made to secure greater inside width without material increase of the outer width. Probably 2 in. in width would have to be added to the outer dimension, but it might be possible to get 8 in. additional inside width. The new cars would be semi-steel, the sides and bottom framing being of steel.

The entire feeder system in Milwaukee was under ground, adding to the installation cost and the maintenance cost. When Mr. Beggs became connected with the Milwaukee properties an average of 100 breaks a week occurred in the wire, but a break now was an unusual occurrence. In discussing the advantages of the pay-as-you-enter system Mr. Beggs spoke of the prevention of accidents. He said the complaint of the public about the improved type of car was really that it eliminated the chance for petty graft in which some people reveled. He said the conductor could not take a newspaper reader by the throat and shake a fare out of him.

ACCOUNTING

The system of reserves was discussed in additional detail by Mr. Beggs. The system in existence on the Milwaukee property was devised by him as necessary for the proper administration and protection of the property. The system had not been changed greatly except in detail since its introduction in 1897. Mr. Beggs spoke of the intro-

duction of the standard system of accounts of the American Street & Interurban Railway Accountants' Association and of the interest of the company in that association. Besides the depreciation reserve a fund was set up for injuries and damages. Injuries and damages were absolutely inseparable from the operation of a large system of railway and no company could liquidate its account for liabilities of this character in less than about six years. This reserve account was started with 3 per cent of the gross revenue annually. It was found a few years ago that this amount was not sufficient and the rate was increased to 4 per cent. The actual expenditures for this expense in St. Louis four years ago were about 8 per cent of the gross revenue, but this was reduced gradually until last year the actual expense was somewhat in excess of 5 per cent, although the charge on this account was 6 per cent.

All fire insurance premiums were paid from the fire insurance reserve fund, which provided an amount from which the company could draw if it was unfortunate enough to have losses. The existence of this fund had been a potent factor in enabling the company to carry its insurance at certainly the lowest rate obtainable on properties of this character. The rate was reduced this year from 1.40 per cent to 1 per cent because the company was able to say that unless this reduction was made it would carry its own insurance. The public-service building and the two large power houses were not insured. The charge on gross earnings for the fire insurance fund was 1½ per cent at one time, and it had been reduced to 1 per cent, and on Jan. 1 of the present year was made ⅝ of 1 per cent. The fund for legal expenses was ¼ of 1 per cent and for contingencies ¼ of 1 per cent. The fire insurance reserve fund had $500,000 bonds and the interest was credited to the fund. The injuries and damages reserve fund now had an equal amount of bonds and their interest was credited also. As these funds increased the charges were reduced. Mr. Beggs did not know of any other company that had created similar funds, but thought that the amounts charged on the various accounts by other companies had been in excess of those charged by the Milwaukee company, out of which it had built up funds.

The company had never set up a fund for operating capital, but if it had had such a fund in the last two or three years it would not have had to sacrifice securities. It was absolutely necessary to make provision for amortization; no provision for retiring the investment had been made. The reserve for injuries and damages was not sufficient. If the company were to attempt to liquidate Mr. Beggs thought it would require the entire reserve fund to dispose of the cases in court, besides which many other cases were pending out of court. It cost much more to take care of injuries and damages than a few years ago owing to the enactment of laws affecting the subject relating particularly to the liability of employers. Mr. Beggs referred to the financial results of accidents involving severe loss of life on small roads, leading, in instances, to bankruptcy. To fail to provide for accidents would be just as reprehensible as to neglect insurance against fire.

The management, Mr. Beggs said, was conservative and the company was practically controlled by its directors. A great many of the employees and nearly every head of a department held stock.

RATE OF RETURN

In discussing the rate of return which should be allowed on an investment Mr. Beggs said that he was a director in a bank in St. Louis which paid 16 per cent dividends a year and was a director in a trust company in that city which paid the same rate of dividend. He was identified with other banking institutions in St. Louis, not as a director, that pay dividends of 20 per cent to 24 per cent. Most manufacturers expected to make at least 15 per cent and from that figure up to 33 per cent. Securities in public-service corporations had never been extremely popular and became less popular year by year. Mr. Beggs spoke of the unreasoning attacks against public-utility corporations and of the conservative attitude of the Massachusetts State Commissions. The general desire of the public to criticise and oppose public-service corporations had had a marked effect on their securities.

In speaking of the failures of traction enterprises Mr. Beggs recalled that the Milwaukee property went through reorganization, involving the scaling down of securities, before his connection with the company, and mentioned also the instances in New York and Chicago. Cleveland, he said, had gone through an experience that ought to be an education to the entire country. A fair and proper return should be allowed on money invested in an enterprise of this character. Mr. Beggs had made the statement a number of times in the last few years that unless investments in properties of this class were assured of a return of from 8 per cent to 12 per cent he would much prefer to place his money in farm mortgages; and unless this return could be assured he would predict that money would not be forthcoming for the development of properties. In the Milwaukee Central Heating Company ordinance it was provided that the company might earn at least 15 per cent net. It had not earned expenses yet and would have to be carried a great many years before it would show earnings. When this company did begin to be profitable it must be permitted to earn on the capital that is now dead.

Mr. Beggs amplifying further his statement regarding the rate of return, said that the average return ought to be 8 per cent to 12 per cent on the amount of money invested in the enterprise.

CLEVELAND FAILURE

In discussing the developments in Cleveland Mr. Beggs said that it had been demonstrated in that city that it was one thing to give a cheap rate, but quite another thing to give good service. After referring to the appointment of receivers to operate the Cleveland lines Mr. Beggs said that it was not possible for any man to operate a street railway in this country for 3 cents and that not many could do it for 4 cents. The commissioners should recognize the efficiency in the management and allow a return commensurate with its importance. Brains and efficiency received consideration in every other branch of business. Mr. Beggs declared that if he were putting the energy and brains into any manufacturing industry in Milwaukee which he had given to the street railroad he would be the most popular man in Milwaukee instead of the most unpopular. Low earnings in a public-service corporation were absolutely antagonistic to the good interests of the public.

DEVELOPMENT EXPENSES

The examination of Mr. Beggs was then taken up by Mr. Mack. Mr. Beggs discussed the difficulties of raising capital for new enterprises. He said it usually required several years for a new enterprise to reach a profitable stage and that a great many had failed entirely to develop in accordance with expectations. Those who advanced the initial capital must hold the securities while the properties

worked out. It required six or seven years after Mr. Beggs took the management of the Milwaukee company to make it profitable.

PUBLIC-SERVICE BUILDING

Mr. Beggs said that if he were to retire from the administration of the property and should be asked what had been the wisest step he had taken for the company he would say it had been the acquisition of the land and the construction of the Public-Service Building. The building more than paid its way year by year through the increased efficiency of the employees and the heads of departments. The offices were cheerful and healthful and Mr. Beggs believed in giving the employees every facility to aid them in the transaction of business. The Public-Service Building was the last thing in the world that should have been attacked. It added to the attractiveness of the city and changed the entire character of the section in which it was located. Inside of 10 years the building would carry itself and pay a dividend to the company without loss to it. Only one-third of the building had been constructed and with the upper stories added the building would make the best hotel, apartment building or office building in the city. Most traction companies had been very lax in providing for their necessities in the central business section of the city, failing to realize the advantages. The management would have been unworthy if it had not looked beyond the immediate bare necessities of the property. Cars could be sent from the Public-Service Building from hour to hour as needed, and if they had to be brought from a distance the company could not respond to the traffic needs of the community. Mr. Beggs would be glad to take the building at its cost.

PAVING REQUIREMENT

The requirement that the company pave 1 ft. outside of its rails was discussed by Mr. Beggs, who said that this practice was an outgrowth of the old horse or mule car system. There was no wear now due to railway operation, but the city had continued to exact this requirement as a means of securing additional taxes.

In the tentative valuation of the physical property of the company by the engineering staff of the Railroad Commission the following allowances were made: For engineering and superintendence, 4 per cent; organization and legal expenses, 2 per cent; interest during construction, 3 per cent; contingencies, 3 per cent; total, 12 per cent. Mr. Beggs said he recognized the conscientious manner in which this figure had been determined, but the allowance was inadequate. Interest was not less than 5 per cent. No one would attempt to build a system of this character probably within three years. It would be safer and more conservative to allow 5 per cent for engineering and superintendence. Five per cent would be a safer allowance for contingencies than the amount stated.

The question of working capital was suggested and Mr. Beggs said that he would not want to lay down a rule for any one; the company had usually saved by using its current income. It might be advantageous at times to use 5 per cent of the cost of the property. He would try to manage without a large amount of money because he would not want to pay interest on it.

The difference in value between the road as an operating, harmonious whole and the bare physical property Mr. Beggs estimated at at least 20 per cent on the capitalization. Many business enterprises had gone into bankruptcy because of a lack of a good organization, proper co-ordination and equipment. Mr. Beggs also discussed the value due to operation of the property as one company instead of through seven railway and three lighting companies, which had formed the present operating corporation, and the economies resulting from unified operation.

The subject of 3-cent fares was suggested again and Mr. Beggs said he was glad the Cleveland attempt was made. The reason why it was possible was that the franchises of the Cleveland Electric Railway were expiring and the company was in a helpless condition. Mr. Beggs described Mayor Johnson, of Cleveland, as a political mountebank who had Presidential ambitions. The 3-cent fare proved to be a 7-cent fare in many cases, with transfers extra. The service was denounced by the public of Cleveland, which learned a lesson that it would do good for the public of Milwaukee to learn.

Mr. Beggs would predict that no man in the world could operate the Milwaukee property on a 3-cent fare. Nineteen men out of 20 that might take charge of the Milwaukee property would bankrupt it within three years and the line between bankruptcy and solvency was so faint that the 19 would not know they had crossed it until several months afterward. Three-cent fares would not pay operating expenses alone.

When the ordinance of the company was extended to 1934 it was calculated that the maximum amount of riding upon tickets would be 60 per cent of the total, but the figure was now 81 per cent.

Under cross-examination by Mr. Manson, for the city, various features of the testimony were reviewed by Mr. Beggs. During this examination Mr. Beggs said that the development of the art had required the scrapping of apparatus every year that he had been with the company.

At the sessions on Feb. 26 and 27 testimony was given by Charles J. Marr, partner in the firm of Dickinson, Wilmot & Sterrett, certified public accountants. The hearing was resumed on March 2.

ACCIDENT AFTER ALIGHTING

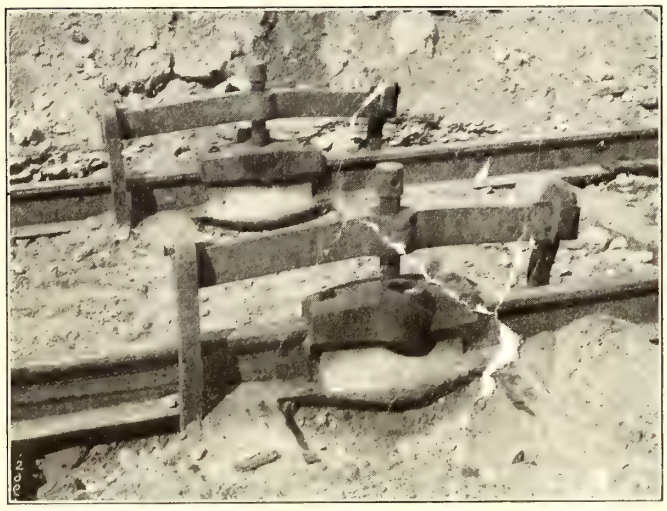
The full bench of the Supreme Judicial Court of Massachusetts handed down a decision on Feb. 26 in favor of the Boston Elevated Railway Company in the case of Henry Tompkins against the company. The case is of interest on account of the circumstances under which the suit was brought, and the decision is that a passenger who alights to permit others to leave a car has no claim for damages. In 1905 the plaintiff, aged 15, and another boy boarded a car in the Boston subway and a few moments later the plaintiff got off to permit two women passengers to alight. In trying to board the car again he was hurt by reason of its making a sudden start. A verdict of $1,000 damages was awarded in a lower court, but this is now set aside. It was argued by the plaintiff that his relation as a passenger ended when he alighted. On this point the court says:

If this should be held [i. e., that his relation as a passenger had been ended] then it did not become re-established, for there was no evidence from which it could be found that the plaintiff gave any notice of such intention on his part to those in charge of the car or that they knew of any such intention or effort or offer on his part or that they accepted him as a passenger. But the plaintiff did not cease to be a passenger by leaving the car momentarily for this cause. He could not have been required to pay a new fare. The necessity or courtesy which prompted his action did not terminate his status as a passenger. It is notorious that this is one of the common incidents during the rush hours. Under the terms of his contract of carriage he took upon himself the consequences of injury ensuing from this act.

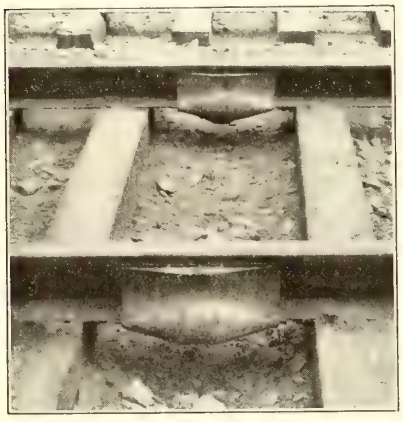
CAST WELDING IN MINNEAPOLIS

Among the large companies which still make a practice of cast welding all of their rail joints is the Twin City Rapid Transit Company, of Minneapolis. Views of the standard joint employed are shown. The material used in the cupola is made up half of machine scrap and half of good quality pig iron, and on the standard 7-in. 91-lb. L. S. No. 375 rail used the joint weighs 160 lb.

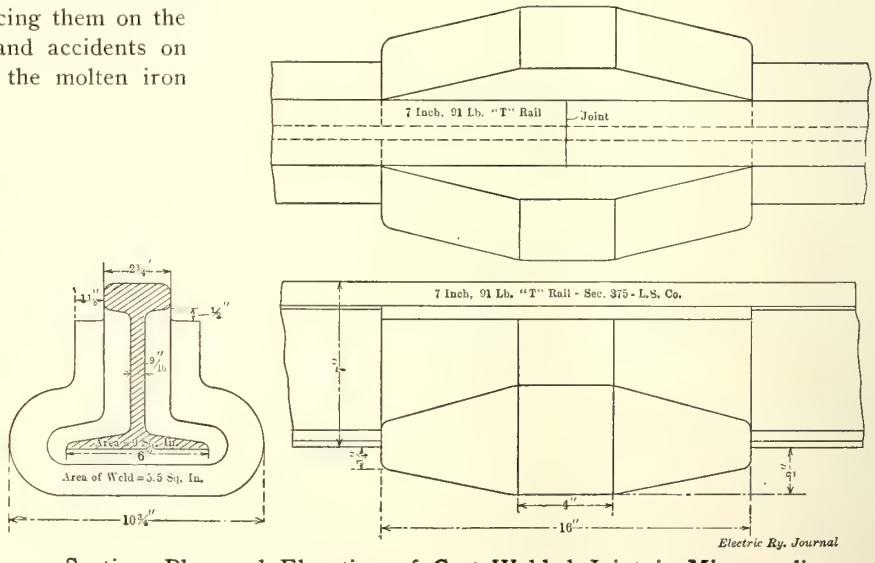
Geo. L. Wilson, engineer maintenance of way, Twin City Rapid Transit Company, believes that in order to insure success in cast welding all the details of the process must be carefully looked after. If this is done, he believes that success will be achieved, and there should be no defective joints. The molds, caps and screws must all be kept in good order and must be put on carefully. The molds must be rubbed on the inside with kerosene or black oil, and heated in an oven just before placing them on the rails. This is done to avoid dampness and accidents on account of steam being generated while the molten iron is poured into them. During the last six years this company has welded about 13,611 joints on 8-in. and 7-in. rail. During this time there have not been more than a dozen breakages of joints.



Cast Welded Joint with Caps, Minneapolis



Completed Joint



Section, Plan and Elevation of Cast Welded Joint in Minneapolis

It is the practice of the company to use opposite joints and to cast weld the joints in the new track before the paving is installed. By care in doing the work no serious difficulty has been experienced by the company through buckling.

MEETING OF THE NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on the evening of Feb. 25, with President M. C. Brush in the chair. Frank Hedley, vice-president and general manager, Interborough Rapid Transit Company, New York, was the speaker, his subject being "Transportation and the Present Attitude of the Public Toward Public Service Corporations." Mr. Hedley reviewed the early history of steam railroading, emphasizing the stimulating influence of the steam locomotive on transportation of all kinds, and then passed to the results of electrical methods in railway work. The attitude of steam railroad officers toward electric railway men is rapidly changing in these days of more extensive uses of electricity on railways, and it is realized that electrical methods must be studied thoroughly by steam railroad officers if they are to retain their positions as progressive workers in the transportation field. Both steam and street railroads are important factors in the commercial success of the urban and the country districts and without modern transportation city life would be almost impossible on anything like its present scale.

The speaker touched upon the enormous development of electric traction during the last 20 years and referred in glowing terms to the work of Frank J. Sprague in the development of the multiple-unit system of control on the South Side Elevated Railway in Chicago at the time of Mr. Hedley's connection with that road. Before the advent of this system a grade of 2 per cent was considered difficult in locomotive operation, but while a 4 per cent grade is undesirable, it is easily negotiated by a modern multiple-unit train. [It may be recalled that when the Boston Elevated Railway Company was testing its multiple-unit train equipment in the Tremont Street subway in 1901 trains were run backward up the 8 per cent grade south of Boylston Street station, attaining a higher speed at the top than when starting.—Eds.] Mr. Hedley stated that an acceleration of 0.6 m.p.h.p.s. to a speed of 20 m.p.h. is about as good work as can be expected by the steam locomotive, whereas an acceleration of 1.3 m.p.h.p.s. is easily obtained in the New York subway trains. An express train there consisting of eight cars weighs about 300 tons and has 10 axles driven by motors aggregating 2000 hp, or about twice the power

of two large locomotives on the Pennsylvania Railroad. The automatic limitation of the current in the acceleration was touched upon with the resulting even accession of speed and lack of opportunity for too slow acceleration and consequent waste of time and current. The trains are now equipped with quick recharge and graduated release air brakes, giving a deceleration of 2 m.p.h.p.s. More accurate stops result and higher efficiency of service under congested traffic conditions. The subway is now carrying over 800,000 passengers per day and has a record of 886,000 passengers in one day. Trains are passed through the junction at Ninety-sixth Street on 54-second intervals with safety, though the train lengths vary from 255 ft. to 408 ft. An interval of 1 minute 48 seconds is maintained in both express and local service. To pass the trains over the junction more safely the company is experimenting with a speed-control and automatic-stop installation which will hold the motormen down to the right speed and prevent any chance of collision.

Mr. Hedley emphasized the importance of the personal equation in the successful operation of system and outlined the work done in the company's training school for car-service employees.

Regarding the attitude of the public toward service corporations the speaker said that the situation has been difficult to bear during the past few years. It has been popular to accuse the corporations of everything that is bad and politicians, yellow journals and even reputable papers have spread broadcast the ideas that the companies are operated without regard to the public. The platforms of municipal politics are to a large degree responsible for these ideas. If onerous terms continue to be imposed, not allowing a fair return on the money put into service corporations, it will be impossible in time to secure money to develop such properties and disaster will follow. Street and elevated railways and subway lines can be developed further, and the day is not far distant when the railroad business will be considered an honorable calling entitled to a fair return upon the investment. Wherever the right prevails it is time that this work of destruction shall stop. Promoters' schemes have in not a few cases been responsible for the temper of the public mind and have caused discredit to companies trying to give proper service. The companies should take the public into their confidence and make clear the difficulties of operation. The public believes that the companies are making large dividends, whereas the facts of the case should be firmly established and the public should be taught that investors who put money into public-service corporations should have as fair a return as in any other line of business. It is important that every employee do his best to give the best possible service, and courtesy and polite conduct are absolutely indispensable at such a time as this. The square deal for the companies is needed. The public is always ready to abide by reasonable rules when it understands that they lead to the highest efficiency of service.

In the discussion which followed C. S. Sergeant, vice-president, Boston Elevated Railway Company, reviewed his 21 years' experience in the field of electric traction and paid a tribute to the pioneer work of Henry M. Whitney in the initial applications of the overhead trolley system on a considerable scale in Boston. The results were most discouraging, especially from the financial standpoint, but Mr. Whitney's courage and faith in electricity led to ultimate success, which would probably otherwise have been postponed many years. Mr. Sergeant stated that all the changes in equipment which have since come have been paid for mainly out of earnings in the Boston system. The stringent laws of the State of Massachusetts prevent the payment of over 6 per cent dividends unless the surplus above 6 per cent is divided with the State. The result has been that stockholders have invested largely on a 4 per cent basis. The nickel has shrunk to 3.15 cents through the extension of the transfer and general increase in demands for service on the part of the public. Labor and materials have advanced in price to the detriment of net earnings. As a result every avenue of economy must be traversed. In Boston a factor that has been serious has been the introduction of bills in the Legislature for miles of subways not within the scope of the 5-cent fare at all. Necessary as may be the subway in the most densely populated sections of the city, it is scarcely apparent how this class of investment can be financially justifiable in the outlying districts. The company must have some relief in this matter of carrying people for nothing through the operations of the practically unlimited free transfer. The transfer has its legitimate place in certain instances, but its application has been extended far beyond its natural field. Mr. Sergeant said that a campaign of publicity is needed to enable the situation to be properly appreciated. He believed that the people want service and will not be disposed to curtail a reasonable return. Mr. Schwab recently stated that unless a manufacturer can obtain about 22 per cent profit on his business he becomes dissatisfied. Yet objections are raised if a street railway company succeeds in earning 6 per cent. No employee is too humble to assist in spreading abroad the right impressions of the street railway situation. The supply men can help by educating their factory employees to see that their bread and butter depend on fair treatment being given the railroads. Millions of persons are affected by this situation, and when it is generally realized there will be a change in sentiment.

P. F. Sullivan, president, Boston & Northern and Old Colony Street Railway companies, said that the present situation is one of the most serious conditions in the country. He was not prepared to say that all the blame rests with the public. Some of it rests with those who have abused their trusts and who have exploited transportation properties for personal gain through improper methods. The pendulum has swung too far, however, and the public has made a mistake in assuming that all public-service corporations are wrong. A reasonable dividend on a reasonable capitalization will be accorded by the public when it appreciates the true facts. Signs of improvement are already apparent and the outlook for the future is distinctly improved. Education of the public along the proper lines is the plain duty of all electric railway employees.

Charles C. Peirce, vice-president, American Street & Interurban Railway Manufacturers' Association, then spoke of the work that is being done by that organization in planning a campaign of education which shall improve the situation. He stated that in a recent attack made on a street railway company in the West which was earning 6 per cent dividends the leader in the movement was an official of a department-store trust which earns 22 per cent dividends per year on its investment.

In closing Mr. Hedley called attention to the fact that only two passengers have been killed on the trains of the New York subway since the service began and these were killed during the strike of a few years ago, when the company started with only 7 motormen out of 10,000 car-service employees to operate its road on the morning of the strike. He emphasized the need of honest financing and conduct of the company's affairs with the interest of the public in mind.

FIRE PROTECTION OF ELECTRIC RAILWAY PROPERTIES

A great many praiseworthy improvements have been made within the last three or four years by electric railway companies in shielding their properties from fire by the installation of division walls, doors, shutters, alarm systems and other devices for the reduction of the fire hazard. Much of this work, however, has been installed without a proper realization of the requirements and consequently has involved a greater expenditure than if the managements had understood the special nature of the problem with which they were confronted. This is unfortunate, because a knowledge of the cost without a full acquaintance of the facts is apt to make the companies apathetic and put off fire protection with the assertion that the game is not worth the candle.

The fire protection of electric railway properties has become a distinct branch of engineering and one whose ideal is the scientific conciliation of the oft-times opposite demands of the fire-insurance and the railway companies. The aim of such insurance engineering is twofold, namely, to determine what is most suitable for construction and use, and how best to maintain the fire-fighting equipment of apparatus and men at the point of highest efficiency. And by highest efficiency is meant real efficiency because poor maintenance and lax discipline instil a false sense of security which is often more dangerous than no especial effort to combat the fire risk and errors of construction. According to the insurance experts there is absolutely no reason why car houses and their contents should burn with more frequency than other classes of property, provided the same high order of intelligence required in electric-car operation is applied to the fire question. That this can be done is exemplified by many instances where companies have built up fire-fighting organizations. In the case of one surprise test at a large car house near New York 97 cars were removed from an upper floor in less than three minutes. Such effectiveness is attainable only through thorough drilling and consistent, conscientious supervision of the equipment. The following suggestions have been obtained from an insurance engineer of high prominence:

CONSTRUCTION HINTS

As an instance of what to avoid he cited one company which has spent thousands of dollars for the construction of car-house partitions extending from the ceiling to within a few feet of the floor. As draft stops, these partitions would have served equally as well if they had been carried only a few feet down. A second railway corporation has built a splendid two-story concrete car house in which the lower floor is of heavily reinforced concrete, but the upper story is carried on 6-in. cast-iron columns filled with concrete. In this case the error in having exposed metal supports can be easily corrected by a thick cement covering, thereby transforming a bad risk into a good one. The tendency of steel to warp under heat makes it a source of danger in car-house construction unless all girders and other exposed members carry at least 4 in. of fireproofing. The ideal car house would be a shell in which could be placed a furnace burning an unlimited amount of fuel without damage to walls or roof. In substations and power houses steel-work protection is not so essential because these buildings contain no cars and, outside of the cranes, usually have no exposed wiring.

The fire underwriters of electric-railway risks have set up certain standard limiting areas for structures built according to different systems. The area suggested for "fireproof" car houses with fire walls is 20,000 sq. ft. and for "ordinary" light car houses 10,000 sq. ft. Power houses and substations with wooden roofs or floors are limited to 5000 sq. ft., but any area is allowable if these structures are designed along fireproof lines.

The terms "fireproof," "ordinary" and other terms thus used require elucidation. "Fireproof" means substantial brick or concrete wall buildings with no bare metal trusses, columns or girders. These supports must be protected with concrete or terra-cotta. "Non-combustible" means made of non-burning materials. This construction is satisfactory for power and substations, but not especially desirable for car houses. "Ordinary" generally means wood or wood on iron construction; it is admissible for car houses if of heavy mill or beam construction with 3-in. or 4-in. floors and roof. It may astonish many to learn that the fire underwriters think little of such materials as concrete blocks, large tile blocks and 8-in. brick. Their choice is for hard-burned brick or properly mixed and well-erected reinforced concrete.

Of course, two-story or three-story buildings are not desirable from the fire standpoint, but are often necessary on account of the high cost of real estate. In all cases they call for special attention to elevator and stairway openings. Elevators preferably should be in a separate brick shaft with automatic fire-doors to cover all openings. Stairways should be of tread-covered concrete and should have emergency fire-doors wherever feasible. Automatic doors for openings between buildings or sections of a building must be operative at all times and not stick halfway. Some railways seem to think that a fire-door is only a gravity closing device and use flimsily sheathed wood, absolutely worthless as a fire stop. Where there is danger from fire from nearby buildings the windows facing these risks should have standard fire shutters. Wired glass should also be used for all sash and skylights and should be set in approved metal frames.

FIRE-FIGHTING APPARATUS

Fire-fighting apparatus is of two classes—freezing and non-freezing. The former comprises ordinary fire buckets, ordinary chemical extinguishers, standpipes so exposed that the water must be turned off in winter, and the wet-type sprinkler system or that in which the pipes continue to carry water during the cold winter months. Apparatus subject to this disadvantage is not only worthless for three or four months a year in most parts of this country, but is out of order at the very time when the municipal fire departments can be of least assistance.

Non-freezing apparatus includes fire buckets containing a solution of calcium chloride, a chemical, however, which cannot be used in the sprinkler piping because of its corrosive qualities; non-freezing chemical extinguishers which cost more but are always serviceable; frost-proof hydrants separately housed; pails of sand for places using oil and where electrical work is carried on; and the dry type of sprinkler systems. Standpipes are an effective element in fire protection only if the water pressure is high. Usually the pressure from city mains is too low and should be reinforced by compressed air. One recent recommendation for standpipe distribution called for one 2-in pipe for 5000 sq. ft. of floor area, each with 100 ft. of 1½-in. hose attached and having the water pressure on at all times. But installations of this kind should be protected from mechanical injury, otherwise broken reels and injured hose will prevent their effective use.

In some places, as in large machine, carpenter or paint

shops, hose and chemical-extinguisher cars are good auxiliaries.

At least one approved chemical extinguisher should be provided for every 2000 sq. ft. of floor space. It should be recharged at least once a year and bear the date of a recharge on an attached tag. If of the freezing type, the extinguisher should be kept in a warm place.

Sprinkler systems, whether wet or dry, need a good deal of care to be effective. The dry system is an especially delicate affair because of its necessity for complicated valves. Wet systems can also get into trouble as in one curious case where the heating system which kept the water from freezing was run by a motor taking current from the carhouse trolley. Surely it would be difficult to conceive a more absurd and dangerous situation than this. It is a mistake to suppose that any device, no matter how effective originally, will continue to be so if neglected.

FIRE ALARMS

One very important consideration should be remembered. A company which undertakes to protect its property from fire should not increase the fire risk of neighboring buildings. This warning relates particularly to fire-alarm systems. A private fire-alarm system which is not interconnected with the municipal boxes is a source of danger to others. The best form of alarm box is one which notifies public and private firemen simultaneously, and thus avoids the loss of precious time required to run out of the building and pull a city box. The private boxes should be connected to inside signal gongs which will indicate the place of the trouble. No matter how effective the inside organization may be, the extent of a fire never can be foretold and the city fire department should be summoned because it is necessarily the best equipped to handle conflagrations of real magnitude.

Alarm boxes should be installed in all risks and on all floors, one for every 20,000 sq. ft. of floor area. They should be in prominent places and where the fire danger is greatest, as at stairways and elevator shafts. Their location can be brought out prominently by painting this part of the wall red and using large letters for the words "Fire Box." Each box should be indicated by a red light.

PREVENTING FIRES

The number of "don'ts" relative to preventing fires in the car house and the shop is almost innumerable, but most of them can be summed up under a few heads. Thus, no one needs to be told that oil and oily waste are dangerous. In spite of this fact, there are many places where the refuse from journal boxes and armature bearings is thrown into pits or under the devil-strips. Oil barrels are tapped without pans to catch the drip and waste tanks are exposed to catch any careless man's burning match or tobacco. Covered waste cans should be so numerous that the workman will have little inclination and less excuse to be reckless in handling waste. If pools of oil on the floor cannot be removed directly, they can be scraped up after they have been covered with lime. All oil receptacles should be in a special fireproof chamber. The ideal way of storing oil is to keep it underground. It can then be removed in very small quantities as needed. In shop work there is danger also from gasoline when stored near gas stoves, and there are various chemicals used in the paint room which involve fire risk. Wooden lockers fortunately are becoming obsolete and consequently the danger from greasy clothing is diminishing.

Points of an electrical nature to be avoided are of widely varied character and involve both operation practice and the original wiring. The ingenuity often shown in rigging up testing sets and other electrical devices is indeed commendable, but only too often such contrivances are made up of all sorts of second-hand material no longer suitable for 500-volt to 550-volt circuits. This is due to a mistaken sense of economy, for which the manager may be more at fault than the shopman.

Suggestions in regard to wiring relate to lighting and power circuits of both buildings and rolling stock. Special care is necessary with railway lighting circuits because of the use of 500-volt to 550-volt series circuits. The insulation therefore should be of the best and the wires carried in conduit. Switches should be of the knife-blade type and placed in metal cabinets with enclosed fuses. A separate switch and fuse for each pit using up to thirty 16-cp lamps is desirable to keep to a minimum the amount of current handled, besides avoiding waste or power. Portable lights should receive particular attention. Their wiring is subject to frequent abrasion and should not be made up of odds and ends as is frequently done by the shopmen. Arc lamps are dangerous in the oil, paint and battery rooms. They may be used elsewhere if furnished with inner globes.

The points regarding lighting circuits naturally apply with greater force to power circuits. Trolley wires should be run in troughs, especially in car houses with steel roof-trusses. These troughs should be of 1½-in. yellow pine, covered with insulating paint. The hanger spacing should be such that in case of a break in the trolley wire, contact cannot be made with ground. Water rheostats of wooden barrel design possess such elements of danger that metal rheostats are preferable, even if they do cost more. In any event, if water rheostats are used, they should be cased in slate, stone or concrete.

In general, it is desirable that all electrical wiring and electrical circuit repairs at any given installation should be done under the direct supervision of one man, who can be held responsible for the enforcement of the safety regulations. Many a company starts right, but soon strays from the road of rectitude in permitting all sorts of makeshift circuits for inspection and repairs.

As the fire risk in railway structures is enhanced by the presence of electric cars, the latter must also come under the jurisdiction of the insurance companies. No car wiring can be considered safe unless it is run in conduit on the underside of the cars and other parts exposed to the weather which come into contact with wood. Circuits of over 5-amp capacity should have a single pole, quick-break or approved blow-out switches. Lightning arresters should be on the roof and on the line side of the lamps. Electric heaters should have their current carrying parts located at least 4 in. from all woodwork, and the heater circuits ought to be carried in metal conduit or approved molding. The smaller the heater unit the better. There is hardly space in an article of this kind to go into further details on car wiring. The reader can safely be referred to the specifications drawn up for the pay-as-you-enter cars of the Third Avenue Railroad Company, New York, described, with accompanying diagrams, in the Electric Railway Journal of Nov. 21, 1908, and Jan. 23, 1909.

In connection with the car wiring practice of the Third Avenue Railroad Company, it is interesting to add that this company has so wired its transfer table and track connections that every track is dead except the one being served by the transfer table. In this way the fire risk from cars in storage has been reduced to zero, and a very

appreciable saving has resulted in current consumed by the lights and heaters.

CONSERVING THE PROPERTY

No matter how much money a railway company spends in the beginning for good construction and wiring, the protection will soon degenerate if it is not guarded intelligently. A competent official should have charge of the fire protection throughout the entire system. Preferably, this man should be one who is directly acquainted with electric railway apparatus and operation, and has been thoroughly drilled by representatives of the fire insurance companies in the meaning of the rules. The principal duties of such an official would be to train the men to fight fire in an organized way, to make sure that all fire apparatus is in operative condition, that the rules with regard to wiring and combustibles are being observed, and, finally, to see that money spent for fire protection is utilized in the most effectual manner.

In all large risks a watchman should be on duty during the day and one during the night. These men should report their movement by time clocks at various stations located throughout the property near the fire alarm boxes. Fire fighting forces should be composed of 10 or more men under a chief, preferably the general foreman of the depot, or some one else in high authority. Each battalion should be organized with a captain, hydrant men, etc. Every man should know his duty. Practice and surprise drills should be held frequently under the eye of the foreman or the man in general charge of the company's fire protection.

FENDER AND WHEELGUARD HEARINGS IN NEW YORK

The hearings preceding the proposed order calling for fender and wheelguard equipment of cars operating in the several boroughs of New York were continued before Commissioner Maltbie, of the Public Service Commission for the First District, on Thursday, Feb. 25. Owing to the number of witnesses called for the Manhattan borough companies, it was necessary to postpone the Brooklyn and Queens hearing until 2:30 p. m., Monday, March 1.

THURSDAY'S SESSION

The first witness was P. C. Nickel, claim agent for the receivers of the Metropolitan Street Railway Company, who said that in the last four years he had investigated 18,000 to 19,000 cases annually, the more serious ones receiving his personal attention. He had always considered the possibility whether wheelguards or fenders would have materially reduced casualties, but he had found projecting fenders so unfavorable that he advised the company to remove them for the benefit of the public safety. In 1906 his company experimented with the Liverpool fender, but this was discarded because it was frequently inoperative and interfered with traffic.

He had analyzed all the accidents on the lines operated by the Metropolitan Street Railway receivers for the 12 months ending Jan. 31, 1909, and had found that of the 2366 cases where cars had struck people there were only 165 where a fender or wheelguard would have been applicable. Of these 165 cases 54 involved serious injuries and 18 insignificant bruises. Commissioner Maltbie suggested to Mr. Nickel that the figures ought to be divided according to wheelguards and fenders, as their functions were not synonymous. The witness did not know what proportion of the cases involved standing or recumbent persons, but stated that 2205 of the 2366 cases covered persons struck by the sides of the cars.

The witness believed that most persons were injured through their negligence in not looking out for cars. Usually they were struck in stepping on the track, running across the track or in leaving the track. Of the 165 accidents, Mr. Nickel said that 82 occurred below Fifty-ninth Street, 82 above Fifty-ninth Street and one on Fifty-ninth Street.

Mr. Nickel related that when the projecting fender was used some years ago it was found impracticable, because it was damaged so easily by vehicle traffic, and often had to be removed and left on the sidewalk or tied up to the dasher. In the lower section of Manhattan borough vehicles often drove over the fenders, and even when the latter were tied up at the rear end of the cars trucks could side-wipe them. The fenders on the back of the car also tempted children to steal rides, thus constituting an additional source of accidents. Alighting rear platform passengers were also injured by the fenders of cars coming in the opposite direction. There were several instances in which the fender was directly responsible for accidents, where pedestrians crossing the street paid attention only to the position of the car and failed to see the low-hung fender.

The witness thought there would be no advantage in having fenders on the cars operated above Fifty-ninth Street, as in general the cars operated at the same speeds in the upper part of the city as in the lower, although there were a few exceptional cases, as low speeds on lower Broadway and high speeds along the western boundary of Central Park, where there are no crossings and the vehicle traffic remains west of the tracks. Some places in the upper part of the city were just as congested as in the business section, and even more dangerous, on account of children who had the playful but dangerous habit of jumping in and out of the fenders when the cars were slowing down. The crosstown lines were run under practically the same traffic conditions throughout the city except in a few instances.

Mr. Nickel stated that when the projecting fender was tried fixed pilot type wheelguards were also used on the cars. He thought wheelguards were more practical than fenders, although those originally installed on the Madison Avenue pay-as-you-enter cars had given considerable trouble by being shaken off the cars. Mr. Nickel said that when an accident occurred in connection with cars carrying fenders careful investigation was made to determine whether the fender or wheelguard had operated either to abate or add to the injuries sustained. Sometimes, when a person was struck by the fender he would be swung inward in such a way as to fall under the rear truck, and consequently the wheelguard was useless. He did not recall any instance where persons who had gone underneath the fender had been picked up by the fixed wheelguard. In some cases they were partly on or under it when the car was stopped. While he had no experience with the combined use of automatic wheelguards and fenders, he knew that his company had experimented with the Providence fender and the Sterling, Liverpool, Consolidated, Parmenter and Hudson-Bowring wheelguards. He felt quite certain that some of the later wheelguards embodied improvements in the art and no doubt would prove more efficient in making pick-ups.

Regarding the effect on a person struck by the bumper of a car, Mr. Nickel said that the injuries might vary

from a fractured skull to a minor contusion, according to the position in which the person happened to be and how he fell. He knew of no cases where bones were broken by the direct blow of the bumper. In conclusion, Mr. Nickel added that the most effective means of preventing accidents was to keep the discipline of the car men at the highest point and to have effective wheelguards and brakes.

The second witness was August Leimbach, general inspector of the Second Avenue Railroad Company. Mr. Leimbach was asked practically the same questions which had been put to Mr. Nickel, and he gave nearly the same answers, but illustrated them by mentioning accidents within his personal experience. He knew of no cases where a fender had prevented accidents, but, on the contrary, did know of instances where they had caused accidents, especially in catching people who were crossing the track or who were standing near curves. From his experience as a motorman and inspector he believed that fenders were decidedly objectionable in service, especially when it was necessary to push wagons up hills and to take disabled cars to the terminal. On the average, a fender would not stay on the line more than a day without receiving some sort of damage. He had had no experience with any other than the Providence fender, but nevertheless thought it as efficient as any projecting fender could be in view of the difficulties of everyday operation. As to wheelguards, the greater part of his experience had been with the Sterling pilot type, and he had also had a few weeks' experience with the Parmenter guards placed on the Madison Avenue pay-as-you-enter cars. He said that the inspectors rather welcomed a snow storm, because it gave them an excuse to get rid of the wheelguards.

The next witness was Jacob Henshaw, superintendent of the Second Avenue Railroad, who testified along the same lines as the previous witness. He also stated that fenders tended to increase the number of accidents. The last witness was David Murray, inspector on the Second Avenue Railroad, who submitted data showing the additional overhang caused at different curves when projecting fenders were on the cars.

The hearing was then adjourned.

MONDAY'S SESSION

On Monday afternoon, March 1, Commissioner Maltbie presided at the hearing concerning the use of wheelguards and fenders in Brooklyn and Queens boroughs. W. S. Menden, assistant general manager and chief engineer of the Brooklyn Rapid Transit Company, reported that his company had no new evidence to offer regarding automatic wheelguards, since so few of them had been tried in the United States. It was possible to install such guards on the Brooklyn cars, but their effectiveness could be determined only by trial under operating conditions. He therefore suggested that the commission, instead of ordering all cars to be equipped immediately, permit the company to equip a few of each of its eight types of cars with several designs of such wheelguards for both body and truck suspension. At the end of six or eight months it would be possible to know which offered the least objections. He felt that while the commission's tests were very thorough, they did not necessarily apply to the variety of service found in Brooklyn. Hence the company wanted a chance to experiment before being ordered to spend about $100,000. Mr. Menden understood that if wheelguards were ordered fenders would still have to be kept on the cars. At present it is customary to raise the fenders only in going over bridges and on the bridge approaches. He could not remember a single accident which occurred under those conditions.

Commissioner Maltbie offered no particular objections to the arguments presented by Mr. Menden, but said that it would surely be better to equip a considerable number of cars with guards rather than a few, so that a clearer idea could be obtained of the value of such devices in operation and of their maintenance cost.

S. W. Huff, president and manager of the Coney Island & Brooklyn Railroad, said that his company operated 250 cars of three different types. All of them are equipped with fenders, which he considered of satisfactory type. He thought it would cost some $10,000 to $15,000 to equip the cars with wheelguards. In general, the suggestions offered by Mr. Menden represented the position of his company; that is, before being ordered to equip all cars his company also wanted the opportunity to try different styles of guards. The fender in use on his lines is of the fixed type and has made successful pick-ups. One difficulty about all projecting fenders was that clearance conditions frequently made it difficult to have them large enough to pick up grown persons as well as children.

The next witness was Charles S. Banghart, superintendent and master mechanic of the New York & Queens County Railway Company. Mr. Banghart also represented the Long Island Electric Railway Company and the New York & Long Island Traction Company. He said that the fender used on the New York & Queens County cars was of the Berg fixed type, which has been found very satisfactory. In the past 12 months there have been about 2000 accidents, of which 70 were caused by cars striking persons. Of these 70 cases there were three where the fender was useful, and succeeded in picking up the pedestrians. In one case the fender ran over a person who was lying in a depression between the rails on an unpaved highway. This accident occurred about 7 p. m. in early winter, when it was too dark to see anybody lying in the road and when the car was traveling at high speed in open country. The cars of the New York & Queens County Railway operated over paved streets on about one-third of the total route, many sections being not only without paving, but also without established grades.

Mr. Banghart did not believe that a wheelguard would furnish additional safety under the operating and topographical conditions prevailing on his lines. There were also several practical difficulties in installing such guards on the Queens County cars. The draft rigging would interfere with them, and on many cars the multiple-unit control, hose connections, storage tanks and track scrapers would be in the way. Mr. Banghart then submitted a blue print showing the location of apparatus used on his steels cars, to show how the under-car apparatus would prevent the installation of a wheelguard. The steel cars have Berg sliding fenders, which are pushed back when cars are operated in trains. The company is now operating 50 cars of this type. In reply to a query from Commissioner Maltbie, Mr. Banghart said that the hose connections could not be changed conveniently because of the 35-ft. radius curves on some parts of the line. He did not think that there would be room for a wheelguard, even if the sliding fender were taken off.

Mr. Banghart submitted a second blue print showing the apparatus under 40 cars of another type, with maximum traction trucks and carrying the Berg folding fender. On these cars it would also be impracticable to install wheelguards; the track scrapers and drawbars would in-

terfere with the tripping mechanism. A third type of car, of which the company operates 10 units, has a reservoir under the platform. The fact that many of the cars had maximum traction trucks made track scrapers a necessity in snowy weather. It would be a most expensive process to rebuild the cars for the application of wheelguards, as the platforms would have to be lengthened 3 or 4 ft. to secure the necessary clearances.

Asked as to his experience with wheelguards, Mr. Banghart mentioned his experiences since 1894, and emphasized the difficulties he had found with automatic guards, because they are too sensitive. On the Long Island lines a projecting fender was a better device because it would not get out of order so often. There was little likelihood of fenders striking people in going around curves, as they had no congested city conditions, and it was the custom to tie up the fenders in approaching the ferries. The fenders are carried 6 in. to 7 in. above the rail. The maximum operating speed is 25 m.p.h. in the open country and 8 m.p.h. in the city sections.

J. L. Quackenbush, of counsel for the companies for which Mr. Banghart testified, asked Commissioner Maltbie whether the commission preferred fenders with or without platform or automatic trips. If a tripping fender was required, Mr. Banghart would see what could be done to rebuild the Berg fenders accordingly. He mentioned that the Eclipse non-automatic fender had made the highest points at the trials of the commission, but Mr. Maltbie pointed out that the tests with that fender had been confined only to standing figures.

The hearing was then adjourned.

110,000-VOLT TRANSMISSION LINE IN ONTARIO

The Hydro-Electric Power Commission of Ontario has just authorized the construction of a 110,000-volt transmission line from Niagara Falls to St. Thomas and Toronto, to connect Dundas, Guelph, Berlin, Woodstock and other cities. In all there will be 293 miles of line. Energy will be purchased from the Ontario Power Company. The contract for the construction of the line has been let to F. H. McGuigan, of Toronto, a well-known former railroad man, who was first with the Wabash and then for many years vice-president of the Grand Trunk. Subcontracts have been let to the Canadian Bridge Company, of Walkerville, for the steel towers; to the Northern Aluminum Company, of Shawinigan Falls, for the aluminum cable, and to the Niagara & Ontario Construction Company, of Toronto, for the balance of the material and the actual erection of the line. Muralt & Company have been retained as engineers, and will supervise the construction. It is expected that the line will be ready for service before the end of 1909. An extension from St. Thomas to Windsor is contemplated.

The poles will be galvanized steel angle iron towers spaced in level country 550 ft. The minimum spacing on curves will be 100 ft. The height will vary according to local conditions, the normal height being about 65 ft. above the ground. The minimum clearance will be 22 ft. between the lower conductors and the ground. At the Welland Canal there will be a clearance of 150 ft. to permit the passage of vessels.

The transmission system will be 25 cycles, three-phase. The present capacity is 40,000 hp. The conductors will be stranded aluminum of No. 0000 B. & S. and No. 000 B. & S. The insulators will be of the suspended type, with several insulators in series.

CHICAGO'S TRANSFER CRUSADE

BY J. V. SULLIVAN, GENERAL SUPERVISOR, CHICAGO RAILWAYS COMPANY

Five hundred arrests for violation of the transfer ordinance, nine-tenths of which resulted in fines, are the visible returns of the first six months of the campaign being conducted by the Chicago Railways Company for the suppression of venders and illegal users of transfer tickets. Other "visible returns" are shown in the increased earnings of certain car lines of the north and west sides, but it is impossible to estimate how much of this gain is due to the crusade. It is equally difficult to figure out the "invisible results"—that is, the number of patrons of the company who have been influenced by the campaign of publicity and prosecutions, so that they now pay cash instead of cheating the company by riding on transfers secured improperly.

In a review of the work of the company in this connection, published in the Electric Railway Journal of Jan. 2, 1909, reference was made to the wide extent of the transfer privilege in Chicago and to many points where transfers are accepted. These statements showed the difficulties which the company's officials encountered when they set out to check a practice which had long flourished with impunity.

A great help was found in the recently acquired "get together" spirit of Chicago's industrial concerns. This helping hand was extended willingly whenever representatives of the company called on business men to assist in the publicity end of the crusade. As a result, there are now displayed in the principal factories and stores adjacent to the company's lines about 500 printed notices reading as follows:

Our employees are warned that it is unlawful to misuse transfer tickets issued by the street railway companies. The city ordinance says: "It shall be unlawful to give away, or to receive for use, or to sell, barter or exchange transfer tickets. Penalty, from $5 to $100 for each offense." There must be no exchange of such transfers on or about our premises. We will assist in the enforcement of this ordinance.

This notice is printed in English, German and Polish on the same card, 11 in. x 21 in. in size, and a place is left for the concern's name at the bottom. One large plant, employing about 10,000 men, has displayed 50 of these signs conspicuously in its various departments; another has posted 25 copies. The effect of such a warning, backed by the authority of all these employers, must indeed be beneficial, and it is not to be wondered at that the company's agents now have difficulty in finding a half-dozen violators of the ordinance at busy junction points where formerly hundreds of transfers were improperly traded and used every morning and evening.

It was discovered in several instances that the workmen at certain plants were so manipulating the transfer tickets that the time punches showing the hour of issue in the morning were filled in and new holes were perforated for the evening trips. Employers of such labor were quick to discharge the offenders whenever their attention was called to the facts by the street railway's representatives. This was all a part of the educational plan, and in no case has a second offense been reported at the same factory.

Every car operated by the company has a warning notice conspicuously displayed, so that thousands of persons have been educated in this way who otherwise might never have known that they were in danger of prosecution by giving away their transfer tickets or using those which

they had received improperly. The newspapers, also, have had occasional editorials advocating the enforcement of this ordinance, which tends to enrich the city as well as the company, and whenever arrests with unusual features have been made the publicity given in the news columns has assisted in deterring others.

While the courts have shown a disposition to enforce the ordinance fairly, the company has not sought the maximum penalty against offenders. One defendant was held to the grand jury on a charge of conspiracy, because it was shown that he was the leader of a number of boys who were soliciting and selling transfers. In the case of a woman making improper use of these tickets a warning is usually sufficient to show her the danger of such practice. The men detailed on this work have the authority of special officers, and they have little trouble in convincing those whom they arrest that it is best to go along quietly to the police station.

The sale of transfers by newsboys was the first evil aimed at, and it is now rare to hear of a case of this kind along the north or west side car lines. Hundreds of persons, however, still persist in throwing away their unused transfers, and it is the persons who pick up these tickets and attempt to ride on them who are the most numerous of those prosecuted daily in the police courts. This practice has been reduced to a minimum, but there will be no let up in the fight until the misuse of transfers is stamped out.

CONNECTICUT COMPANY PREPARING FOR TEST OF CATENARY CONSTRUCTION NEAR HARTFORD

The Connecticut Company is equipping through its own contractors six 2000-ft. sections of railway between Hartford and Middletown, Conn., with catenary line material supplied respectively by the General Electric Company, the Westinghouse Electric & Manufacturing Company, the Ohio Brass Company, the Johns-Manville Company, Electric Service Supplies Company and Elmer P. Morris. Each section will be anchored by the manufacturer's own devices. All of the installations will be carried from poles spaced 150 ft. on tangents and in general will be tried out under the same conditions. Eventually the Connecticut Company hopes to be in position to combine the best features of each system and prepare standard specifications as it has already done for the ordinary d.c. work.

An interesting experiment will also be made in trolley wire. About ½ mile of the usual type suspension leading into the catenary division will be equipped with a No. 0000 trolley wire of steel which will be continued another ½ mile through the adjourning catenary suspension. The latter will have a copper messenger.

The Interstate Engineering & Supply Company, Philadelphia, Pa., S. S. Neff, president, has just let a number of contracts for apparatus to be installed in the new power station now being erected at Reading, Pa., by the Metropolitan Electric Company, of that city. A list of the principal contracts follows: The Allis-Chalmers Company has been awarded an order to supply three 2500-kw turbines and generators, with 80 per cent power factor, designed for 60 cycles, three-phase and 13,200 volts. The Edge Moor Iron Company, Edge Moor, Del., received the contract for sixteen 625-hp boilers. H. R. Heinicke will build two brick chimneys, each 242 ft. high. The General Electric Company will supply two exciters and the Jeansville Iron Works Company, Jeansville, Pa., three boiler feed pumps to be driven by turbines.

FINDING THE RATIO BETWEEN THE INPUT AND OUTPUT OF A STORAGE BATTERY USED AT THE HARRISBURG POWER STATION

The Central Pennsylvania Traction Company, of Harrisburg, Pa., operates in connection with its power plant a storage battery of 288 chloride accumulators having a normal rating of 800 amp-hours and a maximum temporary output of 1400 amp-hours. Some time ago it was deemed desirable to install some apparatus for measuring the input and output of this battery, but on inquiry among electrical manufacturers, it was found that such a device would be too expensive.

This led to a closer study of the problem, as the result of which a relay circuit was devised to permit measurement of the incoming and outgoing currents. It so happened that two watt-hour meters and two ammeters

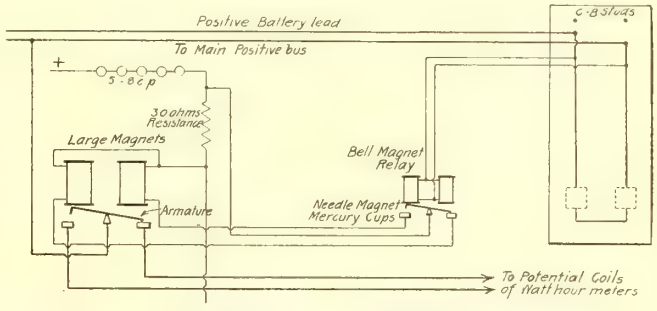


Diagram of Connections of Wattmeters for Recording Input and Output of Storage Battery

mounted on two unused feeder panels were available for this purpose so no expense was incurred for measuring instruments. The ammeters really are unnecessary, as the watt-hour meters record exactly the information needed The operation of this method as shown in the accompanying diagram is as follows:

The watt-hour meters are in circuit through circuit-breaker studs with the positive battery lead which feeds into or out of the main positive bus. The relay circuit is composed of a pair of ordinary bell magnets in shunt with the main circuit across the meters. The magnets are connected in parallel owing to the low voltage. As current flows either to or from the battery these magnets alternately attract and repel a permanent magnet needle carried below them. This needle is suspended on a post in circuit with the operating current which comes through five 8-cp lamps. As the needle dips into one or the other of the mercury cups, current is sent through a pair of large magnets, which lift alternately the ends of the armature beneath them, thus causing the other end of the armature to close the circuit leading to the potential coils of either the input or output watt-hour meters as the case may be. Cut-out switches are supplied for all circuits, but they have been omitted from the diagram for the sake of simplicity. The 30-ohm resistance shown in the lamp circuit is used to reduce the sparking when the current is broken.

This method was worked out by P. Frank Gerhart, chief electrician of the company, and his assistants, D. B. Moist and C. W. Young.

A dispatch from Milwaukee states that the 42 miles of single-phase line placed in operation in 1908 by the Milwaukee Electric Railway & Light Company between Waukesha Beach and Watertown and the 18 miles of single-phase line under construction are to be changed for operation at 1200 volts, direct current.

FORECASTING AND RECORDING TRACK RENEWALS IN BROOKLYN

Some time ago the track department of the Brooklyn Rapid Transit Company made a careful forecast of the nature and estimated cost of track renewals which probably will be required up to and including the year 1912. This data was worked out for every line of the system and thus placed the company in a position where it can tell almost exactly what expenditure the track structure will need each year.

The record for the entire system is kept in a 19-in. x 10-in. book of blue prints, one or more sheets being reserved for each line. On one of these records the first column gives the number of the items (ruled for 50); the second, the location of the piece; the third, the description and construction abbreviations identified by the key in Fig. 2; the fifth, the date of the original installation. The balance of this form, as reproduced in Fig. 1, gives the plan number and the name of the maker. The portion of the same record headed "Date of Probable and Actual Renewal and Probable and Actual Cost" eventually will give the data for the several years forecasted. The last column is reserved for remarks, such as "To be abolished,"

	DATE OF PROBABLE AND ACTUAL RENEWAL AND PROBABLE AND ACTUAL COST.																REMARKS
	RENEWAL PLAN NO.	MAKER	1906		1906		1908		1909		1910		1911		1912		
			PROBABLE	ACTUAL	PROBABLE	ACTUAL	PROBABLE	ACTUAL	PROBABLE	ACTUAL	PROBABLE	ACTUAL	PROBABLE	ACTUAL	PROBABLE	ACTUAL	

Fig. 1—Part Headings of Sheet Used for Recording Track Renewal Forecasts

sibly the introduction of mirrors to help the train guards observe the exit doors. The effect of these additions will be taken up at a hearing on Tuesday, March 23.

NEW YORK CHAMBER OF COMMERCE FOR SUBWAY CONSTRUCTION BY PRIVATE CAPITAL

The New York Chamber of Commerce's special committee on rapid transit has drawn up a report recommending the early construction of additional rapid transit lines, either by private capital or with the aid of private capital. The committee considers the proposed constitutional amendment expanding the city's debt limit to be unwise, and recommends modifications of existing laws to provide protection for private capital in traction investments. It affirms that present laws make these undertakings unwise either for municipal effort or private enterprise, but deprecates and disagrees with the many recent semi-official statements that private capital cannot be had to provide needed facilities if proper and reasonable legal provisions are made.

	SPECIAL WORK RENEWALS Lines																						
No.	Location	Sketch	B.R.T. PLANS		PLANS FOR'GN	Kind of Work	REQUIS'N	P.A. FOR BIDS	ORDER NO.	ORDER DATE	MFGR.	PRICE	TIME SHIPM'T	RECD.	REQ'ST NO.	AUTH. NO.	INST'LD	COST INST'LD	Replaces		FILED ON CARD	REMARKS
			General	Detail															MFGR.	DATE INST'LD		

Fig. 3—Headings Covering Track Renewal at a Given Place

etc. The end of the book contains a recapitulation sheet covering the probable and actual amounts required for each line recorded.

The actual costs cannot be given, of course, until the renewal plans have been drawn, bids accepted, etc. Such figures are kept on separate sheets of the same size. As shown in Fig. 3, they are ruled for location, sketch, plan number, class of work, requisition for material sent to purchasing agent, number and date of order, manufacturer, price, requisition covering installation, cost of installation, date and make of replaced material, etc. The actual cost figure of the completed job is then inserted opposite the estimated figure on the original forecast sheet.

B.O., branch-off.
B.U.T.R., built up tee rail.
C.H., car house.
Comb., combined.
C.I. & B., Coney Island & B'klyn R. R.
Cg., connecting.
Cv., curve.
Cvd., curved.
Dbl., double.
D.T., double track.
Fr., from.
Fr., frogs.
G.R., Girder rail.
H.C.T.R., Hard center tee rail.
L.F., Lewis & Fowler.
L.H., left hand.
L.S. Co., Lorain Steel Co.
N.Y.S. Co., N. Y. Switch & Crossing Co.
P.S. Co., Penn Steel Co.
Pln., plain.
Rep., repairs.
Rev., reverse.
R.H., right hand.
S., single.
S.T., single track.
Sk., skew.
Spl., special.
S.S., slip switch.
Stm., steam.
Sw., switch.
Thr., through.
T., track.
T.R., tee rail.
T.O., turn out.
U.M.L., Unbroken main line.
Xg., crossing.
Xo., cross-over.

Fig. 2—Key to Abbreviations Used with Track Renewal Record

SIDE-DOOR CAR HEARING

On March 2 a hearing was held before Commissioner Eustis, of the New York Public Service Commission of the First District, regarding changes in the subway side-door car train described in the Feb. 27 issue of the Electric Railway Journal. After a talk between the commissioner, Frank Hedley, general manager of the Interborough Rapid Transit Company, and B. J. Arnold, special consulting engineer to the Public Service Commission, it was decided to take this train out of service for about a week, until certain changes can be made. These changes are to include the addition of handles on the platform side of the doors, more flexible rubber door buffers and pos-

INTERURBAN RAILWAYS IN WISCONSIN

F. G. Simmons, superintendent of way, Milwaukee Electric Railway & Light Company, presented at the initial meeting of the Wisconsin Society of Engineers, this week, a paper on the "Building of Electric Roads in Wisconsin." Mr. Simmons pointed out the differences in density of population and in number of cities of considerable size in Wisconsin and in some of the Central States, like Illinois, Indiana and Ohio, as one reason for the greater mileage in the latter States. Another lies in the topography of the country, which in Wisconsin makes electric railway construction expensive. Mr. Simmons also said that the recent ruling of the Wisconsin Supreme Court that the carrying of freight entails an additional burden upon the abutting property within the corporate limits of cities was impeding the development of interurban lines in that State.

ALARM DEVICE FOR ALIGHTING PASSENGERS

A. O. Nichols, of Omaha, Neb., has just placed on the market an alarm device to warn the passengers alighting from the rear platform that a car is coming on the opposite track. This contrivance, which is hung from the rear dasher, consists of a sign marked "Look Out for Car on Other Track," a bell and a hooded lamp. It is operated by the motorman, who closes the alarm circuit by pressing a button with his foot. At night the lamp is also in circuit, so that the sign will be visible. The inventor believes that the application of this device will prevent many people from being run down by cars under the conditions indicated. He reports that several electric railway companies are favorably considering a trial of this invention for the reduction of accidents.



Alarm on Rear Dasher

INSTALLING LIGHTNING ARRESTERS

The proper installation and care of lightning arresters is a subject worthy of most careful study and attention by electric railway engineers. As summer comes on these devices should be gone over and thoroughly inspected. A knowledge of the action of lightning arresters is essential to this work, and to aid inspectors and others the Electric Service Supplies Company, Philadelphia, Pa., has prepared a special bulletin, No. 55, with the title, "Installing Lightning Arresters." This little book contains a number of valuable hints, which may be summarized as follows:

The efficiency of lightning arresters, and therefore the protection which such devices afford, is not only dependent upon the design of the arrester, but is equally dependent upon its being properly grounded. It is also important that a sufficient number of arresters should be installed, so that any one or a few arresters will not be given the work to ground either a lightning discharge or a large amount of static which might collect on the lines. The use of five arresters per mile of line is standard practice on the majority of interurban roads, and has been found to give ideal protection. This spacing gives a sufficient number of outlets for the lightning current, and therefore relieves the work required by each arrester during very severe storms. The life of arresters is correspondingly increased.

A careful examination of each arrester should consist in inspecting the connections between ground and the line at the arrester itself. More important still should be the examination of the ground connections to see that the ground wire is not corroded or broken, especially at the point where it enters the earth. In electric railway practice it is considered advisable not only to ground the arrester to the earth, but to ground it also to the rail. Wires running from the arrester to the line should be short and straight as possible, being free from curls or twists. If a turn in the wire is necessary it is advised to avoid sharp angles by carrying the wire in a curve of long radius. Exposed connections or joints should be taped carefully, except at binding posts. Connections made to metal plates placed under the ground should be carefully soldered, and after soldering should be covered with a coat of preservative paint.

The bulletin contains information relative to the installation, care and inspection of station, car and pole type lightning arresters, as well as the most approved methods of making ground connections. Diagrams of proper connections are shown and information is given as to the number of arresters which should be installed on lines for various services.

OPEN TANK CREOSOTING IN LOUISIANA

A co-operative agreement between the Forest Service and the North Louisiana Telephone Company for the investigation of economic methods for the preservation from decay of loblolly pine telephone poles was recently carried out with gratifying results. The object of the Government was to demonstrate that creosote treatment could be applied successfully and at a low cost to loblolly pine poles. A company has been incorporated under the name of the Louisiana Creosoting Company, which will operate commercially the plant originally designed by the Forest Service.

The treating plant, which has been in operation since the latter part of October, 1908, is of the "non-pressure," or "open-tank," type. This type of plant costs much less than a plant of the "pressure" type, which is ordinarily used for commercial purposes throughout the country. The "open-tank" system depends fundamentally upon the immersion of timber first in a hot bath of the preservative, followed by a rapid change to a cold bath. This does away with the installment of high pressure and vacuum pumps and a treating cylinder of massive construction to withstand a high internal pressure, which are necessary in a plant of the pressure type. It is usual, however, to install a non-pressure treating cylinder of light construction where any great quantity of material is to be treated, since the cost of handling the material and loss of preservative through volatilization during the hot bath is in this way reduced to a minimum. The plant used in the experiment with the North Louisiana Telephone Company is equipped with a horizontal treating cylinder 50 ft. long and 6 ft. in diameter. It was designed by the Forest Service whose representative also supervised the construction and operated the plant for several months. During this period 3000 poles, 2500 cross-arms and 500 ties were treated, an amount sufficient to determine the most economical methods of treating these classes of material. The Forest Service then withdrew from the co-operation and the plant is now being successfully operated by the owner.

ACCIDENT REPORTS

All claim agents lay stress upon receiving from the train crews full reports of all accidents which occur from their cars. The following report, which was received in regular course by a well-known manager, shows that the motorman was at least conscientious in attempting to follow instructions:

Accident—A2158 (Supt. Bryce).
Motorman—J. O. McGehee, No. 1410.
Car—No. 447.
Time—5:15 p. m., Feb. 17, 1909.
Location—In front of Smith's store, Midlothian Turnpike. Goat struck.
STATEMENT.—As I was south-bound at point named above, when in front of above-named store, a three-legged goat ran out in front of car and before I could stop my car one corner of fender struck him and threw him to one side. I did not know that I had struck him until I came back and unknown negro boy said I had cut his goat's leg off—and I can get witnesses to prove that the goat never had but three legs. (Signature)

BOSTON EDISON ELECTRIC ILLUMINATING COMPANY ACQUIRES NEW PLANTS IN SUBURBS

Charles L. Edgar, president of the Edison Electric Illuminating Company of Boston, has announced that the company has arranged to purchase the electric plants of the Waltham Gas Light Company, the Newton & Watertown Gas Light Company and the Chelsea Gas Light Company, and the Brookline-Brighton electrical business of the Boston Consolidated Gas Company. The Massachusetts Gas & Electric Light Commission will be asked to approve the purchases. A feature of interest is the probable supplying of the Boston Suburban Electric Companies with power generated by the Edison Electric Illuminating Company at its L Street station in South Boston, presumably on a long-term contract. At present power for the Boston Suburban Electric Companies is supplied from the turbine plant of the Waltham Gas Light Company through motor-generator sets and from the steam plant at Homer Street, Newtonville. The turbine plant is primarily a lighting station and the Homer Street station is not of particularly modern design, so that the purchase of power from the Edison Electric Illuminating Company is likely to be beneficial to the railway companies and advantageous in its effect upon generating conditions at South Boston. The Edison Electric Illuminating Company sells comparatively little power for railway service at present, but with the expansion of the field of influence of the large and economical generating plant at L Street it is probable that railway loads may become more important portions of the company's business in the future as in the case of the Commonwealth Edison Company of Chicago. There is little indication, however, that the Edison company will assume the railway loads of Boston proper so long as the Boston Elevated Railway maintains its present high standards of station efficiency.

THE CURTIS ELECTRIC CAR TRUCK PLANT

Under this caption the *Iron Age* published in a recent issue an extended description of the new works of the Curtis Motor Truck Company at Decatur, Ill. The present capacity is 10 trucks per day, and spurs connect the works with four steam railroad lines, as well as with the belt line of the Illinois Traction Company. The ground occupied is 10 acres. The forge shop is 70 ft. x 100 ft., and besides the usual machine tools and forges, is equipped with hoists and cranes which command the entire shop. Owing to the large amount of forging work done, the shop contains a large Ajax forging machine with special clearances in die spaces for large work. On this machine all of the pedestals are forged—in fact, all of the large parts of the truck, as no castings are used.

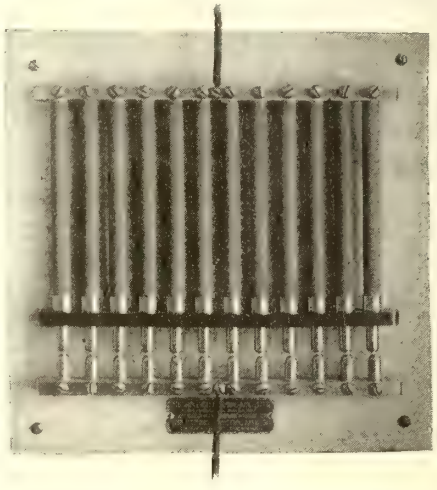
The machine shop is 40 ft. x 200 ft., with concrete floor. It is equipped with the requisite drills, shapers, lathes, planers, etc. Templets and gages are used throughout and special jigs and tools wherever called for, as all parts are interchangeable.

The erecting shop is also 40 ft. x 200 ft., and, like the other shops, is equipped with a traveling crane. Here are located the air operated riveters, forges and various air tools. The material and finishing shops together occupy a building 40 ft. x 220 ft. Here open hearth steel and wrought iron are received as raw material and are cut to dimensions before being distributed.

Power for the shops is obtained from the high-tension line of the Illinois Traction Company at 33,000 volts, which is reduced to 440 volts. At this voltage it is distributed through the shops to 25-cycle a.c. motors. Practically all of the machinery is motor driven. Compressed air is used to a large extent in the power hammers, hoists and riveters, and is supplied from two storage air compressors with a capacity of 350 cu. ft. per minute.

NON-ARCING LIGHTNING ARRESTERS

The Gifford Electric Manufacturing Company, Traverse City, Mich., is making several designs of lightning arresters constructed for very sensitive action in order to take off static discharges before they can reach a dangerous potential. To produce such arresters it was found necessary to have a small air-gap resistance, which in turn necessitated an increase in the series resistance, thus cutting down the volume of current to such a degree that the arresters would not arc after the spark had passed. It was found that arresters on this principle, constructed with



Station Type Multi-Path Lightning Arrester

but one conductor, did not have sufficient carrying capacity to care for heavy lightning discharges. This defect, however, was overcome by using a bank of conductors grouped on one base, so that the manufacturer obtained both a sensitive arrester and one of lower resistance with a carrying capacity proportional to the number of outlets and conductors used. As discharges are split up into as many equal parts as there are conductors, the danger of fusing terminals or continued arcing is greatly decreased.

The Type A station arrester for 500-volt to 2500-volt a.c. or d.c. circuits, which is shown in the accompanying illustration, has 12 separate non-inductive resistance rods connected in parallel and mounted on blue Vermont marble. The series resistance of this arrester averages from 25 to 180 ohms, and the air-gap distance ranges from 1/40 in. to 3/40 in. The distance between the line and ground connections of this arrester is 7 in. The dimensions of the arrester are 12 in. x 12 in. x 1 in., and its weight is 20 lb. The illustration shows clearly how this style of arrester takes care of a lightning discharge.

According to the statistics published in the January *Zeitschrift für Kleinbahnen,* the light railway mileage of Belgium at the end of the year 1907 consisted of 2980 km (1847.6 miles) by steam, 5 km (3.1 miles) by horses and 71 km (44 miles) by electricity. Most of the lines are of meter (39.37 in.) gage, and only 40 km are of American standard gage. The electric railways had 406 passenger cars, of which 218 were motor cars.

LONDON LETTER.

(*From Our Regular Correspondent.*)

That the effect of the competition of electric tramways with the railways in this country is not yet completed is amply evidenced year by year in the speeches made at the half-yearly meetings of the various railways. At a recent meeting of the Great Eastern Railway Company, it was announced that that company had determined to fight the tramway and omnibus competition by a reduction of fares and by the inauguration of a service of fast trains between London and the company's suburban stations. The London, Brighton & South Coast Railway is, of course, fighting the same situation by the electrification of a portion of its line which has been so frequently referred to in these columns. In the case of the South Eastern Railway Company figures were given which would show that during the last five years the company had lost fourteen million passengers, mainly due to tramway competition. This company has come to the conclusion that it is impossible to compete with the tramways and is evidently looking for future increases in its traffic further afield than the suburbs. In Liverpool, also, the effect of the tramways has been severely felt, and the Cheshire Lines committee has just issued a little pamphlet entitled "How to Save Money." The advantages and cheapness of travel on certain routes of its line are carefully compared with the facilities and cost of tramway transport to and from the same districts and the financial balance is shown in a monthly average. This line has already materially reduced its fares and is making a determined effort to retain or recover its traffic.

We noted a few months ago that Liverpool was making the experiment of having first-class cars on the Aigburth route, in which a double fare was charged. The annual return of the Liverpool Corporation Tramways has just been presented at a meeting of the Tramways Committee, and it is stated that over £1,200 had been taken by these cars and the number of passengers had been over 200,000. It has therefore been resolved that the experiment should be continued for a further period of six months as they considered that the service was meeting a demand and would eventually prove financially satisfactory.

A deputation from Sheffield has recently returned from a visit to Austria and Germany where it has been investigating various transportation systems operated by the overhead trackless trolley. Like other deputations who have been on the Continent for the same purpose, the members of the delegation have returned quite convinced of the usefulness of such a system, and will at an early date make a full report to the Council. The question of trackless trolleys is still being considered by Dundee, and quite recently the matter was again remitted to a sub-committee for further consideration. Up to the present no decision has been made by any of the corporations authorizing an experiment on this system.

The City of Hull is offering probably the cheapest tramway ride in Great Britain. The universal fare in Hull is one penny, but in the morning until 9 a. m. all classes have the privilege of traveling at half the ordinary price, and on the longest section passengers can therefore travel upward of 3 miles for a halfpenny. This boon to the working classes is a very great one, and, judging by the increased receipts the experiment seems also to benefit the Corporation, who have recently placed orders for 20 new cars. Hull believes that increased facilities increase traffic, and some time ago inaugurated the policy of allowing a person to travel on two routes for a penny, and the halfpenny rate referred to above is a corollary of this experiment.

The results of the newer tube railways in London for the past six months appear to be eminently satisfactory. The Baker Street & Waterloo Railway has had an increase in receipts of over £17,000, while its working expenditure only increased about £700, so that it is enabled to pay a substantial amount on the ordinary shares. The Charing Cross, Euston & Hampstead Railway has also had an increased revenue of nearly £20,000, and though it is not yet able to pay anything on the ordinary shares it is able to pay all interests accruing on debenture stock. The Great Northern, Piccadilly & Brompton Railway has had an increase of nearly £24,000, and this railway is able to pay ¾ per cent on the ordinary shares. On the three railways during the past six months there has been an increase of about eight-and-a-half million passengers, which must be regarded with entire satisfaction. The Metropolitan District Railway Company, which is allied to these three tubes, has also had a very satisfactory half year, its net receipts showing an increase of nearly £40,000, and an increase in the number of passengers carried of over five-and-a-half millions. These distinct increases are doubtless owing to a considerable extent to the Franco-British Exhibition held last year, and as there is to be another exhibition this year in the same grounds, these railways will again benefit in the same way. The whole of the increase, however, cannot be attributed to the Exhibition, as all of the railways are making substantial increases day by day, and the last-mentioned railway is especially gaining many passengers who take season tickets. The cost of the current supplied from the immense Chelsea power station has also been reduced, and many economies have been practised in the railway itself. The trains belonging to the North Western Railway Company, which used to run into the Mansion House Station, are no longer brought further than Earl's Court, and this makes a very appreciable economy and gives passengers a much better service. An experiment has also been tried by having doors for passengers themselves to open instead of having so many conductors on the train, and this also has resulted in a distinct economy. The whole service of this line is in a much better condition, and prospects are much brighter for shareholders.

The reorganization of Bruce Peebles & Company, which went into the hands of a receiver some six months ago, has now been completed, and Mr. Lee Murray, recently works manager of Siemens Brothers Dynamo Works at Stafford, has been appointed general manager at the Pilton Works, Edinburgh. Mr. Lee Murray has been connected in various capacities with the Siemens interests for a great many years. He is an Australian by birth, and had various engineering experiences in that country, and then settled down to a long connection in Victoria, as representative of the Siemens interest. In 1901, he came to England, and for two years had charge of all the outside work of Siemens Brothers, afterward going to South Africa where he represented this firm for four years. He returned to England in 1907 to become works manager at Stafford, and has done much to put the works in a thoroughly workmanlike condition. Mr. Murray has been deservedly popular wherever he has been, and the staff at Stafford showed him a few days ago, by giving a farewell concert on his behalf, how highly he had been esteemed during his residence in Stafford.

We have not said much in this column recently about London's original "twopenny tube," namely, the Central London Railway. This railway also benefited largely last year by means of the Exhibition, and established a very useful loop at the west end of the route, by which it was enabled to bring passengers to the surface and deliver them at the very gates of the Exhibition. It has, however, a bill this year in Parliament which ought to be of equally great interest to Londoners. This is a bill to secure authorization to extend the railway from its existing terminus at the Bank to the Liverpool Street Station of the Great Eastern Railway Company, and to construct a station there, with access from the Liverpool Street Station and also from the Broad Street Station of the North London Railway which is adjoining. The distance is a short one, less than half a mile, but the terminus would then be at a much more logical situation than the present one.

Visitors to the "White City" last year sometimes experienced considerable fatigue in traversing the extensive exhibition grounds at Shepherd's Bush. The administration of the Imperial International Exhibition has made arrangements for this year which will obviate this difficulty and will make every portion of the extensive grounds easily accessible at the minimum of expense. Two tram lines for 3-ft. 6-in. gage tramcars will be laid down from the back of the building of the Court of Honor which was occupied last year by the French Textiles. One will pass by the rear of the Industrial (formerly Machinery) Hall to the Irish Village, and then return by way of the Garden Club and the Stadium to the vicinity of the Court of Honor. The other line, starting from the same place, after passing between the Industrial (formerly Machinery) Hall and Paillard's Restaurant, will skirt the former Canadian and Australian buildings, and then connect with the first-mentioned line. Passengers traveling by these cars will be able to grasp the general features of the exhibition and grounds, and are recommended to take the trip before making a more leisurely examination of the contents of the various buildings. The whole will be elegantly constructed, the cars being 30 ft. long by 6 ft. wide, with a seating capacity for 30 passengers. Protection against the sun and rain will be afforded by a special contrivance.

The Halifax Tramways Committee has agreed to allow a London company to fix on one of their tram poles, as an experiment, a novel sample electric advertisement. It is an octagonal colored glass arrangement, illuminated internally by two or three lamps, and the intention of the company, if the experiment is approved by the Corporation, is to rent every alternate tram pole in the Halifax system for advertising purposes. The advertising company's offer, besides paying for the electric light used, is to pay a rental of 10s. per pole. As the tram poles aggregate between 3000 and 4000, the revenues derived would be substantial.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

In a decision dated Feb. 26, Judge L. E. Knappen, of the United States Circuit Court at Grand Rapids, Mich., who heard one phase of the traction litigation at Cleveland, on request of Judge Tayler, states that the franchises of the Woodland Avenue and West Side lines expired on Feb. 11, 1908, and that the lines must be operated at a 3-cent fare, under the franchises which were granted to the Forest City Railway and later purchased by the Cleveland Railway. Judge Knappen also decided that the Willson Avenue ordinance of Feb. 19, 1894, does not operate to extend the life of the franchises of the Woodland Avenue and West Side lines to July 1, 1914, although the terms of that grant require that the lines be operated together and that transfers be given from one to the other. Neither the consolidation nor extension grants are taken to mean that the Council intended to extend the grants of the various lines to the date of the expiration of the one having the longest time to run, as was argued in court at the hearing.

Judge Knappen based his decision to some extent, at least, upon the decision of Judge Tayler and the United States Supreme Court in the Central-Quincy case, although attorneys claimed that conditions were dissimilar in many respects and that this case did not have a bearing on the matter. He said that if the Common Council had intended to extend the life of franchises on other streets when it made grants for the crosstown line on Willson Avenue or the extensions to other lines, the fact would have been stated in the grant. He said further that an implied meaning could not be given to the grants, and that if there is any doubt about the significance of the wording the people should be given the benefit of the doubt.

This decision makes it necessary to operate the lines upon the same terms as have governed since the court took them over, without change of fare. The opportunity for making a charge for transfers on the low-fare lines is still open, however, and in this way the receivers will be able to realize more than a flat 3-cent fare for each passenger. Whether that is true to the extent that a private corporation might exact 2 cents extra when transferring to lines receiving 5 cents remains to be seen.

It is claimed by the advocates of the Mayor's plans that this decision establishes the fact that the franchises on Superior, Payne and St. Clair Avenues expire in January, 1910, before the case can be appealed. It is further stated that the low-fare interests, if they can be mustered again, will make a bid for these lines and that another Johnson campaign will be made on this basis. However, the courts may force an issue on the matter before 1910 because of the desire of the people of the city to have better service and a uniform fare.

At a hearing on Feb. 25, Judge Tayler, of the United States District Court, stated that he would render a decision regarding the application of the receivers to expend about $650,000 for the reconstruction of tracks on March 15. Attorneys for the creditors opposed the plan of taking the money for this purpose from the earnings of the Municipal Traction Company on the ground that their clients should be paid from the first money the receivers are allowed to expend, over and above the interest charges. On the other hand, the receivers stated that the tracks on some of the lines are so badly in need of repair that persons riding on the cars are in constant danger and that the cars are being damaged by being operated over the tracks. The court said that it is the primary duty of the receivers to operate the property with safety and to keep it in as good condition as when they took charge of it. To this end Judge Tayler instructed the receivers to do all they could to make the tracks safe, aside from laying new rails, until he could render a decision upon their application. It is possible that an order may be made for an issue of receivers' certificates for this purpose.

The receivers state that they now have on hand $650,000, but of this the maintenance fund amounts to only $104,000. In the next six months this will be increased to about $295,000, which is lower than the estimates for track reconstruction. It is from this fund that the receivers must secure the cash for any improvements they find it necessary to make from time to time, because of the insistence of the creditors for the payment of their claims. Bondholders, on the other hand, have offered no objection to rebuilding the tracks, so long as the money is taken from the funds the receivers have on hand. This would increase the value of their security, but they do not care to have receivers' certificates issued since they would become a prior lien,

In reply to the request that the money set aside to pay rental on the properties be applied to the claims, the court intimated that if the receivers did not pay the rental provided for in the lease to the Cleveland Railway, they would have to give the property up. This fund is being reserved under the terms of the contract between the companies and now amounts to $190,000. This does not include anything for the claim the old company holds against the Municipal Traction Company for unpaid rental. That must come in for adjudication with the other claims.

Judge Tayler and Mayor Johnson held a brief conference in the office of City Solicitor Baker on Feb. 25, but Attorney John G. White, who is looking after the Cleveland Railway interests on this committee, was absent. No facts concerning what took place at the conference have been made public.

Engineers of Wisconsin Form State Society

The organization of the Engineering Society of Wisconsin was completed at a meeting held at the University of Wisconsin on Feb. 24, 25, 26, at which some 150 city engineers, general managers of power and electric railway companies, contracting engineers, superintendents of water and light plants, mechanical and civil engineers, and superintendents of highway construction were present and became charter members. The officers elected were: F. E. Turneaure, dean of the University of Wisconsin College of Engineering, president; McClellan Dodge, city engineer of Appleton, vice-president; B. F. Lyons, assistant general manager of the Beloit Gas & Electric Company, and E. P. Worden, mechanical engineer of the Prescott Steam Pump Company, Milwaukee, trustees for two years, and E. Gonzenbach, of the Sheboygan Electric Light, Power & Railway Company and E. R. Banks, city engineer of Superior, trustees for one year. These trustees as an executive board will elect a secretary later.

At the opening session on Feb. 24, following the address of welcome by President Charles R. Van Hise, W. O. Hotchkiss, highway engineer for the State Geological Survey, discussed the scope of that work, and A. R. Hirst, also of the State highway department, spoke on the use of tar, oils and emulsions on macadam and earth roads. The discussion on pavements was led by McClellan Dodge, city engineer of Appleton, and participated in by P. H. Connoly, city engineer of Racine; W. G. Kirchoffer, consulting engineer of Madison, and others. C. V. Kerch, city engineer of Janesville, spoke on the construction of the Court Street bridge in that city.

Interest in the discussion of the conservation of forests and water resources of Wisconsin, a subject presented by E. M. Griffith, State Forester, waxed so keen that the paper on the water-power resources of the State, by Prof. L. S. Smith, who is an engineer for both the State and national geological surveys, was postponed to the following evening.

Prof. W. D. Pence, who is engineer for the Wisconsin Railroad Commission, opened the session on Feb. 25 with a description of the organization of the commission's engineering staff. The new problem of standards of gas and electric service was discussed by Prof. C. F. Burgess, of the department of applied electrochemistry at the university, who has done important work in enabling the State Railroad Commission to prescribe a standard for fuel and illuminating gas. The interurban electric railways of Wisconsin were the subject of an address by F. G. Simmons, superintendent of construction and maintenance of way for the Milwaukee Electric Railway & Light Company.

Meeting of the New York State Association

The program has been announced for the ninth quarterly meeting of the Street Railway Association of the State of New York, to be held at Schenectady on March 24. As was stated in the Electric Railway Journal of Jan. 30, 1909, page 207, the various committees will report, and the general subjects of "Transfers" and "Claims" will be discussed. The meeting will be held in the Assembly Hall of the Schenectady Railway Benefit Association at 11:30 a. m. The papers to be presented are "Transfers—Use and Abuse," by C. Loomis Allen, vice-president of the Syracuse Rapid Transit Company, and "Claims—Co-operation of Operating and Legal Departments," by Hubbell Robinson, attorney of the Schenectady Railway. The committee of which W. R. W. Griffin, superintendent of the Rochester Railway, is chairman, will report on the use of curtains in car vestibules. The committee of which Albert Eastman, general

passenger agent of the Utica & Mohawk Valley Electric Railway, is chairman will report on carrying musical instruments on cars, and the committee of which George L. Radcliffe, superintendent of the Schenectady Railway, is chairman will report on signaling interurban cars at way stations. The subject for general discussion is "Current Legislation." Hotel accommodations may be secured in advance through E. F. Pack, general manager, Schenectady Railway.

Dayton Street Railway Placed in Operation.—The Dayton Street Railway, which has been under construction since early in 1908, was placed in operation on Feb. 25. The system comprises 14 miles of standard gage track, all within the city limits. The company purchases power.

Proposal for Moving Platform Lines in New York.—The Continuous Transit Securities Company, New York, has asked the Public Service Commission of the First District of New York to invite proposals for the construction of eight moving-platform rapid-transit routes. Three of the proposed routes contemplate crosstown subways in Fourteenth Street, Twenty-third Street and Thirty-fourth Street, One of the routes proposed would be operated in a subway running from Union Square under Broadway to Times Square, thus connecting the Fourteenth Street and Times Square stations of the present subway. This moving-platform subway would also connect at Thirty-third Street and Sixth Avenue with the Hudson & Manhattan Railroad and the new Pennsylvania Railroad terminal. The other four proposed moving-platform routes would traverse the four bridges over the East River on elevated structures.

Favors Additional Expenditure for New York Bridge Loop.—The Public Service Commission of the First District of New York has sent to the Board of Estimate of New York a reply to the resolution recently passed by that body calling upon the commission to explain why no plans for the operation of the subway loop line between the Manhattan ends of the East River bridges have been made, although the construction of the loop is being pushed. The communication says that no effort has been made by the commission to arrange for the operation of the loop for the reason that while the Brooklyn part of the loop is being delayed by the city the commission cannot expect to get bids except from the Interborough Rapid Transit Company. The commission suggests that in order to provide direct communication between the Manhattan loop and Brooklyn it would be advisable to begin at once the construction of the proposed subway under the Flatbush Avenue extension, which is part of the proposed Fourth Avenue subway in Brooklyn. The commission is willing to agree to this compromise, and if the Board of Estimate will appropriate the money for the extension the commission will at once proceed to act upon this suggestion.

The Institute Dinner.—Everything points to a very successful anniversary dinner of the American Institute of Electrical Engineers at the Hotel Astor, New York City, on March 11. All the preparations have now been carefully made, and the number of applications for seats is very large. The dinner will be conducted by President Ferguson, who will act as toastmaster. Prof. Elihu Thomson will speak for the charter members, Frank J. Sprague, for the past presidents. Dr. A. C. Humphreys, president of Stevens Institute of Technology, will speak on electrical engineering and education, and John Bogart, formerly State Engineer, and secretary in 1884 of the American Society of Civil Engineers, will bring the greetings and congratulations of sister societies, several of which will be represented by their officials. An interesting feature of the dinner will be the participation also of a number of branches and sections. The dinner committee requests that applications for tickets and seats be filed at once. The cost of the dinner is $5, including one wine and cigars and cigarettes, music, etc. The dinner will be given in the large ballroom, the small ballroom adjoining being reserved as an annex if necessary.

Electrification of Chicago, Milwaukee & St. Paul Railroad in Far West.—Plans for equipping the Chicago, Milwaukee & Puget Sound Railroad, the extension of the Chicago, Milwaukee & St. Paul Railroad west of Mobridge, S. D., with electricity have been announced by C. B. Pride, hydraulic engineer in charge, with headquarters in Spokane, Wash. Sites for power plants have been purchased on the St. Joe River in Idaho and on the Missoula River in Western Montana. The Idaho division of the Chicago, Milwaukee & Puget Sound Railroad extends from St. Regis, Mont., to St. Joe, Idaho, a distance of 106 miles over the Bitter Root Mountains. The initial capacity of the two plants to be constructed this summer will be 30,000 hp. Other sites for plants have been located and will be purchased and developed if the future demands it. Bids for the construction of the dams and power houses have been received from Porter Brothers & Welch, Spokane, Wash.; the Westlake Construction Company, Seattle, Wash.; the Bates & Rogers Construction Company, Spokane, Wash.; the Puget Sound Bridge & Dredging Company, Seattle, Wash., and the MacArthur Brothers Company, New York. Bids for furnishing water-wheels have been received from the I. P. Morris Company, the S. Morgan Smith Company, the Dayton Globe Iron Works, the Platt Iron Works and the Allis-Chalmers Company. For furnishing structural steel and iron for the two plants, bids have been received from the Minneapolis Steel & Machinery Company, the Allis-Chalmers Company, the Union Iron Works, Spokane; the Valley Iron Works Manufacturing Company, Appleton, Wis.; the Wright & Bell Company, Spokane, and the Hallidie Machinery Company, Spokane. It is expected that the awards will be announced very soon.

Banquet of Employees of the Philadelphia Rapid Transit Company.—The Engineering Banquet Association of the Philadelphia Rapid Transit Company held its fourth annual banquet at the Majestic Hotel, Philadelphia, on Feb. 13, 1909. The guests were Charles O. Kruger, second vice-president and general manager of the company; Alex. Rennick, third vice-president of the company, and Wm. S. Twining, chief engineer of the company. The toastmaster was F. W. Johnson, assistant general claim agent. Speeches were delivered by F. H. Lincoln, assistant general manager; H. R. Goshorn, general claim agent; J. Heywood, superintendent lines and cables; J. H. Andrews, roadway department; Thomas Janviers, civil engineer of the roadway department, and F. W. Johnson, assistant general claim agent. The Engineering Banquet Association was organized in 1905, with 34 members. William H. Kruger, who has since died, was elected president. When the association was first organized, membership in it was confined chiefly to the employees of the roadway department, but the privileges of the association were gradually extended to include members of the various departments of the engineering force. During the last two years, through the efforts of President MacCollin and the other officers, the membership has reached 175, comprising practically all the heads of the various departments of the company and their assistants and employees. The purpose of the organization is to bring the employees of the company into closer touch with each other and to promote sociability. On Feb. 26 the association held its annual business meeting. A. E. MacCollin and C. A. Ritter were re-elected president and secretary, respectively, and C. W. Harvey was elected treasurer.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—In the Electric Railway Journal of Jan. 16, 1909, mention was made of the report presented to the Legislature by the special committee on public service corporations appointed by the General Assembly of 1907, in which it was recommended that a public service commission be created. Governor Lilley, of Connecticut, also made reference to this matter in his message to the Legislature. Now the Governor has sent a special message to the General Assembly asking that it give early attention to the bill to establish such a commission. The Governor has renominated O. R. Fyler, Torrington, and A. F. Gates, Hartford, as members of the Railroad Commission, their appointment to date from July 1, 1909, for four years.

Indiana.—A number of bills were advanced last week and several with little or no merit were killed. The only bill signed by the Governor gives the owners of toll roads the right to permit interurban railways to use the roads. The bill to permit the interchange of traffic between interurban and steam roads and the bill to enable electric railways to lease lines in operation and make operating arrangements with them were passed to engrossment. No effort has been made to advance the bill originating with the Railroad Commission which provides for the separation of grades at highway crossings. This measure is opposed by the interurban interests as it would impose an undue proportion of the expense of separation upon them. The bill requiring automobilists and drivers of vehicles to stop before attempting to cross a steam or interurban railway is being opposed by automobilists, who contend that it would be more dangerous to stop and possibly recrank the machine than to proceed slowly upon approaching a crossing. Neither of these bills seems likely to pass. The bill permitting a charge of 10 cents extra to passengers who put conductors to the trouble of selling them a ticket after they have boarded a car has passed both houses and will probably be signed by the Governor. An attempt was

made to except interurban railways from the provisions of this measure, but the amendment was voted down. One of the bills killed required the refunding of one-half the fare to any passenger not provided with a seat during the first 8 miles of travel; another required all trains to stop at the State line so that the conductor could procure tickets providing for a rate of 2 cents a mile.

Kansas.—The public utilities bill has finally been recommitted to the judiciary committee of the House with instructions to bring in a substitute measure that shall give cities the right to regulate their own utilities instead of creating a State board to do it. Opposition to the measure is very strong by the representatives from the rural districts who say that it means the expenditure of a considerable sum of money in supervising corporations in cities in which their constituents have no interest. The members of the judiciary committee in favor of home rule are for action at once, while those who hold that the matter is a State issue appear to be willing to sacrifice the present for the future with the hope that two years hence they will be able to carry out their program successfully.

Massachusetts.—The committee on street railways has reported in the House for reference to the next General Court the petition of Chas. H. Blood, for the creation of a board of railway commissioners as distinguished from the Massachusetts Railroad Commission to have authority only over the street and electric railways.

New York.—Resolutions introduced by Senator Wagner and Assemblyman Smith, asking the Public Service Commission of the First District when it expects to render a decision in the Coney Island 5-cent fare case, were adopted on Feb. 24 and transmitted to the commission, which promptly referred them to the committee of the whole. Senator Wagner introduced a 5-cent fare bill last year, and after it was reported as a committee measure from the Railroads Committee, it eventually was vetoed by the Governor. Mr. Wagner says he wants the decision of the commission made public now so he can know whether or not to press a similar bill introduced this year. The Governor vetoed the 5-cent fare bill on the ground that the matter was one coming within the province of the Public Service Commission. William R. Willcox, chairman of the Public Service Commission of the First District, entertained Governor Hughes and the members of the Public Service Commissions of both districts at dinner at his home in New York on Feb. 25. When Mr. Willcox was asked if public service questions had been discussed he is reported to have said: "We discussed in a general way the amendments the commissions are anxious should be made in the existing law. The Governor joined in the discussion, but it was all in the nature of an after-dinner talk, without formality and without any effort to come to a conclusion as to just what new legislation should be advocated by the commission." Assemblyman Weber is responsible for a number of measures affecting the electric railways. One of his bills provides that the use of turnstiles shall be discontinued on all elevated railways; another seeks to regulate the headway of owl cars, and another to suppress those passengers who make a practice of gratuitously assuming the responsibility of the conductor when a car is crowded, by giving the signal to start and stop. This last bill provides for the constant presence of a conductor on the rear platform and would mean the employment of an extra conductor on all but pay-as-you-enter cars.

Ohio.—In a decision handed down by the Circuit Court of Franklin County, on Feb. 25, the appointments of both J. C. Morris by Governor Harris and John C. Sullivan by Governor Harmon to the Railroad Commission were declared illegal. It is held, however, that Governor Harmon may now appoint Mr. Sullivan, and on the approval of the Senate he may take the position. Should the Governor feel that the Senate will refuse to confirm the appointment of Mr. Sullivan, he can delay the announcement of Mr. Sullivan's appointment until the adjournment of the Legislature on March 12, and thus have the appointment operate as filling a vacancy until the next Legislature meets. Among other things in the decision of the Court were the following: "It is conceded to be the general rule that an outgoing official cannot appoint for a term to begin after the expiration of his own. It is claimed that the appointment of Mr. Morris is valid because the law in question provides that the term to begin Feb. 1, 1909, shall be made in January, 1909. It must be presumed that the Legislature contemplated that the term of one Governor would expire on Jan 11, 1909, and the term of his successor begin on the same day and a literal construction of the statute would allow either Governor to make the appointment in that month. But it is also to be presumed that the Legislature did not intend to leave the matter open to doubt and to be a race and contest between the two Governors as to which one should make the appointment. In our view the only way to harmonize these presumptions with the apparent uncertainty of the appointive power arising from a literal construction of the statutes, is to hold that the Legislature intended, not otherwise provided, that the general rule above noted should govern. The familiar principle that the common law prevails except when abrogated by statute needs no citation. We conclude, therefore, that the appointment of Morris by the moribund governor was invalid." Attorneys for Mr. Morris state that they will now carry the case to the Supreme Court and that he will continue to act under his old commission until the Senate has confirmed or rejected any other appointment that may be made.

Pennsylvania.—Ten measures of more or less importance to the steam and electric railway interests of the State were introduced in the Pennsylvania Legislature last week, and one of this number, requiring common carriers possessing the right of eminent domain to transport upon demand the United States mail and providing a method of fixing the rate of the compensation therefor where there is a failure to agree upon the amount, has been reported from committee. Two of the bills are designed to increase the powers of the State Railroad Commission and another introduced by Representative W. D. Jones, of Delaware County, not only provides for the taxation for local purposes of all "structures, substructures and superstructures of surface, underground or elevated railroads and railways, including tracks, branches, switches, buildings, enclosures, supports, subways and appurtenances, whether or not such real property may be annexed or affixed to land owned by others," but also provides that "local officers or authorities shall hereafter levy upon and assess the value of all franchises, rights, authorities or permissions to construct and maintain any real property or lines, in, under or above any public highways within the jurisdiction of the authorities levying said tax." Property used for public purposes, including churches, cemeteries and schools, is exempt from the provision of this measure. Senator Wolf has introduced a bill providing for the appointment by the Governor of a commission of three citizens of Philadelphia, to examine and codify the laws of the State relating to railroads, street railways and other transportation companies, and to report the result of their work at the next session of the Legislature. Representative Creasy's bill, which is now in committee, authorizes street railway companies to do an express business and to transport light freight and property at a reasonable compensation. Mr. Barton's bill provides that the real estate of all public service corporations shall be subject to taxation for county, city, borough and all other local purposes. The Kiess bills giving more power to the State Railroad Commission supplement the act approved Feb. 9, 1901, and the one entitled "An act to provide for increasing the capital stock and indebtedness of corporations" providing that all corporations subject to the provisions of the act approved May 31, 1907, shall give notice of such purpose to the Pennsylvania State Railroad Commission. Another measure by Mr. Keiss amends a part of section 14 of the act approved May 31, 1907, entitled "An act to provide for the appointment of a railroad commission," etc., so as to give the commission the power to recommend what safety appliances and regulations should be adopted at grade crossings of public roads and streets except in cities of the first and second class by railroads and electric railways. Still another act by Mr. Keiss makes trespassing on the tracks or roadbed of any railroad, street railway or electric railway other than on a public road or street a misdemeanor and provides for the arrest, conviction and punishment of such offenders. Another bill introduced by Representative Hunter at the instance of Mayor-elect Magee, of Pittsburg, amends the Pittsburg City Charter so that the city may purchase the street railways. Third-class cities, such as Harrisburg, are interested in three proposed bills enforcing the municipalities to regulate corporations having franchises for public utilities. The Sproul State Road bill, which carries an appropriation of $5,000,000, covering the next two years, proposes the construction of a State highway between Philadelphia and Pittsburg via Harrisburg, to be built under the control and supervision of a State Highway Board, which is empowered to grant steam or electric railways the right to lay track and operate cars on State highways on payment by the companies of an annual license fee of $75 per mile of road so used. The Executive and Legislative Committees of the State Grange, in session at Harrisburg last week, passed resolutions favoring an amendment to the present statutes to compel companies operating lines through rural districts to carry freight. It is expected that three sessions a day will be held between March 8 and 18 in order that there shall be nothing in the way of final adjournment on March 15.

Financial and Corporate

New York Stock and Money Market

March 2, 1909.

Since the serious break in the stock market a week ago to-day, there has been a gradual reaction and prices are now at practically the same level they occupied before the disturbance occurred. The flurry was caused, largely, by the demoralization in steel prices and the decisions of the Supreme Court adverse to corporate interests. The sudden rush to sell among the small and weak holders met with a most pointed lack of support on the part of the dominating interests, and many with lightly margined deals were forced into liquidation. The opinion in the Street is that the important financial interests which loaded up with low-priced stocks last spring, though they probably did not engineer the recent sharp decline, were not averse to its occurrence, as it afforded them an opportunity to load up again at lower levels with issues for which high prices were secured during the market rise. Certain it is that, after two days of eager liquidation, the market found support and has since been strong and far less active. To-day the volume of sales was light, but there is no disposition toward lower prices.

The traction stocks were moderately prominent during the period of activity, Brooklyn Rapid Transit and the Interborough issues leading, and in the recovery they all got back to former levels. The continued strength of Brooklyn Rapid Transit is undoubtedly due to the reports of increased earnings and the known fact that the physical condition of the road is better than it has ever been before. In addition, the rumor that a decision favorable to the company in the Coney Island fare case, now before the Public Service Commission, was likely to be issued soon, also had a sustaining effect.

The money market continues to be easy, with supplies apparently plentiful; rates are practically unchanged from those prevailing for the past few months and the demand is never equal to the supply held by the banks. Quotations to-day were: Call, 1¾ to 2 per cent; 90 days, 2¾ to 3 per cent.

Other Markets

In the Boston market, a few shares of Boston Elevated appear each day and sometimes small blocks of Massachusetts Electric, but there is neither pressure to sell nor eagerness to buy. Prices remain at about the levels that have existed since the beginning of the year.

There continues to be considerable activity in the Philadelphia stock market in Philadelphia Rapid Transit and in Union Traction. There are always small lots in the market, but prices recently have shown some inclination toward weakness. Small blocks of American Railways are sold occasionally, the price generally being about 46.

In the Chicago market, the traction issues are little considered. Series 2 and 4 of the Chicago Railways are dealt in to some extent, and South Side Elevated and Kansas City Railway & Light sometimes come into the market. Prices are practically stationary and interest is very slight in the trading.

In the Baltimore trading, the condition that has existed for months continues. There is absolutely no trading in traction stocks, while the bonds of the United Railways are actively dealt in. The "4s," which are selling from 86½ to 87, and the "incomes," which are selling about 52½, are both features of the dealing.

Quotations of various traction securities as compared with last week follow:

	Feb. 23.	Mar. 2.
American Railways Company, Philadelphia	46	46
Boston Elevated Railway	129	127
Brooklyn Rapid Transit Company	67⅞	73⅝
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a76	a76
Consolidated Traction Company of New Jersey, 5 per cent bonds	a107	a106
Detroit United Railway	62	61¾
Interborough-Metropolitan Company	13½	15¼
Interborough-Metropolitan Company (preferred)	38	42¾
Manhattan Railway	*148½	*148½
Massachusetts Electric Companies (common)	14	*14
Massachusetts Electric Companies (preferred)	*68¾	*68¾
Metropolitan West Side Elevated Railway, Chicago (common)	*16	*16
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	—	28
North American Company	78	81⅝
Philadelphia Company, Pittsburg (common)	41⅛	*41⅝
Philadelphia Company, Pittsburg (preferred)	*44¼	42¾
Philadelphia Rapid Transit Company	26	27¼
Philadelphia Traction Company	*93	*93
Public Service Corporation, 5 per cent collateral notes	a100¼	a100¼
Public Service Corporation certificates	a80	a79½
Twin City Rapid Transit Company, Minneapolis (common)	103½	*103½
Union Traction Company, Philadelphia	51⅝	53

a Asked. *Last sale.

Report of the Lake Shore Electric Railway

The report of the Lake Shore Electric Railway for the year ended Dec. 31, 1908, as presented at the recent annual meeting of the stockholders of the company, shows:

	1908.	1907.
Gross income	$867,269	$913,161
Operating and taxes	490,974	521,559
Net earnings	$376,295	$391,602
Other income	25,000	25,000
Surplus	$401,295	$416,602
Interest paid	326,232	294,072
Net surplus	$75,063	$122,529
Per cent of operating	56.61	57.11
Number of car-miles	3,339,131	3,392,735
Income per car-mile, cents	25.97	26.91
Operating and taxes per car-mile, cents	14.70	15.37
Net earnings per car-mile, cents	11.27	11.54
Passengers carried	4,788,418	4,904,505
Earnings per passenger, cents	18.11	18.61

A comparative statement of gross earnings follows:

Year.	Gross earnings.	Increase.	Per cent.
1901	$358,180	.....	....
1902	466,051	$107,870	30.01
1903	616,484	150,432	32.28
1904	659,873	43,388	7.03
1905	788,268	128,395	19.45
1906	860,720	72,451	9.19
1907	913,160	52,440	6.09
1908	867,269	*45,891	*5.02

*Decrease.

E. W. Moore, president of the company, in presenting the report, said in part:

"During the year 21 miles of track were ballasted, 11½ miles with gravel from the Bellevue gravel pit and 9½ miles with cinder from the Fremont and Beach Park power stations. Four miles of right of way fence were rebuilt. Approximately 13,000 ft. of ditch was dug alongside of track for drainage purposes. On the Toledo division all the large trestles were rebuilt; 22,350 new ties were placed under the track during the year.

"At Beach Park a new 200-ft. brick stack was constructed with connections to the four 500-hp Stirling boilers, also a new intake and well with connections to the turbine, furnishing a larger water supply for this station. At the Fremont plant the changing of the transformers and the relocation of machinery were completed. There was also added a new Blake feed-water pump with the necessary piping connections. At the Vermillion substation there was installed a lowering transformer for the purpose of furnishing light and power to Vermillion and its inhabitants.

"An addition was built on the Woodville station for the purpose of housing high-tension power connections with the Toledo, Fostoria & Findlay Railway. To give more adequate fire protection and at the same time reduce insurance premiums, contracts were made for the installation of automatic sprinklers in the car barn, shops, boiler room and coal bunkers at Fremont; in the car barn and shops at Sandusky and in the car barn and shops at Beach Park. In addition to the sprinkling equipment there was installed at Fremont a large fire pump and an air compressor at Sandusky. At Sandusky a 40,000-gal. steel tank and at Beach Park a 500-gal. steel tank were erected for the sprinkler service.

"During the year your officers caused to be incorporated the People's Light & Power Company with a nominal capital. This company was formed for the purpose of doing a lighting and power business in connection with the railway. During October a franchise was granted by and an arc light contract made with Vermillion. The light and power distributed through this company will be taken from the high-tension lines and will not require a large expenditure of money for equipment.

"In connection with the earnings it will noticed that, while the shrinkage in surplus exceeds the decrease in gross earnings by a trifle over $1,500, the larger part of the loss in surplus is due to the increase in fixed charges, owing to the large addition to the Fremont power plant and the construction of the 20-mile line between Sandusky and Fremont. With the return of general business to normal conditions the full benefit of these expenditures will be realized."

Hearing on Connecticut Valley Street Railway Bond Bill

The Massachusetts legislative committee on street railways gave a hearing on Feb. 23 on the bill to authorize the Connecticut Valley Street Railway, Greenfield, Mass., to converts its floating indebtedness into bonds. The bill is intended to relieve a company hampered by poor earnings and increasing expenses in the handling of its floating debt. For the company, Bentley W. Warren stated that under the existing laws this street railway cannot issue any more

bonds unless it receives $100 per share for as much stock as it desired to issue in equivalent bonds. The statute limits bonds not to exceed the amount of stock issued, but the financial condition of the company renders it impossible to raise the money needed by the company through the sale of additional stock.

Mr. Warren showed that in the two years 1906 and 1907 the company paid 2 per cent dividends, per year, whereas in 1905 and 1908 no dividends were paid. The company's capital stock is $500,000 and its outstanding bonds amount to $500,000. There is now a floating debt of $200,000. The stockholders are mostly local people who are not in a position to subscribe for additional shares without dividend prospects. This means that the company must borrow $200,000 every few months from the banks or other parties at relatively high rates of interest. The company asks to be allowed to fund its floating debt in bonds under the control of the Railroad Commission. The road is conservatively capitalized, the average cost per mile of single track being $25,378, against an average cost per mile of $37,540 for all the roads in the State, excluding those in Boston, Worcester and Springfield. In the past three years the operating expenses have risen from 11.6 cts. to 16.4 cts. per car-mile; while the average operating expenses of the other companies above cited are 16.6 cts. per car-mile. The car-mile earnings of the Connecticut Valley Street Railway have increased from 19 cts. in 1906 to 23 cts. in 1908, against average earnings of 25.6 cts. on the other systems. The gross earnings have risen slightly, from $173,000 in 1906 to $182,000 in 1908, which slow rate is a definite obstacle to the placing of new capital. Its gross income above operating expenses decreased from $58,000 in 1906 to $52,000 in 1908, while fixed charges rose from $36,000 to $42,000. The net divisible income dropped over 50 per cent, from $22,000 to $10,000. Operating expenses increased mainly in maintenance of roadway and buildings, $6,500 to $12,700, and in transportation expenses, $81,000 to $92,000 in the three years. Mr. Warren stated that before the law was passed which limited the bonds the Legislature and the Railroad Commission had each in several instances approved the issue of bonds in excess of stock. Speculative investors are about through putting their money into street railway stocks. Under the present law it is utterly impossible to properly take care of the Connecticut Valley Street Railway Company's floating debt.

D. P. Abercrombie, Jr., treasurer of the railway company, then stated that within the past three or four years about $170,000 worth of improvements have been paid for by the company. On Jan. 1, 1909, the company raised the unit of fare from 5 to 6 cents. It is too early to ascertain what the final results of this action will be, but so far there has been no substantial increase in the dollars and cents business, while the volume of riding has fallen off. The road serves a rural section, with the exception of Northampton and Greenfield. Wages have been increased from 17.5 cts. per hour the first year and 20 cts. afterward, in 1906 to 21.5 and 22 cts. in 1908. The company has held down the total expense for operating wages by curtailing its schedules. On account of the increased weight and speed of the cars the total cost of power has been increased 33 1/3 per cent. Letters were read from local bankers and prominent citizens of the district served by the road favoring the granting of more satisfactory terms in bond issuing, as urged in the bill. There was no opposition and the hearing was closed.

Hearing on Proposed Abolition of the Excise Tax in Massachusetts

The committee on street railways of the Massachusetts Legislature gave a hearing recently on House bill 887, relieving street railway companies from the "excise" tax which was established in 1898, whereby the companies reimburse municipalities for the care and maintenance of streets which the railways occupy. In place of this tax the companies are willing to assume again the direct responsibility for their share of the work, in the belief that they can do it at a less cost than under the present arrangement.

R. S. Goff, general manager of the Massachusetts Electric Companies, testified that the Massachusetts Street Railway Association, of which he is a vice-president, is unanimous in desiring the repeal of the law. In the last 10 years Mr. Goff said that electric railways have strongly felt the advances in the cost of labor and material. A majority of the companies in Massachusetts pay less than 4 per cent dividends, and even 4 per cent can scarcely be called a reasonable return on an investment. Many companies are no longer certified to the savings bank commissioner as having securities that are a legal investment for such banks. The tax was first imposed when operating expenses were relatively much lower. The cost of labor has advanced greatly in the last 10 years, and the cost of maintenance has grown so prohibitive that the smaller companies find it difficult to supply the improvements that are required by the Railroad Commission. Many roads which paid 8 per cent dividends 10 years ago do not pay anything like that rate now. On suburban lines larger and heavier cars have been introduced, requiring relatively high maintenance expenses and more power, with no longer life, apparently, than the lighter cars on the lighter tracks. The increase in traffic has not been in proportion to the increase in cost of operation. Mr. Goff said in conclusion that the excise tax appears to offer the only opportunity for expense reduction now before the companies.

Bentley W. Warren discussed in detail some representative payments by companies to cities on the ground of the excise tax. The Berkshire Street Railway paid $7,001 excise tax, distributed among 10 municipalities, the tax in the city of North Adams being $1,458. The Western Massachusetts Street Railway paid an excise tax of $3,238, in four towns, the largest amount being $2,057 in Westfield. The Springfield Street Railway paid an excise tax of $24,836, distributed in five principal communities, the largest tax being $13,608 in Springfield. The Worcester Consolidated Street Railway paid an excise tax of $36,250, the largest amount being in Worcester, $17,500. This company's tax was distributed among 18 principal municipalities. The Interstate Consolidated Street Railway paid an excise tax of $3,107, in four cities and towns, the largest tax being $1,880 in Attleboro. The Boston & Northern Street Railway paid $117,874 in State tax; $61,866 in local taxes and $101,954 in excise tax. The latter is distributed in about 50 municipalities, Lowell taking the largest, or $8,914. The Old Colony Street Railway paid in 1908 a State tax of $42,359 and an excise tax of $58,324. The local tax was $53,374.

D. P. Abercrombie, Jr., treasurer of the Connecticut Valley Street Railway, operating about 47 miles of track, stated that his company has paid dividends of 2 per cent twice in 3½ years. In that time the company added about $150,000 to its property, and is unable to dispose of more stock to its stockholders and unable to meet its funded debt of about $200,000. It pays an excise tax of about $1,800, from which it desires to be relieved.

Mr. Warren stated that the capitalization of the electric railways in Massachusetts per mile is smaller than in the other New England States.

The Railroad Commission authorizes all issues of capital stock in Massachusetts and subjects all proposed issues to close scrutiny. Mr. Warren stated that the capitalization per mile of the electric railways of Massachusetts is less than in any of the other New England States.

Report of Denver City Tramway Company

The Denver (Col.) City Tramway Company has recently made public the following statement of earnings for the years ended Dec. 31, 1907, and Dec. 31, 1908:

	1908.	1907.
Gross receipts	$3,152,567	$2,913,650
Operating expenses	1,515,241	1,374,837
Net earnings	1,637,325	1,538,813
Total fixed charges	940,634	886,048
Surplus	$696,691	$652,765

A comparative statement of the gross earnings, operating expenses and net earnings of the company for the years 1902, 1903, 1904, 1905, 1906, 1907 and 1908 follows:

	Gross earnings.	Operating expenses.	Net earnings.
1902	$1,702,958	$1,040,412	$662,545
1903	1,977,854	1,073,601	904,253
1904	2,040,146	1,075,202	964,943
1905	2,412,129	1,115,621	1,296,507
1906	2,652,218	1,278,815	1,373,402
1907	2,913,650	1,374,837	1,538,813
1908	3,152,567	1,515,241	1,637,325

Central Pennsylvania Tranction Company, Harrisburg, Pa.—The Central Pennsylvania Traction Company has called for the payment of an instalment of $2 per share on the stock of the company, payable March 16, and has declared a dividend of $2 per share out of accumulated earnings to be credited on payment of the call on the stock. The 42,000 shares of $50 each of the company were, according to last accounts, $21,000 paid up.

Chicago Passenger Railway.—Judge Carpenter in the Circuit Court has entered a decree appointing the Harris Trust & Savings Bank trustee of $2,000,000 of mortgage bonds of the Chicago Passenger Railway. The Harris Trust &

Savings Bank succeeds the Equitable Trust Company as trustee of the property.

Chicago (Ill.) Railways Company.—The opinion is expressed in Chicago that there is very little prospect for the consolidation of the Chicago Railways Company and the Chicago City Railway under the valuation terms proposed, which are based on the recent appraisal of the South Side lines. Moreover, it is stated that no accurate estimate of the earning power of the Chicago Railways Company can be made until the rehabilitation of the property has been completed and it is possible to learn what effect the improvements will have upon the riding public.

Interstate Railways Company, Philadelphia, Pa.—Representatives of bondholders of the Interstate Railways Company met on Feb. 26 in the offices of Edward B. Smith & Company and appointed the following protective committee: William R. McIlvain, Reading, vice-president Reading Trust Company; Ferdinand W. Roebling, of John A. Roebling's Sons Company, Trenton; Holstein De Haven, president of the Real Estate Title Insurance & Trust Company, Philadelphia; John C. Bell, counsel of the estate of the late Robert N. Carson, and Charles S. W. Packard, president of the Pennsylvania Company for Insurances on Lives & Granting Annuities.

Ohio Electric Railway, Cincinnati, Ohio.—In his report to the stockholders of the Ohio Electric Railway and the Cincinnati Traction Company, W. Kelsey Schoepf, president, stated that two new car houses had been built for the Cincinnati Traction Company, and that a large club house for the employees will be built at the Brighton car house. Plans have been made for installing two new units at the Pendleton power station. Last year more track was laid than ever before in the same length of time. At the annual meetings of the Ohio Electric Railway, the Cincinnati Car Company, the Columbus, Newark & Zanesville Railway, the Indianapolis, Columbus & Eastern Railway and the Southern Ohio Express Company, the directors and officers were all re-elected.

Ottawa (Ont.) Electric Railway.—The Ottawa Electric Railway has recently issued its pamphlet report for the year ended Dec. 31, 1908. The gross receipts for the year were $616,229, as compared with $574,278 for 1907. The total expenses for 1908 were $455,827, as compared with $393,370 for 1907. The net profit for 1908 was $160,401, as compared with $180,908 for 1907. The total number of passengers carried was 13,711,382 for 1908, as compared with 12,623,440 for 1907. T. Ahearn, president of the company, in presenting the report, said that the decrease in profits for 1908 over 1907 was due to various causes, among them the item of snow clearing, which amounted to $30,000, or twice as much as the average year, to the extreme lowness of the Ontario River last fall which necessitated the use of steam power, and, lastly, to the heavy damages resulting from a collision between cars of the company on May 24. Mr. Ahearn said that a new car barn had been erected on the west side of Coburg Street which will give room for the storage of 48 single-truck cars and that the two single-truck, pay-as-you-enter cars which were put into service last fall had proved so satisfactory that it had been decided to increase the number and 12 more are now under construction.

Rome Railway & Light Company, Rome, Ga.—The Rome Railway & Light Company has been authorized to issue $750,000 of 5 per cent bonds, dated Jan. 1, 1909, of which $500,000 are for refunding and $250,000 for extensions and improvements.

United Railways Investment Company, San Francisco, Cal.—The Stanislaus Power Company, of California, which is the holding company of the Stanislaus Electric Power Company, the hydro-electric proposition which has been recently taken over by the United Railways Investment Company, was placed in the hands of a receiver on Feb. 16 by the United States Circuit Court of California. The application for the receiver was made by the Knickerbocker Trust Company, New York. The action is entirely friendly to the sale to the railway company, and George H. Whipple, the receiver, is a member of the firm of attorneys who represented San Francisco in the bondholders' committee which brought about the sale. The chairman of the bondholders' committee is S. Z. Mitchell, president of the Electric Bond & Share Company, New York, and the details of the new financing plan were worked out by Tucker, Anthony & Company. In speaking of the receivership, a member of that firm said: "The receiver is our representative, and the receivership proceedings were taken for the purpose of hastening the completion of the sale to the railway company. The sale, under foreclosure, will be made just as soon as possible; the bondholders will buy the property, and the transfer to the railway company will be made upon the basis already mapped out."

Traffic and Transportation

Steam and Electric Railways Must Interchange Freight in Kentucky

The Railroad Commission of Kentucky handed down a decision on Feb. 5, 1909, in the case of the Blue Grass Traction Company against the Cincinnati, New Orleans & Texas Pacific Railway, in which it says that the request of the Blue Grass Traction Company that the Cincinnati, New Orleans & Texas Pacific Railway exchange freight with it is reasonable, and that the Cincinnati, New Orleans & Texas Pacific Railway is obligated by law to do so. The Blue Grass Traction Company transports ice from the plant of the Georgetown Ice Company and coal to the plant of the Georgetown Light Company. Much of this business was also handled by the Cincinnati, New Orleans & Texas Pacific Railway. There is a physical connection between the two roads which was used until about two years ago, when the Cincinnati, New Orleans & Texas Pacific Railway refused to recognize the Blue Grass Traction Company as a common carrier, despite the fact that the lines of the Blue Grass Traction Company are standard gage and fully equipped to handle steam railroad rolling stock. This put the Blue Grass Traction Company and the Georgetown Light Company and the Georgetown Ice Company to considerable additional expense in handling freight and also caused somewhat serious delays in transporting goods at times. The action by the Blue Grass Traction Company against the Cincinnati, New Orleans & Texas Pacific Railway resulted from the attitude assumed by that company toward the Blue Grass Traction Company. The Railroad Commission in its findings concludes:

"In this case persons living and doing business on the Blue Grass Traction Company's railroad desiring, in the usual pursuits of their business, to ship and to receive from points in Kentucky freight in carload lots over the road of that company, request and demand that the Cincinnati, New Orleans & Texas Pacific Railway shall unite its track with the track of the Blue Grass Traction Company in Georgetown, to be so arranged, maintained and used that cars loaded and to be loaded with freight destined from and to points in Kentucky on either road shall be received, transferred, switched and delivered, each by and to the other, at the point of connection, as provided by said section 213, in the way and upon the terms which obtain between railroads under like conditions.

"In our judgment this is a reasonable and just demand, with which the Cincinnati, New Orleans & Texas Pacific Railway should comply, not only because, as we think, it will be beneficial to its interests, but because under the sections of the constitution hereinbefore quoted it is legally obligated to do so, for in accepting its charter it agreed and obligated itself to comply with the provisions of that Constitution.

"Therefore, in view of the foregoing facts and the law applicable thereto, the commission is of the opinion, and so decides, that the complainant, the Blue Grass Traction Company, has the same rights, powers and privileges that are granted to all other railroad corporations in Kentucky; that it is the duty of the Cincinnati, New Orleans & Texas Pacific Railway in dealing therewith to comply with sections 213 and 216 of the constitution of Kentucky, the same as is required with any and all other railroad companies in Kentucky; that said Cincinnati, New Orleans & Texas Pacific Railway should in no way obstruct or prevent said complainant from making, and maintaining when made, the physical connection shown herein between the track of complainant and the track of said Cincinnati, New Orleans & Texas Pacific Railway, but permit the physical connection between said tracks to be so arranged, maintained and used as to allow the receipt, transfer, switching and delivery by the Cincinnati, New Orleans & Texas Pacific Railway of all cars that originated and started from points in Kentucky loaded with material or goods or freight of any character destined to points on the line of the Blue Grass Traction Company to the said Blue Grass Traction Company for delivery; that it is the duty of the said complainant to receive and deliver at the said point of union to the Cincinnati, New Orleans & Texas Pacific Railway all cars loaded with material, goods or freight of any character from points on the line of the Blue Grass Traction Company and destined to points on the Cincinnati, New Orleans & Texas Pacific Railway in Kentucky; that to render the public its due accommodation, facilities and service, it is the duty of the Blue Grass Traction Company and Cincinnati, New Orleans & Texas Pacific Railway to so arrange, manage and use the united track that cars loaded and to be loaded with freight destined from and to points in Ken-

tucky on either of the said roads shall, as required by said section 213, be received, transferred, switched and delivered each to and from the other at such point of connection for delivery to destination, in the manner and upon the terms which have been established and obtain between railroads under like conditions.

"It is also the opinion of the commission that a refusal to comply with the demands set out in this decision will be a violation of sections 213 and 216 of the constitution of Kentucky and render the persons offending liable to the penalties prescribed in section 217 of that constitution, of which violation upon duly made complaint we conceive it to be the duty of this commission, charged 'to see the laws relating to all railroads faithfully executed,' to notify the attorney-general, so that he shall proceed 'to enforce the provisions of the aforesaid sections,' as is in section 217 of the said constitution provided."

Finding in Northampton Fare Case

The Railroad Commission of Massachusetts has issued the following finding in the case of the complaint of Northampton against an increase in the unit of fare upon the Northampton Street Railway from 5 cents to 6 cents; of the selectmen of Easthampton that the service of the company is insufficient, and of the citizens of Williamsburg against an increase of fare and of insufficient service upon the Northampton Street Railway:

"The Northampton Street Railway was incorporated in 1865 as the Northampton & Williamsburg Street Railway, and under that name and its present corporate name operated by horse-power 4 miles of street railway in Northampton until 1893. During that period the enterprise was unsuccessful financially. Coincident with the installation of electricity as a motive power the company extended its lines in Northampton and constructed interurban lines to Easthampton and Williamsburg. For these purposes its capital was increased to $300,000, and it was authorized in 1908 to issue $175,000 additional capital, the price being fixed by the Street Commission at $110 per share. The total length of the railway, computed as single track, is about 26.5 miles, affording exclusive street railway transportation in the territory occupied. By connections on the north and south its lines form a part of the through route of street railway transit for the Connecticut Valley.

"With the installation of electricity and the extension of its lines the company immediately became prosperous, paying a dividend of 8 per cent in 1894, including 2 per cent paid on Oct. 1, 1893. The dividends paid from 1895 to 1908, inclusive, were as follows:

1895	7.5 per cent	1902	8 per cent
1896	10 per cent	1903	8 per cent
1897	9 per cent	1904	6 per cent
1898	8 per cent	1905	6 per cent
1899	8 per cent	1906	7 per cent
1900	8 per cent	1907	7 per cent
1901	8 per cent	1908	6 per cent

"On Jan. 1, 1909, the company paid a 2½ per cent dividend.

"The population of Northampton, Easthampton and Williamsburg is shown by the following table:

	Northampton.	Easthampton.	Williamsburg.
1895	16,746	4,790	1,955
1900	18,643	5,603	1,926
1905	19,957	6,808	1,943

"The company's annual return to the Street Commission for the year ended Sept. 30, 1908, discloses the following:

Gross earnings from operation	$171,439
Operating expenses	120,450
Net earnings from operation	$50,989
Net divisible income	17,787
Dividends declared, 6 per cent	18,000

"During this and the preceding year the company appears to have paid out considerable sums for adjustment of claims for injuries incurred in these years and prior thereto.

"The single question presented by Northampton is, whether an increase of 1 cent per fare, establishing the unit of transportation at 6 cents for each fare zone of the Northampton Street Railway, is a reasonable increase.

"The returns of the company for a period of years show a steady public demand for transportation, and the population of the territory served has been well maintained. If the 6-cent unit rate of fare had been in force for the financial year ending Sept. 30, 1908, the same number of passengers would have increased the net divisible income of the company from about $18,000 to $50.000. It is doubtless true that there will be some diminution in the number of passenger fares collected, by reason of an increased rate; but in view of the fact that much of the riding is not subject to fluctuation, considered in connection with the other facts in the case, we are convinced that the net return from the increased fare now in operation would be so substantial as to render the unit fare of 6 cents unreasonable and excessive.

"The remaining questions presented at the hearing relate to the price of trip ticket books on the Williamsburg line and to service on the Easthampton line. In view of the assurance of the company that the advance in the price of these books was made on the basis of the advance in the general unit of fare, we see no occasion to make any recommendation, as the Street Commission expects that with the reduction in the unit fare they will be sold at a reduced price.

"The petitioners and the company having informally conferred upon the Easthampton complaint of service, and being in substantial accord except upon the question of installing double truck cars, we are content to leave that matter for further action should occasion arise."

Employees Urged to Be Courteous

The following communication has been addressed to the employees of the Spokane & Inland Empire Railroad, Spokane, Wash., by C. M. Graves, general manager of the company:

"The possession in marked degree of any worthy faculty should always be an incentive to develop that faculty. This company considers that its agents, conductors and other representatives possess, above the average, the faculty of being courteous to the public. To those who cultivate and exercise this faculty the company extends its congratulations and its thanks; to those who may not have fully appreciated its importance, thoughtful consideration of the following is suggested:

"The principle that underlies courteous treatment of others is simply that of doing unto others as you would they should do unto you.

"In a highly complex and technical business such as that of a railroad there are many things that you, with your training and daily experience, understand with perfect familiarity, but which the public do not understand; therefore, do not assume that the public should comprehend them without asking questions, but when they make inquiry of you give them the courtesy of a reply just as full and clear as you can make it, and without any suggestion of superiority born of a greater knowledge.

"Words are only one means of expression and manner is quite as important; therefore, remember that a kindly and gracious manner is not only the sign and mark of a self-respecting man, but is to your words what oil is to machinery in making them move more effectively to their purposes.

"True courtesy is no respecter of persons. It remembers that 'a man's a man for a' that,' and gives the civil word and the helping hand quite as readily to the ill-clad stranger as to an official of the company.

"Courtesy is not only something the public has a right to expect of you, but it pays.

"It pays in the friends it makes you personally and as a representative of the company.

"It pays in minimizing the friction of your life as well as that between the company and its patrons.

"It pays in raising your standing with the company.

"It pays in the personal satisfaction resulting from having done the right and kindly thing by your neighbor.

"It is the wish of the management of the Spokane & Inland Empire Railroad that all its representatives whose work brings them into daily contact with the public may fully appreciate and fully measure up to their duty and privilege in this respect."

Finding by Ontario Railway & Municipal Board

The following order has been issued by the Ontario Railway & Municipal Board in the case of North Toronto against the Toronto & York Radial Railway, based upon the recommendations of J. F. H. Wyse, consulting engineer to the commission:

"1. The board orders and directs that the company shall place properly constructed drains of 2-in. oak planks with removable tops resting on iron strips supported on two adjacent ties where found necessary to drain the company's track, such drains to have iron grated openings at the end toward the center of the street, and tongue switches shall be substituted for the split switches now used, and that the company shall also macadamize so as to make a hard and permanent roadbed with surface even with the top of the rails of the said track the whole of the space occupied by the company's tracks, rails, switches and turnouts and for 18 in. outside of the outside rails on each side thereof within the said town of North Toronto.

"2. The board orders and directs that all the said works

and repairs shall be made by the company with all possible dispatch, and that the same shall be completed within four months from the date of this order.

"3. The board further orders and directs that the present cars now used by the company and known as the Glengrove cars shall be removed from the service and that four large double-truck cars shall be substituted therefor with all reasonable dispatch and not later than May 1, 1909, and that such new cars shall be equipped with fenders to be approved of by the board.

"4. As to the removal and leveling of snow the board reserves further order and directions."

Pay-As-You-Enter Cars in Washington.—The Capital Traction Company, Washington, D. C., placed 19 pay-as-you-enter cars in operation on its Fourteenth Street division on Feb. 21. D. S. Carll, second vice-president and general manager of the company, says they are operating very satisfactorily.

All Subway Express Trains to Brooklyn.—The changes in the subway station at Bowling Green have been completed and all subway express trains now run to Brooklyn during the rush hours. Traffic to South Ferry is cared for by a shuttle train service between Bowling Green and South Ferry. The cost of the changes necessary to establish the shuttle train service is estimated at $90,000.

Brooklyn Conductor Charged with Misusing Transfers.—A conductor who has been in the employ of the Brooklyn Rapid Transit Company for 25 years was arrested on Feb. 26 for alleged trafficking in transfers. It is said that the man under arrest, through a second party, arranged for the exchange of transfers between conductors, the transfers thus obtained being turned in to the company in lieu of cash fares.

Extension of Transfer Privileges in Toledo.—On Feb. 18 the Toledo Railways & Light Company, Toledo, Ohio, began to issue transfers between the lines formerly embraced in the system of the Toledo Traction Company and what formerly were known as the Robison lines. The first day 3682 transfers were issued. The officials of the company believe that many people asked for transfers mainly for the novelty of the thing.

New York Commission Amends Rules Regarding the Filing of Reports.—The Public Service Commission of the First District of New York has adopted an amendment to its rules regarding the filing of reports by all corporations over which the commission has jurisdiction, by which they will be required, when applying for an extension of time, to submit sworn testimony at a formal hearing on such application.

Receiver Urges Employees to Use Tact.—In a letter addressed to the employees of the Third Avenue Railroad, New York, N. Y., recently, Frederick W. Whitridge, receiver of the company, said: "I hope you will do everything in your power to make the service of the Third Avenue Railroad popular with the people, and that you will show to the public more patience, politeness and consideration than the people show to you. Courtesy costs nothing, and you must remember that we are all alike servants of the public."

Another Accident Fakir Apprehended.—Taking advantage of a mistake in the publication of his name in connection with a street railway accident, John W. Hoover brought suit against the Mahoning & Shenango Railway & Light Company, New Castle, Pa., for $10,000 damages. Hoover took the stand and detailed the accident as it happened to the man who was really injured. The case was dismissed and Hoover was placed under arrest for perjury. Hoover was injured on the night in question, but on the Erie Railroad.

Joint Rate Order of New York Commission May Be Reviewed.—The Court of Appeals has upheld the action of the Appellate Division, First Department, in denying a motion of the Public Service Commission of the First District of New York to quash writs of certiorari obtained by the receivers of the Metropolitan Street Railway to review the proceedings of the commission in fixing a fare of 5 cents to be divided between the Metropolitan Street Railway and the Central Park, North & East River Railroad for rides over lines between Thirty-fourth Street and 116th Street, New York.

New Rule Regarding Stops in St. Louis.—A new rule has gone into effect on all east and west lines of the United Railways Company, St. Louis, Mo., requiring the cars to stop on both sides of the street to discharge and receive passengers at all transfer points and important crossings. Capt. Robert McCulloch, president of the company, says: "Under the new arrangement, the transfer passenger, by being able to leave the car by the front door, at the near crossing, is landed nearer his transfer point, and is often able to catch the car to which he wishes to transfer, which he would miss if required to wait until the car on which he is riding reached the far crossing."

Increase in Fare on New Jersey Road.—The New Jersey & Pennsylvania Traction Company, Trenton, N. J., the residents of Yardley and the Merchants' Association of Trenton have reached an understanding regarding the fare to be charged by the company between Trenton and Yardley. The company proposes to charge a 10-cent fare from Trenton to Yardley, this being an increase of 5 cents. For 60 days, beginning March 1, the fare will be 10 cents each way, and after that a 15-cent rate for the round trip will be charged. In this arrangement exception is made for the cars leaving Trenton at 5:20 p. m. and 5:50 p. m. and leaving Yardley at 6:10 a. m., 6:40 a. m. and 7:30 a. m. On these cars the fare will be 5 cents, except on Sundays and holidays, when the increased rates will be charged.

Sunday Service on the Winona Interurban Railway.—The directors of the Winona Interurban Railway, Winona Lake, Ind., have voted to operate the road hereafter on Sunday, service to begin on March 7. The road extends from Warsaw to Goshen, a distance of about 25 miles. It was promoted by the Winona Assembly and Summer Schools Association, a corporation conducting educational, religious and vocational enterprises at Winona Lake, 3 miles from Warsaw. In deference to the susceptibilities of many persons connected with the Winona organization, the directors of the company refused to run cars on Sunday. The Electrical Installation Company built the railway, receiving as a part consideration of its construction contract more than a majority of the bonds of the company issued for construction, and brought suit to compel the operation of the road on Sunday, which action, and the court decision, were noted in the Electric Railway Journal of June 20, 1908, page 138, and the Electric Railway Journal of Feb. 6, 1909, page 261.

Through Route Opened Between Cleveland and Columbus.—On Feb. 25, the Cleveland, Southwestern & Columbus Railway began operating cars over its line between Cleveland and Bucyrus, the last link, between Seville and Ashland, having been completed a few days previous. At Bucyrus the Cleveland, Southwestern & Columbus Railway connects with the Columbus, Marion & Bucyrus Railway, which is owned by the same interests that operate the Columbus, Marion & Delaware Railway. This gives a through and comparatively direct route between Cleveland and Columbus, the first that has ever been established. Arrangements will be made to route all traffic over these lines, with close connections. The new route will change the character of the business somewhat in some of the cities, especially Ashland and Mansfield, which could not heretofore be reached direct from Cleveland either by electric railway or steam railroad. At Columbus, connection may be made over the Ohio Electric Railway for Springfield, Dayton, Cincinnati and Indianapolis to the south and west and for Zanesville and points east.

An Accident Fakir in the Southwest.—A man who gave his name as George McDaniel boarded one of the 14-bench, cross-seat open cars of the Little Rock Railway & Electric Company, Little Rock, Ark., recently, and took a seat on the rear platform. While the conductor was on the running board collecting fares from some passengers sitting near the front of the car, he heard a globe break, and looking in the direction of the sound was hailed by McDaniel, who held a handkerchief to his eyes. When the conductor reached the back platform, McDaniel claimed that the globe had become unscrewed and in falling had struck the seat and particles of glass had entered his eye. The company immediately had the man's eyes examined by its own surgeon, who said he could find no evidence of glass in the man's eyes, but that they were irritated by what appeared to be some strong liquid. McDaniel immediately made a claim for damages. The company had no witnesses to the accident and nothing with which to defend itself other than the surgeon's statement and the statement of an oculist not connected with the company who examined McDaniel's eyes and said that there was no glass in the eyes or any evidence of the eyeballs being cut by glass. The company refused to settle at the time until it could investigate the matter further. McDaniel is 5 ft. 7 in. high, weighs 140 lb., has a dark complexion and black hair and a powder mark on the left side of his face. He is extremely nervous and talks with an accent, which seems to be acquired. From correspondence with other companies, the Little Rock Railway & Electric Company is inclined to believe that McDaniel is making a specialty of "eye accidents."

Personal Mention

Mr. Walter G. Oakman has resigned as a director of the Interborough Rapid Transit Company, New York.

Mr. E. E. Wright has been elected vice-president of the Memphis (Tenn.) Street Railway to succeed Mr. J. H. Watkins, resigned, who has removed to New York.

Mr. George M. Mattis, treasurer of the Illinois Traction System, Champaign, Ill., has been elected vice-president of the company to succeed Mr. L. E. Fisher, and will hereafter act as vice-president and treasurer of the company.

Mr. Edward P. Coleman has been appointed manager of railways of the Dominion Power & Transmission Company, Ltd., Hamilton, Ont. Mr. Coleman was formerly general manager of the Great Northern Power Company, Duluth, Minn.

Mr. J. F. Slocum, formerly secretary and treasurer of the International Traction Company, Buffalo, N. Y, has become connected with Mr. John T. Steele, Buffalo, N. Y., investment banker, for whom he will give particular attention to the banks and trust companies in Western New York.

Mr. M. L. Corbett has been appointed superintendent of transportation of the Macon Railway & Light Company, Macon, Ga. Mr. Corbett was employed from 1896 to 1898 by the New Orleans Cotton Exchange and from 1898 to 1907 was secretary and treasurer of the Macon Brokerage Company. He then became auditor of the Central Georgia Railway Company and in 1908 accepted the position of claim agent and assistant to the general superintendent of the Macon Railway & Light Company. It was from this position that he was appointed superintendent of transportation of the company.

Mr. Milt H. Saul has been appointed manager of the publicity department of the Georgia Railway & Electric Company, Atlanta, Ga. Mr. Saul has been connected with the Atlanta newspapers for the last 10 years. For five years he was Washington correspondent for the Atlanta *Journal*, and was managing editor of the Atlanta *Georgian* when appointed to the Georgia Railway & Electric Company. Before entering the newspaper field Mr. Saul was in the United States Postal Service. During the Spanish-American War he was acting postmaster at Ponce, Porto Rico, and assistant superintendent of the island postal service.

Mr. A. W. McLimont has resigned as electrical and operating engineer of the Public Service Commission of the First District of New York to become general manager of the Chicago & Milwaukee Electric Railroad, Chicago, Ill. Mr. McLimont has been connected with the commission since it organized, and has been entirely responsible for the conduct of the department of the commission of which he is the head. In his work there devolved upon him the task of making recommendations regarding the physical property of the companies under the jurisdiction of the commission, which includes some 7000 electric cars, 24 car houses and several very large power houses, and of making a number of original investigations for the commission. Perhaps the most important of these was the series of fender tests conducted at Schenectady and Pittsburg, upon which the commission based its recent report. Mr. McLimont is a Canadian by birth. He entered business with the New England Telephone & Telegraph Company in 1885. On Sept. 29, 1889, he became connected with the Thomson-Houston Electric Company, Boston, and in 1901 entered the Chicago office of the company, where he served until the latter part of 1903, assisting during this time in building, organizing and operating railway properties at Dallas, Houston, St. Joseph, Cedar Rapids, Rockford, Springfield, Marquette, Nashville, Chicago and New Orleans, and in installing electric light plants. Subsequently Mr. McLimont became general manager and resident engineer of the Dubuque Light & Traction Company, Dubuque, Ia. In 1905 he resigned from the Dubuque Light & Traction Company and built 70 miles of the overhead work at New Orleans. Upon the completion of that task he joined the foreign department of the General Electric Company, for which he organized and operated the Petropolis (Brazil) Electric Light Company, and designed, built and operated two monocycle electric light and power plants at Costa Rica, C. A., using hydraulic power. His next work was the construction of a long-distance transmission and hydro-electric plant at Cordova, Argentina, for the Cordova Light & Power Company. Returning to the United States, Mr. McLimont constructed the high-tension transmission line for the Hudson River Power Transmission Company from Mechanicsville to Albany. Later he built and operated seven electric light plants for the Guanajuato (Mexico) State Government, and did considerable electric-light power installation work for the Guanajuato Mining & Milling Company. Mr. McLimont next reported for Sperry, Jones & Company, Baltimore, Md., upon a plan to consolidate and electrify the street railways at Monterey, Mex., after which he designed, built and operated an interurban electric railway for W. R. Grace & Company at Lima, Peru, and also built 40 miles of city railway at Lima and operated the system for two years. Returning to the United States again, Mr. McLimont accepted the appointment to the Public Service Commission. Mr. McLimont's experience extends to managing and operating both electric railways and lighting and power companies, much of which was gained by him in foreign countries, where he was compelled to rely solely upon his own initiative and resources. Mr. McLimont succeeds Mr. R. B. Stearns with the Chicago & Milwaukee Electric Railway, Mr. Stearns having resigned in January.



A. W. McLimont

Mr. William C. Brown, who has just been elected president of the New York Central & Hudson River Railroad, was the guest of honor at the annual dinner of the Morse Electric Club at the Hotel Savoy, Feb. 27. This club is an organization made up from the Western Union executive ranks and considered that it could properly honor Mr. Brown, as he began life as a telegraph operator. About 200 members and guests were present. In his speech, President Brown gave an interesting account of his early experiences as a young railway telegraph operator. His duties at that time included the stacking of cordwood and the handling of freight, but he added that he did not consider that he had left the electrical field, as his company was conducting one of the largest electric railway systems in the world.

NEW PUBLICATIONS

Tables of Quantities for Preliminary Estimates. By E. F. Hauch and P. D. Rice. New York: John Wiley & Sons; 92 pages (4 in. x 6¾ in.). Price, $1.25, net.

This appears to be a most useful guide for earthwork estimates. The principal tables are those of quantities from grade to 50 ft. for roadbeds varying by 2 ft. from 12 ft. to 32 ft. and for 35 ft., calculated for formation slopes from ¼ : 1 and 1½ : 1 and transverse slope angles from 0 deg. to 33 deg. There are also several other additional tables including acreage and for converting chains to feet, feet to decimals of a chain and fractions of inches in equivalent decimals.

General Lectures on Electrical Engineering. By Charles Proteus Steinmetz, edited by J. L. Hayden, Schenectady, N. Y.; Robson & Adee; 1909; 284 pages (9 in. x 5½ in.). Price, $2.00 delivered.

Many of those who know the deep mathematical turn of Professor Steinmetz's mind are not aware that when the occasion requires he can explain electrical phenomena most felicitously. This quality of simple and lucid exposition is a strong feature of the present work, which was originally prepared for the students of Union College, Schenectady, N. Y. Every lecture except that on electrochemistry has a strong bearing on electric railway power and lighting problems. The frontispiece is a fine portrait of the author.

Die "Elektrische" (The "Electric"). By P. Scharlott, Leipzig; Carl Scholtze, 1908; 206 pages (6¼ in. x 4 in.); with 206 illustrations and four tables. Price, 1.75 marks.

This booklet was prepared to familiarize the operating personnel of electric railway companies with the various electrical and mechanical features of street railways. The information is presented in remarkably simple and compact form. The author discusses the subject from fundamental standpoints, beginning with the primary definitions of electric action in generators and batteries. Brief illustrated descriptions are then successively presented of the apparatus used in the power stations, on the line, track and cars. There is also considerable information on repair work and on the location of electrical troubles. In view of the universal prevalence of sick benefit societies in Germany, the author has also appended abstracts of government and association rules with regard to the conduct of such organizations together with abstracts of the liability laws.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Illinois Inland Electric Railway, Chicago, Ill.**—This company has been incorporated in Illinois to construct an electric railway from Springfield in a southeasterly direction through Sangamon and Christian Counties to Pana. Principal office, Springfield. Capital stock, $50,000. Incorporators and directors: George W. Davidson, Carl O. Beroth, Thomas C. Kennedy, Albert E. Wolf and William J. Eaker, all of Chicago.

***Pittsburg & Kansas City Railway, Pittsburg, Kan.**—This company has been incorporated in Missouri for the purpose of building an electric railway, from Burgess, Mo., to Pittsburg, a distance of 50 miles. The railway will transport both passengers and freight. Capital stock, $500,000. Incorporators: John W. Ground, William M. Calhoun, Thomas K. Irwin and Fred H. Fitch.

***Scarboro & Cape Elizabeth Railway, Portland, Maine.**—A bill has been introduced in the Legislature to incorporate this company which proposes to build an electric railway, beginning at South Portland Heights, through South Portland, Cape Elizabeth, Scarboro and Westbrook. Capital stock, $400,000. Incorporators: Samuel D. Plummer, Portland; William F. Spear, South Portland; Harry S. Jordan, Cape Elizabeth; John A. Snow, Scarboro; Otis S. Trafton, Westbrook, and Walter J. Gilpatrick, Saco.

***St. Louis Electric Bridge Company, St. Louis, Mo.**—This company has been incorporated in Missouri for the purpose of extending the Illinois Traction System's railway into Missouri by the construction of a bridge over the Mississippi River from Venice, Ill., to St. Louis. Capital stock, $5,000.

***Terminal Street Railway, Philadelphia, Pa.**—This company has been chartered to construct a 2-mile electric railway for passengers and freight from the end of the Market Street Elevated Passenger Railway in Upper Darby, through East Lansdown to Fernwood. Capital stock, $12,000. Incorporators: John Wolfenden, Cardington, president; W. I. Shore, Joseph M. Dohen and B. J. O'Connel, Philadelphia, and Frank B. Rhodes, Media.

FRANCHISES

Wallace, Idaho.—The City Council has passed an ordinance granting a franchise to the Spokane, Wallace & Interstate Railway, which plans to build an electric railway between Wallace, Cœur d'Alene and Spokane, Wash., a distance of about 100 miles. William J. Hall, Wallace, general manager. [E. R. J., Feb. 27, '09.]

Stoneham, Mass.—The Selectmen of Stoneham have granted the Boston & Northern Street Railway, Boston, Mass., a franchise allowing it to complete the railway through the Middlesex Fells and around Spot Pond. According to the franchise the road must be completed Nov. 1. The railway is being built jointly by the Boston Elevated Railway and Boston & Northern Street Railway.

New York, N. Y.—The Public Service Commission of the First District, New York, has approved a franchise granted by the Board of Estimate to the Bronx Traction Company for the construction of 1200 ft. of double track from Classon Point Road and Westchester Avenue to a point east of the Bronx River. This is the first new franchise granted by the Board of Estimate which has been approved by the Public Service Commission since it entered upon its existence over a year and a half ago. The Bronx Traction Company is at present in charge of F. W. Whitridge, receiver.

Hight Point, N. C.—The North Carolina Public Service Company, which has taken over the property of the Greensboro Electric Company, has secured from the Board of Aldermen of High Point, a renewal of all franchises for electric railway facilities in that city. The conditions of the ordinance require extensions of 3 miles within a year. [E. R. J., Feb. 13, '09.]

Lansdowne, Pa.—The City Council has granted the Philadelphia & Delaware County Electric Railway, a subsidiary company of the Interstate Railway, a franchise to build a street railway from Scottdale Avenue to Baltimore Avenue, and thence to Union Avenue.

Waynesburg, Pa.—An ordinance has been passed by the City Council granting a 99-year franchise to the Waynesburg & Monongahela Electric Railway, Washington, Pa., which proposes, with Waynesburg as a center, to build electric railways through the following cities: Waynesburg, Washington, Jefferson, Clarksville, Mariana, Millsboro, Frederickstown, Mount Morris, Carmichaels, Greensboro and South Brownsville. [E. R. J., Jan. 9, '09.]

Montreal, Que.—The Terminal Electric Railway, which is controlled and operated by the Montreal Street Railway, is asking the Canadian Parliament for an extension of the right granted it under its primitive charter to build an elevated railway in Montreal, as the time stipulated in the original grant to the company for the construction of such a road is shortly to expire.

Austin, Tex.—The City Council has passed an ordinance granting the Texas Interurban Company an extension of its franchise until May 19, as the date on which construction must begin on its proposed railway. The company plans to build an electric railway between Austin and Lockhart, a distance of 30 miles. Thomas Moore, Elizabeth, N. J., is one of the promoters. [E. R. J., July 27, '07.]

***Corpus Christi, Tex.**—Application has been made to the City Council by M. Ucovitch for a franchise to construct and operate an electric street railway in Corpus Christi.

TRACK AND ROADWAY

***Mobile, Ala.**—At a recent meeting of the Commercial Club, plans were discussed for the construction of an electric railway down the Eastern Shore and the operation of a ferry across the bay. A committee of nine was appointed to confer with J. T. Ingalls, who has planned to construct the railway. The committee was also instructed to look after the surveys and the preparation of plans and estimates.

Citizens Electric Company, Eureka Springs, Ark.—A. M. Barron, general manager of this company, advises that contracts will be placed during the next three months for the reconstruction of the entire track in Eureka Springs. The company also contemplates an extension of from 3 to 6 miles.

Shore Line Electric Railway, New Haven, Conn.—The Railroad Commissioners have handed down decisions granting the petitions of this company, chartered to build an electric railway from Stony Creek east to the Connecticut River, for the taking of land along its proposed layout.

West Chester & Wilmington Electric Railway, Wilmington, Del.—It is reported that this company is negotiating with Sydney Kennedy and J. T. Dyer, representing a Philadelphia banking firm, for financing the construction of its proposed electric railway between West Chester and Wilmington. [S. R. J., May 16, '08.]

Bluffton, Berne & Celina Traction Company, Bluffton, Ind.—Rudolph Schug, president of this company, is quoted as saying that finances have been secured and that it is the intention of the company to begin work on the section between Bluffton and Celina in the near future. The railway will extend from Bluffton to Celina, Ohio, by way of Berne. [E. R. J., Jan. 23, '09.]

Terre Haute & Merom Southwestern Traction Company, Terre Haute, Ind.—D. M. Roberts writes that construction work on this projected electric railway is now under way. It will connect Terre Haute, Gardentown, Prairieton, Middletown, Fairbanks, Graysville and Merom. It is also the intention of the company to furnish power for lighting. Capital stock, authorized, $200,000. Bonds, authorized, $200,000. Officers: D. M. Roberts, president and general manager; Phillip H. Lahr, secretary; Howard Sandison, treasurer; William A. Whitman, chief engineer, all of Terre Haute. [E. R. J., Feb. 27, '09.]

Centerville Light & Traction Company, Centerville, Ia.—This company is said to have submitted a definite proposition to the citizens' committee of Centerville for the construction of an electric railway from Centerville to Mystic. Frank S. Payne, president.

City Light Company, Hopkinsville, Ky.—This company, which owns and operates the electric light and gas plants in Hopkinsville, is said to be considering a plan to establish a street railway in Hopkinsville. E. K. Dewey, general manager.

Lexington & Interurban Railways, Lexington, Ky.—This company announces that it will award contracts during the next two weeks for the construction of a 12-mile extension from Lexington to Nicholasville. J. B. Crawford, general manager.

***Portland, Maine.**—The People's Ferry Company has applied to the Legislature for the right to operate a street railway from Portland Pier to Monument Square. The plan is to run over the present tracks of the Portland Railroad as far as possible, if arrangements can be made. If not, it is said that the Ferry Company will build its own line, one route suggested being along Commercial Street and up

Center Street to Monument Square. Three modern cars will be built for the service and all boats at Portland Pier will be met and transfers issued for a stated amount so that the trip may be made continuous from Peaks Island to Monument Square, there connecting for all points and vice versa.

Wicomico Electric & Power Company, Salisbury, Md.—W. M. Cooper writes that this company has just been organized to construct a railway connecting the following cities: Salisbury, Hebron, Quantico, Wetipquin, Tyaskin, Bivalve and Nanticoke. It will be about 30 miles in length. It is planned to begin work this year. Electricity will be used for passenger and steam for freight service. A power plant and repair shops will be built in Salisbury. Power will be furnished by the company for lighting. Mr. Cooper states that the railway is open to responsible financing concerns. Capital stock, authorized, $200,000. Officers: M. V. Brewington, president; L. W. Dorman, first vice-president; H. J. Messick, second vice-president; Mark Cooper, secretary; W. M. Cooper, treasurer; J. D. Price, general manager, all of Salisbury. [E. R. J., Feb. 27, '09.]

Grand Rapids (Mich.) Electric Railway.—Announcement is made that this company expects to place a contract during the next two weeks, for the construction of the southeastern division of its proposed electric railway. This section of the railway will extend from Kalamazoo to Battle Creek, Burlington, Coldwater and Camden, across the State line and into Ohio. Another branch of the system will be built from Grand Rapids to Greenville, Edmore and Mount Pleasant. C. J. Post, secretary of the company, advises that construction is to be started on both of these branches early this spring.

Granite City Railway, St. Cloud, Minn.—This company announces that it will construct 3½ miles of track during the coming season.

Kansas City-Southeastern Traction Company, Kansas City, Mo.—Charles A. S. Sims, president, advises that on Feb. 17 this company was granted permission to increase its capital from $180,000 to $5,000,000. On the same date the company placed on record in Jackson County, Mo., a mortgage for $5,000,000 in favor of the Carnegie Trust Company, New York City. This mortgage covers about 125 miles of main line and 65 miles of branch lines that are to be built. The main line is from Kansas City to Jefferson City, and branch lines from Lee's Summit to Pleasant Hill and Harrisonville and another branch line, that is as yet prospective, from the main line at Pittsville, south through Holden, thence south to Clinton. The equipment is also covered in the mortgage. The underwriting is now in progress. Mr. Sims states that a large force is at work on rock excavation 2½ miles north of Raytown. As soon as the weather will permit general construction work will begin all along the line between Kansas City and Lee's Summit. [E. R. J., Feb. 27, '09.]

Springfield (Mo.) Traction Company.—W. A. Bixby, general manager of this company, advises that contracts will be placed during the next four weeks for the building of a 1½-mile extension to the 'Frisco car shops, now in course of erection.

Morris County Traction Company, Morristown, N. J.—Work is said to have been started by this company upon the extension of its railway from Union to Elizabeth. The tracks now run to a point about 1000 ft. below Colonial Avenue, in Union, and it is intended to have them connect with the line of the Public Service Corporation at Morris Avenue, Elizabeth.

Traction Development Company, Elizabeth, N. J.—At a meeting of the directors of this company, which is preparing the preliminary work for the Elizabeth & Amboy Traction Company, the following officers were elected: Richard F. Pettigrew, president; Richard M. Montgomery, vice-president; Robert D. Murray, secretary and treasurer; J. A. Strausman, assistant secretary and treasurer; Percival S. Jones, 27 Pine Street, New York, N. Y., counsel. It was decided to take steps at once for the beginning of work on the projected railway. According to the present plans the Elizabeth & Amboy Traction Company proposes to operate an electric railway from Elizabeth to Linden, Rahway, Carteret, Chrome, Port Reading, Sewaren, Woodbridge and Perth Amboy. Engineers are now at work mapping out the routes and providing for rights-of-way. The principal routes have already been selected and it is stated that many important property grants have been obtained. [E. R. J., Jan. 30, '09.]

New York, Westchester & Boston Railroad, New York, N. Y.—This company started work Feb. 27 in New Rochelle on its four-track electric railway, which will extend from Port Chester to New York. The railway is practically over the route of the old Port Chester Railroad, and will pass through Port Chester, Rye, Mamaroneck, Larchmont, New Rochelle, Mount Vernon and Bronx Borough to the Harlem River. In the Bronx the company has already completed a large section of the railway at a cost of $1,000,000.

***Van Hornesville, N. Y.**—It is stated that D. S. Tilyon is interested in a proposition to construct an electric railway from Van Hornesville to Henderson.

Toledo & Columbus Railway, Toledo, Ohio.—It is officially announced that this company has secured the right of way and is planning to begin the construction of its proposed electric railway this season. The railway will extend from Fremont to Tiffin and Bucyrus. It is the plan of the company to connect at the northern end with the Lake Shore Electric Railway, for Toledo, and at the southern end with the Columbus, Delaware & Marion Railway, for Columbus. Officers: D. H. James, president; Mark Winchester, secretary; H. R. Klauser, treasurer, all of Toledo. [S. R. J., May 18, '07.]

Enid (Okla.) City Railway.—Clarence Kline, general superintendent, writes that this company will begin in about six weeks construction of an extension on South Grand Avenue. About 2400 ft. of track will be built.

Port Arthur, Ont.—Tenders will be received by the Railway Commissioners for rails, ties and other construction material required to complete the double tracking of the Port Arthur & Fort William Electric Railway to the Fort William boundary. About 20 miles of new track will be added to the railway during 1909.

Lane County Asset Company, Eugene, Ore.—This company, which was recently granted a franchise to build an electric railway between Eugene and Florence, has begun making the preliminary surveys. It is the intention of the company to begin construction work within 90 days. [E. R. J., Feb. 13, '09.]

***Ephrata & Lebanon Street Railway, Lebanon, Pa.**—This company is reported to have been organized for the purpose of building an electric railway from Ephrata to Lebanon. It is proposed to connect with the Lebanon & Southern Street Railway at Schaefferstown.

***Susquehanna & Southern Railroad, Hazleton, Pa.**—Announcement is made that this company has been formed for the purpose of building a third-rail railway from Hazleton to Pottsville. The surveys have been completed, and it is stated that the work of building the railway will begin in the spring. Terminal rights have been secured at Hazleton and Pottsville. The railway is to be 32 miles long and will pass through Audenried, McAdoo, Lofty, Delano, Mahanoy City, Morea, Buck Mountain, Frackville and St. Clair, from which place it will enter Pottsville and connect with the Schuylkill Valley Traction Company. It has not yet been decided whether the company will erect its own power station or buy its current from the Harwood Power Company, which is erecting a plant at Harwood.

Anderson (S. C.) Traction Company.—It is stated that this company has decided to extend its railway from Belton to Pelzer, a distance of 9 miles. At Pelzer the line will connect with an extension to be built from Greenville.

***Memphis, Tenn.**—It is stated that John B. Wheeler, who represents Eastern capitalists, is making arrangements for the construction of an electric railway from Memphis to Jackson. A survey has already been made as far as Covington, nearly paralleling the Illinois Central Railroad, and extending through Woodstock, Rembert Springs, Millington, Kerrville, Munford and Melrose to Covington. Headquarters of the syndicate have been established in the Lee Building, Memphis.

Mesilla Valley & El Paso Interurban Railway, El Paso, Tex.—This company has about completed the financial arrangements for building its proposed electric railway to connect Las Cruces and other Mesilla Valley towns with El Paso, and is in the market for about 40 miles of track and overhead line material. H. A. Baum, who is connected with the Safety Electric Company, 33 Michigan Avenue, Chicago, Ill., and O. H. Baum, El Paso, Tex., will direct the purchase of these materials. [E. R. J., Nov. 7, '08.]

Twin City Light & Power Company, Chehalis, Wash.—It is stated that this company has begun making the surveys for its proposed electric railway between Chehalis and Centralia. The company has already secured franchises in both cities. A. Welch is one of the promoters of this railway. [E. R. J., Feb. 6, '09.]

Vancouver (Wash.) Traction Company.—It is announced that this company will soon begin making preliminary surveys to the north of the city to Felida and to the northeast of the city to Orchards, where it is proposed to build extensions. W. J. Patterson, president.

***Hinton, W. Va.**—It is stated that James T. McCreery, Hinton, is interested in a proposition to establish a street

railway in Hinton and to eventually extend it to Avis, Bellevue and Red Sulphur.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company announces that it will soon begin the construction of one-half a mile of double track and a 3-mile extension, and will require considerable new or second-hand 70-lb. T-rail.

SHOPS AND BUILDINGS

Capital Traction Company, Washington, D. C.—This company has awarded a contract to James L. Parsons for the construction of a 70-ft. x 45-ft. brick store building on Fourteenth Street northwest.

Public Service Railway, Newark, N. J.—This company has begun the work on its passenger terminal in Hoboken. The preliminary track work in the vicinity of the terminal will be finished in March and work on the terminal proper will probably be begun about April 1. [E. R. J., Jan. 16, '09.]

Springfield (Ohio) Railway.—Announcement is made that this company will erect a car house this spring.

Portland (Ore.) Railway, Light & Power Company.—It is stated that this company has decided to erect at once a nine-story office building over the substation at the corner of Seventeenth Street and Alder Street. The general offices will be moved into the new structure upon its completion and the First and Alder Street headquarters building will be rented. Work will start at once upon the building, and it is expected to have it completed ready for occupancy by Sept. 1. It is estimated that the cost will be $235,000. It is said that the contract is now being arranged with the Hurley-Mason Company. The present substation will be retained in the basement of the building. The first two floors will also be given over to the machinery that now occupies the substation, together with the storage battery and additional apparatus to be installed to feed the underground distributing system. The company will require three floors of the new building for its offices and the remaining four stories will be rented. The building will cover ground space 100 ft. x 100 ft.

Homestead & Mifflin Street Railway, Homestead, Pa.—This company has about completed a 20-ft. x 60-ft., one-story frame addition to its car house. The floor of the building has been paved and a new siding built. The company expects to install a forge, lathes and drill presses in the near future.

POWER HOUSES AND SUBSTATIONS

Ottumwa Railway & Light Company, Ottumwa, Ia.—This company has purchased from the General Electric Company a 250-kw a. c.-d. c. motor-generator.

Schenectady (N. Y.) Railway.—E. F. Peck, general manager, advises that this company will build a substation at the north end of Ballston Lake on its Saratoga division. The capacity of the station will be 1800 kw. It will be equipped with two 600-kw rotary converters and two 300-kw rotary converters. Current will be transmitted to the station at 2300 volts a. c. and reduced to 600 volts d. c. The building will be built of brick, with stone trimmings, and will have concrete floors and a fireproof roof. It will be erected at an estimated cost of $17,500.

Columbia Power, Light & Railways Company, Bloomsburg, Pa.—B. O. Ellis, general manager of this company, announces that contracts will be placed during the next month for the building of a 25-mile, 23,000-volt, 3-phase transmission line, with about 2000 kw of power transformers, lightning arresters, etc. The company will also install a 500-hp hydraulic turbine, a 300-kw railway generator and a 200-kw belted railway generator, with switchboard, etc.

Levis County Railway, Levis, Que.—This company advises that it is installing a new 250-kw. Allis-Chalmers Bullock motor generator set in its substation. The company purchases its power from the Canadian Electric Light Company and current is brought into the substation by a 11,000-volt, 3-phase, high-tension line. The present equipment in the station consists of two 250-kw. motor generators, the new unit increasing its capacity to 750 kw.

Mesilla Valley & El Paso Interurban Railway, El Paso, Tex.—This company, which proposes to build an electric railway from Las Cruces and El Paso, is in the market for a complete power-station equipment. The contracts will be awarded through H. A. Baum, 33 Michigan Avenue, Chicago, Ill., and O. H. Baum, El Paso. [E. R. J., Nov. 7, '08.]

Norfolk & Portsmouth Traction Company, Norfolk, Va.—This company announces that it will soon begin the work of reconstructing its Suffolk power station which was burned Feb. 24. The machinery for the new station is second-hand apparatus, which has been taken out of a dismantled station by the company.

Manufactures & Supplies

ROLLING STOCK

Southern Wisconsin Railway Company, Madison, Wis., will purchase one car.

Los Angeles-Pacific Company, Los Angeles, Cal., purchased four Rodger ballast cars.

Montreal (Que.) Street Railway is asking bids on 10 all-steel pay-as-you-enter cars.

Granite City Railway, St. Cloud, Minn., will purchase (in the very near future) two electric locomotives and 10 15-ton flat cars.

Mexico Tramways Company, City of Mexico, has purchased for early delivery 10 sets of No. 23-A trucks from the St. Louis Car Company.

Citizens' Electric Company, Eureka Springs, Ark., is in the market for three open cars and three closed cars with single trucks of 6-ft. wheel base.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., is having six interurban cars built by the G. C. Kuhlman Car Company, Cleveland, Ohio.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., will purchase, during the next two months, two new or second-hand interurban closed cars.

Salt Lake & Ogden Railroad, Salt Lake City, Utah, which was stated in the ELECTRIC RAILWAY JOURNAL of Feb. 13, 1909, to be planning the purchase of new cars, will place an order soon for 12 motor cars.

Lexington & Interurban Railways, Lexington, Ky., has ordered from the G. C. Kuhlman Car Company, Cleveland, Ohio, three 31-ft. city cars, with GE-202 motors, and two 55-ft. interurban cars, with GE-204 motors and Brill E-2 trucks.

Missouri & Kansas Interurban Railway, Kansas City, Mo., which was reported in the ELECTRIC RAILWAY JOURNAL of Jan. 23, 1909, as considering the purchase of two interurban cars, has ordered these cars from the American Car Company, St. Louis, Mo.

Atlantic Shore Line Railway, Kennebunkport, Maine, has ordered three double-truck, semi-convertible cars from the Wason Manufacturing Company, Springfield, Mass. The cars will be 30 ft. 8 in. long and mounted on Standard Motor Truck Company's trucks.

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., which placed an order last fall with the G. C. Kuhlman Car Company, Cleveland, Ohio, for 10 cars and later increased the order to 15 cars, will soon receive the first shipment of these equipments. The company has recently purchased 20 dump cars, 10 flat cars and 1 Lidgerwood unloader from the Hicks Locomotive & Car Works, Chicago, Ill.

Albany & Hudson River Railroad Company, Albany, N. Y., referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909, as being in the market for nine interurban cars, reports that it has not drawn specifications for these cars, and that it has not been definitely decided to purchase equipment at this time.

Winnipeg (Can.) Electric Railway Company, mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 20, 1909, as having ordered 30 cars with Brill trucks from a Canadian car builder, is constructing, in its own shops, 30 new double-truck cars, to be equipped with Brill trucks, GE-80 motors and Westinghouse air-brakes.

Municipal Tramway of Calgary, Alta., which was reported in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909, as asking for bids on 12 street cars, has placed orders for six of them with the Preston Car & Coach Company and six with the Ottawa Car Company, all of which will be of the pay-as-you-enter type. Address Mayor Jamieson.

Third Avenue Railroad, New York, N. Y., mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 20, 1909, as having increased the order for 200 pay-as-you-enter cars with the J. G. Brill Company to 275, intends purchasing 300 of these cars, but the order for the last 100 has not been placed as yet. The company is also in the market for 100 motor equipments for the extra cars.

Blue Hill Street Railway Company, Canton, Mass., reported in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1909, as having lost, through fire, 20 heavy electric passenger cars (16 of which were of the semi-convertible type), snow plows and work cars, reports that it will replace the equipment. The details have not been decided on. Stone & Webster, general managers, Boston, Mass.

Seattle (Wash.) Electric Company, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 20, 1909, as being in the market

for cars, has ordered, through the Stone & Webster Engineering Corporation, 30 cars of the Seattle, single-end, combination type, with end and side doors. They are to be 47 ft. 8 in. long over buffers, and are to have a seating capacity of 55 persons. The bodies are to be built by the St. Louis Car Company, and will be mounted on Standard Motor Truck Company, type C-50, double trucks, having General Electric No. 80, 4-motor equipment and General Electric K-28 J type control. National Brake & Electric Company air brakes and Consolidated Car Heating Company's heaters will be supplied.

Wichita Railroad & Light Company, Wichita, Kan., as stated in the Electric Railway Journal of Feb. 6, 1909, recently placed an order with the American Car Company of St. Louis for 10 cars. They will be of the pay-as-you-enter type, and will have a seating capacity of 36. The principal specifications follow:

Length of body....28 ft.	Fare boxes, Brill No. 2 (four-till)
Length over vestibule .....39 ft. 6 in.	Gongs .....Dedenda
Width over parts at belt ..... 8 ft. 2 in.	Headlights, Elec. Service Supplies
Drawbar.....Brill Radial	Motors, type and number, GE-80 (2)
Curtain fixtures, Forsyth Ring	Sanders .....Nichols-Lintern
Curtain material...Pantasote	Seating material...Pantasote
Destination signs.....Hunter	Trucks, type and make, Brill, 27-G-1

Southwestern Interurban Railway Company, Arkansas City, Ark., mentioned in the Electric Railway Journal of Jan. 16, 1909, as making inquiry for three cars, has ordered three Brill semi-convertible cars from the American Car Company of St. Louis. The principal specifications follow:

Weight (car body)..13,000 lb.	Heating system, Consolidated
Length of body.20 ft. 8 in.	Headlights .....Syracuse
Length over vestibule, 30 ft. 1 in.	Motors, type and number, West., 92-A
Width over sills. 7 ft. 9½ in.	Sanders.....Brill "Dumpit"
Width over parts at belt..... 8 ft. 2 in.	Seats ......"Winner"
Brakes .....Peacock	Signal bells....."Retriever"
Drawbars .....Brill	Trucks, type and make, Brill, 21-E
Gongs .....Dedenda	

The company has also purchased from the American Car Company of St. Louis, as announced in the Electric Railway Journal of Jan. 30, 1909, two interurban cars, one passenger and smoking, and one passenger, baggage and smoking car of the Brill semi-convertible type, with a seating capacity of 48. The principal specifications follow:

Weight (car body)..19,000 lb.	Gongs .....Dedenda
Length of body....31 ft. 8 in.	Headlights, Crouse-Hinds "Imperial"
Length over vestibule .....41 ft. 8 in.	Motors, type and number, West., No. 92-A
Width over sills.... 8 ft. 4 in.	Sanders ....."Dumpit"
Width over parts at belt ..... 8 ft. 4 in.	Seats.....Brill "Winner"
Brill Brake staff, Peacock brakes	Seating material.....Rattan
Bumpers....Brill Angle-Iron	Signal bells....."Retriever"
Curtain fixtures, Forsyth Ring	Trucks, type and make, Brill, 27-E-1

TRADE NOTES

Northwestern Railway Supply Company, Chicago, Ill., has increased its capital stock from $500 to $25,000.

Ohio Brass Company, Mansfield, Ohio, has received an order from the Vancouver (B. C.) Power Company for 40,000 45,000-volt porcelain insulators.

Belmont Iron Works, Philadelphia, Pa., announce that after March 1 their New York business address will be 45 Broadway, instead of 1 West Thirty-fourth Street.

Hunter-Clark Ventilating System Company has been incorporated at Chicago, Ill., to do a general sheet metal manufacturing business. The incorporators are J. Hunter, B. S. Clark and Henry Schaaf.

Wonham-Magor Car & Manufacturing Company, New York, has succeeded to the business of the Wonham-Magor Engineering Works. The offices of the company are in the Hudson Terminal Building, 30 Church Street, New York.

Chicago Brake Shoe Company, 406 Fisher Bldg., Chicago, Ill., is developing a brake shoe for high-speed electric railway cars. The shoes are to be constructed for any type of brake head. The president of this company is R. L. Brown and the secretary and treasurer is E. K. Harris.

J. A. Foulks, 29 Broadway, New York, has been appointed Eastern representative of the Indianapolis Switch & Frog Company, of Springfield, Ohio, manufacturer of frogs, switches, crossings and special track material for electric and steam railways, and industrial, mining and smelter tracks.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has appointed H. C. Slemin, Rochester, N. Y., to the dual position of sales manager and advertising manager of the company, the appointment dating from March 1, 1909.

American Bridge Company, New York, N. Y., announces the opening of a new office in the Wilson Building, Dallas, Tex. The general offices of the company in New York are in the Hudson Terminal Building, at 30 Church Street. The company now has contracting offices in 24 cities in the United States.

Dossert & Company, New York, N. Y., have received an order from the Giles S. Allison Company, New York, N. Y., for 170 cable taps and 2-way solderless connectors for large cables for the Rio de Janeiro Tramway, Light & Power Company, Brazil, and for 100 2-way 1,000,000 circ. mil cable connectors from the Chicago City Railway.

A. C. Torbert & Company, 547 Monadnock Block, Chicago, Ill., manufacturers and dealers in steam shovels, locomotives, cars and railway and contractors' equipments, announce that they have developed special construction cars and other equipment for electric railways. The company has extensive shops and storage yards at Hammond, Ind., and is prepared to make shipments promptly.

Grip Nut Company, Chicago, Ill., has absorbed the Silk-McClellan Company, Chicago, and will hereafter make and sell that company's Universal window fixtures. B. S. McClellan has become manager of sales of the Grip Nut Company and will be located in the Chicago office. The company is preparing a catalog showing the window fixtures to be manufactured at its plant at South Whitley, Ind.

Raymond Concrete Pile Company, New York, N. Y., reports that it has under supervision construction work as follows: Placing of Raymond concrete piles for the Brooklyn & Coney Island Railroad; Metropolitan Street Railway, New York; the Chicago Board of Education; Ford & Kendig, Philadelphia; United States Government at Elwood, Kan.; the St. Louis Post-Office; public school and docks at Baltimore, Md.

Wonham, Magor & Sanger, New York, N. Y., have recently closed contracts for the equipment of the following lines in New York City with the "H. B." wheelguards: Third Avenue Railroad; Union Railway; Manhattanville & St. Nicholas Avenue Railroad, and Dry Dock, East Broadway & Battery Railway. This calls for more than 2400 equipments. Negotiations are also in progress with a number of large systems in other parts of the United States for the equipment of their cars with the "H. B." wheelguard.

A Consolidation of Machine Tool Manufacturers has just taken place in Cincinnati, where two well-known companies, the Bickford Drill & Tool Company and the Cincinnati Machine Tool Company, have consolidated under the title of the Cincinnati Bickford Tool Company. The officers of the new company are: August H. Tuechter, president; Sherman C. Schauer, vice-president and general manager; W. H. Shafer, secretary; G. P. Gradolf, treasurer; H. M. Norris, mechanical engineer.

T. S. Ellett, who was formerly employed by the General Railway Supply Company, Chicago, Ill., as engineer of experiments and tests, has accepted a similar position with T. H. Garland, owner of the Garland ventilating patents. Mr. Ellett will have complete charge of all experiments and tests of Garland ventilators for electric railway cars. He advises he has a car on the lines of the Chicago City Railways and one on the lines of the Chicago Railways Company equipped with the Garland system of ventilation and that he is now rebuilding an old street car so as to clearly demonstrate the ventilation of various types of electric cars.

Bruce Peebles & Company, Ltd., London and Edinburgh, have been successfully reorganized and the new corporation is now in active operation. The company has had charge of a number of important engineering undertakings in all parts of the globe, including the construction of electric railways. Fred E. Andrews, who for many years was connected with the Brush Engineering Company, both in London and at Loughborough, has been elected chairman of the board of directors. Lee Murray, M. I. C. E., who was long connected with Siemens Brothers, of London, and who recently has been manager of the Siemens Works at Stafford, has been appointed general manager of Bruce Peebles & Company.

Henry L. Shippy, well known as Commodore Shippy, has decided to retire from active business, and in a card recently issued announces that he has resigned as treasurer of the

John A. Roebling's Sons Company, New York, and that W. P. Bowman, formerly manager of the Cleveland branch of the business, will succeed him. Commodore Shippy is as well known as any one in the electrical business, where his genial ways and spirit of good fellowship have made him deservedly popular. He has been connected with the Roebling Company since 1875, and hence has been a witness and active participant in all the tremendous development in electric matters which has occurred subsequent to that time. His retirement from active work with the company will be a distinct loss to the industry.

Edwin H. Cheney has been appointed manager of the Chicago district of the Wagner Electric Manufacturing Company, St. Louis, Mo., with headquarters in the Marquette Building, Chicago. After graduation from the University of Michigan with the degree of electrical engineer, Mr. Cheney entered the employ of the Chicago Edison Company as chief draftsman, and was subsequently connected with the construction department of the company until 1899, when he resigned to become treasurer and manager of the Mutual Electric Company, Chicago, an electrical construction concern. This office he filled until 1901, when he resigned to become secretary and treasurer of the Illinois Maintenance Company, with which he was connected for five years. Subsequently he became president of the Fuel Engineering Company and resigned to accept the appointment of the Wagner Electric Manufacturing Company as manager of the Chicago district.

Crocker-Wheeler Company, Ampere, N. J., has recently closed a contract for two 400-kw, 575-volt, engine-driven railway generators for the city of Edmonton, Canada, and with the Michigan Alkali Company, Wyandotte, Mich., for 95 hp in small motors. An order for eight form W rolling mill motors aggregating 170 hp has been placed by the Alliance Machine Company, Alliance, Ohio. A number of other orders have been received for d. c. and a. c. generators of various sizes and a large number of small motors. The company has also received an order for a 250-kw motor-generator set for the Tennessee Coal, Iron & Railroad Company, at Ensley, Ala. The unit will consist of a 250-kw, 275-volt, d.c. generator driven by a 6600-volt, 3-phase, 25-cycle synchronous motor and will be used as an exciter. Another order is one for about 50 hp of small elevator motors purchased by the Haughton Elevator & Machine Company, Toledo, Ohio. Yawman & Erbe, Rochester, N. Y., have also placed orders for a number of 2/5-hp motors for use on some of their specialties.

The Second Annual Cement Show was given at the Coliseum, Chicago, Ill., from Feb. 18 to Feb. 24, 1909, under the management of the Cement Products Exhibition Company. Representatives of the cement manufacturers of 25 States were in attendance, and the manufacturers and dealers in cement machinery and cement products from all parts of the United States made displays. Among the 200 exhibitors were the following: Allis-Chalmers Company, Milwaukee, Wis.; American Asphaltum & Rubber Company, Chicago, Ill.; American Steel & Wire Company, Chicago, Ill.; American System of Reinforcing, Chicago, Ill.; Brown Hoisting Machinery Company, Cleveland, Ohio; Chain-Belt Company, Milwaukee, Wis.; Chicago Concrete Machinery Company, Chicago, Ill.; Cincinnati Iron & Steel Company, Cincinnati, Ohio; General Fireproofing Company, Youngstown, Ohio; Robert W. Hunt & Company, Chicago, Ill.; Kennicott Water Softener Company, Chicago, Ill.; Arthur Koppel Company, Pittsburg, Pa.; Lock Bar Steel Concrete Company, Chicago, Ill.; Luck Cement Post Company, Aurora, Ill.; Geo. C. Marsh, Chicago, Ill.; National Fireproofing Company, Chicago, Ill.; Municipal Engineering & Contracting Company, Chicago, Ill.; Ohio Ceramic Engineering Company, Cleveland, Ohio; Perfect Concrete Brick & Fence Post Mould Company, Kendallville, Ind.; D. & A. Post Mould Company, Three Rivers, Mich., and the T. L. Smith Company, Milwaukee, Wis.

MacGovern, Archer & Company, 114 Liberty Street, New York City, the selling agents for the receivers of the Third Avenue Railroad Company, report a very encouraging demand for street cars, and have recently shipped completely equipped cars to the following companies among others: Catskill (N. Y.) Electric Railway; Ithaca (N. Y.) Street Railway; Parkersburg (Ohio) Marietta & Interurban Street Railway; A. H. Flint & Company, New York City; Louisville (Ind.) & Northern Street Railway; Juniata Valley Electric Street Railway Company, Huntingdon, Pa.; Jamestown (N. Y.) Street Railway Company; Bluestone Traction Company, Bluefield, W. Va., and the Hanover (Pa.) & McSherrytown Street Railway Company. The firm also reports the following shipments of electric railway equipment during the last few weeks: Illinois Traction System, Decatur, Ill., three 300-kw 25-cycle rotary converters, complete with the necessary transformers and switchboards; Tarrytown, White Plains & Mamaroneck Railway, New Rochelle, N. Y., two 300-kw 60-cycle rotary converters; Augusta (Ga.) Aiken Railway & Electric Company, one 500-kw belted dynamo; Marquette County Gas & Electric Company, Ishening, Mich., one 200-kw GE rotary, complete with transformers and switchboard apparatus; Lexington (Ky.) Railway Company, one 300-kw 25-cycle rotary converter. The firm also reports that it has a very large number of smaller sales comprised of street railway motors and car controllers, and a very encouraging number of inquiries for the spring trade.

ADVERTISING LITERATURE

Toledo Electric Welding Company, Toledo, Ohio, announces a pamphlet on its electric welding machines.

The Concrete-Steel Retaining Wall Company, Cincinnati, Ohio, has prepared a bulletin showing its Bone system of constructing retaining walls.

Packard Motor Car Company, Detroit, Mich., has issued a publication relating to the adaptability of the Packard automobile mechanism for heavy wagon service.

Allis-Chalmers Company, Milwaukee, Wis., has issued bulletin No. 1063, describing the field for the gas engine, especially in the utilization of low-grade fuels.

Hayes Track Appliance Company, Geneva, N. Y., is sending out a circular which shows in three pictures the progress which has been made in the design of derailers.

Electric Cable Company, Bridgeport, Conn., has printed a leather-bound pocketbook describing Voltax insulating compound besides giving a number of important wire tables.

Hall Signal Company, New York and Chicago, has prepared circular No. 12, descriptive of the a. c. track signal circuit installed on the Long Island Railroad without insulated joints or reactance bonds.

Chicago House Wrecking Company, Chicago, Ill., has printed an illustrated booklet describing the power equipments purchased from the Chicago City Railway Company. This apparatus is now offered to purchasers in any combinations.

Allis-Chalmers Company, Milwaukee, Wis., publish in "Industrial Progress" for March, a description of the Indianapolis, Crawfordsville & Western Traction System, reprinted from the Electric Railway Journal of May 23, 1908.

General Electric Company, Schenectady, N. Y., has issued the following bulletins: No. 4646, on the life and economy of tungsten incandescent lamps; No. 4647, on tungsten lamps for street lighting; No. 4649, on the electrical operation of railway shops.

Queen & Company, Inc., Philadelphia, Pa., have published a pamphlet describing the work of their optical, drafting, engineering, physical, electrical, meteorological and chemical departments, in addition to a list of references on the contents of their catalogs.

Electric Storage Battery Company, Philadelphia, Pa., has published Bulletin No. 110, explaining the operation of chloride accumulators in connection with remote-control oil switches. The installation described is that of the Transit Development Company, Brooklyn, N. Y., one of the subsidiaries of the Brooklyn Rapid Transit Company operating both elevated and surface lines in Brooklyn.

Canton Culvert Company, Canton, Ohio, has issued a handsome folder on the "Acme" corrugated metal culverts, illustrated by 17 engravings showing the culvert in position or being installed, and three of details of the culvert. The company is distributing by mail 66,000 of these folders, which are known as No. 104.

The J. G. Brill Company, Philadelphia, Pa., has for the leading article of *Brill's Magazine* for February a description of the conditions governing the selection of the type of car for city service in New York. This article contains several interesting illustrations, including a map and comparative dimensions of the cars of the Third Avenue Railroad and Metropolitan Street Railway. The cover is a reproduction of a photograph of Herald Square, New York.

Electrical Testing Laboratories, New York, has reprinted a paper on "The Work of the Electrical Testing Laboratories" read by Wilson S. Howell at the twenty-third annual meeting of the Association of Edison Illuminating Companies, held at Hot Springs, Va., Sept. 10, 11 and 12, 1907. Mr. Howell describes the equipment for "testing anything electrical for anybody," and also presents several cases where laboratory trials before shipment proved good investments.

TABLE OF MONTHLY EARNINGS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit. (a) The lighting earnings in January, 1908, were reduced by a change to the continuous system of meter reading, which explains $6,000 of the apparent increase over last year. The remainder represents actual increase in railway and electric departments.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Jan. '09	147,895	84,710	63,185	43,952	19,233
	1 " " '08	126,126	81,892	44,233	43,887	347
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Dec. '08	37,353	19,651	17,702	8,847	8,855
	1 " " '07	33,195	18,501	14,694	7,584	7,110
	12 " " '08	362,252	206,759	155,493	99,692	55,801
	12 " " '07	354,469	199,375	155,094	88,583	66,511
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Jan. '09	192,343	*119,636	72,708	44,783	27,924
	1 " " '08	177,745	*125,803	51,943	43,780	8,163
CHAMPAIGN, ILL. Illinois Tr. Co.	12m., Dec. '08	4,098,621	*2,354,124	1,744 497	.....	.....
	12 " " '07	3,779,187	*2,128,488	1,650,700	.....	.....
	1 " Jan. '09	352,956	*206,492	146,464	.....	.....
	1 " " '08	327,910	*193,654	134,256	.....	.....
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Jan. '09	59,645	38,828	20,817	13,817	7,000
	1 " " '08	61,569	41,161	20,408	13,443	6,965
	12 " " '09	697,303	451,854	245,449	151,808	93,540
	11 " " '08	669,430	427,672	241,758	148,563	93,195
CHICAGO, ILL. Aurora, Elgin & Chicago R. R. Co.	1m., Dec. '08	109,578	62,553	47,025	27,996	19,029
	1 " " '07	109,596	62,298	47,298	28,034	19,265
	6 " " '08	781,045	408,752	372,294	166,478	205,816
	6 " " '07	783,222	413,751	369,472	166,583	202,889
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1m., Dec. '08	32,054	*12,662	19,393	7,613	11,780
	1 " " '07	26,904	*11,003	15,901	9,296	6,605
	12 " " '08	295,812	*167,298	128,514	87,999	40,515
	12 " " '07	296,318	*157,197	139,121	86,552	52,569
Lake Shore Elec. Ry. Co.	12m., Dec. '08	892,269	*490,974	401,295	326,233	75,062
	12 " " '07	938,161	*521,559	416,602	294,073	122,529
	1 " Jan. '09	73,591	*45,575	28,017	34,392	†6,375
	1 " " '08	70,878	*46,791	24,088	30,865	†6,777
DALLAS, TEX. Dallas Electric Corporation.	1m., Dec. '08	106,830	65,940	40,890	27,720	13,170
	1 " " '07	97,463	66,484	30,980	30,094	886
	12 " " '08	1,169,968	780,655	389,313	348,026	41,287
	12 " " '07	1,125,673	760,743	364,930	320,899	44,030
E. ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., Jan. '09	153,539	92,548	60,991	.....	.....
	1 " " '08	173,066	82,815	90,251	.....	.....
EL PASO, TEX. El Paso Elec. Co.	1m., Dec. '08	55,194	37,389	17,805	7,765	10,040
	1 " " '07	50,791	34,569	16,223	6,152	10,071
	12 " " '08	534,223	384,639	149,584	86,893	62,690
	12 " " '07	506,694	370,120	136,574	68,845	67,728
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Dec. '08	118,836	109,738	54,098	.....	.....
	1 " " '07	116,187	62,533	53,654	.....	.....
	12 " " '08	1,322,720	737,134	585,586	488,756	96,830
	12 " " '07	1,283,781	746,036	537,745	427,314	110,430
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Dec. '08	97,448	54,326	43,122	15,185	27,938
	1 " " '07	84,346	46,630	37,715	12,319	25,396
	12 " " '08	1 080,577	630,052	450,525	189,541	260,984
	12 " " '07	1,060,954	595,072	465,881	157,003	308,878
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Dec. '08	96,998	54,931	42,068	20,696	21,372
	1 " " '07	87,669	52,577	35,092	18,212	16,880
	12 " " '08	1,088,447	627,973	460,474	245,277	215,197
	12 " " '07	1,050,893	616,946	433,947	224,938	209,008
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Dec. '08	24,833	13,299	11,534	5,805	5,729
	1 " " '07	19,740	11,354	8,386	4,831	3,555
	12 " " '08	265,576	148,245	117,331	59,632	57,699
	12 " " '07	249,919	146,318	103,601	57,049	46,552
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Dec. '08	38,965	21,548	17,417	7,998	9,419
	1 " " '07	33,243	18,467	14,776	7,825	6,952
	12 " " '08	430,838	253,943	176,895	98,909	77,986
	12 " " '07	392,394	231,191	161,203	75,315	85,887
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Dec. '08	576,141	325,276	250,865	156,089	94,776
	1 " " '07	512,666	261,197	251,469	152,179	99,291
	7 " " '08	3,808,779	2,151,419	1,657,360	1,087,341	570,019
	7 " " '08	3,678,738	1,881,414	1,797,323	1,076,744	720,580
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m., Jan. '09	48,217	*24,668	23,549	11,483	12,066
	1 " " '08	(a) 38,505	*26,785	11,720	11,448	272
LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Jan. '09	59,904	*29,543	30,361	10,727	19,534
	1 " " '08	55,681	*26,363	29,317	9,580	19,738
MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Jan. '09	128,469	*85,030	43,439	35,600	7 839
	1 " " '08	118,761	*78,562	40,199	34,499	5,699
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Jan. '09	344,636	174,619	170,017	103,867	66,150
	1 " " '08	314,708	180,645	134,063	98,109	35,954
Milwaukee Lt., Ht. & Tr. Co.	1m., Jan. '09	103,207	29,512	73,694	60,334	13,361
	1 " " '08	99,411	30,749	68,662	56,917	11,746
MONTREAL, CAN. Montreal St. Ry.	1m., Jan. '09	295,453	202,344	93,109	30,836	62,273
	1 " " '08	285,515	202,504	83,011	31,933	51,078
	4 " " '09	1,230,524	759.639	470,885	113,305	357,580
	4 " " '08	1,188,238	742,027	446,211	115,187	331,024
NASHVILLE, TENN Nashville Ry. & Lt. Co.	1m., Jan. '09	138,969	*83,585	55,384	32,450	22,934
	1 " " '08	124,878	*79,445	45,433	30,194	15,239
NORFOLK, VA. Norfolk & Portsmouth Tr. Co.	1m., Jan. '09	157,430	93,167	64,272	.....	.....
	1 " " '08	144,861	98,621	46,240	.....	.....
PHILADELPHIA, PA. American Rys. Co.	1m., Jan. '09	221,399	.....	.....	.....	.....
	1 " " '08	209,329	.....	.....	.....	.....
	7 " " '09	1,694,587	.....	.....	.....	.....
	7 " " '08	1,780,821	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Dec. '08	7,962	5,651	2,311	2,153	158
	1 " " '07	7,368	6,942	426	2,293	†1,867
	12 " " '08	122,266	88,440	33,825	26,755	7,070
	12 " " '07	119,365	82,106	37,259	26,978	10,281
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Jan. '09	339,226	185,877	153,349	.....	.....
	1 " " '08	340,813	173,589	167,224	.....	.....
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Jan. '09	79,435	41,838	37,597	.....	.....
	1 " " '08	70,159	37,916	32,243	.....	.....
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Jan. '09	829,036	*544,752	284,284	235,568	48,716
	1 " " '08	827,398	*554,359	273,039	233,454	39,585
SAVANNAH, GA. Savannah Elec. Co.	1m., Dec. '08	54,001	33,736	20,266	15,410	4,856
	1 " " '07	53,566	35,756	17,810	15,894	1,916
	12 " " '08	595,819	388,830	206,989	186,615	20,375
	12 " " '07	602,400	383,717	218,682	174,626	44,056
SEATTLE, WASH. Seattle Elec. Co.	1m., Dec. '08	415,079	253,801	161,278	95,313	65,965
	1 " " '07	376,806	229,583	147,223	83,969	63,254
	12 " " '08	4,520,489	2,670,252	1,850,237	1,090,646	759,591
	12 " " '07	4,119,725	2,421,404	1,698,321	920,300	778,020
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Dec. '08	141,031	97,164	43,867	43,354	513
	1 " " '07	130,576	86,947	43,628	43,728	†100
	12 " " '08	1,694,973	1,096,747	598,226	515,140	83,086
	12 " " '07	1,664,281	1,027,894	636,387	451,793	184,594
TAMPA, FLA. Tampa Elec. Co	1m., Dec. '08	50,063	32,671	17,392	5,211	12,181
	1 " " '07	45,895	29,194	16,701	1,045	15,656
	12 " " '08	552,574	367,909	184,665	39,774	144,891
	12 " " '07	521,181	376,639	144,542	18,021	126,521
TOLEDO, O. Toledo Rys. & Lt. Co.	12m., Dec. '08	2,542,110	1,377,021	1,165,089	851,782	313,307
	12 " " '07	2,565,200	1,455,503	1,109,697	794,996	314,701
	1 " Jan. '09	225,317	130,060	95,257	71,013	24,244
	1 " " '08	217,739	125,088	92,651	68,605	24,046

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MARCH 13, 1909 No. 11

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents
Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL 11,000 *copies are printed.*

Neglecting Passenger for Freight Service

Freight transportation has become an established factor in the operation of many interurban railways, but sometimes to the detriment of the passenger business. The fact that all classes of rolling stock on an electric railway receive power from a single source and are therefore interdependent explains why heavy freight haulage is injudicious when the power supply and schedule conditions are unfavorable. This point is illustrated by the following instances culled from the present practice of three interurban lines operating out of large cities. On one of these lines it is not infrequent to couple several freight cars to a motor coach with the inevitable result that the passengers reach their destinations 30 to 60 minutes late. The dispatcher of a second road has the habit of allowing a train of standard freight cars on the line just when the home-going commuters have settled down to their newspapers or whist. The next moment their car is moving about fast enough to synchronize with the gentle jog of a brewery horse and the lamps by their blushing guiltily admit the drop in voltage. A third railway uses the passenger cars as spare freight vans with no good consequences to their inside finish and cleanliness. Delayed schedules, poor lighting and unkempt cars in no wise help to build up the suburban towns along these railways. When the greatest attractions of passenger transportation by electricity are so neglected as by these companies it cannot be said that their large freight business necessarily indicates progressive management. To an electric railway freight rarely if ever is as profitable as the passenger business; hence there is no reason why it should be permitted to hamper the latter.

Mr. Ely's Article

It is doubtful whether any of those who devoted so much time and thought to the reorganization of the association between 1903 and 1905, even Mr. Ely himself, realized the extent and importance of the work which the association as an organization would be called upon to perform during the following four years. But through a fortunate combination of circumstances, a working body was created in 1905 to take up systematically the various problems in all the departments of the electric railway industry before the time when the need for such an organization would be most strongly felt. It was another case in which wise forethought has been justified, because since the reorganization serious problems which the railways can best solve by co-operative action have come on apace. They have not been confined to matters of public relations, but questions of an engineering, legal, accounting and transportation character have proved as important, although of a different nature, as those concerned with the relations of the roads with the State. In another column of this issue Mr. Ely makes an eloquent plea to those companies who are not fully acquainted with what has been done to learn for themselves by giving the matter a half-hour's serious consideration. That much, at least, is due the importance of the subject, and we believe is all, in fact more, than is necessary to prove the necessity of the present work of the American Street & Interurban Railway Association.

The Milwaukee Fare Case

The proceeding under which the Railroad Commission of Wisconsin is making an inquiry into the rates of fare charged by the Milwaukee Electric Railway & Light Company had its origin in a resolution passed by the City Council of Milwaukee, which was designed to force, if possible, the establishment of 2-cent fares. As no analysis was needed to show that this rate of fare was impossible, the council afterward amended its resolution to provide for a 3-cent rate, which is equally unattainable.

During the progress of the hearing the company has presented testimony to justify its charges to capital account, its appropriations for reserve funds, and all other operations pertaining to its finances, regarding which any question has been raised. The thoroughness with which the company has prepared its case and the completeness of the testimony submitted in its behalf are evidenced by the reports of the hearing published in the Electric Railway Journal.

Beginning with the original consolidation of the Milwaukee properties and their electrification, the advantages made possible by years of development have been demonstrated by the various witnesses. In the improvement which substituted electricity for horse and mule power, the property conferred incalculable benefits upon the residents of the city of Milwaukee, not, of course, as a matter of benefaction, but as a business enterprise, for which an adequate return should be allowed without question or demur by the public which is enjoying the advantages of the betterment. Other changes have been made by the company, as described by Mr. Beggs in his account of the history of the property; and while they are less spectacular than the progress from the horse car to electric equipment, and not subjects of public observation, they were just as much in the nature of benefits, were required by the advance in the art, and are legitimate elements which should be taken into account in any computation relating to the cost of operation of a street railway system.

Among the improvements which may be ranked as public benefits is the Public Service Building, which Mr. Beggs properly said was the last thing that should have been attacked by the city, because of the attractive appearance of the structure and the wholesome quarters which it offered the employees who worked there during the day, as well as those of a recreational and educational character. This important improvement provided quarters as a substitute for old offices in which, Mr. Beggs stated, the employees stayed too long. The advantages to the employees of attractive quarters cannot be controverted, but it was stated that inside of 10 years the building will carry itself and pay a dividend to the company, without cost to it, making the investment a wise one, if viewed solely from a business standpoint, without consideration of the humanitarian aspect involved.

In addition to the tangible elements entering into the cost of the property, the testimony included a recital of the intangible values which are apparent in the success of the company. The value of the service rendered by the railway continuously depends upon constant efficiency in management; unless this quality is to receive recognition in earnings sufficient to recompense those who give it for the effort put forth, and to stimulate to further endeavor, the ultimate effect would be the loss of the ability desired in public utility corporations and the withdrawal of the capital which bases its confidence on the belief that an adequate return will be allowed for successful administration.

Franchises, Limited, Perpetual and Indeterminate

Commissioner Milo R. Maltbie, of the Public Service Commission, First District of New York, discussed the relative merits of perpetual, indeterminate and short-term franchises in an instructive report recently submitted to the other members of the commission. The report has been printed, and is the valuable contribution to the literature on the subject which one would expect from the careful student of governmental policies which Mr. Maltbie has shown himself to be, although we do not believe that railway companies will agree with all of the conclusions reached. Mr. Maltbie marshals nine objections to the short-term limited franchise, and cites only one merit, namely, the possibility of municipal purchase and of readjusting operating methods to public needs at short intervals. But he explains that this is usually secured only at the expense of good service and low fares, and that where the franchise provides that at the expiration of the term the property shall revert to the municipality without payment, a poor service is almost inevitable.

Mr. Maltbie is a strong advocate of the indeterminate franchise, but believes that it should always be coupled with a provision that in case the franchise is revoked the company should be paid the value of its property, plus a prescribed bonus where the profits are small or non-existent during the first few years of an enterprise, or where the purchase takes place within a short time after capital expenditures have been incurred. Absence of such a provision of purchase constitutes the chief defect in the Massachusetts system of indeterminate franchises. Mr. Maltbie also considers that the power of purchase should not be confined to the municipality, but should also be permitted to another company, to be authorized by the city, because the latter may not have the financial means to pay for the plant, even temporarily, and municipal operation may be neither feasible nor desirable. The new public utilities law of Wisconsin provides for the purchase of the property by the municipality, but does not permit the alternative of private purchase suggested by Mr. Maltbie, and in this respect he considers it to be seriously defective. The Chicago plan, on the other hand, authorizes either method of purchase, and if the option is exercised before the expiration of the franchise term of 20 years for any purpose other than direct municipal operation or for transfer to a company which agrees to limit its profits to 5 per cent, a bonus of 20 per cent must be paid.

The chief defect of the indeterminate franchise, as we see it, is that it places a tremendous amount of arbitrary power in the hands of those to whom the question of revocation is delegated. "Good behavior," the usual expression to describe the condition under which a railway company is permitted to continue to operate, is a very difficult term to define. If provision is made for the return of the

capital invested, including initial and organization expenses, the injustice of revocation will, of course, be very much less than otherwise. Yet if there is constant danger that a company's affairs will be summarily suspended or turned over to somebody else at the whim of a commission, or even of the electorate at large, it will militate against good service and permanent plans for the future. Experience with indeterminate street railway franchises in Massachusetts has been successful only because, while the franchises are revocable, none of importance has ever been revoked. That is, the franchises are practically perpetual, so that while the two methods theoretically are removed as far as possible in this case they are practically identical. On the other hand, the perpetual franchise, which Mr. Maltbie condemns, has been shown in New York to afford as much opportunity for regulation as those which are revocable, and at the same time gives a sense of greater security to the company, and thus affords more encouragement to install permanent improvements.

The chief objections which Mr. Maltbie urges against perpetual franchises are four in number. He says that "it is unwise and unsafe for a city to grant permanent vested rights to use public property when * * * no one can foresee what the future needs of a community will be, and what may be desirable at one moment is very likely to be undesirable in the near future." But experience has shown that such changes can be required with a perpetual franchise, and when the New York Central was obliged to install electric motive power in the Park Avenue tunnel it could afford, with its real estate rights in perpetuity, to go far beyond the demands of the State. Mr. Maltbie further considers that "it is inconsistent with the idea of free government, instituted for the benefit of the people, to surrender for all time to private interests a valuable special privilege in the public streets." But we cannot see that it constitutes any greater inconsistency than is involved by the right to cross streets, followed by every steam railroad company, or, in fact, in the grant of title of any private property within the city. The third objection is that "perpetual franchises tend ultimately to produce over-capitalization, high rates, poor service, indifference to public welfare and lack of progress." But this presupposes no public regulation.

Finally, it is claimed that "even under an effective system of public regulation and control, there are times when * * * a complete reorganization is the only remedy that will effect a complete cure. In such instances a perpetual franchise is often an insurmountable obstacle. If the situation becomes unendurable the power of eminent domain may be invoked, but the extreme cost of acquisition under such procedure is often prohibitive, as it represents not the actual value of the property, but the capitalized value of prospective earnings for all time to come." We admit that there must be some give and take policy when both the railway and the municipal authorities have rights which must be considered. It is very questionable, however, whether the other alternative is not far worse. If the authorities have arbitrary power to overturn a company's business, even by the payment of a nominal sum, or if such a tempting bait is constantly dangling before the eyes of rival promoters as control of a large city property, will it not be the inevitable tendency of railway companies in States which really have revocable franchises to enter into politics and thus insure the election of those favorable to the retention by them of their property? With a perpetual franchise as complete regulation is possible as with revocable franchises, even to the practical confiscation of a company's profits through taxation. But as the amount of property at stake is less, the company is farther removed from politics than with a franchise revocable at any time by a regulating body or even under stress of temporary political excitement by a referendum.

Car Records as Legal Evidence

In examining the numerous kinds of car inspection and repair records in use it is astonishing to find how few of them would be admissible as legal evidence. Some vouchsafe no more information than a cryptic "o.k." opposite a car number, others bear the initials of the employee with an explanation of the work done, and a select few give the repair account legal value by including the signature of the inspectors and the countersignature of their foremen.

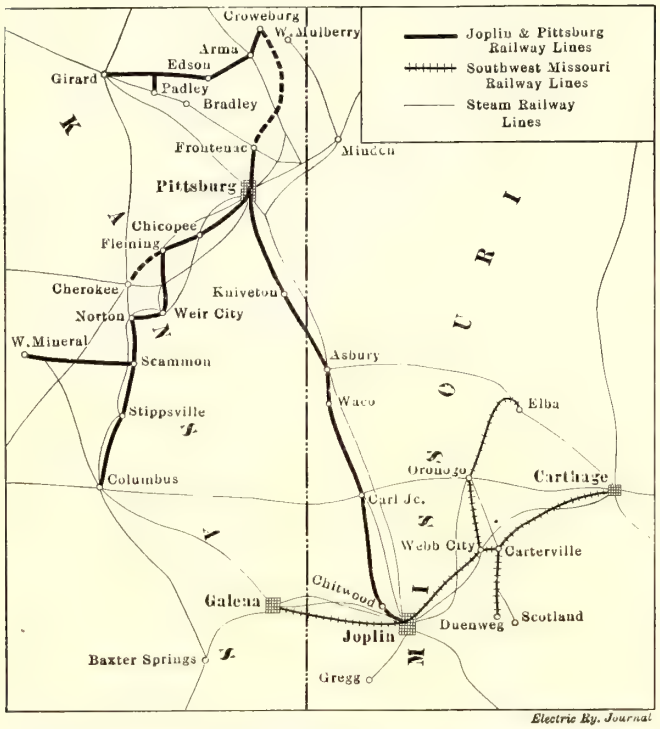
Surely this laxity must be the cause of unnecessary trouble for the claim department. If records are kept at all, it is worth while to make them respected in the courts. Signatures alone, however, would not constitute a satisfactory exhibit. For example, inspection records of the card type with a signature opposite each division of equipment are faulty in so far as they fail to reveal special circumstances. If the car required other than perfunctory attention, the card should be reinforced by an additional signed report, giving the details. In some shops the repairs are recorded by the individual employees in one book. This log system must prove a rather clumsy procedure, and, besides, it is not feasible to allow such a record of all cars to be removed every time the legal department wants to submit it as evidence regarding particular rolling stock.

It is essential that these detailed reports should not be limited merely to those cars which are brought into the terminal in connection with a reported accident. Conductors often fail to report that passengers have entangled their clothing on a projecting bolt, slipped on an icy platform or tumbled backward from a moving car. Perhaps six months or a year afterward, some of the people thus involved become imbued with the idea of mulcting a transportation company, and hand in a claim for injuries to body and peace of mind. The legal department may assiduously dispute the allegations of the complainant but, having no evidence that the cars were not in a neglected state, it must seek a compromise in preference to more costly litigation.

All of this trouble would be eliminated if the maintenance department could offer records of value to its legal fellow-workers. It is highly desirable, therefore, that both branches of the service co-operate in preparing a form which will fulfill both mechanical and legal functions. Incidentally, the filing of the original papers with the legal department will make it unnecessary to bother the shop force every time the history of a car is wanted in connection with liability for negligence cases.

NEW INTERURBAN LINE OF THE JOPLIN & PITTSBURG RAILWAY COMPANY

In October, 1908, the Joplin & Pittsburg Railway Company inaugurated service on a new, well-built line from Pittsburg, Kan., to Joplin, Mo. With this addition of 24 miles of track, the company now has a system of 68 miles of city and interurban lines centering in Pittsburg



Joplin & Pittsburg—Map of System Showing Connections in Joplin

and radiating in three directions. Reference to the accompanying map will show that these lines are located in southwestern Missouri and southeastern Kansas. In this territory is to be found the very unusual combination of great fertility of the soil and extensive mines of coal, lead and zinc.

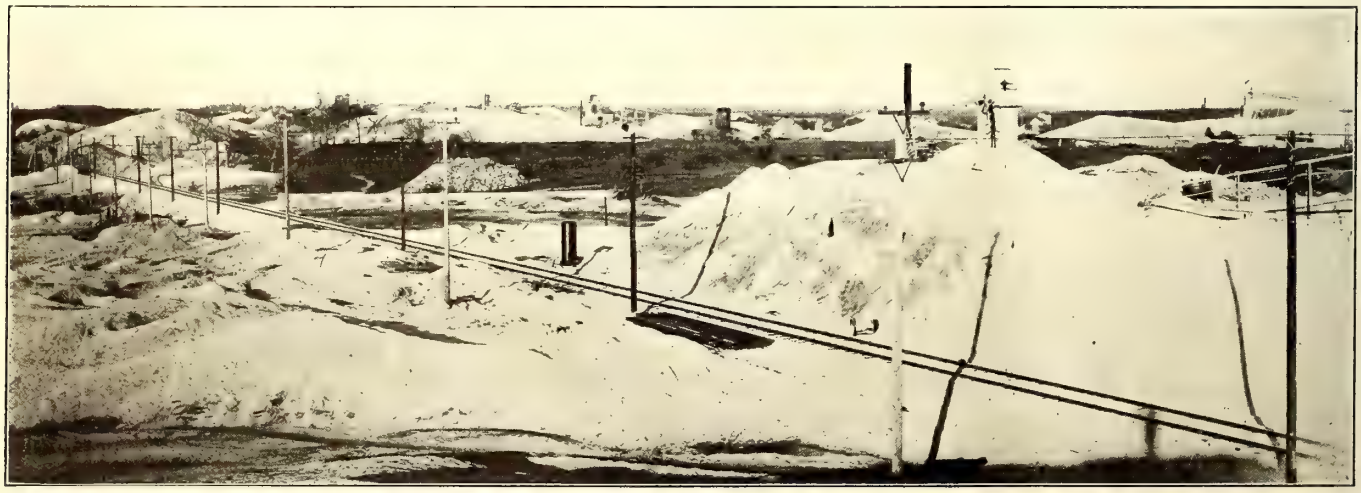
In addition to the Joplin-Pittsburg division, which forms the subject of this article, the company operates an older division, about 32 miles long. This line extends from Frontenac, Kan., south through Pittsburg, and thence southwest through Weir City, Scammon and Stippsville to Columbus, Kan. Last spring a branch of 5.5 miles, extending from Scammon on the Pittsburg-Columbus line, west to West Mineral, was completed. The construction of this new branch corresponds with that of the Pittsburg-Joplin division. In the city of Joplin the company has 6.5 miles of track through principal streets, which track is built of 70-lb. rails with white oak ties laid in concrete and paved to correspond with the street surface. The lines of the Girard Coal Belt Electric Railway Company, running from Girard, Kan., in a northeasterly direction through the towns of Arma and Franklin to Croweburg, with a branch to Radley and Dunkirk, have just been purchased, and arrangements are under way for the construction of from 8 to 10 miles of track to make the connection with the lines of the Joplin & Pittsburg Railway Company. This will give the company as complete control of the situation in the rapidly developing coal fields lying north of Pittsburg as it already has in the thickly populated region south of that city. The town of Cherokee has recently granted a liberal franchise to the company, and a branch line about 2½ miles long will immediately be built to it from the main line. When these extensions are all completed the company will be operating more than 100 miles of finely built, well-equipped electric railway. At Joplin connection is made with the Southwest Missouri Railway, an interurban electric line operating between Joplin, Webb City, Carterville, Carthage and Oronogo, Mo., and Galena, Kan.

These three lines, the Joplin & Pittsburg, Girard Coal Belt and Southwest Missouri, serve a population of over 250,000, so distributed as to insure a relatively much larger business than would usually be obtained from the same number of people.

TERRITORY SERVED

Joplin, the southern terminus of the new division, is the center of an important mining district, which has had a remarkable growth. In 1890 the population of Joplin was 9943; in 1900, 26,123, and at the present time it is estimated to be in excess of 45,000. The city itself has large public buildings, one of the finest hotels in the State of Missouri and many fine residences. It is the shipping center for a large region. The Missouri Pacific, the Missouri, Kansas & Texas, the St. Louis & San Francisco and the Kansas City Southern railroads afford excellent transportation facilities.

In the zinc fields immediately surrounding Joplin the estimated zinc and lead production for the last year was $18,500,000, which is said to have been about 60 per cent



Joplin & Pittsburg—Zinc Mines and Chats Piles from Which Ballast is Obtained

of the zinc and lead mined in the United States and about 30 per cent of that of the world.

The city of Pittsburg, which is the northern terminus of the interurban railway, now has a population of more than 20,000. In 1900 the population was 10,112, a growth of about 100 per cent in eight years. Pittsburg is the center of the finest bituminous coal fields between the Mississippi River and the Rocky Mountains. In these fields more than 10,000 miners are employed, and the value of the mine output is more than $20,000,000 a year. Pittsburg is surrounded by extensive shale beds and great quantities of brick, tile, sewer pipe and cement are manufactured near by. The city is well equipped with public utilities, has fine hotels and many handsome residences. Pittsburg also is a large shipping center, the Kansas City Southern, Santa Fe, St. Louis & San Francisco and the Missouri Pacific railroads giving it unusually good transportation facilities.

Both Joplin and Pittsburg are near the Kansas oil and gas fields, and are supplied with natural gas from these fields. There is an unusual mutuality of interest between these two mining fields, the Pittsburg district supplying the coal for fuel, power and other purposes in Joplin. In the Pittsburg district are located the smelters where the zinc and lead ores from the Joplin district are treated.

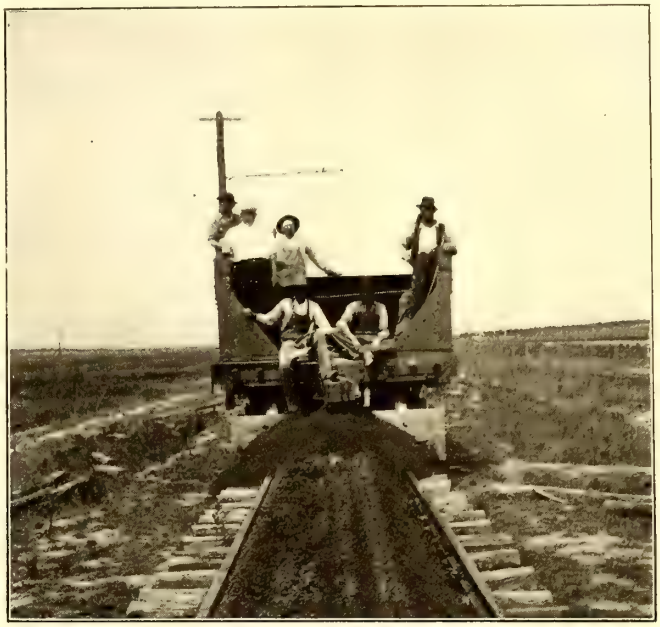
The new interurban division connecting the cities of Joplin and Pittsburg is 24 miles long, and is located on a private right of way the entire distance. Woven wire fencing supported on concrete posts encloses the 100-ft. right of way.

ROADWAY

Steam railroad standards were followed in the roadway construction. The total curved track on the 24 miles is but 7300 ft., and no curve exceeds 3 deg., and there are only two of these, the remainder being 2-deg. curves.

The grades are very light, considering that the south end of the roadway is in Joplin, Mo., at the north foothills of the Ozark Mountains. The heaviest grade is one of 2 per cent for 2000 ft. On 80 per cent of the total length of the interurban road the grades do not exceed 1 per cent. The road is built on prairie country from Carl Junction, Mo., to Pittsburg, Kan., about 18 miles.

All openings for drainage less than 8 ft. and requiring more than 24-in. pipe have standard square-box and double-arch culverts of modern design. The concrete used for the track substructures comprised the Kansas hydraulic cement mixed with chats and river sand in the proportion of 1:5:2. The concrete boxes were so designed as not to require steel reinforcement.



Joplin & Pittsburg—Spreading Ballast

There are seven bridges between Pittsburg and Joplin; one is a 250-ft. through-truss bridge and the other shorter structures are I-beam and built-up girder spans. The bridges were all built and erected by the Southwestern Bridge Company, Joplin, Mo. The concrete abutments and piers were designed and constructed by the contracting engineers.

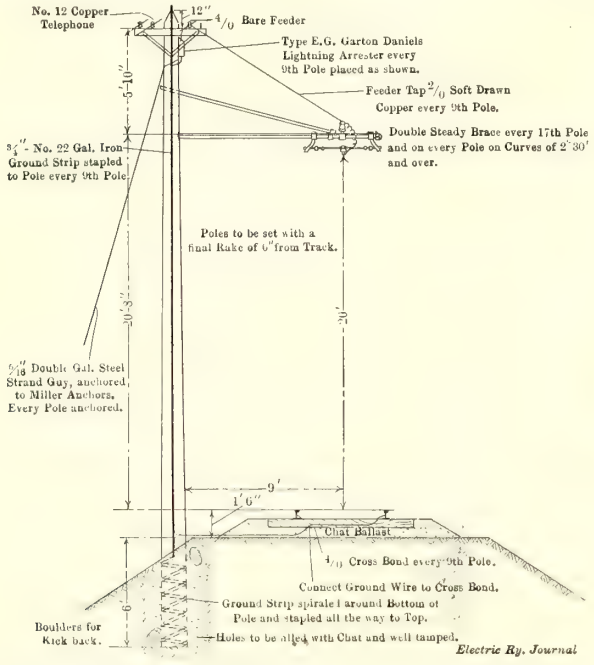


Joplin & Pittsburg—Main Street in Pittsburg, Kan.

TRACK CONSTRUCTION

The track is laid with 33-ft., 70-lb., A.S.C.E. Bessemer rail with "100 per cent" joints, supplied by the Cambria

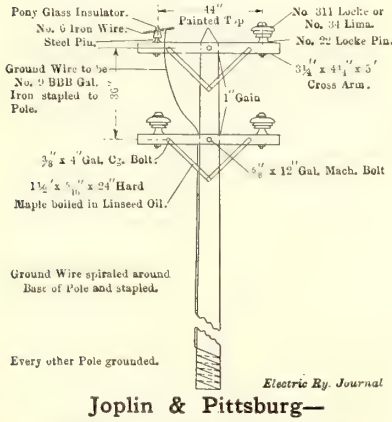
Steel Company. The No. 1 oak ties are spaced on 2-ft. centers. The joints are bonded with two No. 0000 U. S. concealed bonds. The bonds have ⅞-in. terminals. All drilling for the bonds was done after the rails were spiked down. Oil or water was not used, and the bonds were compressed immediately after drilling, with a view to preventing any rust from accumulating on the bright



Joplin & Pittsburg—Standard Track and Overhead Construction

surface formed by the drilling. The rails are cross-bonded every 1000 ft. with No. 0000 bonds.

The road has seven sidings, one double-end siding and six single-end sidings. Standard 15-ft. split-point switches and 8-deg. spring rail frogs are used. The switchstand is 6 ft. high, with a target rod bearing the red and white signals, and also the red and white oil-burning lamps. The switches and frogs were built by the Weir Frog & Switch Company, of Cincinnati, and the Falk Company, of Milwaukee. The special work for the car barns and the railroad crossings was also manufactured by the Falk Company.



Joplin & Pittsburg—High Tension Pole Line

BALLASTING

The material used for ballasting is the ordinary tailings from the zinc and lead mines, commonly called "chats," which range from ¼ in. to ½ in. in size. All of this material used was obtained along the line of the railway company in the Joplin district. An average of about 2400 cu. yd. of ballast per mile was used, but was so distributed in rock cuts as to offer just the necessary thickness to bed the ties and a sufficient amount at the outside ends of the ties to hold them in their proper place. On fills and soft ground the ballast is from 8 in. to 10 in. deep underneath the ties, with a shoulder about 1½ ft. outside of the ties. The steam roads in the zinc and lead districts make a special effort to use chats for ballast. The greatest expense in connection with this ballast is in the hauling and distributing, as it can be obtained from the mines for 3½ or 4 cents a cubic yard.

Accompanying engravings show the methods used in handling the ballast. The chats were loaded from the piles at the mines into Rodger center dump ballast cars



Joplin & Pittsburg—View of 100-ft. Right of Way Showing Double Pole Line

by a steam shovel, and also by an elevator system, which is used extensively in the Joplin district. By the latter method the material was pulled with horse and scraper over a small pit and dumped into a conveyor, which hoisted it to a sufficient height to allow it to fall into the center of a car. One such outfit could load from 300 to 400 cu. yd. per day. This method was used in addition to the steam shovel capacity.

Each ballast train consisted of eight cars. The crew was composed of a conductor, two brakemen and a helper. In unloading, all the cars were first dumped in the center of the track. This left a ridge between the rails about as high as the axles. After the cars had all been dumped a

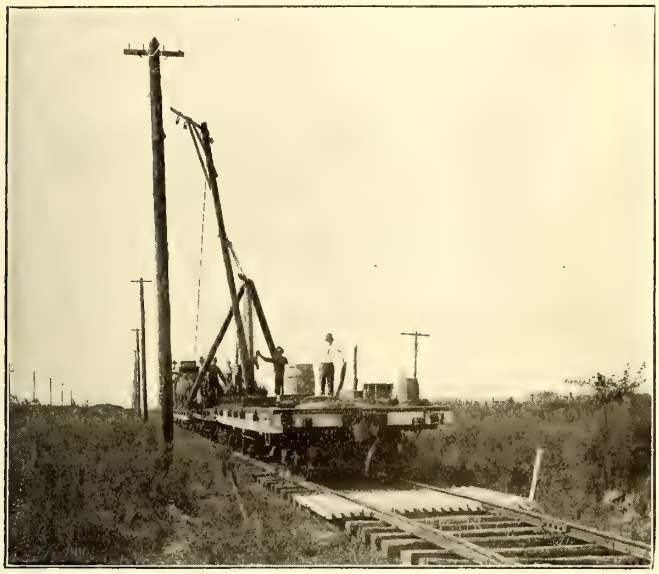


Joplin & Pittsburg—Setting Trolley Poles

"push board," made of 4-in. x 12-in. oak plank 24 in. high and 8 ft. long, was fastened to the forward truck so that it rested on the top of the rails. The locomotive then started to push back over the material that had just been dumped, and thus leveled it off in a smooth and uniform manner even with the tops of the rails. Then the

surfacing gang made the first lift and brought the rails practically up to their final height.

The second ballasting operation was similar to the first, with the exception that a piece of 4-in. plank 4 ft. 6 in. long was bolted below the push board and between the rails. In pushing back over the second layer of ballast this lower board cleared the space between the rails. This

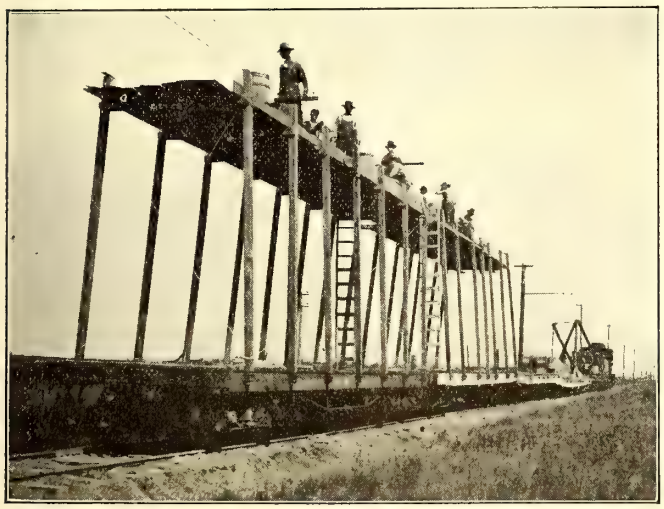


Joplin & Pittsburg—Stringing Wires on Trolley Pole Line

made it unnecessary for the workmen to shovel any material off the top of the ties. With practice the men could dump just a sufficient amount to properly ballast the track, leaving material for the 1-ft. slope on each end of the ties. A train of eight cars could be dumped in from 20 to 25 minutes. In ballast hauling three 80-ton, 10-wheel locomotives were used. The older line from Pittsburg to Columbus is ballasted with smelter cinders, which afford a very solid roadbed.

OVERHEAD CONSTRUCTION

The pole line for the support of the catenary and feeder



Joplin & Pittsburg—Platform Car Used in Erecting Catenary Trolley

system consists of 35-ft. 8-in.-top yellow pine, zinc and oil-treated poles with the ordinary form of T-iron brackets 11 ft. long. The treated poles were supplied by the Zinc-oil Pole Company, Texarkana, Tex. The trolley is suspended 21 ft. above the head of the rails. The feeder system consists of No. 0000 hard-drawn round copper wire with feeder taps 1000 ft. apart and Garton-Daniels lightning arresters at each feeder tap. The lightning arresters are grounded by using Roebling's Sons Company's ¾-in. triple-galvanized ribbon wrapped around the pole at the bottom to give a sufficient ground contact. This ribbon is also connected with the rail to give an additional ground.

Although 600-volt direct current is used to operate the cars the trolley wire is catenary supported. The messenger is ⅜-in. Siemens-Martin double-galvanized steel cable. Twelve hangers support the No. 0000 trolley wire between the brackets, which are 120 ft. apart. The trolley fittings were supplied by the Electric Service Supplies Company.

A very efficient method was used in setting the trolley poles and stringing the overhead and feeder lines thereon. The essential part of the equipment for doing this work was a derrick mounted on a flat car and operated by a small hoisting engine. In setting the poles a second flat car was coupled to the derrick car and both were pushed by a locomotive. The second car was used to carry the poles to be set. While the derrick was lowering one pole in its hole and while the train was being moved ahead to the next pole hole the men on the pole-supply car had time to fasten the block and fall to a second pole, thus making it ready for



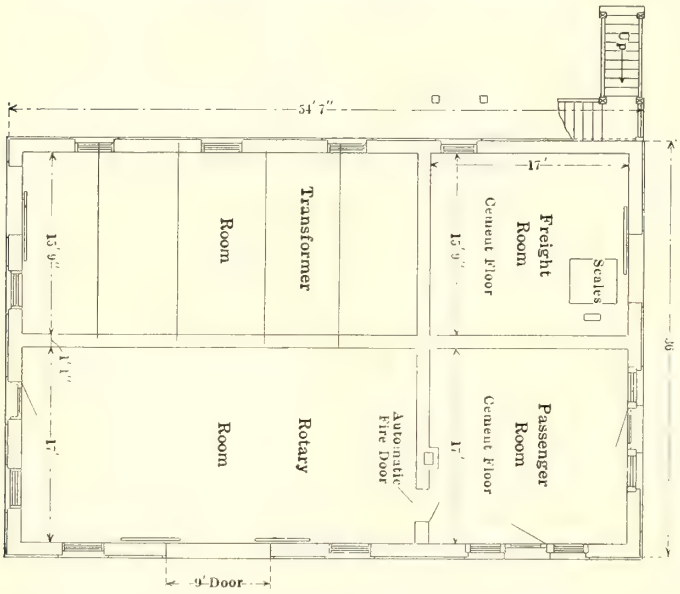
Joplin & Pittsburg—Substation at Asbury, with Living Rooms Above

hoisting and setting as soon as the train reached the second hole. It is stated that in this manner and with a crew of three men about 3 miles of poles could be set in an hour Accompanying illustrations show the construction train as arranged for setting poles, stringing feeders and hanging trolley wire.

The feed wires, which are carried on short cross-arms at the tops of the poles, were placed with the same derrick car that was used in setting the poles. A carload of reels of wire was coupled next to the derrick car so that when one reel had been emptied the wire from a fresh reel placed on the opposite side of the derrick car could be made ready for splicing to the wire just payed out. The splicing and soldering was finished as the wire was placed and the stretching progressed at a rate of about 3 m.p.h. The catenary messenger and the trolley wire were placed by this same derrick car and after they had been properly drawn up and anchored special tower cars, as shown in the illustration, were used while the hangers were placed. These tower cars comprised two flat cars with elevated platforms long enough to cover half a span and thus six hangers could be placed without moving the train. Twelve linemen were

used to fasten on the ears and place the hangers. Before beginning the work all the material was sorted along the platform so that there would be no mistaking the length of hanger for each location as the train moved forward.

Western Electric telephone equipment is used, consisting of pole boxes, jack boxes and also portable telephones for the cars. The telephone line consists of two No. 12 hard-drawn copper wires transposed every 1000 ft. Telephone boxes are placed at each siding and jack boxes for portable car sets are installed at intervals of 1 mile.

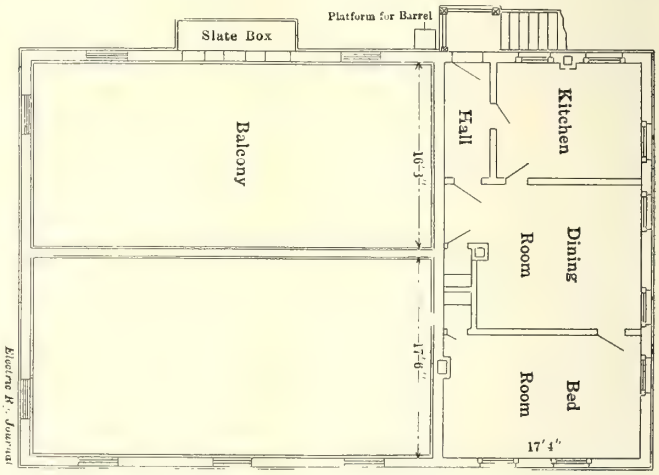


Joplin & Pittsburg—Plan of Ground Floor of Asbury Substation

POWER SUPPLY

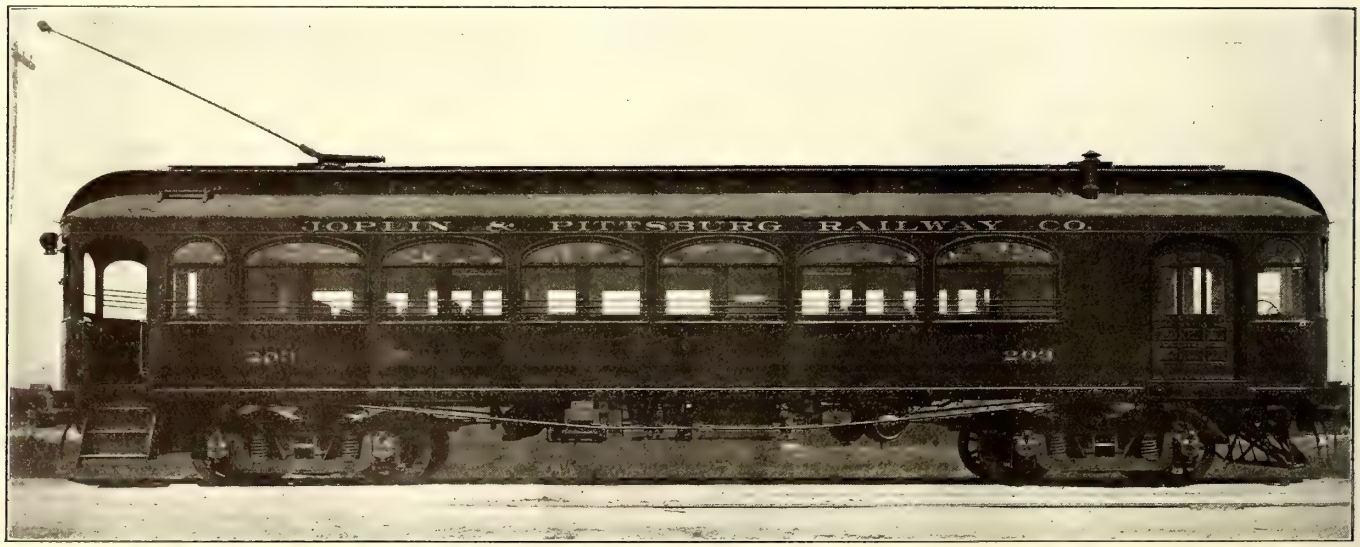
The power for operating the new division is partly supplied by the Spring River Power Company, which has a water-power plant located at Lowell, Kan. The railway company has a power station in Pittsburg which feeds the city lines and part of the interurban system. At this station are three Heine 375-hp water-tube boilers arranged for firing with either coal or natural gas. The main generating units are two Siemens & Halske 700-volt d.c. generators direct driven by two Russel tandem-compound engines. A second power house at Scammon on the Columbus division has an Allis-Chalmers Corliss engine which drives a 400-kw, 600-volt Bullock railway generator. There are also two 150-kw, 600-volt generators belt driven by high-speed engines. The latter are emergency units. Both of these stations are non-condensing and it is necessary to treat the water at both.

A part of the new division is supplied with direct current by two rotary converter substations which receive power from the hydraulic plant earlier mentioned. One substation (No. 1) is located just north of Joplin and the other (No. 2) is at Asbury, Mo. Current at 33,000 volts is brought to each substation from an independent branch of the generating company's transmission system. Substation No. 1, near Joplin, is fed by a transmission line owned by the power company, but the railway company built and owns the high-tension line from Carl Junction, 10 miles north to the Asbury substation.



Joplin & Pittsburg—Plan of Second Floor of Asbury Substation

One of the views shows the location of the transmission line at one side of the railroad right of way and at a safe distance from the overhead trolley system. The type of pole-top construction adopted was that used by the Spring River Power Company. In this company's experience the design had shown itself to be the most satisfactory. The transmission line comprises 30-ft. and 35-ft. cypress poles with 8-in. tops carrying on two cross-arms three No. 4 hard-drawn copper wires arranged at three corners of a rectangle. At the fourth corner is a No. 6 iron wire in-



Joplin & Pittsburg—Standard Passenger Car

stalled for lightning protection. At every second pole the iron wire is connected to ground by a triple-galvanized soft-iron ribbon. The poles of this line are treated with carbolineum to a point above the ground line.

The substation buildings are constructed of Kansas red brick laid with ¼-in. white mortar joints. The roof is covered with tar paper and gravel. The stations and equipment are in duplicate except that the Asbury station has an extension of 18 ft. to accommodate a waiting room and a freight room and also has on the second floor, over these rooms, comfortable apartments for the operator and his family. An outside stairway serves for entrance and exit to and from the second floor.

The freight room is equipped with Buda platform scales for weighing freight. The passenger room has all the modern conveniences for taking care of passengers in the way of heat, drinking water, etc. The heat is furnished for the living apartments and the passenger room by coal stoves.

The 33,000-volt transmission wires are taken into the machine room through a box made of Carthage limestone slabs 1¼ in. thick. The wires pass up through the bottom of the box, which is attached near the roof on the outside of the rotary room. There are three 60,000-volt insulators in the floor of the box and also on the inside wall of the building, which is so close to the openings that it is impossible for birds to short-circuit or to foul the wires.

Each substation has two 300-kw Westinghouse, 25-cycle rotary converters with transformers, switchboard and all the necessary equipment. The rotaries are located in a room 70 ft. 6 in. long by 34 ft. 8 in. wide. The ceilings, 22½ ft. high, give sufficient overhead room for proper ventilation, both in the rotary room and the transformer room. The floors are of concrete 6 in. thick. All conduits for the wires to and from the switchboard are concealed in the floor and the ducts are large enough so that any wire may easily be replaced. The rotary foundations are hollowed out to form pits 3 ft. square and 12 in. deep. These openings immediately under the center of the rotaries accommodate the wires which pass into the ducts leading to the back of the switchboard, where there is another pit 18 in. deep, 3 ft. wide and 28 ft. long. The oil-break switches for opening the 33,000-volt circuits in the transformer house are manipulated by levers from the switchboard.



Joplin & Pittsburg—Express Car

In the transformer room are six oil-insulated, air-cooled Westinghouse transformers of 100-kw capacity each. The floor of this room also is of concrete with the necessary ducts concealed in it.

CAR HOUSE

The Joplin division car house at Joplin is located at the west end of the city on a lot 211 ft. x 420 ft. in size. The outside dimensions of the car house are 29 2ft. 6 in. x 63 ft. The barn is divided by a 12-in. firewall running in the center of the building and extending 2½ ft. above the roof. The structural material of the building is Kansas red brick laid with white lime mortar and trimmed with Carthage limestone. The building has a flat roof supported on 10-in.



Joplin & Pittsburg—Car House and Shop at Joplin

I-beams and built of 4-in. Southern pine covered with tar paper and gravel.

In the southern portion of the car house are two 60-ft. repair pits of concrete. This compartment contains the work shop. There is also a car pit 95 ft. long affording sufficient room to work under two of the 53-ft. passenger cars at the same time.

The northern portion of the car house was planned to have when extended the same number of car pits as the southern portion. Each compartment has two tracks the entire length of the car house. The opening at the east end of the car house for car entrance is closed by large iron swinging gates. There is a small workshop 25 ft. long in the rear of the car house. The main repair shop of the Joplin & Pittsburg Railway is in Pittsburg, Kan.

The special track work leading to the car house in Joplin is so arranged as to form a "Y." On this cars may be turned and started in either direction without first having to run up into the center of the car house to be turned. Both compartments of the car house are equipped with 2-in. hose for fire protection. There are also separate hydrants for car washing.

The offices for the operating department and the rooms for the motormen and conductors are stationed just in front of the car house. This location affords a view of both sides of the car house and of the street at the same time. These offices are built of wood and are heated by natural gas stoves. Here the motormen and the conductors have a card room and lockers for their extra clothing.

ROLLING STOCK

The rolling stock equipment of the entire road includes the following cars:

5 double-truck 53-ft. passenger.
2 double-truck 53-ft. express.
15 double-truck 43-ft. passenger.
4 double-truck open, seating 85 each.
7 single-truck closed.
12 single-truck open.
2 line and wrecking.
10 flat.
3 ballast.
6 coal.

The general characteristics and dimensions of the large passenger cars which are operated on the new line and

which were described in the Electric Railway Journal for Sept. 26, 1908, page 712, are as follows:

Length over all	53 ft. 9 in.
Length of main compartment	24 ft. 1 in.
Length of smoking compartment	10 ft. 5 in.
Length of rear platform	4 ft. 0 in.
Width over all	9 ft. 6 in.
Height—bottom of sill to top of roof	9 ft. 8 in.
Trucks	Class 78-30 Baldwin.
Axles	5½ in.
Wheel base	78 in.
Center-pin load (capacity)	30,000 lb.
Wheels	33 in. Standard.
Weight of truck with motors	11,000 lb.
Control system	Electro-pneumatic.
Headlight	Imperial.
Heater	Smith.
Air brakes	Westinghouse AMM.
Motors	4 Westinghouse 112-B.
Air sander	Lintern.
Curtain material	Pantasote.
Curtain fixtures	Forsyth.
Window fittings	Edwards.
Couplers	Tomlinson.
Signal system	Lintern.
Fare register	Ohmer.

The bodies of these large interurban cars were built by the Jewett Car Company. The bottom framing of the bodies consists of six yellow pine sills. The side and center sills are of compound construction, the former having 7-in. I-beam and the latter 6-in. I-beam reinforcement. The bolsters are extra heavy and have pressed-steel fillers extending their full length. The body framing throughout is of white ash and the construction follows the steam-coach type.

The cars are divided into three compartments—baggage compartment in front, smoking compartment in the center and main compartment in the rear. The main and smoking compartments are finished in selected figured mahogany and the baggage compartment in ash, painted white. The ceiling is of the full Empire style and is painted green with gold decorations. The seats in the main and smoking compartments are wide, are of the stationary type with high roll-top backs and arm rests, and are upholstered in green plush. The cars are lighted by 45 incandescent lamps, which are so placed that they form arches of five lamps each across the ceiling. Push buttons and parcel racks form desirable features of the inside furnishings. Both ends of the car bodies are round and glazed with three single drop sash. A motorman's cab on the left side of the front end has a narrow exit door through the side of the car. The doors in the interior partitions are 20 in. wide and are supported on hinges. A toilet room with wash basin and flush hopper is placed at the rear end of the main compartment.

OPERATION

Hourly service is operated over the new line between Pittsburg and Joplin. Express is carried on all passenger cars and a special freight and express train makes a round trip on each division every day. A minimum rate of 25 cents is charged for packages carried on passenger trains. The service on the Columbus, Frontenac and Mineral branches is operated on half-hour headway. In Pittsburg a local service with 15-minute headway is operated and in Joplin a 10-minute city service is given. On the interurban division the Nicholl autographic register is used when transmitting orders. These registers are carried in the baggage compartments of the cars and are mounted close to the Western Electric telephone set, which is supported on the bulkhead. The train dispatcher is located in the general office at Pittsburg and has to assist him in following the trains, route boards with plugs numbered for each train, which plugs are moved forward as the trains progress and as orders are issued.

ORGANIZATION

The personnel of the operating staff of the Joplin & Pittsburg Railway Company is as follows: Joseph J. Heim, president, Kansas City, Mo.; W. W. Calhoon, vice-president, Carthage, Mo.; John A. Prescott, secretary and treasurer, Kansas City, Mo.; D. L. Robinson, assistant secretary and treasurer, Buffalo, N. Y.; E. S. Bigelow, auditor, Kansas City, Mo.; R. W. Harris, general manager, Pittsburg, Kan. A. L. Register & Company, Philadelphia, Pa., were the general contractors for the construction and equipment of the Joplin-Pittsburg and the Scammon-Mineral branches and the Joplin city division.

A. C. LINES AT MILWAUKEE TO BE CHANGED FOR D. C. OPERATION

The Milwaukee Electric Railway & Light Company is completing plans for changing over its single-phase, 3300-volt lines for 1200-volt operation. It has been found that the single-phase equipment installed more than a year ago is not capable of handling the increased traffic on the Watertown division of the road. For that reason this division and new interurban lines under construction will be equipped for 1200-volt operation. The present a.c. service extends from Waukesha Beach to Watertown, Wis., 42 miles; from St. Martins to East Troy, 21 miles, and on a new extension of 18 miles from St. Martins to Burlington, Wis. The trolley wire on the single-phase lines is now insulated for 3300 volts and therefore will have a considerably increased factor of safety on 1200-volt direct current.

Five new converting substations will be built. It has not yet been decided whether two rotary converters or two motor generator sets in series will be used to convert the transmission current for feeding the 1200-volt trolley. Each of the two substations which will handle the heaviest load near Milwaukee will be equipped with two sets of 500-kw rotary converters or motor-driven generators. The outlying substations each will have two sets of 300-kw machines. Current will be transmitted over the steel-tower line described in the Electric Railway Journal for Sept. 26, 1908, page 692, at a potential of 66,000 volts.

The change-over from 3300-volt a.c. to 1200-volt d.c. operation will require the re-equipment of 10 passenger cars and two utility cars. The company also is having built at the G. C. Kuhlman plant of The J. G. Brill Company 15 large interurban cars which will be equipped for 1200-volt operation. When the new cars are received and the old ones are re-equipped each will have four 125-hp standard interpolar GE motors designed for 600 volts across terminals, but insulated for 1200 volts to ground. The control connections will be arranged for operating two motors in series on 1200 volts and for series-multiple operation on 600 volts. The control equipment will also be designed for train operation. The air compressor motors will be built to operate at full speed on 1200 volts and at half speed on 600 volts. The pump and reservoir capacity will be large, so that there may be plentiful storage on low-voltage sections. A dynamotor will be installed on each car to convert the 1200-volt current to 600 volts for use in lighting the car.

ARE WE GETTING OUR MONEY'S WORTH IN THE ASSOCIATION?

BY HON. W. CARYL ELY, PRESIDENT OF THE AMERICAN STREET & INTERURBAN RAILWAY ASSOCIATION, 1903-1906

At the time of the adoption of the new constitution and by-laws and the revised scale of dues payable by member companies of the American Street & Interurban Railway Association in 1905, there was considerable discussion as to whether it would be possible for the association to render service equivalent in value to the annual dues. The very nature of the case precludes one from establishing affirmatively by reference to concrete examples the rendition by the association to individual companies within any given period of an exact number of dollars' worth of work or service. The proposition, then, if it is affirmatively established, must be by reference to the work of the association in general with regard to its applicability to individual members through their occupancy of a position in the general situation.

The change that has taken place within the past few years in the status of the business itself is constantly tending to require from railroad companies the devotion of time and work, particularly with reference to the investigation of questions general and public in their nature, which a few years ago practically did not exist. The business of electric railway transportation is subject to public opinion in its various methods of expression to such a degree that the questions raised cannot be evaded, but must be squarely met. No individual organization can possibly be equipped to meet these various questions. True, as they arise they seem to be concrete and individual because they come out of a particular situation; but they are at the same time coming out of all situations, and to be settled rightly these questions must be treated in their larger aspect as affecting the transaction of the business everywhere, as a whole, as a line of work. To meet these questions with an array of facts carefully gathered throughout the whole country in such a manner as to leave no question as to their truth is, to-day, one of the prime efforts of the American Street & Interurban Railway Association. Some of the leading minds engaged in the business are dwelling with great intensity upon the necessities of the association as a servant of the business and the statistical bureau of the association is being made, and will be made, a collector, conservator and disseminator of facts gathered everywhere, which will become available upon the mere request of any company having any one of the questions to meet that may be involved in this general situation.

The managements of some of the large companies, with receipts running into millions, may say, "Well, we have a staff of men who can do this work should we be called upon to meet a situation that requires it." Very true; but every company has, in the every-day conduct of its business, all the work that all of its staff can do without sidetracking any one of them to an examination of special questions requiring long and constant effort. Moreover, it would not be possible to obtain that degree of acquiescence from a board of experts to information thus specially gathered that could be readily obtained to facts not collected with reference to a special situation, but patiently gathered throughout the years with special reference to their value as facts, rather than as facts for the purpose of proof in a special case. With the growth of the constant tendency toward a larger and wider degree of public regulation and control, the value of a properly conducted and wisely administered statistical bureau of the association will constantly and rapidly increase. It should and will be so conducted as to be immediately available to any one in the time of his necessity. This will be of immense value to the medium-sized companies, but, nevertheless, of great value to the largest companies.

Notwithstanding the statement made above concerning the difficulty of adducing concrete examples to prove the value of the service, the writer knows a case where, within the last year, a controversy between companies and employees was settled favorably to the companies, largely because of the valuable statistics concerning wages of conductors and motormen which had been disseminated by the association in Confidential Bulletin No. 101. These statistics were found to be much more potent in the minds of the three arbitrators who had been chosen by the parties to settle the dispute than if they had been collected by the agents of the companies themselves for use as proof in the particular case at issue. They were general and had been dispassionately collected for their statistical value, and were looked at in that way by the arbitrators. The saving effected in the wages of that particular class of employees would pay the dues of the companies involved for a considerable period, and there are a number of similar cases which have occurred within the last two years in different sections of the country.

I was asked to be brief in this article, and cannot, therefore, argue special instances, but will merely refer to certain well-known achievements of the association within the last two or three years, which are conceded by all to be and have been of the greatest value; for instance, the work before the Interstate Commerce Commission on the classification of accounts, the standardization of equipment, the revision of city and interurban train rules and the establishment of the index bureau of the claim agents, not to mention many other important subjects of vital interest to the electric railway companies which have been actively taken up. But the strongest proofs that can possibly be afforded of the value of the association, as at present conducted, are the things which have occurred since the last annual convention—the general manifestation of a desire throughout the country on the part of the strongest people in the business to get together and, shoulder to shoulder, work for the general improvement of the entire electric railway situation.

At the time of the annual midwinter meeting of the executive committee there were meetings of a number of other committees. These meetings were attended by prominent men from all parts of the country. Two days were devoted to earnest discussion and work; there were no distracting incidents, but committee after committee met at the headquarters of the association in New York and ardently and earnestly performed the work that had been assigned to them. The exchange of opinion thus effected, the discussion brought forth, the acquaintance with new ideas and thoughts evolved out of the situations in the different sections which were brought up for discussion were illuminating and beneficial in the highest degree. These meetings proved to be so valuable that the executive committee expressed itself in favor of holding similar and more extensive annual midwinter meetings in the future.

The value of the association can be made apparent to the individual only if he will take the time to examine what is being done, and the personnel of those

who are engaged in the conduct of the work through the means of the various committees and the permanent bureau of the association at its headquarters in New York. Investigation will surely result in an affirmative answer to the question we are discussing, and without investigation no proposition was ever correctly solved by any one. The principal reason why the association has slowly advanced to a position of prominence, strength and value has been the reluctance manifested by the individual to investigate what results might reasonably be expected to follow from an organized effort from all the members of one of the greatest businesses that is being prosecuted on the earth. Why, the proposition answers itself, if a man will give to the consideration of it 30 minutes of honest thought, and if he cannot give 30 minutes to the consideration of this subject, then, to use a slang but very effective expression, "he is not on to his job." It would seem that the affirmative of the proposition has been established by the very large increase in the membership and the greatly increased interest which is being manifested throughout the country. Personally, I have been familiar with every branch of the discussion of this point from the beginning of the agitation for the change down to the present time, and I have no hesitancy in expressing it as my opinion that there is to-day a general acquiescence in the proposition that the members of the association who work and take an interest are receiving benefits far in excess of the amount of money they are paying. Furthermore, I would hazard this expression of opinion: That, as this work goes on and its value becomes more and more apparent, any scale of dues that any reasonable man might propose would meet with cheerful acquiescence and immediate adoption.

The value of the association is being largely increased through the medium of associate membership. Effort is now being made to secure 1000 associate memberships within the present association year. This effort should be successful, and these associate memberships should be eagerly sought by every branch of trade and business connected with electric railroad transportation. Especially is this true of the banking element. How valuable the work of the association is becoming to the financial people whose moneys are invested in the street railways! Through the medium of associate membership any one in any business connected with electric traction is brought into close contact with the affairs and the conduct of the association, and is placed immediately in a position where he can obtain information concerning it and the people who are connected with it that cannot be obtained in any other way.

I will refer again to that most important work which is now receiving the earnest attention of the association, namely, the effort to impress upon the minds of the people a recognition of the tremendous increase in the value of the services rendered by the transportation companies to the people. Upon a proper recognition and appreciation of this point will inevitably largely depend the condition of the public mind toward the transportation interests. That there is coming to be this recognition in certain quarters on the part of at least some of the people, as well as public officials, is shown in Massachusetts, in which State an increase of fare has been permitted where it is shown that the existing fares afforded an inadequate return for the services rendered. This bears upon the general proposition of the formation and the shaping of public opinion toward our business. We are stating to ourselves in friendly discussion and beginning to contend in public places that we are not paid enough for the service which we render. This proposition is true or is not true; we believe it or we do not believe it. We claim it is true, and we claim to believe it, and we therefore ought to be able to establish it, as and when it is established the conviction of the truth of it must grow in the public mind; that ripens into public opinion, which is the common judgment of men. When the public forms a proper estimate of the value of the service many bugaboos which now perplex the common mind with regard to capitalization, etc., will disappear like the mist before the sun.

With a united effort participated in by all the people who ought to be interested in the results to be obtained, the value of the association will be immeasurably increased and the value in a monetary way will become constantly more and more apparent as a properly informed and molded public opinion acts with increasing justice and fairness toward the general conduct of the business.

REPORT ON THE NEW YORK RAPID TRANSIT CONDITIONS BY THE CHAMBER OF COMMERCE

The special committee of five appointed by the Chamber of Commerce of the State of New York, Nov. 4, 1908, to investigate the subject of rapid transit conditions in New York City, submitted its report to the Chamber of Commerce March 4 and the resolutions suggested were adopted by practically unanimous vote.

The committee reported that the obstacles which now obstruct further progress in rapid-transit problems are financial, legal and public opinion.

FINANCIAL OBSTACLES

The financial obstacles are that the city has not the funds to construct the lines and with its commitments its borrowing capacity will not increase sufficiently for a long time to permit it to do anythng serious in rapid-transit directions. In the meantime it has been impossible to interest private capital, partly because of the legal limitations on the length of franchises, partly because the return on the investment is not large and partly because of the ever-present uncertainty as to what taxes and regulations may be imposed on public-service corporations in the future. The committee stated that formerly an enormous amount of capital was poured into transportation fields in most large cities, often with an improper knowledge or total disregard of the results to be obtained from operation, although the opinion generally prevailed that such enterprises must pay. With the advent of regulations of corporate issues and securities and a better knowledge of the small profit to be earned, this stream of speculative capital has now been diverted to other directions.

LEGAL OBSTACLES

The most important of the legal obstacles is the Elsberg bill, passed in 1906, which limits the franchise for a subway to 20 years with the privilege of 20 years' renewal instead of a total of 75 years as previously. The committee considers this as obstructive "as though it had been designed for the purpose of preventing any other construction of rapid-transit lines." The public-service law enacted in 1907, while possessing some advantages, also acts to prevent the investment of capital. The commissioners can practically assume the usual prerogatives of operating officers and their rulings can be contested to the courts only on the ground of confiscation. The commissioners do not have to be experts, they are under con-

tinuous pressure from associations of citizens and the public generally and presumably cannot altogether escape from political influences. Moreover, an entire change of personnel in the commission can occur every five years and no act or order of the commission is binding on its successors, so that corporations cannot anticipate the financial responsibilities which may be imposed on them. In other words, however wise and conservative the exercise of its powers may be by one set of commissioners, there can be no absolute assurance that these powers will always be so exercised and this makes it impossible to estimate accurately in advance with what conditions a company will have to deal in order to justify large expenditures.

OBSTACLES ARISING FROM PUBLIC OPINION

There is also a popular misconception as to the value of transportation franchises and a mistaken impression that private capitalists are waiting to sieze the supposedly productive fields of street railway transportation and bind the people in bondage while reaping a rich harvest for themselves. The attitude of a portion of the public press assists in inspiring and maintaining this state of the public mind.

METHODS OF RELIEF

In considering methods of relief the committee makes a strong plea for a third track for express service on the Second and Third Avenue elevated lines, although the present law will have to be amended so as to permit the grant of a franchise for a much longer period than at present before this is possible. From its examination of the subject the committee believes that such an extension could be constructed and put in service in two years and its estimated capacity would be reached before any new subway could be put into operation even if started promptly. The objections generally held against any increase of elevated structures in New York City would hardly apply to the same extent in this case because the proposed lines is merely for an addition to structures already in existence.

It is also suggested that the present subway company might accept a franchise for an extension south from Times Square on the west side of the city to the Battery, and north from Forty-second Street and Park Avenue to a connection on the Bronx division, provided it should be relieved from taxes or franchise charges on these extensions, though it might possibly agree to pay a certain share in the profits to the city after certain dividends had been earned. The committee believes that the Steinway tunnel should be put into operation without delay.

For future relief the committee mentions seven possible plans for construction of future subways, but dismisses briefly several as impracticable. Among those worth consideration are construction, equipment and operation by private capital, with the option of the city to purchase and, in any event, the reversion at the expiration of a definite term to the city of the structures and appurtenances, the term being long enough to effect amortization of the capital invested. Another is a profit-sharing plan with the option of the city to purchase, similar to that in Chicago, and this the committee urges as the most effective method of obtaining future rapid transit lines in New York.

Consideration is given to the suggestion of the City Club to raise funds for construction of future rapid transit lines by direct assessment upon the property benefited, but the committee believes that legal and other complications of such a plan are considerable. Two other suggestions worth consideration in the opinion of the committee are to increase the fare to 10 cents on express trains and a subsidy by the city for lines which prove unprofitable. With such a guarantee as is embodied in the latter plan capital could be secured on better terms than without it, as the minimum return on the capital at least would be fixed. At the same time there might be an agreement to share profits between the city and private capital if a high income should be earned. Municipal operation at the present time, the committee considers, would prove a failure economically and a disaster politically and socially.

If any plan of profit sharing should be adopted, the committee suggests that it might not be necessary to make any change to the public service commission law in advance, but it would be important to make legal provisions by which the security of the investment and a stated degree of return on it would not be jeopardized by changes arbitrarily ordered by the commission which might then happen to be in office. The Chicago plan of an engineering commission in which the corporations are represented is more desirable.

The committee also believes a great deal would be accomplished in overcoming the apprehensions which the owners of private enterprises must now entertain with respect to the future if there should be some method of determining by arbitration the reasonableness of orders issued by the present Public Service Commission before they were finally promulgated, other than by an appeal to the courts on the ground that the orders are oppressive and confiscatory. In concluding, the committee urges prompt action, because the approaching completion of the North River tunnels will encourage settlement in New Jersey of a suburban population which otherwise might be kept in New York to its great interest.

The recommendations of the committee consisted of a series of resolutions embodying the points outlined in the report.

A CHEAP METHOD OF REFINISHING OLD CARS

An editorial in the Electric Railway Journal of Jan. 23, 1909, with the title "Submitting Samples of Car Painting," has elicited many inquiries as to the exact method of refinishing an open car for $5.50, which was referred to in general terms in the editorial in question. Through the courtesy of the Philadelphia Rapid Transit Company this paper has been given permission to publish the formula for the oil composition used and directions for applying it. The composition consists of 1 gal. raw linseed oil, ⅛ gal. turpentine and 2½ oz. beeswax. The beeswax is melted in the oil and the turpentine is then added. This solution is applied to the woodwork of the car either with a brush or waste. After all the woodwork has been coated with the compound the surface is wiped off and polished by rubbing lightly with dry waste.

It is reported in government circles at Toronto, Ontario, that a far-reaching electrical merger is being formed, having for its object the protection of the various independent electrical companies threatened with great loss of revenue by the initiation of the government power scheme. All the companies operating within the confines of Ontario are included. Where the organizers hope to rival the hydro-electric commission will be in embracing the radial traction lines of the Eastern Provinces.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

The hearing before the Railroad Commission of Wisconsin in the case concerning the rate of fare of the Milwaukee Electric Railway & Light Company was continued at the City Hall, Milwaukee, last week. The testimony presented on behalf of the company included that of Prof. M. E. Cooley, of Ann Arbor, Mich., who has been actively engaged in appraisals of the property of public utility corporations; Charles J. Marr, of Dickinson, Wilmot & Sterrett, certified public accountants; Prof. W. D. Pence, of the University of Wisconsin, and that which was given under additional examination by John I. Beggs, president and general manager of the company. An abstract of Mr. Marr's testimony will be published next week. Those of the others follow:

ADDITIONAL TESTIMONY OF MR. BEGGS

The examination of John I. Beggs, president and general manager of the company, was resumed on March 2. It was stated by Mr. Beggs that if the cost of transporting a passenger had not been reduced the company would have been bankrupt long ago. Costs of labor had increased, and new economies and equipment had to be devised to make such savings as were absolutely required. All the improvements which had been effected had benefited the public, not capital; in fact, the return to capital had been reduced. Wages of trainmen had been increased possibly 30 per cent on the average since the speaker became interested in the property.

Mr. Manson, assistant city attorney, asked if it were not a fact that in a great many instances in this country street railway companies maintained amusement parks and places of that kind for the purpose of creating traffic where there would be no traffic otherwise.

Mr. Beggs said it used to be, but that this policy was not now general "except in the case of some of those who were foolish enough to invest a large amount of money in that kind of enterprise, upon the false idea of the profits that would be realized from them; and some of them still have to maintain these resorts. But, as a general policy and rule, the roads have learned by sad experience that it is not profitable. I have never done it. I could not see any profit in it."

In speaking of the difficulty in handling traffic in Milwaukee when the weather became disagreeable suddenly and many who usually walked took the cars, the speaker said that the people of the city were very economical and that short riding was limited. Possibly one-half of the force in the accounting department was required to audit the large number of tickets used on the city system. The units of expenses on the system had increased and the unit of revenue had decreased, and was still being reduced.

INCREASED FARE SUGGESTED

Mr. Beggs referred again to the expectation held when the ordinance was extended to 1934 that not more than about 60 per cent of the total revenue passengers would ride on tickets, whereas the result last year was a little over 81 per cent, and said that the fraction of a cent difference which that change made was great. If present tendencies continued, the next hearing before the Railroad Commission concerning the company would be one to permit an increase in the rate of fare sufficient to keep the property running. The company had now about reached the limit of economies from increased volume of business.

The power plants were operated as if they were owned by an entirely independent corporation, and at the end of each month the cost of operation was divided among the different departments on the basis of the current consumed. Statistics showing the results of operation of the power plants were sent to every operating engineer in the company, and an effort was made to disclose reasons for unnecessary costs, if they existed.

Owing to business conditions, the operating force was much more efficient last year than in 1906 or 1907. More changes occurred in trainmen in 1907 than in any other year because of the large number of positions that were available. Not one man was leaving now where 10 left during the boom period. The transportation department was watched closely, and Mr. Beggs received semi-monthly reports from that department where he had monthly reports from the other branches of the service.

The cost of skilled labor entering into any piece of apparatus was 25 per cent less than two years ago, because of the increased efficiency acquired by the men. More money was spent constantly to meet the increasing demands of the public. Shop expenses were higher and the cost of cleaning cars was greater.

OPERATING OF THE PROPERTY FUNDAMENTAL

John T. Kelly, city attorney, asked about the difference in the attitude of the public and the employees. Mr. Beggs said that the employees were not in politics and were not influenced by sensational newspaper articles. The employees knew that the fundamental principle governing the management was the operation of the property; they believed in the management and realized that they would receive consideration from it. The public in general would not start any of the attacks which were common. Such attacks were caused by sensational criticisms.

It had been only 12 years since one fare case affecting the company had been decided, and the speaker asked what assurance there was that, after the settlement of the present fare case, another would not be started.

The company studied changes in routes to accommodate the greatest number of people. A great many requests for changes arose from managers of department stores; every merchant in the city would like every car to pass by his store.

W. J. Curtis, counsel for the North American Company, asked further concerning the company's Public Service Building. Mr. Beggs stated that in his judgment there was more property in the Public Service Building for the dollar expended than in any other building in Milwaukee.

TESTIMONY OF PROF. W. D. PENCE

Prof. W. D. Pence, engineer for the Railroad Commission, was examined by Mr. Manson on behalf of the city on March 2. Referring to the valuation of the property of the Milwaukee Electric Railway & Light Company, Professor Pence said that operating property was considered as that which was directly in use and necessary for operating purposes. There was certain trackage in the city of Milwaukee, with its overhead equipment, that appeared to be non-operating, and was so classed, based upon actual statements of the company and upon investigation. There was certain real estate in the city which was not directly connected with or necessary for the operation of the railway, and there was other property of the same nature. Vacant space in the Public Service Building, together with that space which might be classed as used

for general purposes, was apportioned upon a special basis to meet actual conditions. A fraction of that building which was unoccupied was called non-operative.

The subdivision of the railway operating property between the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company was primarily upon a territorial or geographical basis. At the beginning of the investigations by the engineering staff it was ascertained, both by requests in writing and by oral discussion with the officials of the road, that the company claimed a separation of the property between the two companies at practically the city limits. There were some minor deviations from this separation as stated. Having determined that separation as a fact, the property was then separated with reference to its position or its use, as, for instance, with cars used primarily on the out-of-the-city line, but stored in the city chiefly over night. The claims of the company as to the ownership of such cars by the rural company were found to be correct and consistent with the use of the cars.

In speaking of the apportionment of power plants, Professor Pence read the following paragraph from the report of the engineering staff on the valuation:

"In apportioning the power plants between the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, it was found that purely geographical separation of the power plant valuations for railway purposes only, with respect to city limits, differed only 2 per cent from a separation upon car-hour basis." The fact that a part of the power produced within the city was used for operating the interurban lines outside of the city was taken into account in the investigation.

Mr. Manson asked upon what theory paving was included in the report as a part of the property used for railway purposes.

Professor Pence responded as follows: "I may answer that question by saying that we do not necessarily include it. The staff is engaged in making reports to the Railroad Commission, and also, when called upon to do so, to the State Board of Assessment; and the summing up of our items is made upon a basis whereby the item may be included or excluded according to the final decision of either commission. There is nothing in the fact that we have included it in our summary which would bind or influence the commission as to the inclusion or exclusion of the item."

Mr. Mack, during the cross-examination, asked further about the division of property between operating and non-operating. Professor Pence said that anything which might reasonably be used at any time in the year or probably would be used in the ordinary course of operation, was included as operating property. Outlying real estate of the company that is held with the ultimate intention of use as a car-house or shop site was classed as non-operating.

Under cross-examination by Mr. Curtis, it was stated by Professor Pence that in engineering estimates for the cost of construction of property it is customary to make an allowance for contingencies, varying with the completeness or detail of the preliminary surveys, the completeness of the plan, etc. The allowance may be as much as 10 per cent in some cases and as low as 5 per cent in others. In the valuation of the Milwaukee properties the contractors' profits were regarded as covered by the items on the unit prices which the staff used in its work. The usual allowance was 4 or 5 per cent for superintendence and engineering.

Testifying regarding the adoption of 3 per cent for interest during construction, the witness said that it was considered that any ordinary extension of the property in all probability would be put into operation within the year in which it was undertaken, and that, with a well-organized company like this, the funds would be so available that there would be an interest charge equivalent to probably not more than one-half the time.

In testifying regarding the allowance of time for the construction of a property of this character, which seemed pretty short to Mr. Curtis, it was stated by Professor Pence: "There are two ways of viewing a matter of this sort. For instance, a steam railroad line is being built across country, from terminus to terminus, and there will not be much development of traffic until the line is completed. Such line may be considered as being under construction until the through traffic is established. A different case is found in a street railway system in a large city, where the extensions are not all made in one continuous process. The work is finished by degrees or stages, and the length of the construction period is a matter of interpretation."

Mr. Curtis said he believed it required three years to equip the property electrically, and the witness said he believed it would take some such length of time as that.

Resuming his testimony on March 3, Professor Pence explained further that "the term which is called the term of construction might be subject to several interpretations. For instance, one interpretation might fix the end of the construction period when traffic first begins, even though the actual construction work should still be incomplete; and there might be the other view in which the construction period would not be regarded as ended until the work was completed in all its details. In the first case a fraction of the system is completed, according to the plans of the company, and a return obtained upon part of the line; in the latter case the property might not be regarded as used in the full sense until wholly completed."

In continuation, he said it was believed that the valuation of all the physical property included in the inventory was on the basis of actual cost for such installation, and where that was contract work the contractor's profit was covered.

Discussing further the allowance for contingencies, under examination by Mr. Manson, the witness stated that in construction the difference in cost resulting from unforeseen difficulties "is usually, as experience has shown, in the direction of increased cost, and different engineers will make different allowances, according to the uncertainties of construction. It may run as high as 10 per cent and on down to a much less figure. This valuation being upon a known inventory, or upon an inventory which is as nearly complete as can be made, is upon quite a different basis from an estimate made in advance of construction. The contingency does not cover uncertainties in unit prices, because it is intended to have each item essentially correct on a middle-ground basis."

The values of the generating machinery were taken according to actual use. Those that were strictly railroad were so classed. Those which were strictly for light were so classed. Then those which were used for the two purposes jointly were apportioned. The value of the railway property thus ascertained was apportioned according to the car-hours operated by the two companies, which

agreed, as already stated, closely with a territorial separation at city limits.

Mr. Manson brought up the question of the use of power plants within the city for the common purpose of railway and light service, both inside and outside of the city limits. Mr. Mack said that the essential and important point should be taken into consideration of the extent to which the cost of power for railway use within the city was reduced because of the generation of the greater amount required to supply the service outside the city and the lighting business within the city as well as the railway business inside the city. The cost per kw-hour was reduced as the total output was increased. The net result of furnishing power to the Milwaukee Light, Heat & Traction Company was to make the power cost for the Milwaukee Electric Railway & Light Company less than would have been the case if the plant had been operated for the city railway only.

Mr. Mack suggested a difference that would be paid for experience while doing the work and because of inevitable mistakes, to which Professor Pence responded: "If I adhere rigidly to my statement that 3 per cent consists only of omissions or defects of inventory, then I must admit that there are some items which should perhaps be covered by a further allowance for these rejected parts during the period of construction." Professor Pence thought, however, that such an expense would be infinitesimally small compared with the total value of a property of this character, and it brought back the question of whether the 3 per cent allowance was sufficient on a reasonably perfect inventory of the property, made from excellent company records and supplemented by careful field investigations.

TESTIMONY OF PROF. M. E. COOLEY

Prof. Mortimer E. Cooley, consulting engineer and dean of the department of engineering, University of Michigan, took the stand on March 5 and, under examination by George P. Miller, of counsel for the company, testified regarding depreciation, valuation of tangible property and other subjects of fundamental principle or practice involved.

Professor Cooley described his experience as an engineer, giving in detail his connection with important public works. He appraised property of the Detroit railways in 1889 and a year later was appointed appraiser of all the public utilities in Michigan which paid specific taxes. The latter appraisal was followed by two other appraisals of steam railroads; in all of these appraisals Professor Cooley represented the State of Michigan. With Bion J. Arnold and A. B. du Pont Professor Cooley valued the Chicago properties. A number of other public services in which the witness has taken part were mentioned. The total approximate valuation of properties which Professor Cooley had taken part in appraising and of which he had charge was between $800,000,000 and $900,000,000. During his testimony the witness discussed at length the difficulties which are encountered in making valuations. He said that reproduction value frequently failed to include moneys expended (or to recognize such expenditures at anywhere near their actual amount) for preparing the way for construction of the property, as, for example, in acquiring the several properties in Milwaukee preparatory to the present investment, which had led to a single system for the entire city as against the five or six different systems which existed previously.

No account was taken in such reproduction value of the advance in the state of the art which may have led to the disappearance of property before the appraisal was made; although in such appraisal obsolete property found in use should be, and sometimes was, considered at its proper value. As examples of the necessities which had developed from the advance in the state of the art the following were mentioned:

1. Necessity for heavier rails.
2. Necessity for better track foundation.
3. Necessity for larger and better cars.
4. Necessity for more powerful car equipment.
5. Necessity for larger and more economical power stations.
6. Necessity for larger and more capacious distributing means.

All of these grew out of public demand and the rejected materials were scrapped at great sacrifice usually; and this sacrifice included, Professor Cooley said, not only the materials themselves, but the cost of the labor involved in their original installation in removing them from their place of use and in disposing of them as well as the cost in the form of interest on the money required for the purpose of making the changes as well as on the cost of the original installation.

Other elements of original cost usually not found in making an appraisement were contingency items. Provision was made for these by adding a percentage item (usually 10 per cent) to the estimated cost. Such items, for the most part, were concealed and hence unknown to the observer unless he found them entered in the construction accounts. They were just as much a part of the property, however, as though visible to the eye and, presumably, were the property to be reproduced the expense of such items would have to be incurred and hence become a part of the reproduction cost.

CONTINGENCIES

As examples of such contingency expenses, the following were cited:

1. Grading.—Original estimates and costs were based on accurate and complete surveys; since the surveys were made the contour of the ground may have been changed materially.

2. Clearing and Grubbing.—Obstructions found at the time of the original construction were not present at the time of the appraisal owing to the development or improved condition of the locality.

3. Ballast.—The allowance for ballast would probably be short because no account would be taken of its gradual disappearance. The roadbed had been improved thereby and the cost of such improvement had appeared in reballasting.

4. Alignment.—Changes in alignment or location necessary for improvement in the service growing out of the development of the city.

5. Foundations.—Only the property in sight was considered, Professor Cooley said. Expensive foundations were overlooked because their extent was unknown; sinkholes and quicksand frequently involved extraordinary expenditures far exceeding those covered by any usual percentages. On this point several examples were cited. The cost of the Ponchartrain Hotel, Detroit, and of the Ford Building, in Detroit, far exceeded the original estimates because of difficult foundation work. The track of the Ann Arbor Railroad for one-half mile in length sunk out of sight two or three times after it was built and had to

be rebuilt, the route being changed finally to avoid the sinkhole. Bridge foundations frequently involved similar extraordinary expenditures. In a city the cost of overcoming obstructions due to water pipes, sewers, gas mains, electric conduits and paving may be unknown. The expense of taking up and replacing pavement was an important item, particularly in congested districts, and the construction costs in certain localities may be even double that in more favored districts.

6. Crossings, Switches and Frogs, Special Work.—It was stated by the witness that unless great care was taken a proper allowance for this work may not be made. Sometimes these items were computed the same as main track while the actual expense was much greater. Turnouts may be included in main track and hardened center work may be overlooked entirely.

7. Rails and Track Fastenings, Bonded Joints.—The tendency had been steadily toward heavier rails. While the cost of the present construction in itself may be found readily, the concurrent costs of removing the old rails, ties and foundations were almost sure to be underestimated and may be overlooked altogether.

8. Bridges.—The tendency was to underestimate the original cost of bridges, as usually the costs were based on weights, and these were determined very carefully in the original estimates. The centering and falsework may have been expensive and unusual difficulties may have been experienced in erecting, all of which may be unknown to the appraiser. Bridges sufficiently strong for the traffic of 10 years or 15 years ago had to be replaced for the heavier traffic of to-day. The original cost of pile and trestle construction was usually overlooked when these constructions had been filled afterward.

9. Buildings and Miscellaneous Structures.—In speaking of buildings, Professor Cooley said that structures originally in use and which had disappeared were omitted in an inventory, although their cost still remained in the property. Buildings in use for only 15 years or 20 years were valued frequently at only a small fraction of their actual cost as they had ceased to be suitable for present purposes and this notwithstanding that the depreciation of such structures was based almost always on a life of 50 years. The cost of removal of an unsuitable building to make way for a new building may not appear in an inventory, although it was a proper item under clearing and grubbing.

10. Power Stations.—While it was comparatively easy to value the larger units in a power plant it was practically impossible to find all the small items that made up the complete whole. It was very common to undervalue the piping and cost of wiring. One hesitated to double or triple an item obtained by straight figuring, even though his judgment, based on experience, had taught him the necessity of so doing. Foundations for machinery were frequently considered to suffer but slight depreciation; in the installation of new machinery the old foundations often have to be removed. This, like the item of clearing and grubbing, entered into the cost of the property, although it did not appear in the inventory.

CHANGES IN EQUIPMENT

11. Rolling Stock.—In speaking of equipment Professor Cooley discussed the changes in the habits of the American people. He said that very great changes had been necessary in the cars owing to the increased demands of the public.

12. Shop Machinery and Tools.—As in buildings and power plants a complete inventory of the machinery and tools of a plant was practically impossible, in the opinion of the speaker. The items are too numerous and scattered. Belting, shafting and pulleys could be seen readily, but any attempt to measure and value them, to be at all exact, must be very laborious. This was even more true of the hand tools and of the cutting tools used in connection with machines. Jigs and patterns were rarely ever estimated at their true value or cost and almost always when a change was made the old special tool, jig or pattern became worthless. Its cost appeared on the books, but the item found no place in the inventory.

13. Miscellaneous Equipment.—This equipment, including snow plows, sweepers, repair cars, construction cars, hydraulic and screw jacks, block and tackle and other things required in repairing damage due to accidents and the elements, was scattered and difficult to find and measure and any inventory of such equipment involved much patience and labor. It was frequently determined approximately only by adding something to the main items of the equipment.

14. Stores and Supplies.—These were even more difficult of appraisement than shop machinery and tools, said the witness, and it was customary to take the value when possible from the books of the company.

15. Scrap-Heap.—Discussing this subject, Professor Cooley said that probably no part of a plant undergoing valuation was more instructive as an aid to forming an opinion as to the cost of the plant than the scrap-heap. It usually was either neglected altogether or received but a passing glance.

As an example the history of the Pittsburg Water Works was cited. Twenty-five years ago the large yard in front of the water-works building was almost completely filled with the enormous casting of the pumping engines which had failed and had to be replaced. A few years later these pumps were scrapped and replaced by some of more modern design. To-day still a third set is being installed. An inventory to-day would reveal only the pumps now in use, but the cost of the plant included all three sets of pumps. The scrap-heap revealed one of the most important elements in the valuation of a property, namely, the difference between what the plant had cost and its reproduction cost as shown by an inventory. In the valuation of the Michigan railroads in 1900 the reproduction cost was found to be approximately $200,000,000 and the existing value of the physical properties a little more than $160,000,000. The books showed construction costs of about $300,000,000. The appraisal covered approximately 10,000 miles of single track, including second track, spurs and sidings. The reproduction cost, therefore, was about two-thirds the construction cost shown on the books and the property was maintained at a little better than 80 per cent of its reproduction cost. A similar result was found in subsequent reappraisements of the Michigan railroads in 1903 and 1905 and in the appraisement of the street railways of Chicago in 1906. In Minneapolis in 1908 the property of the General Electric Company was found to be maintained in a fairly uniform condition at from 75 per cent to 80 per cent of its reproduction cost, and such had been found to be substantially true of other properties, including water works, manufacturing concerns, telegraph and telephone properties, although in telegraph properties the value maintained was nearer 50 per cent than 80 per cent.

CONCLUSIONS AS TO VALUATION

From his detailed discussion of the various items Pro-

fessor Cooley drew the following conclusions: In the valuation of a property there was the cost shown by the books, the cost of reproduction as shown by inventory and the existing value of the physical properties, the second being about two-thirds of the first and the latter about three-quarters of the second. In addition to these costs and values there were the cost of making the property a going concern and the value of the property as a going concern. This latter value Professor Cooley called the kinetic or dynamic value of a property as distinguished from its potential or static value. These costs and values were found in all classes of property from the wheelbarrow used in moving earth, the lathe used in making machinery, the farm used to raise crops and animals, to the railroad used to transport earth, machinery, farm products and passengers.

There was also the working capital required to keep the property going, and without which, or its equivalent in credit, the property cannot be made to go. This working capital must be provided and maintained constantly the same as a supply of fuel to an engine. Its provision, in the first place, was an element of capital invested and its maintenance an element of operating expense.

Other elements of cost were contingencies of construction, contractors' profits, engineering, insurance during construction, organization, legal expenses, general contingencies, including incomplete inventories, interest during construction and finally brokerage or the cost of floating the securities to cover all of the expenses incurred up to the time the complicated and inert structure became a thing of life and through the early years required to give it the strength and vigor necessary to make it self-supporting. At this point it became in reality a going concern and not before.

UNIVERSAL TRANSFERS AND INCREASED EXPENSES

Professor Cooley also discussed universal transfers, stating that they increased travel, but diminished earnings per passenger. All expenses advanced with the number of passengers carried; therefore, universal transfers had resulted not only in decreased net earnings per passenger, but in decreased net earnings for the company.

Density of traffic, which was formerly supposed to lead to increased earnings, had not resulted in such increase in business districts, owing to frequent stops and interruptions. Frequent stops meant wear and tear of cars and rails, increased platform expense and greatly increased current consumption in starting and getting the car up to speed. This was one of the elements offsetting the supposed greater current consumption with the heavier cars and faster speed of interurban roads.

The dollar had a less purchasing power; all expenses have increased.

DEPRECIATION NEGLECTED

Depreciation, Professor Cooley remarked, had been neglected in the past through ignorance of its necessity. To neglect depreciation was to borrow from the future. A property must be maintained at a suitable working standard out of earnings if it was to be permanent. If not so maintained it must deteriorate and eventually must be rehabilitated or built over. Chicago was cited by the speaker as an illustration. The public demanded satisfactory transportation facilities and objected to overcrowding. This meant larger and finer cars and more of them, all of which necessitated greater investment, greater operating expense and decreased earnings.

This must be true whether the property was operated privately or by the public. A deficiency due to public operation must be met by taxation. The necessary money to maintain and operate the property up to public requirement must come from some source. The issue was real and should be squarely met.

ELEMENTS OF DEPRECIATION

Depreciation consisted of several elements which should be understood carefully, Professor Cooley stated, to avoid confusion in the use of the term. These elements were defined by him as follows:

1. Depreciation Due to Wear and Tear and Exposure to the Elements.—This is continuous. All elements have a wearing life varying with the element itself. No element can be completely worn out; it can be worn only to a point below which it becomes unsafe or no longer serves its original function. In practice the average condition of all elements must be maintained at a high percentage of the original cost if the property is to serve its purpose properly. This percentage varies from 75 per cent to 85 per cent of the cost new of the property. The difference between this percentage of from 75 to 85 and the original 100 is a depreciation which is inherent in the property and cannot be dispensed with. It must be met by a sinking fund, or its equivalent, otherwise this part of the original investment becomes lost.

2. Depreciation Due to Accidents, a Sudden Depreciation.—An engine or a boiler may be wrecked and with it other machinery. This might, and probably would, involve a considerable expense for repairs or replacement, besides possibly crippling the plant in part. Cars may collide or a car may drop through a bridge. A bridge itself may fail or be carried away by floods. A storm, as a cyclone, may work havoc, entailing costs in excess of those proper to be charged to ordinary maintenance of property.

3. Depreciation Due to Inadequacy.—Cars suitable in the past had already been superseded several times by larger and better cars. This has rendered the track, structure and bridges inadequate, and as more power is required to propel the larger cars, the power plants have become inadequate. The public demand is largely responsible for this depreciation due to inadequacy.

4. Depreciation Due to Obsolescence.—This, while closely allied to the depreciation due to inadequacy, is different in that it embraces changes due to advance in the art. More efficient and effective machinery has appeared, which must be substituted for the old to keep abreast of the times. For example, in steam-engine practice the turbine has come into general use during the past five years and the art of steam turbines is at the beginning. Generators adapted to piston-engine practice are not adapted to steam-turbine practice and must also be changed. Boilers adapted to piston-engine practice must be replaced to carry the higher pressures required. Condensers must also be changed to secure the better vacuum required to realize the full advantage of the steam turbine. Owing to the rapid disappearance of coal beds, the price of fuel must advance, and this presumably will before many years force the adoption of the gas producer and the producer gas engine. Water powers are wisely being developed, but to utilize them requires the scrapping of large parts of the machinery in use at present.

REPLACEMENT FUND THE ONE LIVE ISSUE

Continuing, Professor Cooley said that the ordinary operating expenses included the cost of maintenance and repairs, but this was limited usually to the work required to keep the elements of a property up to a proper condition for continuous use and to prolong the useful life of the elements. Only to a limited extent did this ordinary maintenance and repair account include expenditures for replacement or renewals of any except minor elements. The replacement of major elements involved a sum in addition to that appearing in the cost of operation, and it was this fund that was receiving so much attention throughout the railroad world to-day. It was the one live issue of prime

importance involved in the successful management of railroad properties not only in cities, but throughout the entire land. The Interstate Commerce Commission had recently undertaken to investigate the subject in its broad aspects. The belief was widespread that a greater fund than ever before must be set apart if railroads were to continue on a paying basis.

RELATION OF LOAD FACTOR TO POWER COSTS

On March 2 papers were presented and a discussion held before the Chicago branch of the A. I. E. E. and the electrical section of the Western Society of Engineers on "The Relation of Load Factor to Power Costs." The authors of the papers were C. A. S. Howlett, Western Electric Company; J. M. S. Waring, Electric Storage Battery Company, and E. W. Lloyd, Commonwealth Edison Company. The papers and discussion dealt largely with the problems of lighting and industrial power loads.

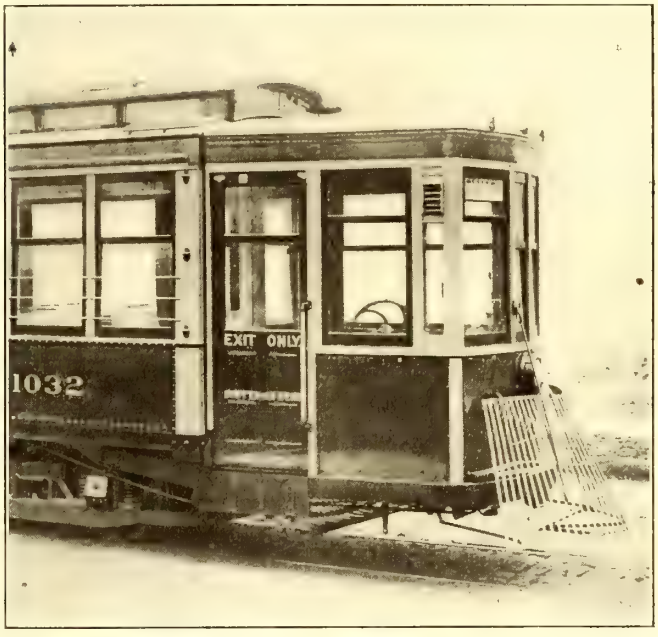
Mr. Waring's paper set forth the desirability of the use of a storage battery for improving the load factor of the purchaser of large amounts of current. He pointed out that a power rate to be equitable, first, should distribute the fixed charges on the plant in proper proportion among the various customers and, second, should also distribute the operating cost in proportion. Any rate to be equitable, therefore, should have a primary fixed charge and a variable operating charge. A large power consumer might reduce the primary or fixed charge, which should be proportionate to the maximum demand that he might make upon the generating station by installing a storage battery to handle the peak and thus purchase power at a lower rate.

John F. Gilchrist, Commonwealth Edison Company, called attention to the increasing diversity of load on a large central power station which gradually adds every class of customers. In the case of the central station which supplies residences and business lighting districts and also street railways where the peak of the load is likely to occur in January or February, and on account of the use of electric car heaters the time of this peak is largely dependent upon the temperature. The method of determining the peaks of railway load upon which to base the fixed charges per kilowatt of maximum demand may have an important influence on the amount of such fixed charges. For example: The method of determining the maximum demand made by street railways in Chicago, as stipulated in a recent contract (see Electric Railway Journal for Oct. 31, 1908, page 1291), is by taking the combined output of six hours, three of which shall be the hours of greatest output in the first half of the day for three consecutive days and the other three the hours of greatest output for three consecutive days in the second half of the day. These six hours of output divided by six determine the maximum demand for the year. If momentary peaks were the basis of measurement the Chicago railways would have to pay for about 12 per cent greater maximum demand. The yearly load factor of the Chicago railways is from 38 to 40 per cent.

G. H. Atkin, Electric Storage Battery Company, called attention to the large storage battery which the Chicago City Railway has installed in its Plymouth Place substation. This battery makes the maximum demand by that company 2500 kw less than what it would be if there were no battery. It was stated that this reduction brings about a yearly saving of $37,500 to the railway company in the purchase of power from the Commonwealth Edison Company.

NEW STEEL CAR OF UNITED RAILWAYS COMPANY OF ST. LOUIS

A steel passenger car of considerable interest has just been built at the shops of the United Railways Company, of St. Louis. This car is designed for the pay-as-you-enter method of fare collection, and includes improvements made after the successful operation of composite cars of the same



St. Louis Steel Car—Front End, Showing Fuse-Box on Vestibule Corner Post

general type during the past year. The use of steel for the entire main structure below the window rail has served to reduce the body weight of this car by 1000 lb. below that of the cars of the earlier design. This gain in weight has been brought about by the omission of side-wall lining and sheathing. The thin side-wall construction also has made possible an increase in the effective interior width of the body by 8 in. with the same outside width over all. Other



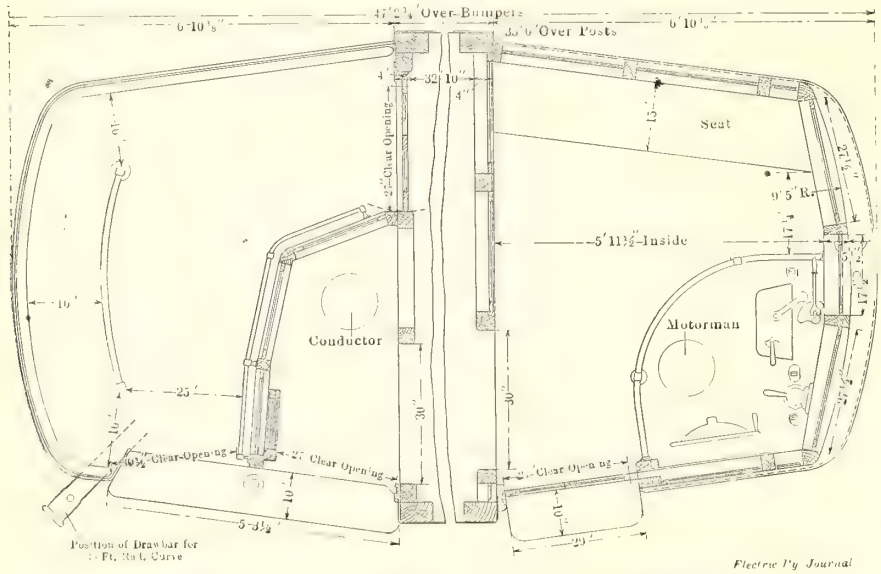
St. Louis Steel Car—Interior View, Showing Wide Aisle

improvements include enlarged front vestibule; more satisfactory window arrangements; sanitary composition floor, and larger doors with improved fittings. The design and construction of the new steel car were executed at the car shops under the care of Robert McCulloch, president, and M. O'Brien, master mechanic. The new car will be used as

a model for future construction. A second car of this design is now being built, and others will follow as soon as an appropriation is made for them.

DETAILS OF BODY CONSTRUCTION

Accompanying engravings present the general dimensions of the platforms and body and illustrate the details of side and window arrangement as shown by a model section. This sample section was built before the car was set up, so that the special sill, window and floor details might be studied.

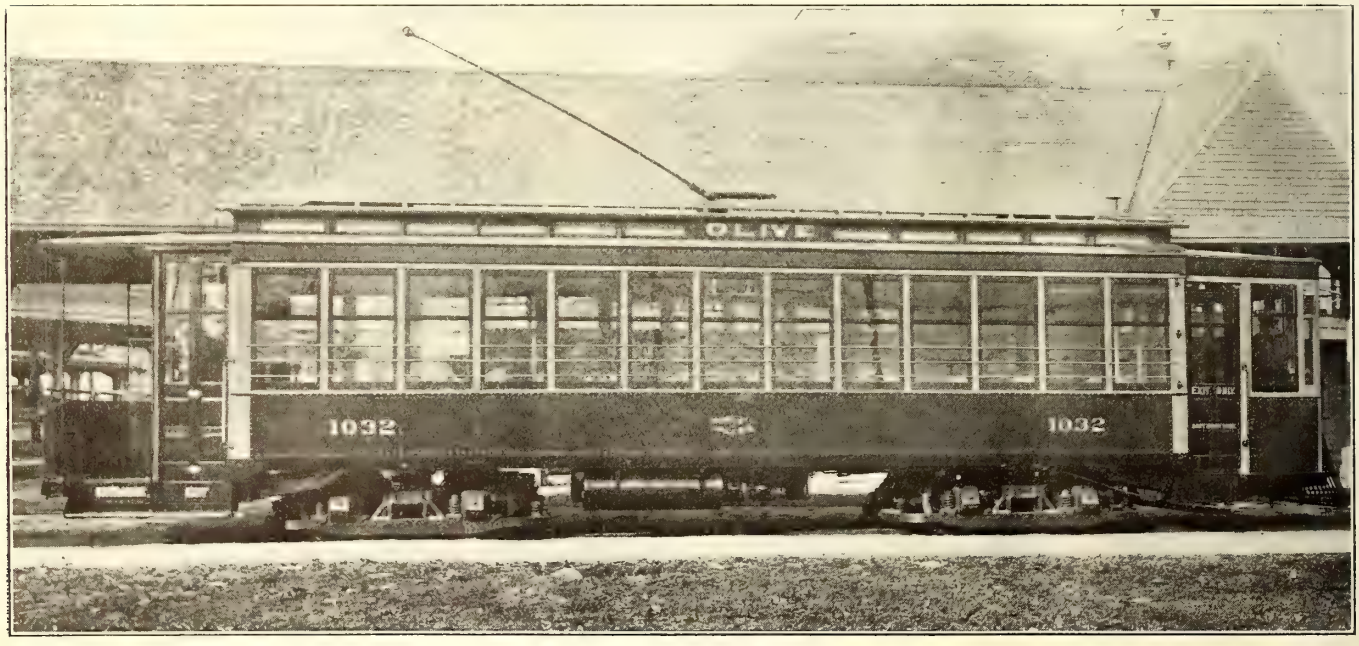


St. Louis Steel Car—Plan of Platform Arrangement

The body below the arm rails and the underframe is made of structural steel shapes and plates. The main members of the underframe are the 3/16-in. steel side plates 26 in. high. These are made in three sections for each side, butt-riveted to form the side sills and the siding of the car below the window rails. Riveted to the bottom and inside of these side plates are two angle irons, which form the connection for the 4-in. I-beam cross sills. One angle iron is 8 in. x 3½ in. x ½ in., with its long side riveted to the 26-in. side plate. The cross sills rest on the flange of this L-shaped iron. Above the cross sills is the second angle, which is 3 in. x 4 in. x ⅜ in. in dimensions, and rests on top of the 4-in. cross sills, thus securing them against vertical movement. Both angles are riveted to the side piece and the cross sills are riveted to the angles. There are no center sills. The belt rails are 3/16-in. steel, specially rolled, so that it may be riveted to the side plates and fitted under the wooden window capping. All the window posts extend to the floor, and each is fastened to the side plate by five ⅜-in. bolts.

One of the half-tone engravings illustrates the roof construction. It is similar in design to the roof formerly used by the United Railways except that the slope is not so great at the sides. The additional height thus obtained affords space for the bottom window sash to raise into the roof.

The floor construction is fireproof. On top of the 4-in. I-beam cross sills is placed a covering of galvanized sheet iron to protect the superstructure against damage by fire or water. A ⅞-in. yellow pine tongue-and-groove floor is laid on the galvanized iron and supports a composition floor surface about 11/16 in. thick reinforced with wire netting. The edges of the trap doors and openings through the floor are protected by angle-iron frames and a drain opening is placed in the center of the car floor. The wearing surface of the floor is "marbleoid," supplied by the St. Louis Marbleoid Manufacturing Company. This material is a composition of granite and cement, which is said to wear well and be water and fireproof. In placing the composition, which has the appearance of red concrete, it was brought up along the sides of the car body to cover a row of rivets and also to afford a joint which would not catch dirt. This feature is clearly illustrated.



St. Louis Steel Car—Exterior View, Showing Front and Rear Platform Arrangement

The windows of the car body all raise to leave large openings for summer service. The top sash is fixed and the lower sash raises so that the bottoms of both sash are even, leaving an opening 27½ in. high by 27¼ in. wide. The

lower sash is fitted with a ⅜-in. rubber bottom piece to provide a tight joint with the arm rail in wet weather. Edwards lock lifts and compression rollers are used to keep the sash from rattling and to maintain a close fit under various weather conditions.

The interior woodwork of the new car is natural cherry and the steel side plate exposed below the window rail is colored and grained to imitate cherry wood. The headlining is three-ply birch, painted light blue. A combination of colors very pleasing to the eye is presented by the blue ceiling, cherry woodwork and red floor. The most noticeable body improvement which results from the use of the uncovered steel sides is the additional leg space of about 4 in. obtained under each arm rail. The width of the car between arm rails is 8 ft. 1¾ in., but the available width at the level of the seat cushions is 8 ft. 9½ in. There are seats for 46 passengers inside the car body and for 4 on the platform. The seats are 34 in. over all in length and the aisle between seat ends is 34½ in. wide. The car is built for single-end operation and the body is heated by a stove set at the forward end of the aisle.

PLATFORMS

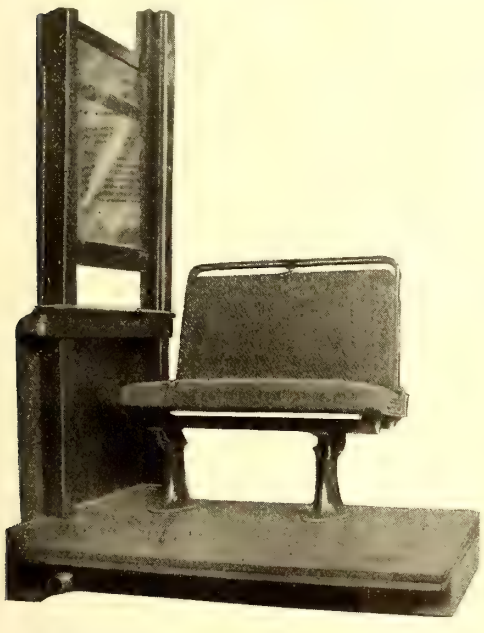
Each platform is 6 ft. 10⅜ in. long over all. On account of the space occupied by the bumper and the front vestibule wall the inside length of the front platform is 5 ft. 11½ in., while the open rear platform is available for standing passengers for its full length. Each platform is supported by four 8-in. x 3½-in. x ½-in. angle irons sheared to a taper at the outer ends. The platform floors are of wood and are dropped 10 in. below the level of the car-body floor.

There are six window openings in the front vestibule and all the sash raise except that in front of the motorman. This is arranged to lower for the convenience of the motorman in throwing switches. This window has ratchet locks so that in inclement weather the motorman may fasten it at any height desired. As shown, the platforms are arranged for single-end operation only and on the front platform the operating equipment is installed at the right-hand corner and the motorman is separated from the passengers by a pipe railing. A longitudinal seat 15 in. wide and 5 ft. 6 in. long is built along the wall of the vestibule on the blind side, thus increasing the seating capacity of the car from 46 inside to 50 total. The exit door from the front platform has a 27-in. clear opening and a 29-in. x 10-in. folding step. Both door and step are connected for operation by a handle above the controller.

A specially designed fuse box is built above the motorman's head and between the two posts at the forward right-hand corner of the car. This box is so designed and placed that when a fuse blows the bases pass to the outside of the car through slat-covered openings in the side of the car, as shown in one of the illustrations. The fuse can be replaced by the motorman without leaving his place at the controller. The box is built with a door which opens into the front vestibule. On this door are carried contact points which are so wired that when the door is not tightly closed no electrical connection is made with the fuse holder. Thus after a fuse has blown the motorman opens the door of the fuse box and thereby disconnects the fuse-holding terminal. Then he can handle the terminals and parts without danger of shock.

The general arrangement of the rear platform is the same as that described in the Electric Railway Journal for Aug. 22, 1908, page 515. The conductor is protected from the weather by a full-height partition with three sash and a folding outside door. A pipe railing 16 in. from the rear dash serves to separate smokers from incoming passengers who, on boarding, pass between the railing and the vestibule, entering the car body through a 27-in. swinging door. The conductor collects the fares as the passengers pass the window of his compartment nearest the entrance door. This door is hung on spring double-swing hinges and is controlled by a double-acting door check. The door check serves to prevent the quick closing of the swinging door and thus eliminates accidents.

In the first design of pay-as-you-enter cars built at St. Louis a stop was placed to prevent the rear-entrance door from swinging outward. An objection to this was raised because of the possibility of this opening thus not being available as an exit in emergency. For this reason the door of the new car is built to swing both ways and a latch is provided so that unless tripped by the conductor the door will only swing inward. An inside check also is fastened on the door post within reach of the conductor so that he



St. Louis Steel Car—Leg Space Between Posts



St. Louis Steel Car—Window and Roof Details



St. Louis Steel Car—Details of Exterior

may lock the rear door against movement in either direction. A folding seat is provided for the conductor. The window sash of the conductor's compartment are hung with balances so that they may be placed at the most convenient height for receiving fares. The conductor's and motorman's bells are enclosed in neat cherry boxes so that they may not be deadened with paper, waste, etc.

The electrical equipment of this car includes four GE-80 motors with K-35 C controller. All wiring is carried in loricated conduit supported under the cross sills and terminating in malleable junction boxes under the controller. Westinghouse storage air-brake equipment is used.

The weight of the new car here described complete and without passengers is 49,550 lb. The car body with seats, fittings, etc., weighs 23,300 lb. and the trucks, electrical and brake equipment weigh 26,250 lb. The general dimensions of the new steel car follow:

Length of car body	33 ft. 6 in.
Length over all	47 ft. 2¾ in.
Length of platforms	6 ft. 10⅜ in.
Width over all	9 ft.
Width of inside plates	8 ft. 9½ in.
Width between arm rails	8 ft. 1¾ in.
Width of aisle	2 ft. 10½ in.
Height from track to trolley base	12 ft. 3 in.
Truck centers	22 ft. 3 in.
Wheel base	40 ft. 6 in.
Seating capacity (persons)	50

MEETING OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The eighth meeting of the Central Electric Accounting Conference was held at Lima, Ohio, March 6. A list of the members of the association presented at the meeting showed that it included the chief accounting officers of some 34 of the principal interurban electric railways in the Central States.

The first order of business was the presentation of the report of the committee on permanent organization. Messrs. Elkins, Vordemark and Baker presented their report, and the following constitution and by-laws were adopted:

CONSTITUTION AND BY-LAWS OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE.

CONSTITUTION.

1. Name—The name of this Conference shall be The Central Electric Accounting Conference.

2. Object—The object of this Conference shall be to bring together those engaged in the accounting department of electric railways for the interchange of ideas, and to promote the adoption of a uniform system of accounts, and to encourage closer and more intimate personal relations.

3. Members—The membership of this Conference shall be composed of the authorized representatives of the accounting department of electric railways operating within the states of Ohio, Indiana, Illinois, Michigan, Kentucky and western Pennsylvania.

All applications for membership must be presented to the Secretary, and by him referred to the Executive Committee for approval and shall bear the approval of the Executive Committee before being presented to the Conference.

4. Officers—The officers of this Conference shall consist of a president, vice-president, secretary and treasurer, and four other members, all of whom shall constitute the Executive Committee.

The duties of the secretary and treasurer shall be performed by the same person.

5. Meetings—The regular stated meetings of the Conference shall be held on the first Saturday after the first Monday in March, June, September and December of each year, at such place as may be designated by a vote of the Conference at its next preceding meeting.

Special meetings may be called by the president, with the approval of the Executive Committee.

The December meeting shall be the annual meeting of the Conference.

Eleven members shall constitute a quorum for the transaction of business at any meeting of the Conference.

6. Amendments—This Constitution may be amended by a two-thirds vote of the members present at a regular meeting, provided the proposed amendment shall have the approval of two-thirds of the Executive Committee, and provided a copy shall have been sent to each of the active members of the Central Electric Accounting Conference at least thirty days prior to the date of the meeting at which the proposed amendment is to be acted upon.

BY-LAWS.

1. Election of Officers—The officers shall be elected at each annual meeting of the Conference and shall hold office until their successors are elected. They shall assume their duties immediately after the close of the meeting at which they are elected.

In case of resignation or death of any of the officers, the vacancy may be filled for the remainder of the term by the Executive Committee.

2. President—The president shall be the chief executive officer of the Conference. He shall preside at all meetings of the Conference. He shall appoint all committees and designate the chairman of such. He shall be ex-officio a member of all committees. He shall watch over the interests of the Conference and see that its objects are carried out.

3. Vice-President—The vice-president shall perform all of the duties, and exercise the powers of the president, during his absence or disability.

4. Secretary and Treasurer—The secretary shall attend all meetings of the Conference, keep correct minutes of the proceedings thereof, a copy of which shall be furnished to each member of the Conference on request.

He shall send notices to each member of all regular and special meetings of the Conference, and shall refer to proper officers or committees, or keep and submit, at the next meeting of the Conference, all communications sent him for that purpose.

He shall notify all members of their appointment on committees, and keep proper record of all matters and action taken thereon.

Acting as treasurer, he shall have charge of all funds of the Conference, and shall pay such bills as bear the approval of the president, payment having first been authorized by the Conference.

In the absence of the secretary and treasurer, the president may designate a member of the conference to act as such. The report of such acting-secretary must be promptly forwarded to the secretary.

The secretary and treasurer shall receive such compensation as may be fixed by the Executive Committee, the same to be paid out of the funds of the Conference.

5. Executive Committee—The Executive Committee shall hold a regular meeting before each annual meeting of the Conference, and shall hold such special meetings as may be called by the president.

The secretary shall give such reasonable notice of all meetings of the Executive Committee, and all such notices shall, as far as practicable, specify the nature of the business to be brought to the attention of the committee at such meetings.

The Executive Committee shall present a written report to the Conference at each annual meeting, including in this report the work accomplished by the Conference during the year, together with its recommendations for the future work of the Conference.

The Executive Committee shall have charge and management of the affairs of the Conference while it is not in session, reporting any action taken at the next meeting of the Conference.

A majority of the members of the Executive Committee shall constitute a quorum for the transaction of business.

6. Voting—All votes except as herein otherwise provided shall be *viva voce* or by ballot upon the request of any member, and in case of a tie the presiding officer shall vote. In case of a vote by ballot each company represented shall be entitled to one vote only.

7. Rules of Order—The rules contained in "Roberts' Rules of Order" shall govern this Conference in all cases to which they are applicable and in which they are not inconsistent with the By-Laws of this Conference.

8. Order of Business—At each regular meeting of the Conference the order of business shall be as follows:

(1) Reading of the minutes of last meeting.
(2) Address of the president.
(3) Report of the Executive Committee.
(4) Report of the secretary and treasurer.
(5) Reports of special committees.
(6) Reading and discussion of papers.
(7) General business.
(8) Election of officers.

The order of business may be varied from as the wisdom of the president may dictate.

The question of compensation of the secretary and treasurer and the raising of funds for the conference was referred to the executive committee, with instructions to report at the next meeting of the conference.

The following officers were then elected:

President, M. W. Glover, auditor, The Ohio Electric Railway Company, Cincinnati, Ohio.

Vice-President, Wm. H. Forse, Jr., treasurer, Indiana Union Traction Company, Anderson, Ind.

Secretary and Treasurer, C. B. Baker, freight auditor, The Western Ohio Railway Company, Lima, Ohio.

The Executive Committee—The officers mentioned above and:

W. I. McLure, auditor, Toledo Urban & Interurban Railway, Findlay, Ohio.

R. J. Thompson, assistant secretary, Indianapolis & Louisville Traction Company, Seymour, Ind.

S. C. Rogers, treasurer, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

W. B. Wright, auditor, Indianapolis & Cincinnati Traction Company, Rushville, Ind.

The following letter from Robert N. Wallis, president, American Street & Interurban Railway Accountants' Association, was presented by Mr. Forse with a few appropriate remarks:

To the Members of the Central Electric Accounting Conference:

I am very much interested in the activities of the Central Electric Accounting Conference, and feel that the relations between this body and the Accountants' Association should be made as close as possible.

If I understand the personnel of the Accounting Conference correctly, it consists almost entirely of interurban railways, and was formed for the purpose largely of meet-

ing certain problems which apply to this class of railway exclusively. It so happens that the Middle West territory has developed interurban railways to a larger extent than any other portion of the United States.

As we recover from the effects of the panic and feel the impetus of returning prosperity, the interurban electric railway will undoubtedly continue its development, not only in the territory which your conference represents, but in the country at large. The position of the interurban railway, therefore, is bound to be one of increasing importance, both numerically and geographically. It seems to me, therefore, that the American Accountants' Association should make a special effort to keep abreast with this development.

It is my desire, and I know it to be the desire of all prominent in the work of the association, that the association may keep up with the needs of this important branch of our industry. In no better way can this be done than by keeping in close touch and upon most cordial relations with the Central Conference, representing very nearly the whole of this interurban branch.

In forming the program for another convention and in planning the work for another year, it is my desire to keep in sight the accounting problems of the interurban railways and to give them the importance which their prominence entitles them to. I shall be glad, therefore, for the suggestions of your individual members, or of the conference itself, as to what problems should be considered. I solicit such suggestions.

The Accountants' Association recognized the peculiar problems concerning the interurban railways at the Atlantic City convention, last October, and provided for a committee on interline accounting, consisting of Messrs. Forse, of Anderson; Fullerton, of Detroit, and Wight, of Des Moines.

The interest which this association feels in the problems peculiar to the interurban railway at the present time it wishes to continue and increase. To that end I ask the assistance of the Central Accounting Conference and its members. May I further say that I should be glad at some early meeting of your conference, if it be agreeable to all its members, to attend, in order that I might study at first hand how to make the relations between the association and the conference closer, and in order that I might meet and talk with the men who are responsible for the rapid development of the accounting end of the interurban business. I should be glad if you would express for me the sentiments which I voice herein to the conference.

(Signed) ROBERT N. WALLIS, President,
American Street & Interurban Railway Accountants' Association.

The following resolution was then unanimously adopted by the conference:

Resolved: That the Central Electric Accounting Conference appreciates the kindly expressions contained in the open letter received from President Wallis, of the American Street & Interurban Railway Accountants' Association, and extends a cordial invitation to Mr. Wallis personally, or in his official capacity, to attend the next meeting of the conference as its guest.

W. B. Wright, chairman of the committee on uniform blanks, then presented a report, with samples of the proposed blanks, which were fully discussed, and after a few minor changes were made, were recommended for adoption by the lines handling interline freight and passenger business. These forms were 14 in number, as follows:

Statement of interline tickets issued; size 8½ in. x 14 in.

Statement of interline ticket differences; size 14 in. x 8½ in.

Monthly statement of interchangeable mileage coupons, C. E. T. A.; size 8½ in. x 5½ in.

Standard straight bill of lading, three parts; size 8½ in. x 11 in.

Standard order bill of lading, three parts; size 8½ in. x 11 in.

Note.—These forms of bills of lading were recommended for adoption with the understanding that lines in Indiana would continue to use the present form of bill of lading until the order issued by the Railroad Commission of Indiana concerning the uniform bill of lading is withdrawn.

Interline way-bill, five parts; size 8½ in. x 5½ in.

Interline way-bill, five parts; size 8½ in. x 5½ in.

Interline way-bill, steam railroad type; size 14 in. x 8½ in.

Note.—Owing to the local conditions existing on different lines, it was not considered advisable to recommend adoption of a single form of interline way-bill, and the types of bills submitted above were recommended for adoption, the local conditions of each line to determine the form of billing to be used, but all interline way-bills should follow the forms shown above.

Passing report of interline way-bill, in book form; size 8½ in. x 13 in.

Agents' way-bill correction; size 8½ in. x 11 in.

Note.—The general information shown on correction is given on the form submitted, but the instructions should be printed to agree with the local conditions on each line, it being understood that all lines will arrange to furnish a copy of the correction to the auditor as well as to the agent of the foreign line interested.

Abstract of interline way-bills received; size 8½ in. x 14 in.

Division of revenue on interline way-bills received; size 14 in. x 8½ in.

Statement of differences on interline freight accounts; size 14 in. x 8½ in.

Correction account, adjusting differences in settlement of interline freight accounts; size 14 in. x 8½ in.

A telegram was received from S. C. Rogers, chairman of committee on Interstate classification of accounts, regretting his inability to attend this meeting, and it was decided that at the next meeting all questions pertaining to the new classification of accounts would be discussed, and that all questions which had been submitted by any members to the Interstate Commerce Commission and rulings obtained on same would be furnished the other members of the conference for their information.

It was decided to hold the next meeting in Columbus, Ohio, on Saturday, June 12, 1909.

The conference then adjourned.

PROGRESS IN GASOLINE MOTOR CARS

A recent publication issued by the McKeen Motor Car Company, of Omaha, Neb., presents some interesting particulars of the increasing popularity of gasoline motor cars with mechanical transmission, as made by that company. This type is now in use on the Union Pacific Railroad, Central Pacific Railroad, San Diego, Cuyamaca & Eastern Railway, Illinois Central Railroad, Galveston, Houston & San Diego Railway, Erie Railroad, Chicago & Northwestern Railway, Los Angeles & San Diego Beach Railway and the Silver Peak (Nevada) Railway. McKeen cars have been in practical daily service for four years, during which time 36 have been built and are in operation. California heads the list with 15 cars, and another will shortly be sent to the Los Angeles & San Diego Beach Railway of that State. Sixty cars are now under way at the shops of the company. Five of these new cars are 70 ft. long, have a seating capacity of 105 passengers, and each is being built to take the place of a steam locomotive and two or three cars. The regular 55-ft. car, which seats 75 passengers, will generally accommodate the traffic usually handled by a steam locomotive and one or two cars.

EXAMINATIONS IN SERVICE RULES, SIGHT AND HEARING ON THE LAKE SHORE ELECTRIC RAILWAY

To ascertain the fitness of its motormen and conductors, the Lake Shore Electric Railway Company, of Cleveland, Ohio, has temporarily transformed one of its large passenger coaches into a testing car. Not only does the company desire that employees should be acquainted with the rules placed in their hands, but that they should also be able to approximate distances by the size of the switch and tail lights, distinguish colors both day and night, and read signs in letters of ordinary size. As arranged, this coach is a complete examination car, held long enough



Lake Shore Electric Examinations—Dark Room Provided on Examination Car

at the most convenient point on each division to examine all the men employed on the respective divisions. The smoking compartment is used for the examinations on operating rules. In all, 183 questions are asked on this subject, which is made to include a general acquaintance with the different equipments found on the several lines. Motormen are expected to be able to take care of minor troubles and bring cars in, even if they must do it with one motor. The total number of questions in the list for motormen alone is 101.

Conductors are required to acquaint themselves only with such matters as pertain to their own work. While the superintendents are glad to have them know something of the equipment and operation of cars, so that they may be able to aid the motormen in case of a breakdown or other trouble, they are not required to answer questions of this kind or study the rules relating to such points. As conductors are not allowed to operate cars, the responsibility in case of accident can be placed on the motorman.

Since the men have known that they would be subjected to severe tests, they have put in their spare time at study. It is said that at almost any time the book of rules could be found about the cabs or showing above the pockets of the employees. This was hard work for some, but merely "brushing up" for others. The net result was a good examination for all so far as the tests have proceeded. Most of the old men averaged around 98 per cent, but some had perfect marks. The younger ones in the service attained good percentages, but most of them did not quite equal the records of their elders.

All motormen and conductors are required to take an examination after completing their student work. This has always been a rule with the company, and the test must show a standing of at least 75 per cent. By this method most of the applicants who would eventually prove poor employees are weeded out at once.

The men unanimously approve of this plan of testing their knowledge. They realize the necessity of exercising intelligence in the operation of the road, and feel that the certificates granted them are proof that they are trustworthy. As electric railroading grows and the use of fast trains increases, the necessity for expert work becomes more apparent, and shortly the trained and tried electric railway man may be as much of a necessity as the steam railroad engineer.

The examination on hearing is not formal. Ability to hear well is judged from the way the men catch the questions as they are asked in an ordinary tone of voice. Accuracy in understanding is also shown in this manner. Among all the men who have been examined so far none has been found defective in this sense.

For testing sight the large compartment of the coach is used. The seats on one side were removed and a dark room 30 ft. long was made by enclosing the space in black cloth. The window blinds on that side were drawn and the wall was lined with black. The entrance to this room is at the rear of the car. On the boarded-up window space between this compartment and the smoker was placed a small case containing a roll curtain, on which are lines of letters of various sizes to be read at 10 ft., 15 ft., 20 ft. and 30 ft. The larger letters are to be read at greater distances, but the superintendents are able to test ability to read at the greater distances from the small letters which extend in lines across the curtain about 15 in. in length. This case is lighted by a lamp placed in a reflector slightly above it. Current is taken off the lighting system of the car. A cord attached to the curtain mechanism is extended along the car to the rear, so that the examiner may stand at the opening with the applicant and operate the curtain as he desires.

Dr. C. H. Williams' lantern is used for the color test. It is placed in the same position as the chart and light is fur-



Lake Shore Electric Examinations—Illuminated Sign with Different Size Letters in Dark Room

nished from the same line. The lantern shows white, yellow, red, green and purple. The aperture for showing the lights is perhaps ¾ in. in diameter and the colors are obtained by revolving various colored disks over the opening. Employees are asked to name the colors immediately on seeing them and the changes are made rapidly, so that the test shows the aptness of the employee to distinguish them quickly and easily.

To test ability to approximate distances from the ap-

parent size of lights a slide is arranged so that openings of various sizes from ¾ in. to ⅛ in. in diameter are shown in the various colors. These correspond to the varying distances from lights on cars or switches and good judgment on this point is expected in order to prevent collisions or passing danger signals. This test is perhaps more severe than any of the others, except where absolute color blindness exists. The latter has been found only in two cases and these cases were on local city lines.

Professor Holmgren's worsted colors, prepared by F. A. Hardy & Company, of Chicago, are used for testing colors

THE LAKE SHORE ELECTRIC RAILWAY CO.

CERTIFICATE OF EXAMINATION.

19

This is to Certify, *That Mr.*
has this day passed an examination in vision and hearing test and is in no manner disqualified for performing the duties of a railway employe, by reason of color blindness, defective sight or hearing.

Color . . per cent., Vision per cent.; Hearing . . . . . per cent.

Examiner

Signature of Holder:

Approved:

Gen. Superintendent.

Lake Shore Electric Examinations—Certificate of Physical Examination

in daylight. Very faint shades of yarn are included, as well as the more pronounced, to ascertain whether the men are able to distinguish the color of faded flags. The degree of ability is shown by the number of shades they are able to select from the conglomerated mass when the yarn is thrown out of the case.

One of the most important features about the whole plan is the fact that the employees are becoming acquainted with standardized rules of operation. All signals are made in the same way and there is no danger of mistaking them. Everything else has been brought to a standard and each

THE LAKE SHORE ELECTRIC RAILWAY CO.

CERTIFICATE OF EXAMINATION.

No. 19

This is to Certify, *That Mr.*
has been examined upon the RULES AND REGULATIONS OF THE OPERATING DEPARTMENT, and is qualified to fill the position of

Rules . per cent. Equipment per cent.

Examiner.

Signature of Holder

Approved.

Gen. Superintendent.

Lake Shore Electric Examinations—Certificate of Examination on Rules

employee learns it just as all the others do. As the result of such training they are able to work together with perfect intelligence and understanding at all times.

General Superintendent L. K. Burge planned the test car and he is aided in giving the tests by Warren Gregg, superintendent of the Cleveland division, and P. M. Truman, superintendent of the Toledo division.

Governor George W. Donaghey, of Arkansas, in his inaugural message to the Legislature of that State, suggests increasing the power of the Railroad Commission to include, in addition to the control of transportation of freight and passengers, control of the condition of roadbed, bridges, cars and other equipment of railroads operating in that State.

COMMUNICATION

ACCIDENT CLAIMS IN AUSTRALIA

THE BRISBANE TRAMWAYS COMPANY, LIMITED
BRISBANE, AUSTRALIA, Jan. 5, 1909.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL for Nov. 14 I find very interesting reading under the head of "Claim Agents' Question Box." The following remarks from one company prompt me to give our own experience:

"There are so few cases occurring in the operation of a street railway company where there is no liability that it is always safer to prepare the case for the future, as there is a claim made in about 99 cases out of every 100 cases."

This is so different from our own experience that a few figures may possibly be of interest to your readers. That they may be intelligible and form a basis for comparison, I give you some data upon our business:

Population	130,000
Street mileage	35½ miles
Cars in daily operation	60-90
Car-miles per annum	3,500,000
Passengers carried per annum	27,500,000

During the seven years 1901-1907 (both inclusive) we had a total of 5521 accidents, including the most trivial as well as serious. The total number of claims made was 312; the total amount claimed, $8,400; the number of cases in which liability was admitted, 97; total amount paid, $2,700. During the seven years we have had to defend only three suits, all of which the company won. We have only lost one suit since the company began operating by electricity, nearly 13 years ago. In that case a young woman alleged she had suffered from electric shock. She brought a suit for £1,000 and got a verdict for £150.

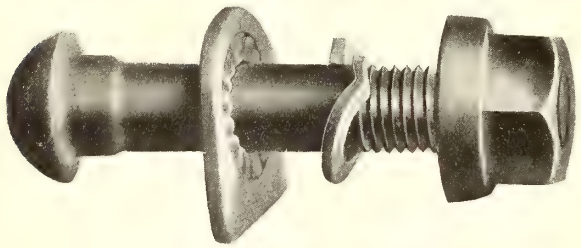
J. S. BADGER, Manager.

A NEW LOCK BOLT

The weakest portion of a railway track is, of course, the joint, and in spite of frequent inspection the track nuts will loosen or the bolts stretch in service, allowing the rails to get out of line. Various spring lock washers have been devised from time to time to prevent the nuts from slacking. The great fault with practically all of these is that the spring is flattened out by the tightening of the nut and the tension of the nut is transmitted through the spring to the angle plate. Therefore, any sudden blow from a passing wheel is very apt to break the spring, or if it is tough enough to stand this strain it will gradually lose its tension under the mechanical stress and serve merely as a plain washer. The spring is also exposed to the weather and sooner or later corrodes; as the greater part of the elasticity of the spring is in the skin of the metal, this rusting soon ruins the elasticity. The ordinary spring nut lock also depends for its grip on cutting a groove in the surface of the angle plate and in the surface of the nut which it touches. This disfigures both, and is quite apt to spoil the nut in case it is removed.

To avoid troubles of this kind Harold P. Brown, of New York, has brought out the "Stay-there" bolt and the "O. K." lock, which are sold by him especially in conjunction with the Plastic rail bond. It is stated that the bolt is made of a special high-grade steel fully 50 per cent stronger than the ordinary track bolt. The nut has a receptacle which completely shields the spring from the weather. The outer edge of this receptacle touches

the lock washer and thus prevents the bolt from getting askew as the nut is tightened. The depth of the receptacle is so proportioned that when the nut is screwed tight the entire mechanical strain is taken on its outer edges and the spring is still unflattened and has no more strain on it than is necessary to prevent the nut from turning backward. This locking of the nut is effected by a rounded ratchet surface on the inner side of the nut receptacle and on the corresponding surface of the lock washer.



Track Joint Bolt and Locking Plate

To prevent injury of these surfaces and of the spring the ends of the spring are given a peculiar curve so that a nut may be tightened and loosened again and again without injury to any of the parts. The manufacturer states that four years' severe service on the New York division of the Jersey Central and of the Pennsylvania Railroads has shown that when once set up no amount of mechanical motion or hammering can cause the nut to loosen.

The spring is made of a steel of extraordinary toughness and elasticity. It has sufficient strength in case of the stretching of the bolt still to keep the parts firmly together. A maintenance-of-way engineer on one of the roads mentioned is quoted as saying that the use of the bolts saved about $21 a mile a year in the reduction of labor. Such a saving would more than compensate for the extra cost of these bolts. When desired the bolts and locks are made rust-proof.

COMBINED ANTI-CORROSION AND INSULATING PAINT

After three years' successful experimenting under a great variety of conditions, the Eldo Company, New York, has brought forward the Eldo anti-corrosion and insulating coating. This is made from a natural mineral product known as elaterite, and is said to owe its excellence to a process of manufacture which results in an absolutely uniform product without pigments. Numerous tests made for the manufacturer and results in service have shown that it resists the action of muriatic, nitric and sulphuric acids as well as chlorine. Its resistance to chlorine vapor would make it particularly valuable in painting fixtures in chloride accumulator plants. In general, the chemical qualities of this coating make it suitable for covering all classes of metal work subject to any kind of corrosion. Among the power plants where it is now in successful use is that of the Public Service Railway at Marion, N. J.

Because of its uniform composition, the standard product will cover anywhere from 800 sq. ft. to 1000 sq. ft., according to the character of the surface and the skill of the manipulator. The grade of Eldo used for high temperature conditions will cover even greater surfaces, as it is usually thinned with pure turpentine. The waterproof properties of both grades make this paint suitable for covering concrete, brick and wood. It may be employed, also, as a black, permanent enamel by baking it at a temperature from 40 deg. to 175 deg. C. for various periods, according to the hardness desired.

For large surfaces this paint is generally applied with a brush, but spraying is a desirable alternative when the parts to be covered are not readily accessible. Small objects are simply dipped into the compound. It has such a low freezing point that in one case a water gate was painted with it at an outside temperature of 25 deg. above zero, Fahr.

According to several tests made by the Electrical Testing Laboratories of New York, this material has splendid insulating qualities. Puncture tests of samples submitted showed a minimum break-down resistance of 1500 volts per mil and a maximum break-down resistance of 2100 volts per mil. Naturally, such insulating qualities as these, in combination with its chemico-physical properties, make this paint applicable for coil insulation of all kinds, for painting motor shells, controller parts and other electrical apparatus, and for protecting all metal subject to electrolysis.

HIGH-TENSION DROP-OUT SPAN PROTECTORS

Where high-tension lines cross over telephone or other circuits it is essential that some method be provided for protecting the lower circuits in case the transmission wires should break. To secure such protection some engineers require that where cross-overs occur extra high poles be placed close together, so that broken wires will not dangle

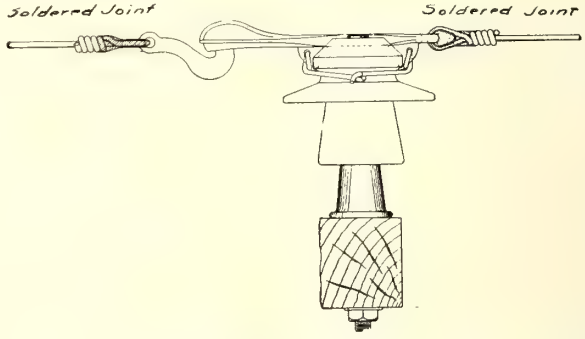


Fig. 1—Single Break Protector

low enough to touch the lower wires. In other cases the use of a grounded wire network or basket between the high-voltage and low-voltage wires has been required. However, there are many cases where it is not feasible to set two high poles close together, and the specifications for the grounded network often require a very heavy and

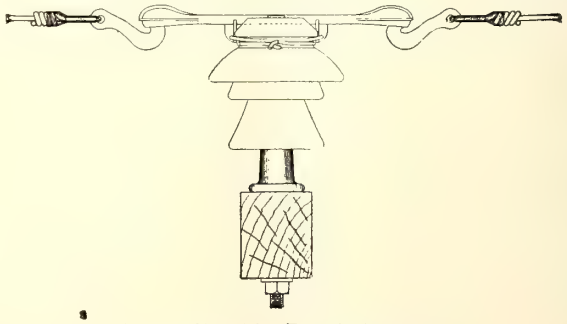


Fig. 2—Double Break Protector

impracticable device, especially where heavy wires are used on the transmission lines.

To meet the conditions actually found in commercial practice, the high-tension drop-out span protector shown in the accompanying cuts has been devised by the Central Electric Company, Chicago, Ill. The device consists of two parts, a fixed element secured to either the top or

side of a standard insulator and a movable element connected to the transmission line and so arranged that by means of a ground ball joint it makes positive contact with the fixed element. With a given span wire intact,

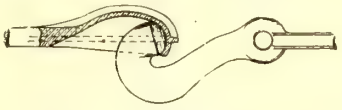
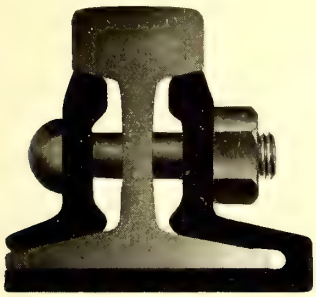


Fig. 3—Ground Ball Joint

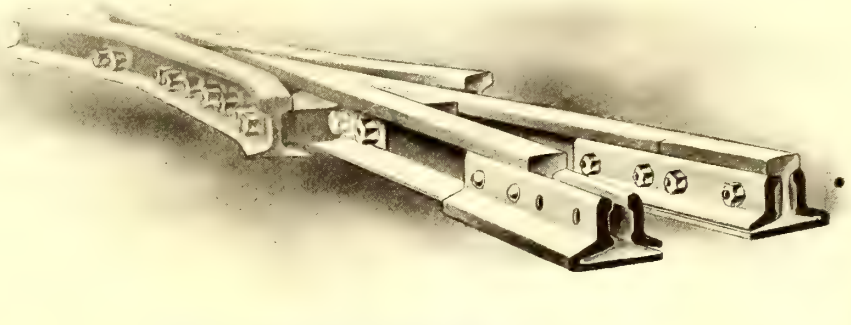
heavy contact is maintained between the two elements of the connector, but upon the breaking of the span wire the movable element immediately drops and effectually disconnects, at the same time removing any danger of a live wire dropping across the telephone or other wires. The device is made in two types. Fig. 1 shows a single-break protector and Fig. 2 a double-break type. Fig. 3 shows the ground ball joint.

RECENT IMPROVEMENTS IN RAIL JOINTS

The Rail Joint Company has recently put on the market a modification of its Continuous rail joint, designed for the use of frogs and the heels of slip switches, and for other places where there is insufficient clearance for the use of the usual type of Continuous joints with extended



Section of Rail and Joint



Special Work with New Type of Joint

base. As will be seen from the accompanying section, the joint has two parts besides the bolts; one of these consists of a side and base member and the other of a side member only. The especial advantage of this construction is that on one side the joint members do not project beyond the base of the rail; hence by placing the plates so that this side of the joint is on the inside of the frog this joint can be used with perfect satisfaction in bolting up straight track with special work. In fact, it permits the use of as long joint plates as could be used with ordinary angle bar construction, yet provides the base support characteristic of the Continuous joint. Besides its application to frogs and switches, this joint is equally well adapted to cross-overs and rails with guards; in fact, to any positions where the bases of the rails abut. Considerable trouble was originally encountered by the Rail Joint Company in designing the rolls to produce this joint, but this problem was finally overcome at the works of the company at Troy.

Recent figures compiled by the company indicate that its three standard types of joints, Continuous, Weber and Wolhaupter, are in use on over 50,000 miles of steam and electric track. For electric railway service the Continuous and Weber have been most generally employed, but for steam service all three are used, about in the proportions of 75 per cent for the Continuous, 15 per cent for the Weber and 10 per cent for the Wolhaupter. Each type gives three points of contact, under the head, over and under the base, thus providing the stiffness and eliminating the tendency to lateral and vertical motion. At the same time the base plate removes the necessity of the use of a tie plate, as where angle bars are employed, and adds greatly to the strength of the joint. The three joints mentioned are used either suspended or supported, according to the preference of the engineer in charge of the work, and seem to give equally satisfactory results in both ways.

Most of these joints are manufactured at the Rail Joint Company's plant at Troy, which has recently been enlarged. The rolling mill employed at this plant measures 430 ft. x 194 ft., and is equipped with two 20-in. three-high trains, which serve an 8-ton jib electric crane, for rapid roll changing, and 10 finishing machines. In the rolling shop, which is 136 ft. x 25 ft., there are five roll lathes of modern type and motor driven, for the manufacture of rolls to correspond with any new section of rail which may be on the market. The output of existing machinery in a single turn of 12 hours is 200 net tons per day of joints, or about 62,000 tons per annum.

In addition, the shops are equipped with heating furnaces and possess an electric plant of 500-kw capacity and a storage house adjoining the mill, 150 ft. x 79 ft. All the buildings are equipped with an electric traveling crane. The shipping facilities of the plant are by water and steam.

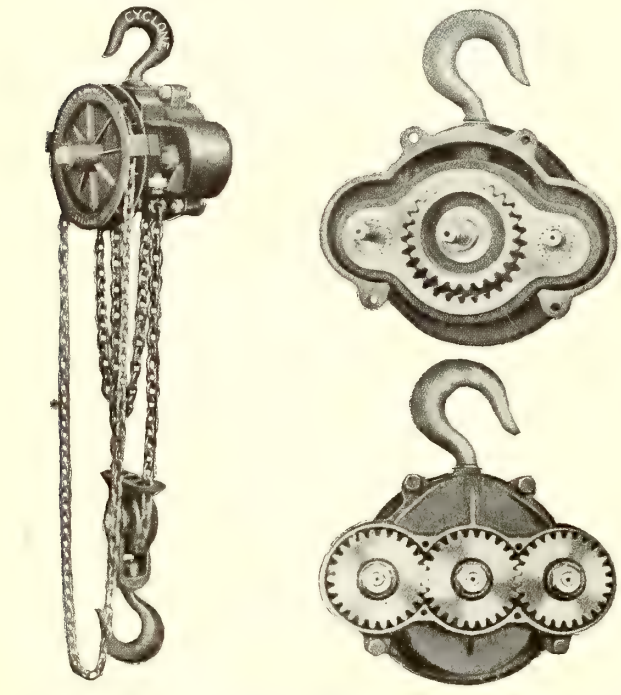
A NEW COMPANY TO MAKE BRAKE SHOES

A company to manufacture brake shoes for electric railways has been formed under the title of the United States Brake Shoe Company, with the following officers: President, Louis Streuber, a capitalist of Erie, Pa.; vice-president, Elmer P. Morris, the well-known electric railway supply dealer of New York; secretary and treasurer, J. F. Austin, postmaster of Corry, Pa.; general manager, J. J. Ressler, of Walton, N. Y., who has been making brake shoes at Corry for the past 22 years. The company purchased in February a large foundry and machine shop at Walton, N. Y., and will operate this in addition to the present Corry plant. Contracts have been let for new buildings at the junction of the Pennsylvania and Erie railroads at Corry, and the company expects to have this new plant in operation about June 1. It is intended to start another plant in the South and one in the West, and negotiations are now under way for sites for these additional plants. The fiscal office will be at Erie, Pa., and the general sales office will be in New York under the management of Elmer P. Morris.

HIGH-SPEED CHAIN HOIST

The Chisholm & Moore Manufacturing Company, Cleveland, Ohio, is building a chain hoist known as the "Cyclone High Speed," which appears particularly suitable for the winding rooms and the truck and machine shops of electric railways. This hoist embodies several valuable constructional and operating features, as described in the following paragraphs:

The lift or sprocket wheel which carries the lift chain is cast in one piece with the spur wheel driving it. This double wheel turns freely upon a hollow shaft rigidly supported at both ends in the frame. The spur wheel is encircled by a yoke having internal teeth meshing into the spur wheel teeth and driven with a gyrating movement about it by two eccentrics placed diametrically opposite. The hand-wheel shaft passes through the hollow main shaft and carries at the further end a pinion which drives two spur wheels, one on each of the two eccentric shafts as illustrated.



Assembled View and Sections Through Gearing of High-Speed Chain Hoist

The number of the teeth in the spur wheel divided by the difference between the number of the spur teeth and the number of internal teeth of the yoke equals the number of revolutions of the eccentric necessary to turn the lift wheel once. In the one-ton size the spur wheel has 21 teeth, the yoke 24 internal teeth and the eccentrics turn seven times to each revolution of the lift wheel. Several teeth are always in contact, thus insuring great strength. The eccentric shafts have bearings at both ends and roller bushed connection with the yoke. All bearings have self-lubricating graphite bronze bushings, which require no oil and are said to run indefinitely without cutting. There are no overhanging bearings in the hoist, so that the frame will not spring and bind the working parts under full loads. The whole construction is extremely simple, and has been found as practicable for the 20-ton capacity as for the ½-ton hoist without undue increase in size or weight.

The friction loss of this movement is so slight (the efficiency is about 80 per cent) that it has been found practicable to gear the hoists to a very high speed without increasing the hand wheel pull above that of slower hoists of other design. The 1-ton "Cyclone" overhauls only 29½ ft. of hand chain to raise the maximum load 1 ft. with a pull of 85 lb. The 2-ton hoist overhauls 29½ ft. of hand chain to raise the maximum load 1 ft. with a pull of 125 lb. On the other hand, the average speed of the best types of screw hoists in the 1-ton size is given as 60 ft. overhaul of hand chain with a pull of 88 lb., and in the 2-ton size 90 ft. overhaul of hand chain with a pull of 120 lb. to raise the load 1 ft. Hence, with the same power application the load can be raised with the described hoist more than twice as rapidly as with the best screw hoists.

The automatic brake used with this high-speed hoist permits the spinning of the hand wheel in either direction when there is no load, locks the load with perfect safety, and yet permits its free lowering by a very slight reverse pull on the hand chain.

A NEW LINE OF INSULATING VARNISH

For years a demand has existed for a product so flexible as to lend itself to blending with varnishes, making them as nearly non-explosive as practicable. Heretofore benzine has been a big factor in the very few compounds on the market at all suitable for insulation, but fire underwriters do not regard this favorably, and anything which minimizes the fire risk is welcomed by them.

The latest contribution towards safety in insulating compounds is furnished by the John C. Dolph Company, of Long Island City, N. Y., in its "Wayahead" brand of varnishes. These are made up with the new "Polar" solvent, and are especially recommended for the insulation of armature and field coils. The compound is named "Polar" because it keeps cool. The announcement that it is now to be had will be of interest to those delegates who during the last convention of the American Street & Interurban Railway Association were interested in the discussions on insulating compounds and varnishes, because a strong point was made of the fact that the flash point of such materials should be considered from a fire insurance standpoint. The "Wayahead" polar solvent covers this point in particular.

Presiding at the half-yearly meeting of the Baker Street & Waterloo Railway, Sir George Gibb said that since the opening of the railway they had had a record of steady and continuous progress and improvement. In the past half-year they had carried 13,337,126 passengers, which was an increase of 25 per cent over the figures for the corresponding half of 1907. The principal increase had occurred in through passengers exchanged with other lines. The largest exchange had been with the Central London Company, the next largest being with the Piccadilly Tube. They had also had large exchanges with the Metropolitan and City and South London Companies, and it was to the development of this system that all the companies must look for increased profits in the future. Regarding the North-West London Railway Company, which held a concession for a line between Cricklewood and Victoria, that company had decided to modify its scheme, and build a line between Edgware Road and Brondesbury as an extension of the "Bakerloo." This company had entered into a working agreement with the North-West London Company, and probably this would cause it to modify its Paddington extension scheme.

News of Electric Railways

Subway Plans Outlined at Hearing in New York

The Public Service Commission of the First District of New York held a hearing on March 9 on the application of the Hudson & Manhattan Railroad for permission to extend its subway from Thirty-third Street and Sixth Avenue, New York, to the Grand Central Station, thus affording a connection between the Hudson & Manhattan Railroad and the New York Central & Hudson River Railroad and the New York, New Haven & Hartford Railroad, and making the Hudson & Manhattan Railroad a connecting link between these roads and the Delaware, Lackawanna & Western Railroad, the Erie Railroad and the Pennsylvania Railroad, with all of which the Hudson & Manhattan Railroad will eventually connect in New Jersey. William G. McAdoo, president of the Hudson & Manhattan Railroad, in urging the application of his company set forth the purpose of the extension as providing the facilities just mentioned by affording a connection between the New Jersey railroad terminals and the commercial center of New York. He said that the construction of the tunnel would not disturb the surface of Bryant Park at Sixth Avenue and Forty-second Street, or the present subway, which extends through Forty-second Street from Fourth Avenue to Broadway. Mr. McAdoo also said that it was proposed to connect with the Steinway tunnel to Long Island City. While the proposed extension is only about a mile long, it would eventually link Long Island, New York and New Jersey. Mr. McAdoo concluded by stating that the company would build the line with its own capital and that it would accept a franchise along the lines of the indeterminate grant it now holds for its present line under Sixth Avenue, New York, and its Ninth Street extension, which provides that the city may purchase the property at cost at the end of 25 years.

Theodore P. Shonts, president of the Interborough Rapid Transit Company, appeared for his company to point out certain objections to the engineering plan of the Hudson & Manhattan Railroad, and caused a sensation by formally announcing that the Interborough Rapid Transit Company had been quietly at work on plans for the immediate extension of the New York subway system which would probably meet the demands of the city for 10 or 15 years. He said that the work in mind would involve an expenditure of $50,000,000. In replying to Commissioner Eustis, Mr. Shonts said that the new plan of his company would involve the necessity of a change in the Elsberg law, and that as he was well aware that the time for legislation at this session was growing short, he hoped to submit the plan for the new subway to the commission by March 17. Pending the formal presentation of the matter to the commission, Mr. Shonts refused absolutely to discuss the plans of his company. He said, however, that the Interborough Rapid Transit Company would not definitely oppose the application of the Hudson & Manhattan Railroad and added that it was not opposed to any enterprise that would benefit the city at large. His desire was to be assured that the building of the new line by the Hudson & Manhattan Company would not interfere with the present subway lines operated by the Interborough Company.

Still another subway plan was outlined on March 9, when a proposal was made to the Public Service Commission by William J. Wilgus and his associates in the Amsterdam Corporation. Briefly stated, if suitable legislation can be obtained the Inter-Terminal Belt Line will build a belt line elevated and subway for both passengers and freight as far up as Fifty-ninth Street, with crosstown connections under Fifty-eighth Street, and under Forty-third Street, Seventh or Eighth Avenue and Thirtieth Street. Mr. Wilgus has as associates Gustav H. Schwab, C. D. Halsey & Company, J. G. White & Company, Hodenpyl, Walbridge & Company and C. C. Cuyler. The plan of the company proposes among other things the following conditions:

"It shall transport passengers over its lines for a full 5-cent cash fare.

"Its scurities shall be so safeguarded that the investor will be made as secure, as to return of interest and principal, as is consistently and conservatively possible, and the authorized issue of bonds and stock shall be on terms that will be reasonably attractive to investors and to those who initiate and establish the project.

"After provision has been made for operating expenses, interest on bonds, and depreciation the city shall, in lieu of all State, city, county and franchise taxes and all other taxes except taxes on real estate, share with the company in the net profits.

"At the end of the franchise period the city is to have the right to purchase the property at a fair valuation, or the franchise is to be extended for a further period."

Cleveland Traction Situation

The report of the receivers for the Cleveland Railway shows gross earnings of $451,211 and a surplus of $28,979. It follows:

Gross earnings	$451,211
Operating expenses	288,048
Net earnings	163,163
Miscellaneous income	3,210
Gross income	166,373
Taxes	23,564
Income less operating expenses and taxes	142,809
Interest and other deductions	40,452
Net income	102,357
Cleveland Railway, rental	73,378
Surplus	$28,979

According to the estimates made by the receivers, the results are about the same as would have been obtained under a fare of six tickets for 25 cents, although the burden, under present conditions, is upon those who patronize the lines receiving 5-cent fare and those who must transfer from the low-fare lines. The total deficit under the Municipal Traction Company and under the receivers to Feb. 1, when the fare was increased, was $229,678. The surplus for February reduces this to $200,690.

Notwithstanding this, Mayor Johnson in an interview in a Detroit paper was quoted as saying that the 3-cent fare had not failed to pay all the legitimate expenses of the company and the interest on the stock. He was also quoted as saying that the old company would never get another franchise in Cleveland that did not contain a clause by which the property could be taken over by the city or some company designated by the city at any time at 110. From this, it would seem that only the defeat of Mr. Johnson at the polls this fall will make it possible for negotiations looking to a settlement of the question to be entered into with any prospect of their being concluded successfully.

Frequent complaints have been made to the City Council that certain of the 3-cent lines have been crowded since the fare on the other lines was increased and that not enough cars are operated over these lines to care for the traffic. At times the complaints have amounted to accusations of partiality on the part of the receivers, although the receivers have time and again asserted that they are giving all the lines, regardless of the rate of fare, all the cars that are in condition for operation. One of the local papers said a few days ago in an editorial that the receivers are perfectly impartial in the distribution of the cars, but that they would not be doing wrong if they did give the best service to the people who are paying the highest price for it.

Considerable evidence was introduced at the hearing of claims before Master Commissioner Belford relating to the bills for food consumed by the directors of the Municipal Traction Company at their noon-day luncheons. It was shown that between April 27 and Nov. 12, 1908, the bills at two restaurants amounted to $1,576. Of this a balance of $731 remains unpaid. J. J. Stanley, vice-president of the Cleveland Railway Company, testified that daily meetings of the directors had never been found necessary with the Cleveland Electric Railway and he did not believe they could find enough business for such frequent meetings. He said that the directors of the Cleveland Electric Railway always paid for their own lunches and that when he and President Andrews ate lunch in their offices they paid for it themselves. Attorneys for the claimants are endeavoring to show that these lunches were a necessary part of the expense of operating the street railway.

March Meeting of the Central Electric Railway Association

The secretary of the Central Electric Railway Association has just issued the following notice:

"The regular meeting of the Central Electric Railway Association will be held at the Hollenden Hotel, Cleveland, Ohio, on March 25, 1909, morning session commencing at 10 a. m. sharp. In view of the fact that our meetings are to be held once every two months, and also in view of the elaborate program that has been prepared, it is sincerely

hoped that every member of the association will be present to make this meeting one of intense interest. It is suggested to those members living at a distance that the trip be made in special interurban cars, which will tend to increase the interest and make the trip one of immense value by personal observation.

"As the morning session will commence promptly at 10 a. m. and the session of the association close on the same day, it is hoped all will be present at the opening of the meeting. Members have the privilege of inviting any friends they wish to have present at this meeting. It is also urged that all master mechanics be present."

Program

Morning Session

10:00 a. m.—Business.

11:00 a. m.—Little Things in Connection with Operation. Paper by W. A. Carson, general manager, Evansville Railways Company, Evansville, Ind.

12:00 m.—Adjournment for luncheon.

Afternoon Session

1:30 p. m.—The Preservative Treatment of Timbers Used by Electric Traction Companies. Paper by J. N. Nelson, Jr., of the United States Department of Agriculture, Washington, D. C. This paper will be illustrated with a series of stereopticon views covering the various conditions of the wood before and after the use of preservatives. It is expected that this paper will be of great benefit to traction lines in connection with the life of ties and bridge material used.

2:30 p. m.—The Loose Leaf Filing System of Matters in Periodicals. Paper by R. N. Hemming, assistant superintendent of the Ohio & Southern Traction Company, Columbus, Ohio.

Adjournment.

A. A. Anderson, president of the Central Electric Railway Association, announces that, owing to the withdrawal of C. C. Reynolds, as chairman of the subject committee, he has appointed H. U. Wallace, general manager of the Chicago, Lake Shore & South Bend Railway Company, as chairman, and G. S. Henry, traffic manager of the Indianapolis & Cincinnati Traction Company, as a member of that committee.

Why the History of the Minneapolis Street Railway was Published

C. G. Goodrich, vice-president, Twin City Rapid Transit Company, Minneapolis, has made public a short statement of the reasons of the company for publishing a history of the company in the daily papers. Briefly they were:

First. To comply with numerous requests for the publication of the history of the company.

Second. To present facts relating to the growth and development of the system and demonstrate that the present rate of fare is as low as can be made if the quality of service and present excellent physical condition of the property are to be maintained.

Continuing, Mr. Goodrich points out that the original grant to the Minneapolis Street Railway Company fixed the minimum fare at 5 cents for a ride of 3 miles without transfers. If the company was now operating under these conditions it would be receiving fares of from 5 cents to 25 cents instead of the 5-cent fare. But while fares have been thus virtually reduced, the purchasing value of the 5-cent piece, so far as supplies and wages are concerned, has also been reduced. On Feb. 8, 1907, an ordinance was passed by the Minneapolis City Council requiring the company to sell six tickets for 25 cents. The Federal Court, Judge Lochren presiding, held that the Council had no right to enforce such an ordinance, but the city appealed the case and it is now pending in the United States Supreme Court. Mr. Goodrich adds:

"The company is advised by its counsel, and believes, that Judge Lochren's decision was absolutely right and that it will be sustained by the Supreme Court, but the policy of the company has always been and is, if possible, to avoid controversy with the city in the courts and, therefore, knowing that anything less than a straight 5-cent fare, or the possibility of a less rate, would unquestionably have a retarding effect on the growth and development of the city as a whole, the company will, at the next meeting of the City Council, present a communication requesting the appointment of a committee before whom representatives of the company, as well as others interested, may appear to answer such questions and furnish such additional information as may be desired, with a further request that, if the committee should make a favorable report, the council will instruct the city attorney to dismiss the appeal now pending and accept the decision of the federal court.

"Favorable action on the part of the City Council will enable the company to continue its present policy of high-grade improvements, which for the current year include a large number of new cars, a further increase in power equipment and a large expenditure of money for track and paving improvements which are necessary in anticipation of the city's extensive plans for improvements during the present year.

"We believe that the citizens of Minneapolis want a constantly improving service, with a straight 5-cent fare with transfer, rather than a continually depreciating service, which in other cities has invariably followed any reduction from a 5-cent fare."

Strike in Manila.—The employees of the Manila Electric Railroad & Light Company, Manila, P. I., went on strike on March 4. They demanded an increase in pay and a readjustment of the hours of labor. Non-union Filipinos and Americans were engaged at once to man the cars, under a strong force of police. Desertions from the ranks of the strikers were numerous as a result of the determination shown by the company in promptly manning its cars, and by March 6 the strike had petered out.

Chicago's Return from Street Railways a Sinking Fund.—Judge Thomas G. Windes, in the Circuit Court, has ruled that the moneys accumulating from the city's 55 per cent of the profits from the operation of the Chicago City Railway and the Chicago Railways cannot be used by the city for any purpose except to form a sinking fund for the purchase of the street railways when their franchises expire. Judge Windes also holds that even if it were proper for the city to draw on the fund, it could not be done without the approval of the voters.

Electrifying Long Island Railroad Branches.—It was reported in New York recently that the Long Island Railroad was making plans for beginning the work of electrifying its Port Washington branch at once. P. H. Woodward, secretary to Ralph Peters, president and general manager of the Long Island Railroad, who was asked for a statement regarding the matter, said that the plan of the company at present is not to begin electrifying the Port Washington branch until some time in 1910. He added, however, that "the plan might be changed by an improvement in financial conditions."

Petition in Minneapolis to Discuss Fare Appeal Case.—The following petition is being circulated in Minneapolis: "To the Honorable City Council, City of Minneapolis: Gentlemen—We, the undersigned citizens of Minneapolis, believing that the interests of the city as a whole, and the patrons of the street railway, will be best served and promoted by improved service and additions to the system rather than by a reduction in the fare, hereby respectfully petition your honorable body to take such action as may be necessary to authorize and instruct the city attorney to dismiss the appeal now pending in the Supreme Court of the United States on the so-called 'Six for a Quarter Ordinance,' and allow the decision of Judge Lochren to become final."

Decision in Steinway Tunnel Suit.—The Appellate Division of the Supreme Court, by a unanimous decision, holds that the franchise of the Steinway, or Belmont, tunnel under the East River from Forty-second Street to Long Island City did not lapse on Jan 1, 1907, because the tunnel was not complete, and that it does pass to the trustees of the creditors, stockholders and members of the New York & Long Island Railroad, who were the defendants in the suit brought by the city. Those defendants are in lawful occupation of "the tunnels, tracks, structures and property of the company in the Borough of Manhattan and in the Borough of Queens," and the city "should be enjoined from interfering therewith." An offer to sell the property to the city for $7,000,000 was rejected. It was contended by counsel for the company that while the company had ceased to exist as a corporate body, the tunnel and all of its property thereby passed in 1907 from the company to the directors as trustees for creditors and stockholders of the road. The decision sustains that contention.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Delaware.—February 19 was the last day fixed by the General Assembly for receiving new business. Up to the last moment nothing of import to street railways had transpired, but just before the close of the session Senator Drexler gave notice of a bill providing for a public service commission. The Senator said that the measure had not yet been drawn, but announced that his proposed bill would create a commission with authority over all public service corporations, the members of the commissions to be appointed by the Governor. The announcement is not taken very seriously as none of the street railway or electric light properties in the State is large, and there are no intrastate railroads in the strict sense.

The bill has been passed by the House which provides that the State may, after 10 miles of a freight and passenger railway have been built, invest in 3 per cent bonds of the company at the rate of $1,000 a mile, the total investment not to exceed $100,000. The supervision of this investment by the State is invested in a commission of five members to consist of the Governor and four others, to be appointed by him to serve without remuneration.

Maine.—The first really significant measure of this session, as far as the railroads are concerned, has reached the House. It is a public utilities bill, and provides for the extension of the power of the Railroad Commission and a change of name for that body to the Public Service Commission. Maine found its incentive in the similar measure in Vermont. The commission is given authority over the railroads, street railways, electric light and power companies, telephone companies, etc. One clause of the measure says that the commission shall have jurisdiction over "the manner of operating and conducting any business subject to supervision under this act so as to be reasonable and expedient, and to promote the safety, convenience and accommodation of the public." The tariffs of all companies are to be filed with the commission for public inspection.

Minnesota.—A measure by Representative Christensen places all city railways under the control of the State Railway and Warehouse Commission; another, by Johnson, does away with the present ad valorem basis of taxation and puts all street railways on a gross earning basis; another by Zelch covers interurban electric railways and designates them as common carriers, with all the rights now enjoyed by the steam roads. The Zelch bill as outlined by its author is for the purpose of bringing all suburban lines under the ruling of the Supreme Court which has held that they are common carriers and subject to the same laws and regulations as the steam roads. He asks that they pay 4 per cent on their gross earnings, which is what the steam roads pay. This tax, while collected by the State, is also returned to the localities in which the lines are located. The bill is still in committee, but it is expected that it will be sent to the House with a favorable report.

Missouri.—A bill creating a State utilities commission will be introduced by Representative Wade of Greene. It will provide that the commission have charge of all the public utilities in the State, including railroads, but it will in no wise interfere with the commissions in St. Louis and Kansas City. One feature will be the abolition of the Missouri Railroad and Warehouse Commission, the members of which are to be made members of the Missouri Public Utilities Commission and to serve for a term equal to that remaining in their present places. Besides these three members, there are to be two others. The salary of each of the five members is to be $3,500, which is $500 in excess of that paid to the present members of the Railroad and Warehouse Commission. The members of the commission are to be named by the Governor. In regard to the proposal to create a Public Service Commission in Missouri, Governor Hadley said: "I have been considering this question for some time and I have about reached the conclusion that we need a utilities commission to check corporate abuses and insure every corporation, great or small, a square deal. It is my idea that the commission be clothed with semi-judicial powers. It should have the right to investigate every phase bearing on the conduct of public service corporations, with respect both to their physical and financial condition."

New Jersey.—The joint special finance committee which has been considering means for recouping the State treasury has submitted its conclusions to the Legislature. A retrenchment of $176,976 in the annual appropriation bill is recommended. Two recommendations are made affecting the railroads. One proposes a revaluation of the railroad property within the State; the other proposes "a fair revision of the franchise tax by a moderate increase in tax on the capital of corporations above $5,000,000." This would result in an increase of revenue to the State each year of approximately $500,000, in the opinion of the committee. The bill introduced in the Senate by Mr. Gaunt, to give electric railways the right to carry freight, and which has been referred to the committee on judiciary, follows: "Be it enacted by the Senate and General Assembly of the State of New Jersey: 1. It shall be lawful for any traction company or other company owning, leasing or operating any street railroad in this State to receive and carry over such street railroad freight and express matter for hire and to deliver the same to parties entitled thereto; provided that it shall be lawful for the governing body of any city having a population exceeding 12,000 to prescribe certain hours of the day during which freight may not be carried in such cities, and to prescribe reasonable regulations for the use and operation of cars in such cities used in carrying freight and express matter. 2. All acts and parts of acts inconsistent with this act are hereby repealed, and this act shall take effect immediately."

New York.—The prospects are that the Legislature will adjourn during the first week in May. There is still a flood of business before it, however. The report of the New York City charter revision committee has at last been presented, and will be referred to the cities committees of the Senate and the Assembly. In this connection it is interesting to note that both houses have passed the resolution continuing the Cassidy commission until the end of the session. This commission investigated the financial condition of New York City, and the majority reported in opposition to the constitutional amendment exempting income-producing bonds from the city debt limit. Supporters of that amendment declare that it is the quickest and surest way of providing funds for transit requirements in New York City. The cities committees will have the benefit of the advice of the Cassidy committee in regard to fixing the debt limit of New York. Those interested in the new charter are anxious to have it passed at this session so that public officers may be elected to serve under its provisions at the November, 1909, election. As Mr. Shonts, president of the Interborough Rapid Transit Company, said at the hearing on the application of the Hudson & Manhattan Railroad for permission to extend its subway line, his company will desire a change in the Elsberg law, but the tenor of this modification will probably not be known until he presents his formal plans to the Public Service Commission of the First District, on March 17. The constitutional amendment to take the subway bonds out of the debt limit has been introduced in the Assembly, and Senator Travis has promised to introduce a correct copy of the measure at once. Both houses passed the amendment last year, but it must be passed again and then submitted to the voters. Amendments to the Public Service Commission law. placing telephone, telegraph, ferry and stage companies under the jurisdiction of the commission, have been prepared for introduction. The Public Service Commission of the First District of New York has replied to the resolutions adopted by the Assembly and the Senate of New York asking when the commission expects to render a decision in the Coney Island fare case. The reply of the commission appears elsewhere in this issue.

Ohio.—The Woods bill, providing for a commission to have charge of the appraisement of public utilities corporations, as amended, passed the House on March 3. In order to escape the criticism of its being a partisan measure, the bill was so changed that the commission will consist of a Republican and a Democrat, with the provision that the Supreme Court shall appoint an arbiter in case of disagreement over any point. The members are to be appointed by the Governor. The commission will take the place of about 12 boards composed of elective officials. A uniform system of bookkeeping is to be provided for the various classes of utilities. Provision is made that a corporation into which two or more other corporations are merged shall not have a greater capital stock than the aggregate capital stock of the companies affected. No utilities are affected except those which now come under the various boards, except boat lines between Ohio ports and points in other States. The members of the commission are to receive salaries of $5,000 per year each and neither they nor their wives can hold stock in any of the corporations coming under their control. In the Senate the bill has been referred to a committee where it is believed it will remain until after adjournment. The following bills affecting street railways have been introduced in the House: Providing for a fine of from $100 to $1,000 for failure to equip cars with safety and power brakes; providing for a change in the law requiring the payment of 10 cents additional fare when tickets are purchased on cars, so that the act will apply only to steam roads; providing that when street paving is torn up for the purpose of laying new street railroad track, half of the original cost of the pavement shall be repaid to the property owners by the company; giving interurban railways the right of eminent domain in securing land for the purpose of straightening tracks or otherwise altering established lines; giving municipalities the power to require street railways to sprinkle streets where they have right of way; giving electric railways the same right to condemn property in municipalities that steam railway companies now have. The nomination of John E. Sullivan for member of the State Railroad Commission has been confirmed by the Senate. This was done with the consent of John C. Morris, who has held the place. The confirmation of both Mr. Morris and Mr. Sullivan to the office creates a situation that will result in an appeal to the courts.

Pennsylvania.—A time limit for the introduction of new bills at the present session of the State Legislature will

be fixed this week. Hearings on several important bills now in committee will be held next week, one of these being the Keiss bill increasing the power of the State Railroad Commission so that the commission may regulate capital stock increases. Railroad and railway interests are opposed to this measure. At the instance of the Pittsburg Railways Company a hearing was given by the Senate committee on municipal affairs on March 9 on the bill amending the Pittsburg city charter so that the municipality will have power to regulate street railway service. It is believed that the bill will be favorably reported by the committee. Stone & Webster have made an exhaustive report to the State Railroad Commission regarding street railway service in Pittsburg, but it will not be given out for publication until it has been considered by the commission as a whole. Among the new measures presented in the House last week was the Hilton bill, which seeks to regulate the compensation or salary to be paid to directors, officers and superintendents of any corporation by permitting any stockholder or stockholders representing not less than 10 per cent of the capital stock of any corporation to present a bill or petition to the court of common pleas of the county in which the corporation has its principal office, calling for a review of the case, if, in their judgment, the compensation or salary paid any director is excessive or unreasonable. In direct contrast to the Sproul State road bill now in committee, the administration State road bill was introduced last week in the House by Mr. Ambler, and will probably be given the right of way over the Sproul measure. It prohibits the use of the State highway for railway purposes. Senator Sproul has also introduced an anti-spitting measure which has the endorsement of the State Health Department. It provides a fine of from $5 to $50 for spitting in public places or in cars. The judiciary general committee of the House is now considering the Foster bill, further amending the act entitled "An act concerning the sale of railroads, canals, turnpikes, bridges, and plank roads," approved April 8, 1909.

South Carolina.—The General Assembly has adjourned. The session this year was somewhat longer than usual, this being accounted for by the time given to the consideration of the liquor bills. Strictly speaking, the great bulk of the legislation is local, having to do with county affairs, provisions for the refunding of town and county bond issues and similar matters. Only one bill directly affecting the electric railways is before the Governor for approval. It requires electric railways to enclose the vestibules of their cars during the winter. A measure which includes the electric railways under its provisions provides that every corporation doing business in South Carolina, which is capitalized at more than $25,000, shall make an annual itemized report to its stockholders, showing the assets and liabilities of the company.

Wisconsin.—The suggestions for legislation made by the Railroad Commission of Wisconsin in its second annual report covering the year ended June 30, 1908, are being discussed generally. The commission says that in several instances it has been obliged to place a somewhat liberal interpretation upon the public utilities law and adds that it will be assumed that the intrepretation thus placed upon the law is in harmony with the spirit and intentions of the Legislature, unless the Legislature directs otherwise. The only amendment suggested to the law is one extending the period of time during which public utility companies, organized before the enactment of the law, can surrender their franchises and secure in lieu thereof indeterminate permits. The report says: "The utilities law limited the time during which a franchise could be surrendered to July 1, 1908. Since this date a number of companies have inquired of the commission as to the manner in which they could now surrender their franchises. In our judgment it is desirable that utilities still operating under franchises granted before the enactment of the law should have an opportunity to surrender the same at any time in the future. Possibly it is in the interest of the public to go a step further and under the reserve power of the constitution, by statute repeal all franchises still in existence and grant in lieu thereof indeterminate permits. The second suggestion is obviously a much larger proposition, but we are inclined to believe that it merits careful consideration. The public convenience and necessity law could to advantage be modified so as to permit the commission to consider the financial ability of the applicants in passing upon the application for such certificate, as some doubt exists at present of the right of the commission to inquire into such matter. The law might be further amended to authorize the commission to permit modifications of the certificate of public convenience and necessity at any time subsequent to its first issuance."

Financial and Corporate

New York Stock and Money Market

The stock market during the past week has been rather inactive, although prices have been well maintained. There have been few occurrences of interest to induce trading, beyond the inauguration of the new President and the discussion of Mr. Taft's inaugural address. Taken as a whole, the financial district is very well pleased with the expressions of the new head of the government. It believes that while he will pursue the policies of his predecessor, prosecutions of corporations will be conducted in a legal and orderly manner, and that the minds of the public will not be inflamed by violence, either of language or action. One point that is especially encouraging to the business world is Mr. Taft's demand that the new tariff bills shall be speedily adopted.

Interest in traction stocks has been mainly in the Interborough-Metropolitan issues and in Brooklyn Rapid Transit. The former have advanced during the week several points, due undoubtedly to the report for the quarter recently made public, which shows that the business of the Interborough-Metropolitan is steadily increasing and that the expense percentage is being kept within reasonable limits. The prevalent uncertainty regarding the course of Brooklyn Rapid Transit tends to keep it constantly more or less active.

The money market continues to be very easy and cash seems to be plentiful. Bonds are still in demand and are taken eagerly by all kinds of investors. Quotations to-day for money were 1½ to 2 per cent for call loans and 2½ to 2¾ per cent for 90-day paper.

Other Markets

Rapid Transit and Union Traction continue to be the leading traction issues in the Philadelphia stock market. Still, they have not been as active during the past week as during preceding weeks, because the entire market has been much duller. Prices for Union Traction have remained about stationary, while Rapid Transit has sold off a trifle.

In the Boston trading, traction securities have played but little part. A few scattering lots of Boston Elevated and Massachusetts Electric come into the market, but there is no definite trend to the trading. Prices are little changed from former quotations.

In the Chicago market, South Side Elevated has been selling to a limited degree and prices have shown an inclination to recede. Among the other elevated shares, Metropolitan and Northwestern have been traded in to some extent, but price changes have been only fractional. There has also been some renewed activity in all of the "Series" of the Chicago Railways Company, but changes in price have been unimportant.

In the Baltimore trading, the bonds of the United Railways continue to be the only issues that demand attention. The funding 5s are steady at about 80, and the incomes are selling from 53¼ to 53½. A few shares of United Railways stock have been sold at from 11⅛ to 11¼.

Among the securities sold at auction in New York last week were: Eight shares of Sixth Avenue Railroad Company at 118½; 507 shares Brooklyn City Railroad, $10 each, at 191¼; 1000 shares of the same at 191½; 1975 shares at 191½.

Quotations of various traction securities as compared with last week follow:

	Mar 2.	Mar. 9.
American Railways Company, Philadelphia	46	*46
Boston Elevated Railway	127	127
Brooklyn Rapid Transit Company	73⅝	71⅝
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a76	a78
Consolidated Traction Company of New Jersey, 5 per cent bonds	a106	a107
Detroit United Railway	61¾	61
Interborough-Metropolitan Company	15¼	15⅜
Interborough-Metropolitan Company (preferred)	42¾	43⅜
Manhattan Railway	*148½	144
Massachusetts Electric Companies (common)	*14	14¼
Massachusetts Electric Companies (preferred)	*68¾	72
Metropolitan West Side Elevated Railway, Chicago (common)	*16	19
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	28	*28
North American Company	81⅝	80½
Philadelphia Company, Pittsburg (common)	*41⅝	41⅝
Philadelphia Company, Pittsburg (preferred)	42¾	*42¾
Philadelphia Rapid Transit Company	27¼	27½
Philadelphia Traction Company	*93	*93
Public Service Corporation, 5 per cent collateral notes	a100¼	a100¼
Public Service Corporation certificates	a79½	a80¼
Twin City Rapid Transit Company, Minneapolis (common)	*103½	105
Union Traction Company, Philadelphia	53	53½

a Asked. *Last sale.

Annual Report of Georgia Railway & Electric Company

The pamphlet report of the Georgia Railway & Electric Company, Atlanta, Ga., for the year ended Dec. 31, 1908, contains a statement of earnings of that company and the Atlantic Gas Light Company, combined for the year, and a separate statement of the earnings of the Atlanta Northern Railway, the capital stock of which is owned by the Georgia Railway & Electric Company. The statement of the Georgia Railway & Electric Company and the Atlanta Gas Light Company follows:

Gross earnings		$3,339,021
Operating expenses		1,649,994
Net earnings		$1,689,027
Taxes		231,662
		$1,457,365
Dividend treasury stock	$29,604	
Dividend miscellaneous stock	4,222	
		33,826
		$1,491,191
Interest on bonds	$545,368	
Interest on notes	56,371	
		601,739
		$889,452
Dividend on preferred stock		120,000
Surplus earnings		$769,452
Dividend on common stock		510,876
		$258,576
Profit and loss balance		1,016,348
Surplus Dec. 31, 1908		$1,274,924

The consolidated balance sheet of the companies Dec. 31, 1908, follows:

ASSETS.

Construction plant	$21,035,556
Supplies, fittings, etc.	341,729
Cash and accounts receivable	312,979
Prepaid accounts	6,545
Stocks and bonds	2,397,012
Job and work orders	41,551
Sinking fund bonds	112,000
Sinking fund premium	5,211
Sinking fund trustee	208
Total	$24,252,791

LIABILITIES.

Capital stock, preferred	$2,400,000
Capital stock, common	8,514,600
Mortgage bonds	10,855,000
Accounts and bills payable	1,046,631
Interest payable	4,791
Taxes payable	19,877
Reserve accounts	110,627
Sinking fund interest	26,340
Profit and loss surplus Dec. 31, 1908	1,274,925
Total	$24,252,791

The statement of earnings of the Atlanta Northern Railway, for the year ended Dec. 31, 1908, follows:

Gross earnings	$112,821
Operating expenses	83,749
Net earnings	$29,072
Taxes	2,949
Net income	$26,123
Interest on bonds and notes	22,022
Surplus for year 1908	$4,100
Surplus at Dec. 31, 1908	52,283
Total surplus at Dec. 31, 1907	$56,383

The balance sheet of the Atlanta & Northern Railway, as of Dec. 31, 1908, shows as follows:

ASSETS.

Construction plant	$597,719
Supplies	2,748
Cash and accounts receivable	3,335
Prepaid accounts	623
Total	$604,425

LIABILITIES.

Capital stock	$100,000
Mortgage bonds	400,000
Accounts payable	7,332
Bills payable	34,000
Reserve accounts	6,709
Surplus Dec. 31, 1908	56,384
Total	$604,425

P. S. Arkwright, president of the Georgia Railway & Electric Company, in presenting the report, said in part:

"The total mileage of railway track, on a single-track basis, owned and operated by the company on Feb. 15, 1909, was 166.2 miles. During the year, 5.4 miles of new track were built, 0.261 mile of track taken up and abandoned, and 4.07 miles of track were rebuilt. 159.7 miles of track out of the total mileage have been built or rebuilt since Jan. 1, 1899, with heavy rail of modern sections and on ballast. Of the total mileage only 4.4 miles of track are constructed of light rail not in good condition.

"During the year the sum of $390,786 was expended on new construction and additions to the property of the company.

"There have been no increases in the capital stock of the company during the year and no bonds have been issued during the year. Underlying bonds of the Atlanta Consolidated Street Railway, of the par value of $25,000, were redeemed in accordance with the sinking-fund provision in the mortgage securing these bonds, and $10,000 par value, first consolidated mortgage bonds of Georgia Railway & Electric Company were retired in accordance with the sinking-fund provision of the first consolidated mortgage securing these bonds.

"In addition to the general effect on business, due to the financial depression, which affected the business of this company during the year 1908, there were special circumstances tending to decrease the company's revenues on the one hand and increase its expenses and fixed charges on the other, as compared with the year 1907. The year 1908 covers the first period of the operation of the State prohibition law. This tended to decrease the business of the company in every department.

"Beginning April 1, 1908, the new contract with the city of Atlanta became effective, resulting in a decrease of charges for public street lights from $75 per arc per annum to $60 per arc per annum, and reducing the prices to commerical customers for electric-light service from 12 cents to 10 cents per kw-hour maximum, and for power from 7 cents to 6 cents per kw-hour maximum.

Effective on Sept. 1, 1907, the wages of the motormen and conductors were increased, so that during the first eight months of 1908 the comparison of expenses was on the basis of a higher wage scale for motormen and conductors than for the corresponding period of the year 1907.

"During the year 1907 the taxes were very largely increased, the assessment of the physical property and franchises being increased 130 per cent over 1906. This increased assessment was maintained during the year 1908, and added to, to some extent, on account of additional property. That the company was able, notwithstanding these adverse conditions, to show an increase in both gross and net earnings for the year 1908 over the year 1907, demonstrates its stability.

"In the latter part of 1907 the powers of the Railroad Commission of Georgia were extended over electric railroad, electric light and power and gas companies, with the right, on the part of the commission, to regulate and control the service and rates of companies engaged in these lines of business. During the year 1908 petitions were filed with the Railroad Commission, asking for a reduction of the rates of the company in the matter of passenger fares upon its street and suburban railroads, and against the Atlanta Gas Light Company in the matter of rates charged for gas, and for various corrections of alleged improper service furnished by the company. After a full and complete hearing and a thorough investigation, these petitions were refused and the rates charged by the company and the Atlanta Gas Light Company were found reasonable and their service satisfactory.

"Similar complaints were made to the Railroad Commission as to the rates of fare and service of the Atlanta Northern Railway. These complaints were likewise dismissed by the commission after a hearing, and the rates pronounced reasonable and the service satisfactory.

"The company made, during the year, an exceptionally good record for carefulness and diligence in its transportation department. Approximately 46,000,000 passengers, including paid passengers, transfers and free passes, were handled on its lines of street railroad, and not one single passenger was killed or seriously injured."

Decision Against New Haven Company in Holding Case Confirmed

The full bench of the Supreme Court of Massachusetts has affirmed the decision of Justice Rugg of the Supreme Court, handed down in June, 1908, to the effect that the New York, New Haven & Hartford Railroad must relinquish before July 1, 1909, its interest in the Worcester & Southbridge Street Railway, Worcester & Blackstone Valley Street Railway, Worcester & Webster Street Railway, Webster & Dudley Street Railway, Springfield Street Railway and the Berkshire Street Railway, controlled by the New York, New Haven & Hartford Railroad through the New England Investment & Security Company. Action against the New York, New Haven & Hartford Railroad was brought by the Attorney-General of Massachusetts in May, 1908. In its appeal the company contended that Justice Rugg's decree was "vague and uncertain." On this point,

which is the principal subject treated in the decision of the full bench, the court says:

"The only relief asked for by the informant (Attorney-General Malone) was an injunction compelling the defendant to comply with its statute by ceasing to hold or control, directly or indirectly, the stock referred to in the information.

"Construing the decree in relation to the matters stated in the information and recited in the decree, it is difficult to see how the defendant can be in doubt in regard to the meaning of the order, or its own duty in the premises. It was entirely immaterial to designate and describe the defendant more particularly in the decree, either by calling it a corporation existing under laws of Massachusetts or by calling it a corporation existing under laws of Massachusetts, Connecticut and Rhode Island. We see no possibility of doubt on the part of the defendant in regard to the conditions that must come into existence to constitute a performance of its duty to cease to hold or control, either directly or indirectly, the stocks referred to in the information."

The decision is not regarded as changing the situation in any material aspect. The question which now arises is whether or not before and during the legal proceedings the controlling interest of the New York, New Haven & Hartford Railroad in the companies mentioned has been legally disposed of. Since October, 1908, the controlling common stock has been, with a single exception, sold to persons entirely disconnected with the company. The only official connection remaining, it is said, is in the fact that President Mellen of the New York, New Haven & Hartford Railroad remains one of the trustees of the Investment & Security Company. The New England Navigation Company holds as a creditor certain notes of the Investment & Security Company, but has no other relation to it. The 1000 shares of common stock are distributed among some 15 or 20 outside holders, while the 40,000 shares of preferred stock are distributed among 700 or 800 shareholders.

Pennsylvania Railroad Required to Dispose of a New Jersey Electric Railway

Chancellor Pitney, in the Court of Errors and Appeals of New Jersey, has delivered an opinion and ordered a judgment in the case of the State of New Jersey against the Atlantic City & Shore Railroad, which operates between Egg Harbor and Atlantic City, and has undertaken, through stock ownership and lease, to exercise the franchise rights of the Central Passenger Railway, operating an electric railway in Atlantic City, and several other contiguous lines which are considered feeders for the Atlantic City & Shore Railroad. The Atlantic City & Shore Railroad is controlled by the Pennsylvania Railroad, 51 per cent of its stock being deposited for purchase by the West Jersey & Seashore Railroad, which is owned by the Pennsylvania Railroad.

The State of New Jersey, in instituting the action, challenged the right of the Atlantic City & Shore Railroad to acquire and own the stock and bonds of the Central Passenger Railway, or to operate cars over its routes on the ground that such powers were not conferred upon it under the railroad act and cannot be derived from Section 51 of the general incorporation act referred to above. This position is upheld by Chancellor Pitney, and a judgment is ordered ousting the Atlantic City & Shore Railroad from the electric railway franchises it has acquired from the Central Passenger Railway, and requiring it to dispose of the stocks and bonds of the company.

Under the decision, the following general propositions are laid down as covering the holding company device or corporate control:

"Under the general railroad act a railroad company may not claim any general power that is not appropriate to and consistent with the construction, maintenance and operation of its railroad between the terminal declared by it pursuant to the railroad act.

"The power to purchase, hold, etc., stock and bonds of other corporations conferred by Section 51 of the general corporation act is to be exercised subject to the limitations imposed by Section 2 of the same act; that is to say, the power exists as a primary power only when the purpose to exercise it as such is expressed in the certificate of incorporation, and otherwise it exists as an incidental power only so far as necessary or convenient to the attainment of the objects that are set forth in the charter or certificate of incorporation.

"A railroad company incorporated under the act of 1903 for the purpose of constructing, maintaining and operating a line of railway with definite termini is without power to hold the stock and bonds of a street railway company operating beyond those termini and thereby to control its operations."

The Chancellor declares his belief that the opinion he expresses of the limitations of Section 51 of the New Jersey corporation law is held by the legal profession in general and that the articles of association of most holding companies are made to express in terms the purpose of holding stocks in other corporations.

Quarterly Report of the Interborough Rapid Transit Company

The report of the Interborough Rapid Transit Company, New York, N. Y., for the quarter ended Dec. 31, 1908, to the Public Service Commission of the First District of New York compares with the previous year as follows:

	1908.	1907.
Gross earnings	$6,786,899	$6,301,496
Operating expenses	2,691,804	2,602,095
Net earnings	$4,095,095	$3,699,401
Other income	341,989	306,941
Total income	$4,437,084	$4,006,342
Interest funded debt	499,208	275,000
Taxes	543,308	457,715
Rentals	2,007,254	1,993,036
Discount, etc.	3,033	.....
Total deductions	$3,052,803	$2,725,751
Surplus	$1,384,281	$1,280,591

The report gives the net income previously reported for preceding quarters in the fiscal year 1908 as $91,189, compared with $207,091 in 1907.

The following table shows the proportion of the foregoing earnings furnished by the Manhattan Railway and the Subway divisions, respectively:

	Manhattan Railway.	Subway.
Gross earnings	$3,606,800	$3,180,098
Operating expenses	1,548,872	1,142,932
Net earnings	$2,057,928	$2,037,166
Other income	135,775	206,214
Total income	$2,193,703	$2,243,380
Interest funded debt	.....	499,208
Taxes	527,712	15,595
Rentals	1,464,315	542,939
Discount, etc.	.....	3,033
Total deductions	$1,992,027	$1,060,775
Surplus	$201,676	$1,182,605

Albany & Hudson Railroad, Hudson, N. Y.—The Albany & Hudson Railroad has applied to the Public Service Commission of the Second District of New York for permission to issue $100,000 of bonds to defray the cost of work being done at its Stuyvesant Falls power plant.

Blue Ridge Traction Company, Danielsville, Pa.—The property of the Blue Ridge Traction Company, including Edgemont Park, has been sold to a syndicate at the head of which is J. K. Hower. New officers have been elected as follows: J. K. Hower, president; C. C. Marsh, treasurer and superintendent; H. H. Hower, secretary; J. K. Hower, C. C. Marsh, H. H. Hower, James L. Foote, G. T. Oplinger and Jay S. Moyer, directors.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—The Public Service Commission of the Second District of New York has received an application from the Fonda, Johnstown & Gloversville Railroad for approval of an increase of stock from $2,500,000 to $3,500,000, and for consent to issue $500,000 of such increase. The $1,000,000 increase is proposed to be 6 per cent cumulative preferred stock. The petition also asks for approval of the classification of the present $2,500,000 stock as common stock and the $1,000,000 increase as preferred stock. The proceeds of the $500,000 preferred stock are to be used to pay in part obligations incurred for betterments, and the remaining $500,000 is to be held for future betterments.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.—The new second mortgage of the Fort Wayne & Wabash Valley Traction Company, securing $1,000,000 of 6 per cent, 25-year bonds, has been filed for record, the Guarantee Trust & Safe Deposit Company, Philadelphia, trustee. It is stated that the proceeds of the issue are to be used for the construction of the Logansport-Lafayette extension and for remodeling the power house at Lafayette.

Gainesville (Ga.) Electric Railway.—The property of the Gainesville Electric Railway was bought for $180,000 by R. L. West, Atlanta, representing the bondholders at the foreclosure sale recently.

Interstate Railways Company, Philadelphia, Pa.—The bondholders' committee selected by the holders of the 4 per cent bonds of the Interstate Railways Company has organized by electing Holstein DeHaven chairman, Gerald Holsman secretary, and John C. Bell counsel. It has been

decided to extend the time for deposit of bonds with the Philadelphia Trust Company until March 31. Bonds to the amount of about $7,000,000 have already been deposited. It is said that the report on the physical condition of the property, on which the reorganization plan will be based, will be ready about March 15.

Macon Railway & Light Company, Macon, Ga.—The Macon Railway & Light Company recently elected officers as follows: W. J. Massee, president; M. F. Hatcher, first vice-president; F. B. Stubbs, second vice-president; J. T. Nyhan, general manager; H. H. Hertz, secretary and treasurer; F. D. Bloodworth, assistant secretary and treasurer, and M. L. Corbett, superintendent of transportation.

New England Investment & Security Company, Springfield, Mass.—The following trustees have been elected to represent the preferred shares of the New England Investment & Security Company: H. L. Higginson, Boston; C. S. Mellen, New Haven; A. W. Damon, Springfield. The following trustees have been elected to represent the common shares: Lawrence Minto, Boston; A. G. Bullock, Worcester; Gordon Abbot, Boston, and Bennett W. Warren, Williamstown.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—The hearing on the application of the Maryland Trust Company, trustee under the general mortgage of the Newport News & Old Point Railway & Electric Company, for the appointment of a receiver has been adjourned to March 12.

New York, New Haven & Hartford Railroad, New Haven, Conn.—The New York, New Haven & Hartford Railroad has applied to the Public Service Commission of the Second District of New York for permission to purchase the stock of the New York & Port Chester Railroad and the New York, Westchester & Boston Railway, now owned by the Millbrook Company, and also whatever remaining stock in the New York, Westchester & Boston Railway may be acquired from other parties. The Millbrook Company owns all of the $250,000 stock of the New York & Port Chester Railroad except nine shares, and of the $1,000,000 stock of the New York, Westchester & Boston Railway the Millbrook Company owns 75,829½ shares, and 32,580½ shares are owned by other parties. The New York, New Haven & Hartford says that it has advanced money for rights of way, construction work and disbursements of the Millbrook Company, and desires to eliminate the Millbrook Company as an unnecessary intermediary.

New York State Railways, Rochester, N. Y.—As a part of the plan of the Central Railway Syndicate for refinancing and reorganizing its electric railway properties as the New York State Railways the Rochester Railway and the Sodus Bay Railway have applied to the Public Service Commission of the Second District of New York for permission to consolidate.

New York & Stamford Railway, Port Chester, N. Y.—The New York & Stamford Railway was granted permission by the Public Service Commission of the Second District of New York on March 4 to make a mortgage in favor of the Union Trust Company, New Haven, Conn., as trustee, to secure an issue of $2,000,000 of 5 per cent bonds and to issue thereunder $701,000 for refunding and discharging note obligations and for other purposes. The New York & Stamford Railway is operated by the Consolidated Railway of Connecticut and has outstanding $450,000 of 5 per cent bonds due October, 1931.

Second Avenue Railroad, New York, N. Y.—Holders of the first consolidated mortgage bonds of the Second Avenue Railroad asked Justice O'Gorman, in the Supreme Court, recently, to instruct George W. Linch, the receiver of the company, to take steps to enforce the lease entered into between the Second Avenue Railroad and the Metropolitan Street Railway. Counsel for the petitioners asked that Mr. Linch be instructed to observe, as far as possible, the obligations of free transfers imposed by the railroad law and to insist that the Metropolitan Street Railway permit the Second Avenue Railroad to carry its passengers over the lines of the Metropolitan Street Railway. The court reserved decision.

Third Avenue Railroad, New York, N. Y.—Judge Lacombe, in the United States Circuit Court on March 6, handed down an order granting permission to Frederick W. Whitridge, as receiver of the Third Avenue Railroad, to issue additional certificates to the amount of $375,000 for the purchase of new cars.

Virginia Passenger & Power Company, Richmond, Va.—The United States Circuit Court of Appeals on March 4 affirmed the decree of foreclosure and sale of the property of the Virginia Passenger & Power Company, made by Judge Waddill. It is generally expected that the road will be sold within 60 days.

Traffic and Transportation

The Coney Island Fare Case

In reply to resolutions of the Senate and the Assembly of New York asking the Public Service Commission of the First District of New York when it expects to render a decision in the Coney Island 5-cent fare case, the commission, through Chairman Wilcox, made the following answer on March 4:

"The resolution specifically refers to the complaint made to the commission by Scott MacReynolds against companies comprised in the Brooklyn Rapid Transit Company. Another complaint by J. Monheimer against virtually the same companies, for the same cause, was received at the same time. Both issues against this company were heard and considered together. Both complainants also made separate complaints against the Coney Island & Brooklyn Railroad, a company independent of the Brooklyn Rapid Transit system.

"All of these complaints were to the effect that the charge of 10 cents for a continuous ride to Coney Island was excessive, unreasonable and unlawful, and they prayed that the commission order a reduction in the rate of fare to 5 cents.

"The commission assumes that the intent of your resolution would go to all of these companies, and I beg to submit the following statement including them:

"Under Section 49 of the Public Service Commissions law this commission has no authority to issue an order changing rates except upon complaint and after hearing. Such hearings were promptly held in the cases above referred to. Complainant Monheimer submitted no evidence. Complainant MacReynolds presented considerable evidence, but withdrew from the prosecution of the case before the hearings were ended. The companies affected submitted considerable testimony. Additional facts and figures were also prepared by the bureau of statistics of the commission.

"The companies affected by the complaint were the Coney Island & Brooklyn Railroad and the following, embraced in the Brooklyn Rapid Transit system, namely, Brooklyn Union Elevated Railroad, Brooklyn Heights Railroad, Nassau Electric Railroad, Brooklyn, Queens County & Suburban Railroad, Coney Island & Gravesend Railway, South Brooklyn Railway and the Sea Beach Railway. They include four elevated routes and six surface lines. It was maintained by the Brooklyn Rapid Transit Company that, although the several companies carried on a joint operation, they did so independently, and that, with two exceptions, each of the lines was operated by at least two different companies and under different franchises. It was contended, therefore, that the 10-cent fare now charged must be considered a joint rate, and that any lowering of the fare must be under the joint-rate clause of the Public Service Commissions law.

"After the hearings were held the commission proceeded carefully to consider the voluminous testimony which had been taken. That presented by the complainant was fragmentary and did not cover all the ground. Even the reports of the corporations, because of the method of accounting practised by the subsidiary companies of the Brooklyn Rapid Transit Company, were not in proper form to facilitate a prompt decision. The commission ordered a further investigation by its expert accountant of the companies' books, which were examined in connection with the figures presented in the testimony.

"After careful examination it was found that the evidence in its entirety did not offer sufficient grounds upon which this commission could arrive at a conclusive decision, either that a 10-cent rate was reasonable or that a reduction could be ordered. It was found that in order to rest a decision upon solid ground justice, both to the company and to the public, required that it would be necessary to make an appraisal of the tangible and intangible properties of the companies, and such an appraisal was decided upon. Prior to this time the commission had found it important to begin the appraisal of several of the Manhattan lines that were in the hands of receivers. The expert force of the office capable of doing this work was fully occupied in working under the urgent pressure of the unusual and acute situation in Manhattan. As soon as a part of this force could be put to work on the Brooklyn companies it was done, and for some time past an appraisal of the property of the Coney Island & Brooklyn Railroad has been proceeding, and is now nearly completed. When this has been done in the case of all the lines it will then be clearly shown what is the fair value upon which a reasonable profit must be allowed; for, of course, every rate of fare ordered by this commission must permit an equitable return to the companies after the payment of proper expenses, taxes and other charges of the city and State.

"An exact date cannot be fixed when this work will be completed and the decision rendered, but it will be continued as rapidly as possible.

"It may be added that the complex and complicate intercompany arrangements existing between the companies in the Brooklyn Rapid Transit system and their methods of keeping accounts of traffic returns have delayed a decision, owing to the time required for a thorough investigation. The commission, meantime, has prescribed a uniform system of accounts which hereafter will clearly show all the operations and the condition of the companies.

"It would also have been possible to have reached a decision at an earlier date if the case could have been decided upon the evidence presented at the hearings by the complainants and the companies affected, as the commission had hoped would be the case. This could not be done, however, and the commission has interpreted the law to require that while an order in a rate case may not be made except on complaint and after a hearing, the commission shall, of itself, make investigation of all essential facts and come to a decision only after such have been secured."

Lifeguard Being Tried in Chicago.—The Chicago (Ill.) City Railway has installed "H. B." lifeguards on one of its large pay-as-you-enter cars with a view to testing the merits of this device under operating conditions in Chicago. It is stated that the Chicago Railways will similarly install these guards on two of its cars.

Transfer Order in New York.—The Public Service Commission of the First District of New York issued an order on Feb. 26 directing the Central Park, North & East River Railroad, which operates the Fifty-ninth Street crosstown line, to issue transfers at the Fifty-ninth Street junction with the Third Avenue Railroad.

Temporary Reduction in Suburban Fare at Syracuse.—The Syracuse Rapid Transit Railway has offered voluntarily to put a 5-cent fare in effect on its line between Syracuse and Liverpool, instead of a 10-cent fare, for three months, to see what the effect would be upon the traffic and if a reasonable return could be made at the 5-cent rate.

Hearing on Vestibules on Albany, N. Y., Cars.—The Public Service Commission of the Second District of New York held a hearing on March 1 at Albany on the question of fully vestibuling the cars of the United Traction Company, Albany. Some of the cars of the company are vestibuled only at the front and one side. The company pointed out that it would be inadvisable from a traffic standpoint completely to vestibule the cars and filed a demurrer to the effect that its cars as now equipped comply with the vestibule law of 1903.

Express Earnings of the New York, New Haven & Hartford Railroad.—The net earnings from freight transported over the electric railways in Connecticut and Massachusetts controlled by the New York, New Haven & Hartford Railroad are said to have approximated $60,000 for the Connecticut companies and $49,400 for the Massachusetts companies for the six months just ended. It is also said unofficially that the company will take over the express business at Hartford now being done by a private company at the expiration of the lease a few months hence, and that plans are also under way for developing express business on the lines controlled by the company in Rhode Island.

Syracuse & Suburban Railroad Adopts New Fare Tariff.—The Syracuse & Suburban Railroad will adopt the following tariff of fares on its line on April 1: To Orville, 10 cents; return, 15 cents; present rate, 20 cents. To Country Club, 10 cents. To Jamesville, 15 cents; return, 25 cents; present rate, 30 cents. To Fayetteville, 15 cents; return, 25 cents; present rate, 30 cents. To Manlius or Edwards Falls, 20 cents; return, 35 cents; present rate, 40 cents. A special rate ticket book will also be issued on April 1 containing 275 coupons. Each coupon will equal one cash fare, and not less than two coupons will be accepted for any distance. These books have no expiration date and will be transferable and interchangeable on the various suburban roads running out of the city.

Unused Transfers Returned in Cincinnati.—On March 4, R. E. Lee, superintendent of the Cincinnati (Ohio) Traction Company, received by mail a bundle of 800 old transfers, accompanied by an unsigned letter stating that the adoption of a new system of transfers had made it impossible to use the old ones and the possessor had no further use for them. Formerly the company used transfers of six different colors, one for each day in the week, instead of having spaces for the date to be punched by the conductor. The transfers in the package had been sorted ready for use and neatly arranged, so that they could be used with little trouble. A transfer recently adopted is punched by the conductor for the day and the hour, and has the year printed on it.

Personal Mention

Mr. George L. King has been elected secretary of the Northwestern Pacific Railroad, San Francisco, Cal., to succeed Mr. J. L. Willcut.

Mr. Malcolm Baxter, master mechanic and superintendent of motive power of the Western Ohio Railway Company, Lima, Ohio, for four years, has resigned, effective April 1.

Mr. A. E. Roome, superintendent of telephones, telegraphs and signals, of the Pacific Electric Railway, Los Angeles, Cal., has been appointed to have entire charge of that department. Mr. S. H. Anderson, electrical engineer of the company, has assumed charge of the bonding and thermit welding for the company.

Mr. Garrett T. Seeley, engineer of maintenance of the South Side Elevated Railroad, Chicago, Ill., has had assigned to him in addition to his present duties, those as assistant to the general manager. The heads of departments of the operating organization will report to Mr. Seeley as the representative of the general manager.

Mr. George F. Faber has been appointed traffic manager of the Chicago, Lake Shore & South Bend Railway, South Bend, Ind. Mr. Faher was formerly general superintendent of the Western Ohio Railway, Lima, Ohio. He has also been superintendent of the Elgin & Belvidere Electric Railway, Elgin, Ill., and superintendent of the Central Market Street Railway, Columbus, Ohio.

Mr. J. W. Waggener, formerly superintendent of the Atchison Railway, Light & Power Company, Atchison, Kan., has been appointed general manager of the company. Mr. Harry Askin, who rebuilt the lighting plant in 1908, succeeds Mr. Waggener as superintendent. Mr. Askin has advanced in the last six months from chief electrician to assistant superintendent, and now to superintendent.

Mr. T. Ely has been appointed superintendent of transportation of the Beaumont (Tex.) Traction Company. Mr. Ely has had an extended experience in street railway work. He began his career as a conductor in St. Louis and served with the St. Louis Transit Company and its successors for 10 years in various capacities. Mr. Ely at different times has also been in the employ of the United Railroads of San Francisco, the Public Service Corporation of New Jersey, and the Boston Elevated Railway.

Mr. A. H. Mann has been appointed superintendent of the Lansing, Lansing and St. Johns and the Lansing and Jackson lines of the Michigan United Railways, Lansing, Mich., in complete charge of the operating and mechanical departments. Mr. Mann was formerly general master mechanic of the Michigan United Railways, and previous to becoming connected with the Michigan United Railways he was superintendent of motive power of the Evansville & Southern Indiana Traction Company.

Mr. Henry Procter Waugh has been appointed publicity manager of the Interborough Rapid Transit Company, New York. Mr. Waugh, after graduating from college, became connected with the New York *World* and served with it as reporter and in various editorial positions for 12 years, finally becoming assistant city editor. He has a wide acquaintance with newspaper men in New York and the Metropolitan District and is familiar with the local traffic situation in New York.

Mr. R. B. Stichter has been appointed general manager of the Texas Traction Company, Dallas, Tex., to succeed Mr. Theodore Stebbins, who has resigned, but who will continue to serve the company in an advisory capacity. Mr. Stichter is a resident of Dallas and is a well-known gas and electrical expert. He is at present president of the Southwestern Gas & Electrical Association. Mr. Stichter has been general manager of the Bonham Electric & Gas Company, Cleburne Electric & Gas Company, Dublin Electric & Gas Company, Hillsboro Electric & Gas Company, Sherman Electric & Gas Company and Waxahachie Electric & Gas Company. The Texas Traction Company operates an interurban electric railway between Sherman and Dallas, 66 miles distant, and has leased the Denison & Sherman Railway, which operates between Denison and Sherman.

OBITUARY

Col. Henry Bramble Wilson, a member of the firm of Emerson McMillan & Company, New York, bankers, a director of the American Light & Traction Company, New York, the Southern Light & Traction Company, San Antonio, Tex., and many public service corporations, is dead. Mr. Wilson was born in Ironton, Ohio, in 1837, and came to New York in 1890 to become connected with Emerson McMillan & Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***California Electric Railways, San Francisco, Cal.**—This company has been incorporated to construct a crosstown street railway, 2½ miles long, in San Francisco. The company is capitalized at $10,000,000, and it is understood that it is really to become the holding corporation for the Stanislaus Electric Power Company and the Tuolumne Water Power Company, both of which were thrown into the hands of a receiver a few weeks ago as an initiatory proceeding, it has been reported, for turning the property over to the United Railroads of San Francisco. Incorporators: Lewis F. Byington, Frederick V. Scott, John R. Tyrrell, John F. Forbes and W. H. Orrick.

***Port Jervis & Delaware Valley Railroad, Port Jervis, N. Y.**—This company has been incorporated in New York to operate an electric railway 1 mile long, from a point in Port Jervis to a connection with the Port Jervis, Monticello & Summitville Railroad. Capital stock, $10,000. Directors: F. A. Sawyer, New York; E. P. Emerson, and Dr. W. F. Cuddeback, Port Jervis.

***Fort Wayne & Toledo Traction Company, Hicksville, Ohio.**—This company has been incorporated for the purpose of building an electric railway from Bryan to Fort Wayne and from Bryan to Montpelier. Capital stock, $100,000. Incorporators: R. L. Bastress, C. A. Bastress, W. Behne, R. L. Starr and W. S. Tomlinson.

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—This company will apply to the State on March 29 for a charter to construct a street railway in the borough of Duquesne and Miflin township. It is also proposed to build to Dravosburg and West Elizabeth. Directors: A. J. Krill, John C. Cato, T. F. Vankirk and Charles McGinley. [E. R. J., Aug. 29, '08.]

Inter-County Electric Company, Reading, Pa.—Application will be made to the State on March 22 for a charter for this company, which proposes to construct an electric railway from Reading to Allentown, via Lyons and Tipton, 35 miles long. Capital stock, $500,000. Directors: Maxwell H. Bochow, George F. Souwers, Bateman Saddington, Josiah H. Fisher and Frederick R. Perry. [E. R. J., Feb. 6, '09.]

***Morrisdale Railway, Morris, Pa.**—This company has been chartered to build an electric railway, 4 miles in length, in Clearfield County, its location being in the vicinity of Morris. Capital stock, $40,000. Charles Steele, Northumberland, president.

***Dakota Western Railway, Whitewood, S. D.**—This company has been incorporated in South Dakota to build a 30-mile electric railway from Whitewood to Attainment. Incorporators: H. E. Cooper, P. W. Benniwell, T. W. Thompson, Whitewood; Samuel R. Cleaver, Fred A. Robinson, Empire.

***Rockport & Aransas Pass Railroad, Austin, Tex.**—This company has been chartered to construct an electric railway from Rockport to the jetties at Aransas Pass, a distance of 11.5 miles. Capital stock, $11,500. Incorporators: C. G. Johnson, Harry Traylor, D. R. Scrivener and W. H. Baldwin.

FRANCHISES

***Santa Rosa, Cal.**—The City Council has granted a franchise to the Santa Rosa & Clear Lake Railroad for the part of its system which will be built within the limits of Santa Rosa in the construction of a railway between Santa Rosa and Lakeport, on Clear Lake. By the terms of the franchise it is provided that the work in the city must be finished in six months from the time construction work is started. Gasoline motor cars will be operated.

Atlanta, Ga.—The Atlanta Northeastern Railroad, which was chartered to build an electric railway from Atlanta to Cumming, Ga., through Roswell and Alpharetta, has applied to the Fulton County Commissioners for a franchise to lay tracks through certain streets of Atlanta. J. L. Murphy, secretary. [E. R. J., Oct. 17, '08.]

East St. Louis, Ill.—The East St. Louis, Columbia & Waterloo Electric Railway has applied to the City Council for a franchise to build an electric railway on Nineteenth Street from the southern city limits to Bond Avenue. E. F. Schoening, Waterloo, president. [E. R. J., Dec. 12, '08.]

Rock Island, Ill.—The Galesburg & Rock Island Traction Company has applied to the City Council for a franchise to construct an electric railway on Fifth Avenue from Seventeenth Street to Second Street, south, to the Rock River. From Rock Island the railway will extend west to Andalusia, through Edgington, Buffalo Prairie, Marston, Millesburg, Aledo and Alexis to Galesburg. [E. R. J., Feb. 20, '09.]

LaPorte, Ind.—The Indiana Union Traction Company has filed a petition with the County Commissioners of LaPorte, Starke, Pulaski and Cass Counties for a franchise for the construction and operation of an interurban railway through the counties to connect Logansport, Winamac, Bass Lake, Knox, LaPorte and intermediate towns.

***Des Moines, Ia.**—Application has been made to the City Council by C. R. Keyes, representing the Des Moines Elevated & Interurban Railroad, for a franchise to operate an electric railway through the streets of Des Moines.

Springfield, Mo.—Application has been made to the City Council by the Springfield Traction Company for a franchise to construct a street railway from the city limits on Nicholas Street west, to the site of the new Frisco shops. The extension will be about 1½ miles in length.

Mineola, N. Y.—The Nassau County Board of Supervisors has granted an extension of one year to the South Shore Traction Company in which to complete the building of its electric railway.

New York, N. Y.—The Coney Island & Brooklyn Railroad has applied to the Board of Estimate and Apportionment for permission to lay tracks for a line through the Flatbush Avenue extension to the Manhattan Bridge, now under construction, and over which it proposes to operate its cars.

Owego, N. Y.—The City Council has granted the Waverly, Sayre & Athens Traction Company, Waverly, N. Y., an extension of one year on the franchise given to it to extend its railway in Owego.

Clifton Heights, Pa.—The Delaware County & Philadelphia Electric Railway has closed negotiations for the purchase of the Terminal Railway Company's franchise between Fernwood and Sixty-ninth Street. This will give the Delaware County Company, whose system is subsidiary to the Interstate Street Railway, a direct line from Lansdowne to the Sixty-ninth Street terminal.

Pittsburg, Pa.—The Committee on Surveys, of the City Council, has approved a resolution and ordinance granting the Pittsburg Railways an extension of nine months on its franchise obligation to lay tracks on Second Avenue and Greenfield Avenue. The original franchise ordinance provides that the work should be completed in one year.

Salt Lake City, Utah.—The County Commissioners have granted the Utah Light & Railway Company a 50-year franchise to extend its railway from Murray to Sandy and Bingham Junction. The franchise must be accepted by the company in 60 days, and in 60 days thereafter work must be begun. The work must be completed and the lines in operation by Aug. 1, 1910.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—The City Council has awarded the following contracts for material to be used in the construction of the proposed street railway: 1110 tons of steel rails, 400 tons of which will be 80-lb. and 710 tons 60-lb., to Lorain Steel Company, represented by Gorman, Clancey & Grindley, Calgary, for $70,000; the contract for ties was let to the East Kootenay Lumber Company, who will supply them at 56 cents apiece.

Los Angeles (Cal.) Railway.—This company has begun the construction of an extension of its Washington Street line, due west along that thoroughfare from La Salle Street, thence 1½ miles into the country.

Georgia Railway & Electric Company, Atlanta, Ga.—This company has received permission by the County Commissioners to extend its line 1½ miles into the Inman yards from its present terminus at Longley Street.

***Paris & Northern Interurban Company, Danville, Ill.**—This company is said to have begun making the surveys for its proposed electric railway between Paris and Ridgefarm, a distance of about 26 miles. W. M. Bridgett, president.

Springfield (Ill.) Consolidated Railway.—This company, it is said, expects to begin construction work next month on the extension of its Eighth Avenue line to Harvard Park, a distance of about half a mile.

Evansville & Southern Indiana Traction Company, Princeton, Ind.—It is said that this company has decided to extend its railway from Patoka to Hazleton, work to begin early in the spring. The survey was made last fall.

Fort Wayne & Springfield Railway, Decatur, Ind.—This company expects to place, during the next three weeks, contracts for 12 miles of 70-lb. T-rails and 1 mile of 70-lb. high T-rails.

Wabash & Rochester Electric Railway, Wabash, Ind.—The Circuit Court has appointed Robert R. Carr receiver for this company on complaint of the Stanley Contracting Company, which holds a claim of $7,000 for work done on the railway projected between Wabash and Rochester, a distance of 37 miles. The section of the railway between Akron and Gilead, 8 miles, has been partly completed.

***Sioux City, Climbing Hill & Ida Grove Electric Railroad, Sioux City, Ia.**—This company is said to have been organized for the purpose of building an electric railway from Sioux City through Climbing Hill and Anthon to Ida Grove. Officers: C. S. Malcomb, Climbing Hill, president; Payne Sargison, Luton, treasurer; W. H. Steinhauer, Climbing Hill, secretary.

Tri-City Railway, Davenport, Ia.—J. F. Porter, president of this company, advises that contracts will be placed during the next few weeks for material for the construction of about 8 miles of new track.

Electric Railway, Light & Ice Company, Junction City, Kan.—This company expects to place contracts during the next 60 days for about 2 miles of catenary construction with 000 groove trolley.

Boston, Mass.—Bids will be received until March 30 by the Boston Transit Commission, B. Leighton Beal, secretary, for constructing Section 1 of the tunnel under Beacon Hill, for the Cambridge connection. The structure will be mainly of concrete.

Twin City & Lake Superior Railway, Minneapolis, Minn.—Announcement is made that additional contracts are to be let about April 1 by this company for building a double-track, third-rail line from Minneapolis, Minn., northeast via St. Paul, Minn., and Superior, Wis., to Duluth, Minn., 130 miles. Contracts have been let as follows: From the lower St. Croix River to upper St. Croix, 33 miles, to Westerdahl & Carlson, and from upper St. Croix to Superior, Wis., 60 miles, to Smith & Jones. Track has already been laid from Minneapolis to Coon Lake, 25 miles. Two bridges will be constructed. J. H. Thomas, chief engineer, 440 Railway building, Minneapolis.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—Samuel Barnes, general manager of this company, advises that during the next month contracts will be let for material for the reconstruction of a considerable amount of track. A number of new turnouts will also be built.

***St. Louis, Mo.**—An ordinance is being prepared for introduction into the Council granting a company a franchise to construct a passenger and express subway from near the Eads Bridge downtown to Taylor Avenue in the west end of St. Louis. An organization has been effected, and it is said that plans and estimates have been practically completed. Four branch lines are also planned. William J. Gates is in charge of the company's affairs in St. Louis. The cost of the subway is estimated at $40,000,000.

Missoula (Mont.) Street Railway.—S. R. Inch writes that this company has recently been granted a franchise to build an electric street railway in Missoula. The officers and operating staff of the company have not yet been selected. The company proposes to begin construction work in about 6 months. Contracts have not yet been placed. Current will be rented from the Missoula Light & Water Company, which is controlled by W. A. Clark, who also owns the Missoula Street Railway. The repair shops will be located in Missoula. Capital stock, authorized and issued, $100,000. [E. R. J., Feb. 27, '09.]

Piedmont Railway, Thomasville, N. C.—This company is reported to have been organized to take over the Carolina Valley Railroad, which proposed to build an electric railway from Thomasville to Denton, a distance of 30 miles. Milton L. Jones, of Thomasville, president; Thomas J. Jerome, Salisbury, N. C., vice-president, and J. L. Armfield, secretary and treasurer. Capital stock, $500,000. It is the intention of the present company to extend the railway into the timber region. [E. R. J., Dec. 5, '08.]

Sydney, N. S.—W. Crowe advises that the project for building an electric railway from Sydney to East Bay is at present only in the preliminary stages. No company has been chartered for the purpose, and all that has been done is to apply on behalf of the promoters to the Cape Breton County Council for municipal assistance. The County has voted about $50,000 in aid, provided certain conditions are complied with. Mr. Crowe states that application will be made to the House of Assembly, at Halifax, during the present season for a charter. The proposed railway will be about 17 miles in length. [E. R. J., Feb. 20, '09]

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y.—It is stated that this company will soon begin the construction of a viaduct across the shallow portion of Cayuga Lake. It will have several 60-ft. openings; it is estimated that it will cost $180,000.

Rochester & Manitou Railroad, Charlotte, N. Y.—This company expects to place contracts during the next month for the construction of 1800 ft. of concrete viaduct and 600 ft. of wood-piled trestle, across Braddocks Bay. Contracts have been recently placed by the company for the following material: 14 frogs, 11 switch points, targets, etc., with the Ramapo Iron Works, Niagara Falls; 31 miles No. 12 iron wire; 1/3 mile guy wire, and 1000 lb. 5/16-in. strand span wire with J. A. Roebling's Sons Company, Trenton, N. J.

Sapulpa & Interurban Railway, Sapulpa, Okla.—Announcement is made that this company proposes to build an electric railway from Sapulpa to Glen Pool to connect with the Midland Valley Railroad, a distance of 10 miles. This line is to run via Kiefer and directly through the Glen Pool oil fields. In addition to this, the company expects to build 5 miles in and around Sapulpa, and a line 3 miles northeast, to Tanneha. Contracts will be let for grading, bridges and culverts, but the company will build the overhead work. The line traverses a hill district with a maximum grade of 2 per cent and a maximum curvature of 10 deg. H. E. Clark, Glen Campbell, Pa., president; B. B. Burnett, vice-president and H. H. McFann, general manager, both of Sapulpa.

Springfield & Washington Railway, South Charleston, Ohio.—It is stated that this company is considering the construction of an extension of its railway from Springfield to Clifton, Cedarville and probably on to Jamestown. George W. Baker, Washington, C. H., president.

***Philadelphia, Pa.**—It is stated that a company will be organized at once for the construction of an electric street railway between Bridge Street, Frankford, and Bustleton and Somerton. Application for a franchise will be filed at Harrisburg, probably this month, and at the same time the City Councils will be asked to pass the necessary legislation. The cost of the road, which will be about 4½ miles in length, is estimated at from $75,000 to $150,000. T. C. Pearson, John T. Sale, Barclay Twining, Horace Shallcross and Dr. John C. Tustin are said to be interested in this project.

Knoxville Railway & Light Company, Knoxville, Tenn.—The Knox County Commission has granted this company permission to double-track its railway from Knoxville to Fountain City.

***Brady, Tex.**—Col. J. H. Ransom, of San Angelo, is reported to have made a proposition to citizens of Brady for an electric railway from Brady to Eden, Tex., 50 miles, the line to connect at San Angelo with the Kansas City, Mexico & Orient Railway and with the Houston & Texas Central Railroad at Llano, Tex. Mr. Ransom is also stated to have projected an electric railway from Ballinger south to San Antonio.

Galveston-Houston Railway, Houston, Tex.—The Stone & Webster Engineering Corporation has been authorized to proceed with the construction of track in the cities of Galveston and Houston to provide the terminal connections for the Galveston-Houston Railway. [E. R. J., Jan. 23, '09.]

***Palestine, Tex.**—George W. Burkett, owner of the Palestine Electric & Ice Company, is reported to be interested in a plan to construct a street railway in Palestine, which, eventually, is to be extended to Dallas. It is said that a company will soon be organized and franchises applied for.

***Port Arthur, Tex.**—It is stated that H. J. Meyers and H. J. Pierce are considering a plan to construct a street railway in Port Arthur. An application for a franchise will be made to the City Council at once.

Texas Interurban Company, Austin, Tex.—It is announced that this company has completed three surveys and prepared maps, profiles and estimates for its proposed electric railway from Austin to Lockhart, 30 miles. A proposition has been made to promptly construct the railway, providing donations or subscriptions are secured sufficient to insure the placing of securities. An extension of time until May 19 has just been granted the company as the date on which construction must be begun. [E. R. J., March 6, '09.]

***Wichita Falls, Tex.**—It is stated that J. A. Kemp and I. H. Kempner have purchased the Wichita Falls Water & Light Company and will build their proposed electric railway from Wichita Falls to Lake Wichita, 5 miles south.

Rutland (Vt.) Railway, Light & Power Company.—It is stated that this company has under consideration a plan for extending its electric railway from Castleton to Poultney, a distance of 6 miles.

Priest Rapids Railway, Seattle, Wash.—This company, which was incorporated for the purpose of building an

electric railway from Waterville to Kennewick, a distance of 136 miles, has been purchased by the Chicago, Milwaukee & St. Paul Railway. [S. R. J., Jan. 11, '08.]

Whatcom County Railway & Light Company, Bellingham, Wash.—It is stated that this company will soon begin the building of its North Street line extension from Dock Street to St. Clair Street, a distance of about 1½ miles.

Wheeling & Elm Grove Railway, Wheeling, W. Va.—It is announced that this company is planning to extend its electric railway from the present terminus at West Alexander to Claysville. This company and the Pittsburg Railways, which has just completed its line from Pittsburg to Washington, are said to have entered into an agreement whereby the latter company will extend its railway to Claysville to connect with the West Virginia system.

Milwaukee Western Electric Railway, Milwaukee, Wis.—Surveys are being made for a proposed electric railway running northwest from Milwaukee through Hustisford, Juneau and other towns to Beaver Dam, a distance of 70 to 75 miles, according to the route finally selected. About two-thirds of the route has been surveyed, and maps have been filed with the State Railroad Commission. The contract has been awarded to C. A. Chapman, Inc., engineers, Marquette Building, Chicago. J. W. Barber, Majestic Building, Milwaukee, secretary.

POWER HOUSES AND SUBSTATIONS

Sheffield (Ala.) Company.—J. B. McClary, manager, writes that this company expects to place within the next few weeks, contracts for mechanical stokers for 1200-hp boilers, also feed-water heater for same and a coal crusher.

Calgary (Alta.) Municipal Railway.—The following contracts have been awarded by the city in connection with the construction of the proposed municipal street railway: Allis-Chalmers-Bullock Company, Montreal, generator set and switchboard, $15,950; Robb Engineering Company, Amherst, N. S., 750-hp 3-cylinder compound engine, $14,300.

Citizens Electric Company, Eureka Springs, Ark.—This company is considering the purchase of a 300-kw d.-c. turbo-generator and a 300-kw a.-c. turbo-generator.

Havana (Cuba) Electric Railway.—F. Steinhart, general manager, in transmitting the report of that company to the president and directors of the company, under date of Feb. 1, said: "The service at the power station has now reached a point where it becomes necessary to purchase additional generating equipment. Plans for this are well under way for the ensuing year."

Quincy Horse Railway & Carrying Company, Quincy, Ill.—This company will install in its power station one 800-kw d. c. 500-volt railway generator. The contract has already been placed.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has begun excavating for a new 5000-hp plant as an addition to the Water Street power station and has started the repairs on the Ninth Street station. The new plant will be equipped with a battery of four boilers and will have a 5000-hp capacity. A 3000-kw turbine will also be installed. A brick stack 175 ft. high will be built and coal and ash handling apparatus for the entire plant will be installed.

Electric Railway, Light & Ice Company, Junction City, Kan.—This company has placed an order with the Kennicott Water Softener Company, Chicago, Ill., for one 200-hp and one 400-hp water-tube boiler.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—This company has under consideration the purchase of a new switchboard.

New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J.—This company has placed an order with the General Electric Company for a 300-kw rotary converter with transformer and switchboard complete.

Public Service Railway, Newark, N. J.—This company expects to purchase during the next three weeks miscellaneous apparatus for its various substations, consisting of rotary converters, transformers and switchboard apparatus, and also one 2000-kw turbo-generator for its Camden station.

Conestoga Traction Company, Lancaster, Pa.—This company has placed a contract with the Westinghouse Machine Company for the turbines for which it was reported to be in the market in a recent issue of the ELECTRIC RAILWAY JOURNAL. The company also has a contract with the Western Electric Company for the bulk of the wire for which it was reported to have asked bids.

SHOPS AND BUILDINGS

Tri-City Railway, Davenport, Ia.—This company announces that it will soon award contracts for the construction of a storage shed. J. F. Porter, president.

Manufactures & Supplies

ROLLING STOCK

Port Arthur (Ont.) Electric Street Railway, it is reported, is in the market for four pay-as-you-enter cars.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., is in the market for 25 interurban cars.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo., reports that it will purchase some car equipments in the near future.

Grand Rapids (Mich.) Railway is in the market for 12 pay-as-you-enter cars. It is reported the order for these cars will be placed at once.

Aurora, Elgin & Chicago Railway, Chicago, Ill., has increased its original order for 25 sets of trucks, placed with the Pullman Company last fall, to 28 sets.

New Hampshire Electric Railways, Haverhill, Mass., has ordered from the National Brake & Electric Company, 12 straight-air equipments of the latest type.

The Electric Railway, Light & Ice Company, Junction City, Kan., will purchase during the next three months, one double-truck, four-motor closed car, about 44 ft. over all.

Montreal (Que.) Street Railway, mentioned in the ELECTRIC RAILWAY JOURNAL of March 6, 1909, as being in the market for 10 all-steel pay-as-you-enter cars, reports that it intends purchasing 25 cars of this type.

Milwaukee Northern Railway, Cedarburg, Wis., expects to be in the market for interurban cars, but has not reached a decision as to the number of cars to be ordered or the date when bids will be received.

Conestoga Traction Company, Lancaster, Pa., has placed with The J. G. Brill Company, Philadelphia, Pa., the order for 18 interurban cars for which it was reported to be in the market in the issue of the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., has ordered from The J. G. Brill Company, of Philadelphia, Pa., two 14-bench, center-aisle open cars, to be mounted on No. 27 G-1 trucks, for May, 1909, delivery. The car bodies will be 34 ft. in length, over dashers, 43 ft., and will each be equipped with two GE-57 motors. The company has also placed an order with The J. G. Brill Company for four 20-ft. 8-in. Brill patented semi-convertible motor car bodies, vestibuled, with a length over all of 30 ft. They are for October, 1909, delivery.

Chicago, Blue Island & Joliet Traction Company, Chicago, Ill., has placed an order for one combination baggage and passenger car with the McGuire-Cummings Manufacturing Company, Chicago. The car, which is to be delivered on June 1, is to have an over-all length of 56 ft. and is to be mounted on McGuire-Cummings 20-A trucks and rolled steel wheels. M. C. B. type of draw-bars and longitudinal seats have been specified. The interior of the car is to be finished in mahogany. The order was placed through W. H. Conrad, First National Bank Building, Chicago.

Third Avenue Railroad, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of March 6, 1909, as being in the market for an additional 100 pay-as-you-enter cars, has placed the order for these cars with The J. G. Brill Company, of Philadelphia, Pa. Westinghouse motors were specified for 50 of the cars, and General Electric motors for the remaining 50. The Westinghouse Air Brake Company received an order for 75 of the air-brake equipments. The Consolidated Car Heating Company closed a contract for equipping with heaters the entire 300 cars included in this and previous orders.

Rochester & Manitou Railroad, Charlotte, N. Y., reported in the ELECTRIC RAILWAY JOURNAL of Jan. 16, 1909, as having ordered from the G. C. Kuhlman Car Company, Cleveland, Ohio, three semi-convertible cars, states that the cars will be double truck and have a seating capacity of 44. The company has ordered from the National Brake & Electric Company, Milwaukee, Wis., three compressor straight-air brake equipments and also six of the same type for trail cars. Mention of the intended purchase of these equipments was made in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1908. It has also purchased from the Recording Fare Register Company the 20 registers, the intended purchase of which was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 13, 1909.

Wausau Street Railway, Wausau, Wis., mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1909, as being in the market for one car, has ordered through the Knox Engineering Company, Chicago, one semi-convertible passenger

car from the Niles Car & Manufacturing Company, Niles, Ohio. The car will have an over-all length of 42 ft.; wheel base, 6 ft. 3 in.; weight, 18 or 19 tons; seating capacity, 44. The special equipment specified follows: Type K control, Standard couplers, Pantasote curtain material, Forsyth curtain fixtures, Ohmer registers, Crouse-Hinds headlights, Taylor journal boxes, four 101-B2 Westinghouse motors, Keystone sanders, Hale & Kilburn seats, Niles Car & Manufacturing Company's steps, Westinghouse trolley poles and attachments, Taylor trucks. The car is to be delivered on April 24, 1909.

Municipal Tramways, of Calgary, Alta., mentioned in the Electric Railway Journal of March 6, 1909, as having placed an order for 6 pay-as-you-enter cars with the Preston Car & Coach Company, and 6 of the same type with the Ottawa Car Company, has placed an order for only 4 cars with the former company and the remaining 8 cars of the total order for 12 with the latter company. The cars to be built by the Ottawa Car Company will be of the semi-convertible type with pay-as-you-enter platforms, and will have a seating capacity of 38. The principal specifications follow:

Weight of car body. 19,800 lb.	Couplers ..... Standard
Length of body.....28 ft.	Curtain fixtures.....Forsyth
Length over vestibules.40 ft.	Curtain material...Pantasote
Length over all.....41 ft.	Fenders ..... Jenkins
Width inside.....7 ft. 8 in.	Hand Brakes.....Peacock
Width over all.....8 ft. 6 in.	Motors.....4 Westinghouse 101-B.
Height inside....7 ft. 11 in.	
Height, top of rail to sills.....32 in.	Sanders .....Ottana
	Seats.....Ottana No. 2
Body....Wood construction	Seating ..... Rattan
Underframe.....Wood, reinforced with steel.	Trucks.....Brill 27-G1

TRADE NOTES

Perry Ventilator Corporation, New Bedford, Mass., advises that it is furnishing the ventilators for the new cars being built for the Denver City Tramway.

Harry De Steese, representing the Frank Ridlon Company, of Boston, Mass., has moved his office to 26 Cortlandt Street, New York, where he will have larger facilities at his command.

Darley Engineering Company, Singer Building, New York, has received orders to install its suction ash conveyors in the plants of the Boston Elevated Railway Company, Boston, Mass., and Nelson Morris & Company, Chicago, Ill.

The Dorner Railway Equipment Company, Chicago, Ill., has been incorporated to buy and sell new and second-hand railway equipment. The company has a capitalization of $2,500. Otto G. Knecht, John W. Tibbitts and Ralph J. Taylor are named as the incorporators.

Strauss Self-Balancing Window Company, Ft. Dearborn Building, Chicago, Ill., which recently placed on the market a self-balancing window frame, reports that it has made extensive experiments with a new frame and has found it especially practicable for use on steam and electric passenger cars and in office buildings.

Stewart Speedometer Company, Chicago, Ill., reports that it is making some changes in the driving mechanism of its apparatus, and that as soon as this is accomplished the company will make more demonstrations of the value of the speedometer for use on electric cars operated in interurban service.

Charles F. Johnson, Cleveland, Ohio, has returned from a trip to the Pacific Coast and reports an active demand throughout the Western States for all kinds of electric railway equipment. He is offering a large stock of new and second-hand railway motors, generators, cars and other equipment, and is also constantly in the market for the purchase of electric railway apparatus.

Interstate Engineering & Supply Company, Philadelphia, Pa., reports that the lighting and power station of the Metropolitan Electric Company, Reading, Pa., which it is about to build, will be equipped with three 4500-kw Allis-Chalmers turbo-generators, and not 2500-kw generators, as printed last week. S. S. Neff, president of the Interstate Engineering & Supply Company, also states that other contracts will be announced soon.

T. H. Symington Company, Baltimore, Md., has received the order for the journal boxes and ball bearings used on the 15 cars recently ordered by the Buffalo, Lockport & Rochester Railway, and the boxes for the new lot of open and closed cars recently purchased by the Indianapolis Traction & Terminal Company. Other orders from electric railway companies upon which the Symington Company is engaged are journal boxes for cars to be built for the Michigan United Railways, Lansing, Mich., and the Citizens' Traction Company, Oil City, Pa. The Symington Company will also furnish center bearings for the Lansing cars and also for 50 new cars which are under construction at the Brill Works for the Washington Railway & Electric Company.

Farrington Company, Boston, Mass., has been organized to manufacture insulating compounds, following the return of C. E. Farrington to the field of insulating compound manufacture. As is generally known, Mr. Farrington was one of the first chemists to devote serious attention to the problems of coil insulation. Since 1892 his work has been followed with great interest by machine designers in America and Europe, where he is well known. Turner & Hobart's "Machine Insulation" devotes some 16 pages to his conclusions, which have become generally accepted. He was chief chemist of the Massachusetts Chemical Company until 1907, when he resigned to enter the broader field of consultation work. The new plant of the Farrington Company at Jamaica Plain, Mass., is finely equipped with machinery designed for the work.

Westinghouse Electric & Manufacturing Company, and the Westinghouse Machine Company, Pittsburg, Pa., are now working on the first apparatus represented by the $5,000,000 contract which the Pennsylvania Railroad placed with the Westinghouse companies some time ago. All of this machinery will be used in the electrification of the Pennsylvania terminals and tunnels in New Jersey, New York City and Long Island. The initial order calls for two 12,000-hp turbo-generators, two 4000-hp equipments of the same type, and 100 200-hp electric railway motors. The turbines will be constructed in the shops of the Westinghouse Machine Company, and the generators will be made at the factory of the Westinghouse Electric & Manufacturing Company. When they are completed, they will be installed in the power-houses of the Pennsylvania Railroad at Long Island City. The two large machines will furnish the power for some of the locomotives and the smaller ones will generate current for lighting the New York terminal station and the railway tunnels under the North and East rivers. The 200 electric railway motors will be mounted on cars which will be used in hauling passengers on the Long Island Division of the Pennsylvania Railroad. The Pennsylvania Railroad engineers and the electric railway experts of the Westinghouse companies have about completed the design of the electric locomotive which will be used in this installation, and it is expected that work on the first locomotive will be started in the very near future. The steam turbines for the Pennsylvania terminal and tunnel work in New York City are especially noteworthy. The two largest, of a normal capacity of 12,000 hp, will be constructed so as to carry, when necessity demands it, an overload of 100 per cent.

ADVERTISING LITERATURE

John C. Dolph Company, Long Island City, N. Y., announces the publication of its new insulating-varnish catalog, issued in American, German, French and Italian editions.

John A. Roebling's Sons Company, Trenton, N. J., has printed a pamphlet entitled "Wire—Its Manufacture and Uses." The contents are partly historical and partly descriptive.

Pettingell-Andrews Company, Boston, Mass., publish in the March issue of *Juice*, a number of interesting items on Pittsburg transformers, high-tension fuses and insulated wires and cables.

Norton Company, Worcester, Mass., has issued a catalog describing the process of making Alundum and giving data on grinding wheels, grinding machines and other abrasive specialties which it manufactures.

Farrington Company, Boston, Mass., is sending out return post-cards regarding the supply of samples of its armature and field-coil liquid insulation, known as "Collisol." It is asserted that if this material is used for insulation, it is impossible for moisture to get into the armature or field coils.

Arthur S. Partridge, St. Louis, Mo., is sending out a list of steam and electrical equipment for sale. Among the items listed are four interurban cars, four closed motor cars and six 12-bench open motor cars. The list also contains a number of generators, rotary converters and motors for railway purposes.

Rail Joint Company, New York, N. Y., has issued a folder of its three standard types of rail joints, in which a statement is given of the engineering features of each joint. The circular is accompanied by views of the company's new rolling mills at Troy, and contains the significant statement that the output of the company, as shown by its records at the close of September, 1908, has been more than sufficient to equip a double-track railway around the globe.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MARCH 20, 1909 No. 12

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Saving Labor by Shortening Routes

As operating economies become more and more necessary in the conduct of the transportation department, a close study of the car service will often show where substantial savings can be made without seriously impeding the regular flow of travel. By combining transfer facilities with different arrangements of car routing it is sometimes feasible to give the public the same ride as before and still operate the schedules more efficiently. As an example, a city company recently ran two different lines of cars from the urban center to a suburban terminal 7 miles distant. Near the city end of the route the two lines were diverted through adjacent districts, to be joined again about 4 miles out, the balance of the routes in each case being over a common pair of tracks. One mile from the suburban terminus was located the principal car house of the division, where transfers were exchanged between all cars moving in the same general direction, but having different destinations. The company desired to cut down its expenses to the lowest point consistent with good service and it was found that by terminating the route of one line at the car house seven round trips per day could be made by each crew against only five round trips under the old plan of operating cars through to the end of the route. The passengers were taken care of by a transfer good at the car house, according to their direction of travel, and small timetables were distributed to facilitate the convenience of making connections. The labor cost per round trip was reduced to about 64 cents, against 90 cents, simply by cutting off the longer route a mile short of its original destination and allowing passengers to continue their rides on other through cars. This simple change saved the company something like $1,200 a year and the public was not restricted in the purchasing power of its fares on either route.

Motor Efficiency and Lubrication

Electric motors are free from many of the disadvantages under which steam locomotives operate during cold weather. The sudden fall in temperature which chills the steam boilers and steam chest of the latter has only a beneficial effect on the resistance of the field and armature coils of the former. Hence the electrical efficiency of the motor improves, but unless care is taken with regard to its lubrication, the total power consumption is apt to increase because of the sluggish action of the lubricant. Great progress has been made in motor lubrication during the past five years, but the subject is so important that too much attention can hardly be given it. An inconvenient position of the oil cup or the ineffective distribution of the oil may counteract elaborate efforts of the motor designer to add ½ of 1 per cent to its electrical efficiency. This portion of a motor equipment is supposed to be given daily attention, but often this work has to be done in the semi-darkness of a damp, cheerless pit or in the bitter cold of an open-air terminal. When under such conditions it is difficult to get oil into a cup without a great deal of discomfort, the chances are great that the duty will be neglected. Even if the oil cup is conveniently placed, there must be certainty that the lubricant is going where it should. Paucity in the quantity or quality will cause a heavy drop in efficiency of the

motor, aside from the expensive break-downs which are sure to come. Fortunately, defects of the kind just named above are not inherent to either motors or lubricants. The remedies for their correction lie in a closer personal study of motor inspection practice, and many a useful hint can be gained, even by designers, by observing the methods which master mechanics have invented to overcome such troubles.

Shop Employees' Meetings

We have referred a number of times in these columns to the gratifying results obtained by several of the larger electric railway companies through holding regular monthly or semi-monthly meetings of shop and car house foremen, at which questions relating to their work are discussed. The value of these meetings is unquestioned, and the practice is being widely adopted, even among smaller companies which have only a few men to participate in the exchange of opinions and experiences. The same plan, if extended to include also the rank and file of the shop and car house forces, offers almost unlimited opportunities for accomplishing good. Theoretically, the foremen are expected to impart all the knowledge and ideas absorbed at these meetings to the men under them. It is reasonable to suppose, however, that suggestions for improvement communicated first-hand to the men who actually do the work are more likely to be followed to the letter than when repeated more or less hazily a few days later through the foremen. It is true that the average shop employee is likely to be interested only in the details of car maintenance which form his daily work, and all the points of a general discussion of equipment failures, for example, would not especially interest him. Nevertheless the points relating to his particular part of the work would appeal to him directly and forcibly. Discussions of general topics would also tend to arouse the interest of the men in the work of departments in the shop other than their own, and perhaps lay the foundation for the development of capable foremen from among the ambitious men. For teamwork it is essential that the men and the officers over them learn to know each other's personalities, ideas and ambitions. No better means to this end is available than these informal experience meetings.

Steel Street Cars

The use of steel in passenger car construction has been making rapid strides of late. All-steel cars are now the only type of construction considered for subways, and have been generally adopted for suburban service on the electrified steam roads. There is also a strong decided tendency toward the use of this type of construction for passenger cars in through service on steam roads. A few street railway companies have had steel cars built for city service, and many other companies are seriously considering their adoption in the near future. The reasons for using all-steel construction for steam railroad and subway cars, however, are quite different from those advanced for adopting steel throughout in building street cars. The vastly superior strength of steel over wooden construction in collisions and derailments is a strong argument in favor of steel cars. The elimination of danger from fire is also an important advantage, especially where the cars are run in subways or tunnels. One other reason, which in time will become more and more important, is the scarcity of timber suitable for use in the long underframes of modern railway coaches. In building street cars the strength of steel construction in derailments and collisions is a comparatively unimportant factor, as it is very seldom that a car is in collision or is derailed when running at a speed high enough to demolish it. The fire risk is also unimportant, as practically the only danger from fire is in short circuits of the electrical equipment, which can be sufficiently guarded against by the use of metal conduit for the wiring and protection plates under the floor above the motors. The scarcity of timber is not yet a serious difficulty in building wooden street cars, which are seldom more than 30 ft. or 35 ft. long over end sills as against 60 ft. to 65 ft. in steam railway coaches.

The use of steel in street car construction brings about two very important economies—of reduction in weight and in the cost of maintenance. The new all-steel cars of the United Railways Company, of St. Louis, which were described in the Electric Railway Journal of March 13, weigh 1000 lb. less than the composite steel and wood cars of which this company has a number in service. This reduction in weight should result in a saving in cost of operation of from $50 to $60 a year. The cost of maintenance is, of course, largely problematical, but the experience of the steam railways so far in the painting and upkeep of steel cars has been quite satisfactory.

The tendency in adopting steel construction is to go to the extreme of eliminating every piece of wood, even to the arm rests on seats and the window sash, as well as all interior moldings and finish. This is a good advertisement in some cases, as it inspires confidence in the traveling public that there is absolutely no danger of fire when riding in a car which has nothing in its construction which will burn. The use of steel for many of the parts of a car, however, is much more expensive than wood, and there is little, if any, saving in weight or cost of maintenance. Just how far the use of steel should be carried, to the exclusion of wood, is open to question. In the window sash, for example, it is extremely difficult to make a tight fit between the window and the frame when metal is used for both. Metal seat arms feel cold and hard in comparison with wood, and as they are subjected to constant friction the paint soon wears off of the metal finish and leaves an unsightly surface. Where wood is eliminated entirely, it is necessary to secure the steel plates and finish moldings with tap screws. The constant vibration and unequal expansion of the steel construction soon loosen these fastenings. The use of wood furring strips, to which the steel parts can be secured with wood screws, is a much better construction.

The cost of steel cars is as yet much in excess of the cost of wooden cars of the same dimensions. This is due not so much to a difference in cost of the raw material as to the cost of designing steel cars and in the amount of work necessary for their fabrication and erection. It took six months to make the drawings for the order of 50 steel cars now building for the Chicago Railways Company before a single part was manufactured. From this it will readily

be seen that the cost of design bears a very high ratio to the total cost of the cars. It is necessary to lay out in advance on paper every rivet hole and make templates and jigs for every piece. The erecters cannot use a saw and chisel to cut and try as can a carpenter working on a wooden car. If many cars of the same type are ordered at one time the unit of cost of making up the design is, of course, reduced proportionately, but few street railway companies order equipment in such large numbers as are required to keep down the first cost of steel cars to a point where they can compete with wooden cars. The solution of this problem, of course, is in the general adoption of standard designs. If the builders of steel cars are permitted to bid on their own standard designs they can afford to name a much lower price than if they are required to get up an entirely new set of drawings for every small order to meet the whims and hobbies of the purchaser. The steel passenger car industry is comparatively new to the railway companies, but the builders of steel passenger cars have been in the field long enough to develop designs which can be built at a moderate cost and in the end probably serve quite as well as special designs worked out by the engineers of the railway companies.

Further Evidence of the Cost of Rapid Transit in New York

The proposition of the Interborough Rapid Transit Company to spend $50,000,000 in extensions of the present subway system in New York and the plan of the Hudson & Manhattan Railroad to build its line from its present terminus at Twenty-third Street to the Grand Central Station have led to some confusion and misunderstanding as to the profits in subway operation, when coupled with the report of the Chamber of Commerce published in our last issue and Mr. Arnold's study of the financial returns of the present subway. The reports of Mr. Arnold and the Chamber of Commerce were pessimistic as to the investment of private capital in further subways when built under present conditions, because, in spite of the enormous traffic which is assured, the average profits per passenger are so small.

To increase the net income in the present subway, Mr. Arnold suggested that a few economies, such as reducing the non-productive mileage, might be made; that the receipts per passenger mile, and hence per passenger, could be increased by devoting more attention to the local traffic, and that by certain changes in the equipment a gain might be secured in the capacity of the subway. But he based his main hope for any future system of subways upon a radical change in the design of the stations to increase greatly the capacity of the trackage and in the use of the city's credit in the equipment of the line, and believed that these courses presented the only alternative to a higher fare. The Chamber of Commerce took the ground that it would be a long time before the borrowing power of the city would be sufficient to warrant its financing any more subways, and expressed the hope that New York would be able to escape both horns of the dilemma by the adoption of some plan of profit sharing which would not require the issue of bonds.

At first sight the two propositions now before the city, involving the use of private capital in further subway construction, and that of the Amsterdam Company for a rapid transit system along the river front, seem to conflict with the conclusions reached by Mr. Arnold and the representatives of the city's commercial interests, but in reality they will be found corroborative of them. The plan of the Hudson & Manhattan Company, as outlined to the Public Service Commission, is for a short extension only to the existing system, and one which places its northern terminal at a logical point so far as traffic is concerned. The haul from Forty-second Street to Christopher Street, where the line leaves Manhattan Island to cross the Hudson River, is only about 2 miles, and this is the maximum distance which a person could travel on Manhattan Island. The average length of ride per passenger on the completed system is yet problematical, as the line is not yet in operation, but it will probably be less than 3 miles of course, a much shorter distance than on the present subway system.

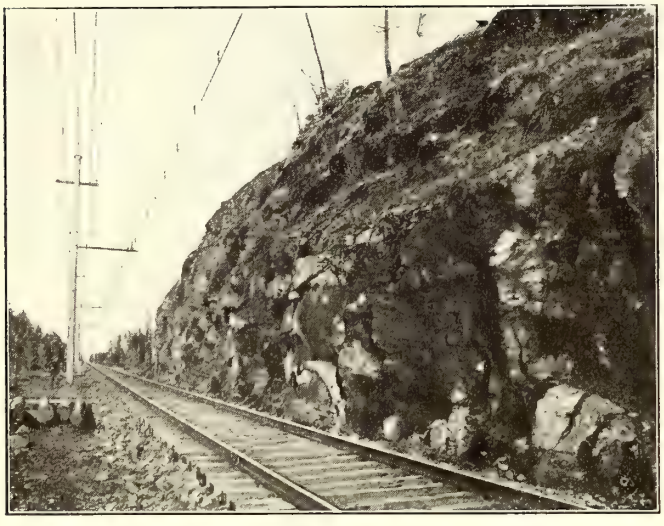
The plans of the Interborough Rapid Transit Company, to which legislative sanction is necessary, are in no respect similar, so far as traffic is concerned, to those which would be present in a new subway, or even to those existing in the present subway. The construction of the extensions from Times Square to the Battery on the lower West Side, and from the Grand Central Station north on Lexington Avenue to a point where the road would join the present subway, would tend to decrease the average ride per passenger in two ways. First, the two tracks which it is proposed to install would be useful in attracting considerable short-haul traffic, and, second, they would shorten the distance which the express trains from the north on either side of the city have to traverse before reaching the Battery. The offer of the Interborough Rapid Transit Company is coupled with the proviso that it should have permission to build third tracks on the Second and Third Avenue elevated lines under the same conditions as those possessed by the present elevated lines. This latter improvement is one for which a strong plea was made by the Chamber of Commerce, and as a way of ameliorating the present conditions should have been adopted long ago.

The proposed Eleventh Avenue and West Street improvement of the Amsterdam Company is to be devoted largely to freight, and should in no wise be considered on the same basis as a purely passenger road.

The situation in New York possesses far more than local interest, as it indicates that even in New York City investment in city transportation enterprises has come to be less favorably regarded than perhaps at any time during its history. This is partly because of the increased cost of supplies, partly because of the added burdens imposed by legislative action upon railway companies, and partly because of the lower receipts per passenger which have followed extensions of the average length of ride per passenger. The causes that are at work in New York are present in all cities—large and small—throughout the country, as well as on the interurban lines of the far East and the central West. If, in addition to this condition, those railway companies which show a profit are to be limited in their returns to a nominal percentage, not on the investment made by the company, but on the appraised value of the material in use, it will soon be regarded as a better indication of business sagacity to lock one's money up in a safe deposit vault than to invest it in public utility.

THE OREGON ELECTRIC RAILWAY SYSTEM

In the spring of 1906, after considerable delay on the part of the city, the Oregon Electric Railway Company (under the name of the Willamette Valley Traction Company) secured from the city of Portland, Ore., a franchise enabling it to enter the city, establish its freight and passenger terminals and connections with the yards of the transcontinental steam railroads. At the same time similar franchises were secured in Salem, the capital of the State, and other intervening cities.

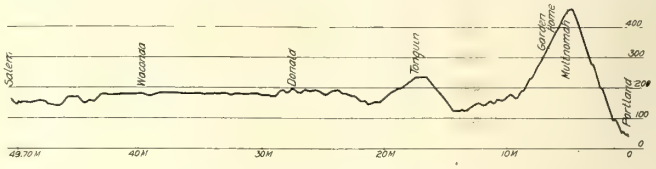


Oregon Railway—View Showing Catenary

The first section of the main line, as now built and operated, connects the cities of Portland and Salem (50 miles), and a branch line, 20 miles long, has just been completed to the cities of Hillsboro and Forest Grove, located southwest of Portland.

The main line enters the remarkably beautiful and fertile Willamette Valley, destined to be the "garden of Portland" and capable of supporting in itself an independent population of several million people. Before the Oregon Electric Railway system was projected, this territory, about 300 miles long and 60 miles wide, was served by one steam road, namely, the Portland-San Francisco main line division of the Southern Pacific, which traverses the full length of the valley.

For more than 20 years a Willamette suburban electric line had been planned by as many companies, but beyond an "occasional streak of rust" left here and there by a few miles of 35-lb. rails, no evidence exists of these many unsuccessful ventures. One reason for the failure of previous projects was doubtless the unappreciated difficulty in effecting a river crossing, since the Willamette River cuts off Portland to the south from the most fertile part of the valley. This river is supplied by glacial streams and a very extensive valley watershed, and has at certain times during the year a rapid rise and fall, amounting often to 40 ft. or more. This serious obstacle had in the past not received proper consideration by the promoters until the work was under way, and then, when the difficulty was realized, the capitalists back of the project became uneasy and abandoned it.



Oregon Railway—Profile

The effecting of a proper entrance into Portland from the south was in itself a serious problem. The Southern Pacific's line, leaving the city on a 4 per cent grade, winds up among the mountains which surround Portland to the south and west until an altitude of over 600 ft. is reached. The Oregon Electric Railway Company, after a number of careful surveys, selected a route out along the side hills, and with a maximum grade of 2½ per cent reaches an altitude of about 450 ft. in a distance of 5 miles, from which point it can reach any locality in the valley by easy grades and curves. The main line of the company extends approximately south from Portland a distance of 49.7 miles to Salem. In addition, there is a branch from Garden Home Junction, 7 miles from Salem, extending west 19.1 miles to Forest Grove.

TRACK

The construction of the track and substructure was rendered difficult, due to four causes inherent in the country and the route:

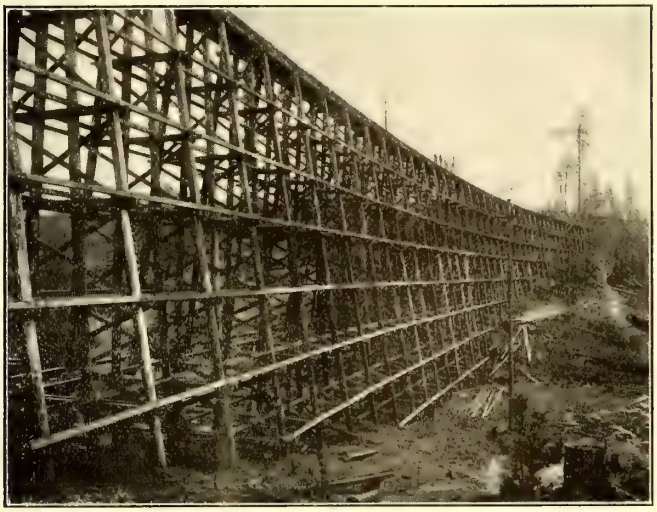
1. The hills which guard the entrance to Portland.
2. The Willamette River, which had to be crossed at a height sufficient to pass river-going craft underneath, allowing for 46 ft. clearance at high-water level.
3. The rainy season, which lasts five months, and during which time the soil is difficult to work.
4. The scarcity of material suitable for ballast.

In the 70 miles of line there are many bridges, trestles



Oregon Electric Railway—Willamette River Bridge

and undergrade crossings, the most important structure being the bridge over the Willamette River. This bridge is 3422 ft. long. It is made up of four steel spans (810 ft.) carried by concrete-steel piers and approached by two high-



Oregon Railway—Long Trestle

pile three-stringer trestles, the one on the north being 982 ft. long, and the one on the south 1630 ft. long.

During the construction of this bridge, which lasted from August, 1906, to September, 1907, there were seven floods, the water rising from 18.6 ft. to 41.6 ft. above normal low-water mark, and had these extraordinary conditions not been taken into account by the designers, or had their plans not been skilfully carried out, the partially completed bridge would have been washed away before its completion.

The piers of the bridge rest upon heavy foundation footings some 40 ft. below mean river level, and are of solid concrete up to high water. From this point the piers are lightened by a hollow construction stiffened by cross-walls. The foundations are heavily riprapped with stones, no one of which weighs less than 5 tons.

During the construction of the piers men were stationed at points up the valley to notify the workmen of an approaching flood. When such a signal was received work was stopped, all machinery removed and the incompleted piers capped over. The rapidly rising waters were allowed to flow over the work, heavy log booms being used to keep off driftwood. All night powerful acetylene searchlights were placed on each shore, and men in boats stationed inside the booms and armed with pike poles warded off floating logs and other debris.

Under these repeated strains a careful examination after the work showed no injury whatsoever, and soon the piers were above the high-flood danger line. All foundations and the steel structure were designed and erected by the engineers, W. S. Barstow & Company.

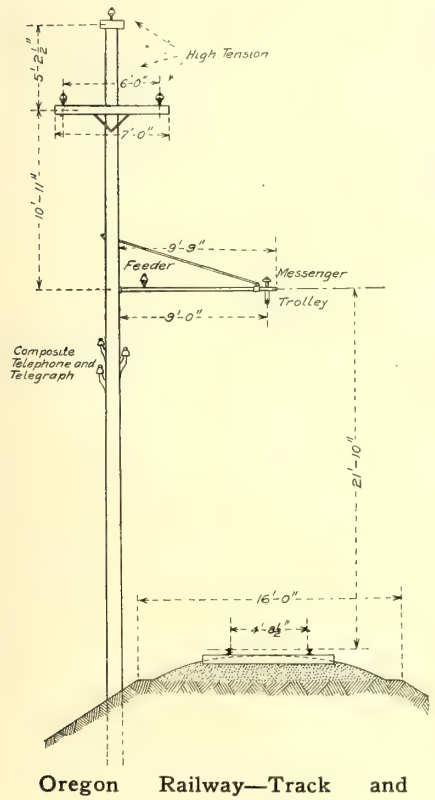
About a year after it was finished, the bridge was tested by running over it, at 65 miles an hour, a steam train consisting of a 116-ton locomotive and 10 loaded ballast cars, each weighing 136,000 lb.; making a total load of 1,592,000 lb. The deflection was only 1⅛ in., which is less than one-half of the camber when the bridge is unloaded.

The substructure of the road itself is built for heavy passenger and freight traffic. A typical section, showing slopes, etc., is illustrated. The width of the single-track roadbed at subgrade is 16 ft. on embankments and 22 ft. in cuts, 14 ft. of width being added for each additional track.

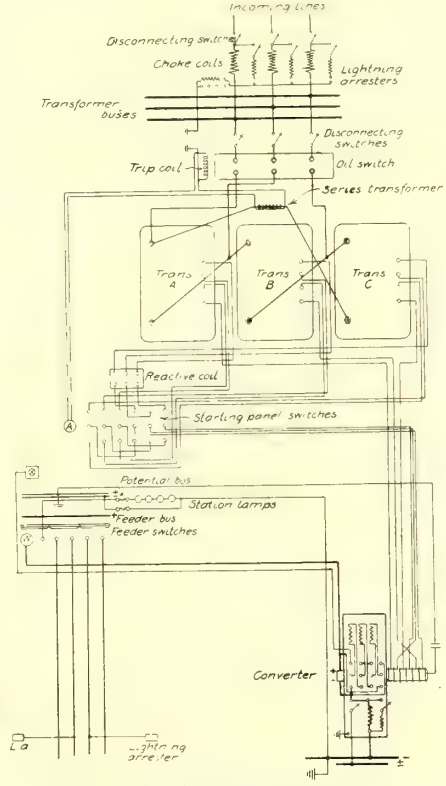
The track consists of Illinois Steel Company's No. 7010 steel rail, 70 lb. per yard, spliced with 24-in. angle bars, weighing 40 lb. per pair and laid on 8-in. ties, spaced 2880 to the mile.

The engineers had the good fortune to locate before the work was started an unusually fine gravel bed of about 21 acres at a point on the line near Salem, and from here out all ballast for the entire road was hauled. During the first year of operation the road was not ballasted, because of the impossibility of doing this work while the wet season ran out as fast as it was put in. When it was once properly put down under favorable weather conditions it gave no further trouble during the wet seasons. About 2500 cu. yd. of ballast was used per mile of single track, with the result that a solid and smooth riding road has been produced.

The track is bonded partly with the Ohio Brass Company's type GA, No. 0000 knife-edge soldered bonds, and partly with the Lord Electric Company's type Ct, No. 0000 soldered bonds, both types being soldered to the ball of the rail. In the streets, at crossings and at other places where the bonds are liable to be injured, the Ohio Brass Company's type GFA, No. 0000 concealed bond is soldered to the web of the rail under the angle bar. At every 23d rail the track is cross-bonded with one Ohio Brass Company's type F63, No. 0000 bond soldered to the flange of the rails. The bonds used on open track and soldered to the ball of the rail were tested with a



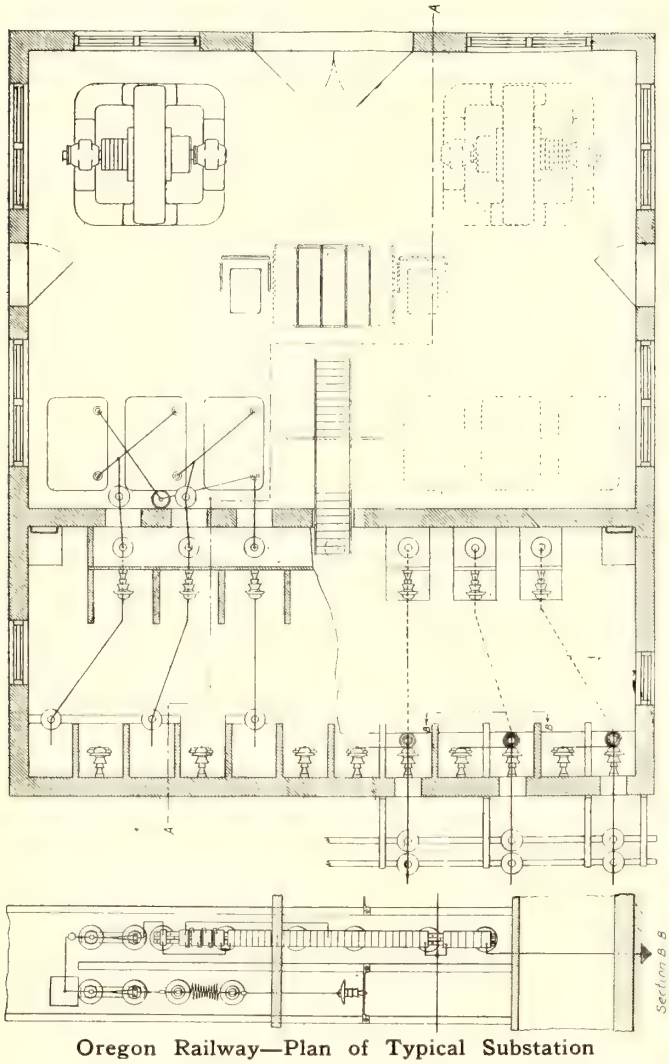
Oregon Railway—Track and Overhead Section



Oregon Railway—Typical Connections in Substation

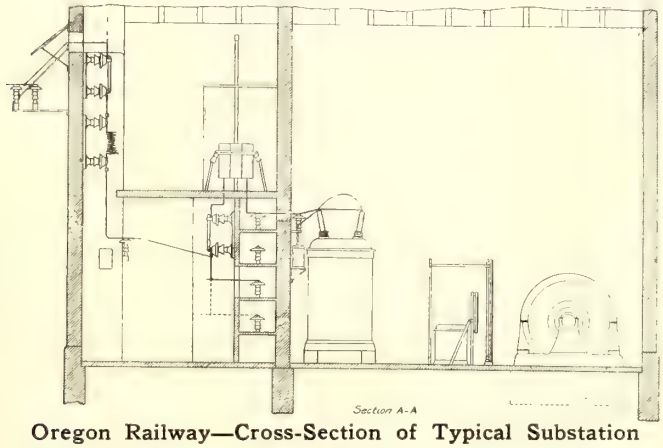
shering stress of 1800 lb. per square inch of contact surface.

Every precaution was taken to render operation as safe as possible. The entire right of way, including station yards, etc., is fenced in with standard American Steel & Wire Company's woven wire fencing, with one strand of



Oregon Railway—Plan of Typical Substation

barbed wire strung along the top. At grade crossings, public or private, the track is protected by cattle guards and wing fences running from the edges of the track to the main fences on each side. The road is well equipped



Oregon Railway—Cross-Section of Typical Substation

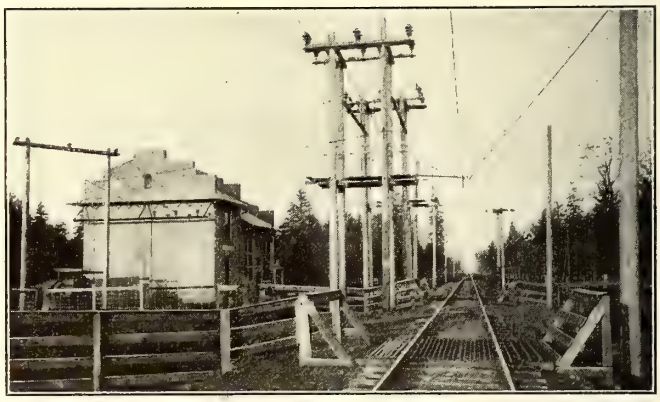
with signs, indicating distances, boundaries, danger points, etc., for the guidance of trackmen, motormen, property agents and others. A comprehensive system of signals and interlocking switches was installed, and has given excellent results in actual operation.

OVERHEAD CONSTRUCTION

The high speed employed made the catenary type of construction preferable. The single catenary type of suspension furnished by the Ohio Brass Company was used. The construction can be seen in several of the illustrations. A 7/16-in. galvanized steel messenger cable having a safe tensile strength of 12,000 lb. is suspended from insulators on brackets with 150-ft. spans and anchored every ½ mile on straight track and at the end of every curve. On curves the standard construction was modified by stringing a 5/16-in. galvanized steel cable between the supports which serves as a spring guy, to which ¼-in. pull-off bridles are attached at 15-ft. intervals, thus making a very smooth curve.

Section insulators are provided at every substation so that the overhead wire can be cut out between any two stations without affecting the rest of the line. The contact wire is of No. 0000 hard-drawn copper, suspended from the messenger at intervals of 15 ft., and is fed with a 500,000-circ. mil copper feeder over the heaviest grades for 7 miles out of Portland, and from there on with a No. 0000 copper feeder tapping into the contact wire at every 10th pole.

The insulation of all catenary construction is designed for 1500 volts, so that later, when the traffic becomes



Oregon Railway—Tapping Transmission Wire at Substation

heavier, this voltage can be used by changing the car motors and converters, thereby increasing to a very large extent the power-carrying capacity of the entire system without disturbing in any way the overhead feeder or trolley installation.

SUBSTATIONS

The direct-current distribution system is supplied with energy through synchronous converter substations. Five of these stations were built and feed the middle sections of the line, while the ends of the line are fed from substations belonging to the local power companies in Portland and Salem.

The substations are built of reinforced concrete, with corrugated galvanized iron roofing carried on steel beams. Waiting rooms and ticket offices are provided in each substation, the attendant acting as electrician, station agent and telegraph operator.

The building is divided into two parts: the high-tension compartment, which contains the lightning arresters, disconnecting switches, oil switches, etc., and the operating room, which contains the transformers, switchboard and the converters. The high-tension compartment is divided into two stories, the upper one containing the oil switches and the lower one the high-tension buses.

The low-tension wiring, both a.c. and d.c., is carried in

fiber conduits embedded in the concrete floor. The drawings show the general arrangement of the apparatus and high-tension wiring and the complete diagram of connections for the station.

The 33,000-volt line enters the building under a weatherproof hood through 18-in. holes, and passes down the wall through a disconnecting switch and a choke coil to the lower room, where it crosses to the high-tension buses. The lightning arresters are fastened to the rear wall and separated from the disconnecting switches and choke coils by concrete barriers. They are connected through disconnecting switches to the line just after it enters the building.

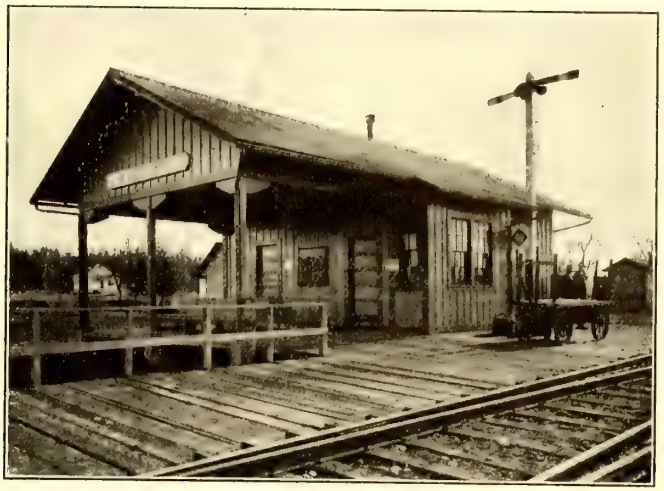
Taps from the high-tension buses pass through disconnecting switches, up through the floor to the oil switches, then down again and through the partition wall to three 185-kw. 33,000 to 430-volt transformers connected in delta.



Oregon Railway—Electric Locomotive

Four leads are brought out from the secondary winding of each transformer and connected diametrical-six-phase to a 500-kw synchronous converter, which is equipped with end-play and speed-limit devices and a low-voltage circuit-breaker. The converter is started on one-third and two-thirds transformer taps.

The entire high-tension system is designed for 60,000 volts, and later, by changing the transformer connections, the e.m.f. may be raised to 52,000 volts, thereby increasing the power carrying capacity of the whole transmission system. The switchboard consists of two feeder panels, one converter panel and one starting panel, which equipment will later be doubled. The entire electrical equipment for the transmission lines and substations was furnished by the General Electric Company.



Oregon Railway—Typical Waiting Station

TRANSMISSION LINE

The substations are supplied with energy by the Portland General Electric Company from its hydro-electric plant in Oregon City and interconnected with its other power plants. The transmission line extends from Oregon City over a private right-of-way and for a very short distance along a country road 8½ miles to a point about 1 mile north of the Willamette Bridge, where it connects to the transmission line that is carried on the same poles with the overhead work, and runs from Salem to Multnomah and from Garden Home Junction to Moffat substation, making a total of 65½ miles of transmission lines.



Oregon Electric Railway—Portland Terminal Freight Station at Left, Passenger Station at Right

Voltage range to meet all conditions is secured by a 75-kv-amp reactive coil in the substation; also by 5 per cent taps on the low-tension side of the main transformer at Oregon City (the beginning of the transmission line), and 2.5 per cent taps on the high-tension side of the substation transformers.

At Oregon City the e.m.f. is stepped up from 10,000 to 33,000 volts by three delta-delta-connected 33-cycle, 750-kw water-cooled oil-insulated transformers, which are housed in a reinforced concrete building. A motor-operated three-phase oil switch is connected to the primary

side of the transformers, and air switches are provided to enable a disabled transformer to be cut out so that operation can be continued with the remaining two. The building also contains lightning arresters, and is intended to accommodate just double the present equipment. The pole line is built with 45-ft. cedar poles, each fitted with two fir cross-arms; the upper one 5 in. x 5¾ in. x 18 in., and the lower one 5 in. x 5¾ in. x 84 in. The wires are No. 0 seven-strand aluminum, and are carried on No. 419 slate-glaze Locke insulators, spaced to form a 6-ft. equilateral triangle and supported by ⅝-in. steel pins. A composite telephone and telegraph line is carried on the pole line from Portland to Salem and to Oregon City. The power wires are not transposed, but the telephone wires are transposed at every alternate pole, with the result that no trouble is experienced from induction.

ROLLING STOCK

The rolling stock now in operation consists of 14 combination passenger, smoking and baggage cars, 77 express and baggage cars, 2 freight locomotives and 77 freight cars.



Oregon Electric Railway —Standard Passenger Car

Of the 14 coaches, eight were built by the Jewett Car Company, while the rest and the two express cars were built by the Niles Car Company. The general dimensions of the passenger cars are as follows:

Length over bumpers	57 ft. 8 in.
Length over bulkheads	47 ft. 10 in.
Width over all	9 ft. 4 in.
Distance from top of roof to top of rail	13 ft. 7 in.
Weight	50 tons
Seating capacity, main compartment	38
Seating capacity, smoking compartment	16
Baggage room	8 ft. 2 in. x 9 ft.

The seats were furnished by the Heywood Brothers & Wakefield Company, and are of its "Walkover" type; they have high backs and are equipped with grab handles, roll head rests, pedestal bases and automatic foot and arm rests. Those in the main compartment are upholstered with dark-green plush, while those in the smoking compartment are upholstered with rattan.

The interior, including the end doors, is finished in mahogany rubbed to a dull finish. The ceilings are full empire style, done in green and gold, and all windows are glazed with heavy American plate glass, except the top and deck sashes, in which opalescent cut glass is used. The exterior finish is in orange color and similar to that of the coaches of the Chicago, Milwaukee & St. Paul Railroad.

The electrical equipment of the cars is as follows:

Sprague-General Electric relay automatic multiple-unit control system with one master controller.

Four GE-73 motors rated at 75 hp each, having a gear ratio of 22 to 53, which gives a speed of about 45 miles per hour.

One Westinghouse motor-driven air compressor and automatic pressure governor.

Two circuits of No. 93 truss-plank heaters.

One 4-amp luminous arc headlight.

Five 32-cp incandescent lamps.

Thirty 16-cp incandescent lamps.

A switchboard located in the motorman's cab permits the control of all the auxiliary apparatus mentioned above.

The trucks were made by the Baldwin Locomotive Works. They are equipped with rolled steel wheels pressed and keyed on the axles, according to approved steam locomotive practice. The journal boxes are of the M. C. B. type and were made by the T. H. Symington Company. The general dimensions of the trucks are as follows:

Truck gage	4 ft. 8½ in.
Wheel base	6 ft. 6 in.
Weight of truck	10,250 lb.
Weight of truck with two motors	18,994 lb.
Diameter of wheels	36 in.
Tread of wheels	4⅛ in.
Flange of wheels	1⅛ in.
Diameter of axle at center	6 in.
Diameter of axle at gear seat	7 in.
Journals	5 in. x 9 in.

All passenger cars are equipped with Westinghouse automatic air brakes and also with hand brakes.

The two locomotives were built by the American Locomotive Company and were equipped by the General Electric Company with 4 GE No. 55 motors rated at 160 hp each and controlled by the Sprague-General Electric non-automatic multiple-unit control system. The general dimensions are:

Length over bumpers	29 ft. 4 in.
Length over main cab	9 ft. 6¼ in.
Distance from top of rail to trolley base	11 ft. 9 in.
Weight	50 tons

TRAIN SERVICE

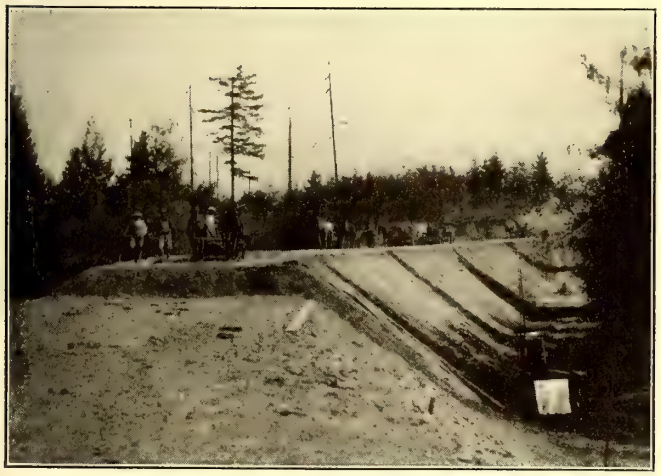
The main line from Portland to Salem has been in operation about a year and the branch to Hillsboro and Forest Grove about 60 days. Local and express passenger trains are operated at frequent intervals. A number of limited trains are operated daily in each direction over

NAMES OF STATIONS AND DISTANCES FROM PORTLAND

Name	Distance in miles	Name	Distance in miles
Main Line—		Main Line—	
Portland	0.0	West Woodburn	32.8
Shops	0.8	St. Louis	35.6
Corbett Street	1.7	Waconda	39.5
View Point	2.8	Chemeketa	41.1
Fulton Park	3.3	Quinaby	42.4
Capitol Hill	3.9	Chemawa	44.7
Ryan Place	4.5	Claxtar	45.9
Multnomah	5.0	Highland	48.1
Shahapta	5.4	Salem	49.7
Kusa	6.0	Branch Line—	
Barstow	6.5	Garden Home Junction	7.0
Garden Home Junction	7.0	Firlock	7.6
Metzger	8.7	Whitford	8.5
Greenburg	9.5	Beaverton	10.2
Tigard	10.4	St. Mary's	12.0
Bonita	11.8	Mortondale	13.4
Durham	12.7	Quatama	15.1
Tualatin	14.3	Orenco	16.4
Nasoma	15.8	Milkapsi	17.3
Tonquin	17.3	Moffat	19.0
Mulloy	18.5	Hillsboro	20.2
Wilsonville	21.2	Varley	22.0
Wallace	23.0	Cornelius	23.6
Chopunnish	24.3	Haynes	24.8
Donald	27.4	Forest Grove	26.1
Broadacres	30.1		

Note: A number of these stations are flag stations.

the road. The schedules of these trains are arranged especially to suit the different classes of travelers; for example, the "Supreme Court Train," which leaves Portland at 8 a. m. daily and arrives at Salem at 10 a. m., is especially intended for Portland attorneys and others who desire to be present at the opening of the State Supreme Court. Some of the trains make exceptionally good time between Portland and Salem; one of the fastest, the



Oregon Railway—Making a High Fill

"Capitol City Flyer," leaves Portland at 9:15 a. m., arriving in Salem at 10:50 a. m., making the run of 50 miles in 95 minutes, including two stops, one at Garden Home Junction and the other at Tualatin.

ORGANIZATION

The road was designed and built by W. S. Barstow & Company, New York, who acted throughout as engineers for the owners. The operating offices of the Oregon Electric Railway Company are located in Portland. The officers are: George B. Moffatt, New York, president; Guy W. Talbot, vice-president and general manager; George F. Nevins, secretary, auditor and traffic manager; C. A. Coolidge, superintendent; H. Milliken, electrical engineer.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

The hearing before the Railroad Commission of the case instituted by the city of Milwaukee to compel the Milwaukee Electric Railway & Light Company to reduce its fares to 3 cents was continued at Milwaukee last week. After hearing the evidence presented on March 12, the commission adjourned the hearing untitl March 29, when further testimony will be given on behalf of the company.

The examination and the cross-examination were conducted by the following representatives of the company and the city:

George P. Miller and Edwin S. Mack, of Miller, Mack & Fairchild, of Milwaukee, general counsel, Milwaukee Electric Railway & Light Company. W. J. Curtis, of Sullivan, Cromwell & Curtis, of New York, general counsel, North American Company. John T. Kelly, city attorney; Lester C. Manson, assistant city attorney.

TESTIMONY OF C. N. DUFFY

C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, took the stand on March 10. Mr. Duffy described his connection with St. Louis companies as secretary, treasurer and auditor, and with the Chicago City Railway as secretary and auditor, comprising experience with horse, cable and electric railways, and as comptroller of the New York City Railway in 1903.

APPORTIONMENT OF COMMON CHARGES IN OPERATING EXPENSES

Mr. Duffy explained the apportionment of common charges in the operating expenses of the Milwaukee Electric Railway & Light Company and Milwaukee Light, Heat & Traction Company substantially as follows:

General Expenses.—"General expenses common" are apportioned as between "railway," "lighting" and "heat" on the basis of the proportionate gross earnings of each. "Railway" is further apportioned as between the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company on the basis of the proportionate car-hours of the two companies. "Lighting" is further apportioned as between each of the lighting systems of the two companies, on the basis of the proportionate gross earnings of each. There is no further apportionment of "heat," as there is only one company and one system for the heating business.

Transportation, Way and Structures, Rolling Stock.—These expenses are apportioned as between the Milwaukee Electric Railway & Light Company or Milwaukee Light, Heat & Traction Company on the basis of the proportionate car-hours of each company.

Maintenance and Operation of Power Plants and Substations.—The cost of generating and regenerating electric current, as carried in "Maintenance and operation of power plants and substations" is charged to "railway," "lighting" and "other purposes" of each company and each system of each company separately, on the basis of the kw-hour consumption. "Heat" is charged with steam furnished by the power plants, which charge is deducted in arriving at the net cost of electric current. Electric current for "other purposes" than "railway" or "lighting" is charged out at 2 cents per kw-hour consumed. The difference between the cost of generating and regenerating electric current so consumed and the charge of 2 cents per kw-hour is credited in "maintenance and operation of power plants, and substations," correspondingly reducing the kw-hour cost charged to "railway" or "lighting."

What are termed "special accounts" with this company, known as "clearing accounts" in the Interstate Commerce Commission classification of accounts, and by some electric railways entitled "apportionment accounts," consist of the following: 1, Printing bureau; 2, draughting bureau; 3, photograph bureau; 4, laboratory; 5, pipe shop; 6, brass foundry; 7, cast welding; 8, operating gravel pits; 9, stable expense; 10, utility equipment.

In the 10 accounts outlined above are carried all expenses of operation, maintenance and fixed charges, in order to arrive at the true cost of the product produced or the service performed incident to the operation of any one of the departments enumerated above. This true cost thus ascertained is charged in the proper account or accounts of the company or companies using the product produced or receiving the benefit of the service performed.

Work Orders.—For all work other than current or ordinary maintenance, renewals or repairs, a work order is issued upon the recommendation of the departmental head or heads interested or concerned and the approval of the president and general manager. This recommendation covers a full description of the work to be done, with an estimate of its cost. All labor, material and expenses incident to doing the work covered by the work order is charged to this work order and carried in the work-order book, finally landing in the accounts of the company, usually as a charge to "depreciation" or "construction," although, of course, there are some work orders charged to operating expenses or some other account.

Mr. Duffy also described the division of earnings and expenses shown by the Milwaukee Light, Heat & Traction Company cars while running over the Milwaukee Electric Railway & Light Company's lines.

BENEFITS OF ORGANIZATION AT MINIMUM EXPENSE

By the apportionment of the common charges to operating expenses between the Milwaukee Electric Railway & Light Company, Milwaukee Central Heating Company and the Milwaukee Light, Heat & Traction Company, Mr. Duffy said that each company bore the proper proportion of the expense of operation of the three companies, as well as the different kinds of business in which they were engaged. Each company and each kind of business of each company enjoyed all the advantages of the organization of the entire property at a minimum of cost. Without these advantages, each company separately could not operate at the low cost that it does and maintain its property in the condition it does. These advantages, with the uncommon capacity of the president and general manager, his executive ability and efficient and economical administration of the property made possible the results achieved. Without these advantageous conditions, neither of the three companies could show the results attained, if, indeed, they could operate the properties and meet fixed charges, to say nothing of any profits.

APPORTIONMENT ON CAR-HOUR BASIS

After discussing further the apportionment of operating expenses between the Milwaukee Electric Railway & Light Company and Milwaukee Light, Heat and Traction Company on a car-hour basis, Mr. Duffy said that that basis had been adopted as more equitable than any other and as the most practicable one to apply. For instance, in maintenance of way and structures it was found that so far as current maintenance and renewals were concerned the costs were approximately the same for both companies. The current or extraordinary renewals were greater on the city system than on the suburban or interurban system, but were charged to depreciation reserve, not operating expenses.

The car-hour unit had the advantage of eliminating the element of speed, which made the car-mile unit unsatisfactory in many instances.

WISDOM IN ESTABLISHMENT OF RESERVES

Mr. Duffy then analyzed a supplemental report made by Edward E. Gore, accountant for the city, regarding the operations of the company in 1907. The report of Mr. Gore criticised the reserves of the company. Mr. Duffy spoke of the wisdom and foresight in the policy of the company which dictated the establishment of the reserves for depreciation, contingencies, injuries and damages, fire insurance and taxes. No provision was made for other reserves which it would be desirable to set up, as for amortization of the non-physical investment, including expenses of organization, creation of the property and financing; for the preservation of the physical investment or the difference between the value of the physical property as an operating whole and the shrinkage in that value as a non-operating property because of expiration of franchise; and for casualties, such as earthquakes, conflagrations, floods, strikes, riots, etc., the experiences of San Francisco, Baltimore, Boston, Chicago and St. Louis illustrating the advisability of such provision.

The reserves set up on the books of the company indicated, Mr. Duffy said, an able, wise and conservative administration, seeking to strengthen the financial condition of the company and to provide in advance for misfortunes that might befall it.

Attention was then called by Mr. Duffy to the classification of accounts for electric utilities prescribed by the Railroad Commission of Wisconsin, which included depreciation and "contingencies—extraordinary," as items of operating expense. Discussing the desirability of making provision from earnings for depreciation and contingencies, as demonstrated by his own experience, Mr. Duffy mentioned the cyclone in St. Louis in 1896 and the loss which it entailed upon many, including the railway with which he was connected. Mr. Duffy said: "I say that reserves are just as necessary and important in this business as they are, for instance, in any insurance business. You might as well say that the difference between the premiums collected by the insurance company, fire, life, casualty, liability or whatever it may be, and the expense of conducting the business, represent the profits available for distribution and dividends on stock. It is exactly the same principle. Is there any man that would insure his property in an insurance company conducted on that basis? Would any man insure his life for the benefit of his wife and children in a company conducted on those lines? No. It is part of the cost of the business that the buyer of insurance has to pay for and the buyer of transportation facilities in a street railway ought to pay for; and it is exactly the same principle in one case as in the other."

In submitting the accompanying table showing the number of transfer and revenue passengers carried and car-miles run from 1897 to 1908, Mr. Duffy called attention to the fact that the number of transfer passengers carried in 1908 was about three and one-half times the number shown in 1897; the number of revenue passengers in 1908 was only about two and one-half times the total in 1897.

The accompanying table shows the revenue and transfer passengers carried per car-mile from 1897 to 1908.

These figures should be considered in connection with the rates of fare charged in different years, shown in the second table.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
Passengers Carried and Car-Miles Run.
Submitted in Evidence by C. N. Duffy, Comptroller.

Year.	Transfer passengers.	Revenue passengers.	Car-miles run.
1897	7,088,300	27,777,962	7,632,849
1898	7,913,393	30,673,564	7,426,033
1899	8,327,553	33,765,324	7,662,821
1900	10,505,107	38,286,003	8,395,323
1901	12,151,806	41,682,088	8,669,402
1902	13,926,679	46,974,373	9,143,023
1903	16,253,333	52,104,579	9,568,915
1904	17,172,188	55,149,378	10,477,929
1905	19,886,450	61,327,936	10,521,160
1906	22,976,165	68,798,430	11,492,013
1907	25,809,012	74,720,783	12,294,354
1908	26,492,482	74,965,927	12,144,642

The average fare per passenger and percentage of revenue passengers riding on transfers from 1897 to 1908, inclusive, with the average for the entire period are shown in the second table published herewith. Attention was called by Mr. Duffy to the rapid decline in the average revenue per passenger carried, beginning with the year 1905. The percentage of revenue passengers riding on transfers increased from 25.52 to 35.24 per cent in 1908, notwithstanding the purpose of the company to route its cars so that wherever possible and practicable a man could be carried from one part of the city to any other part without the necessity of changing cars.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
Passengers Carried Per Car-Mile.
Submitted by C. N. Duffy, Comptroller.

Year.	Revenue.	Transfer.	Revenue and transfer.
1897	3.64	.93	4.57
1898	4.13	1.07	5.20
1899	4.41	1.15	5.56
1900	4.56	1.25	5.81
1901	4.81	1.40	6.21
1902	5.14	1.52	6.66
1903	5.44	1.70	7.14
1904	5.26	1.64	6.90
1905	5.83	1.89	7.72
1906	5 99	2.00	7.99
1907	6 08	2.10	8.18
1908	6.17	2.18	8.35
Average 12 years	5.12	1.57	6.69

Rates of Fare.

1897, 1898, 1899:
Adults, 5 cents cash or 5-cent ticket.
Children under 10 years of age, 3 cents cash.
1900, 1901, 1902, 1903, 1904:
Adults, 5 cents cash, 4⅛-cent ticket (6 for 25 cents), 4-cent ticket (25 for $1).
Tickets good only between the hours of 5:30 and 8 a. m. and 5 and 7 p. m.
Children under 10 years of age, 3 cents cash.
1905, 1906, 1907, 1908:
Adults, 5 cents cash, 4⅛-cent ticket (6 for 25 cents), 4-cent ticket (25 for $1).
Tickets good all hours of the day and night.
Children under 10 years of age, 3 cents cash.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
Average Fare Per Passenger and Percentage of Revenue Passengers Riding on Transfers.
Submitted by C. N. Duffy, Comptroller.

Year.	Including transfers—cents.	Excluding transfers—cents.	Percentage of revenue passengers riding on transfers.
1897	3.94	4.95	25.52
1898	3.92	4.93	25.80
1899	3.89	4.91	26.14
1900	3.76	4.80	27.44
1901	3.75	4.84	29.15
1902	3.76	4.87	29.65
1903	3.72	4.88	31.19
1904	3.71	4.86	31.14
1905	3.27	4.33	32.43
1906	3.22	4.30	33.40
1907	3.18	4.27	34.54
1908	3.15	4.27	35.34
Average 12 years	3.61	4.68	30.15

At the presentation of the table last mentioned Mr. Curtis said it seemed to him to be a more impressive exhibit of the effect of increasing transfer traffic than he had ever seen before.

The company had been criticised severely, Mr. Duffy said, for enforcing a rule embodied in its 1900 contract with the city of Milwaukee, providing that transfers should be issued only at the time of the payment of fares. Enforcement of this rule was absolutely necessary for the preservation of the life of the company, and that was demonstrated by the misuse of transfers in other cities.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
Earnings and Operating Expenses.
Submitted by C. N. Duffy, Comptroller.
Cents per Car-Mile.

Year.	Gross receipts.	Operating expenses.	Operating expenses—per cent of gross receipts.
1897	18.45	10.63	57.60
1898	20.48	11.08	54.09
1899	21.78	11.04	50.71
1900	22.04	11.38	51.63
1901	23.44	11.68	49.82
1902	25.18	11.83	46.99
1903	26.74	13.50	50.49
1904	25.76	13.10	50.85
1905	26.38	12.48	49.18
1906	25.67	12.67	43.96
1907	26.21	13.70	52.27
1908	26.54	13.82	52.08
Average 12 years	23.99	12.24	51.22

Another table presented by Mr. Duffy, reproduced herewith, showed the gross receipts and operating expenses, per car-mile, from 1897 to 1908, and the percentage of gross earnings used in operating expenses.

TESTIMONY OF CHARLES J. MARR

Charles J. Marr, resident partner at Chicago of Dickinson, Wilmot & Sterrett, certified public accountants, was called to the stand on Feb. 26 to testify regarding an examination and report which he made of the books and accounts of the company.

The witness said that the purpose of the examination was to ascertain in what respects the report of the accountants engaged my the city differed in results from what was shown by the books of the company, the reasons and the propriety of the differences.

In computing the cost of the property Mr. Marr began with the actual net cash invested in the property as of Jan. 1, 1897, as disclosed in the testimony in the 4-cent-fare case, which was tried about that time. The Milwaukee Electric Railway & Light Company was formed by issuing its securities in exchange for the securities of the predecessor company and Mr. Marr inquired into the basis for the exchange and then endeavored to go behind the values to ascertain the values behind the securities of the predecessor company. In reaching the figure of $8,885,644.17 Mr. Marr excluded items of bond discount and of like character amounting to $3,675,000. This is more than the amount excluded by the accountants for the city, who arrived at a first cost of property of slightly over $9 000,000.

The depreciation adopted would work out to about 4 cents per car-mile over the 10 years' history of the Milwaukee company, and the maintenance would amount to about 2 cents per car-mile, making a total of 6 cents. By the method adopted the accountants had taken care of all the elements which could arise so far as they had been experienced in the last 10 years, but it might be that changes in the management and operation of street railways might be more radical in the next 10 years than in the past 10, in which case the rates would be insufficient.

RATE OF RETURN

The rate of return on the investment in ordinary private business enterprises varied considerably. No industrial or manufacturing company would be regarded as successful which did not earn 8 per cent or over and many earned a great deal more. In this statement the witness meant a return on the capital stock outstanding, which in the case of a majority of corporations of this character was offset by a more or less substantial amount for goodwill. The percentages would be a great deal more accord-

ing as the good-will was eliminated from consideration in the capitalization of the business. In a well-managed private corporation earning the rate of return named it was customary to make liberal provisions from earnings for depreciation of plant, machinery and equipment and for reserves for bad debts and contingencies in addition to carrying a considerable amount to surplus.

Reference was made to the reports of several large industrial companies, including the United States Steel Corporation. The latter company, Mr. Marr said, set up liberal reserves and its accounts were prepared on the most conservative basis possible. The greater the reserve the more solid would be the foundation on which a company would stand.

During his examination the witness found the books were well kept. No attempt was made to hide any entries of any kind; the books were remarkably free from any criticism in that respect.

Under examination by Mr. Curtis, it was stated by Mr. Marr that upon the low adjusted cost of operation as computed by the accountant for the city, allowing 4 per cent return upon the valuation fixed by the engineering staff of the Railroad Commission—reproduction value new—it would be impossible for the road to be operated and pay on a 3-cent fare. It was also stated by the witness that, based upon the readjusted expenses of operation of the city's accountant and upon his insufficient depreciation of 8 per cent and allowing 2½ per cent return on his valuation of the property, it would cost more than 3 cents per passenger to do the business. The amount of depreciation allowed by the company, which was 2 per cent in excess of the allowance suggested by the city's accountant, was wholly insufficient, in the opinion of Mr. Marr.

ALLOWANCES IN CHICAGO ORDINANCES

A question was raised as to the rates allowed for maintenance, repairs, renewals and depreciation in the Chicago ordinances and the witness said he did not know how the companies in that city could maintain the property on the basis of only 14 per cent of gross earnings. The experience of the Chicago railways had demonstrated that 14 per cent was wholly insufficient. Their experience had shown that at least 24 per cent would be sound. Any ordinance which restricted them to expending 14 per cent and charging that against the earnings and paying additional expenditures for maintenance out of the company's share of the profits would not be fair. The Chicago companies, however, made the existing arrangement in the face of the approaching end of the franchises.

Mr. Marr considered that intangible assets had a value which was usually determined by the difference between the price paid in a purchase and what was received that was tangible. Sometimes evidence of the value could not be seen because the company had bought, as in this case, several disconnected and old and antiquated systems and practically replaced them with new. The cost of the new included, nevertheless, the cost of the properties bought and superseded immediately. A lot with a building on it might be bought and payment be required for the building; but although the building should be torn down immediately, the price paid would be considered the price of the lot. Transactions of the magnitude of that involved in the Milwaukee case were not based usually upon a minute investigation of the value of each separate piece of property. Independent of the other value in a property of this kind was that of the going concern, the opportunity of getting and putting together several disconnected parts and making of them a complete, up-to-date, efficient whole.

GOOD FAITH IN PURCHASE

Mr. Marr was asked by Mr. Manson to explain his reference to good faith in the purchase of properties of this character. He said in reply: "If I go into partnership with you and pay a price which I believe to be reasonable at the time in this joint enterprise, not intending to impose upon you or in any way do you any financial injustice, I should think that although it might transpire later that I paid an excessive price for the property, I ought to be entitled to a proper return on what I did pay." He added that he should think that the city and the people would have been very glad that some powerful financial interests stepped in and took up the bankrupt property and provided a well-equipped and serviceable system. If a private corporation stepped in and bought a broken-down property and, in face of the failure of the previous property, undertook to expend a great deal of money in the reconstruction and extension, provided free transfers and commodious cars and charged a low rate of fare, that implied a community of interest between the public benefited and the capitalists who risked their capital. Clearly it would be in the highest degree inequitable for the city to deny those contributing the necessary capital any return on a portion thereof merely because it is not now represented by physical property.

EXCLUDED ITEMS

When the hearing was resumed on March 2 Mr. Mack submitted on behalf of the company a statement of the items excluded from the cost of property by Mr. Marr. The company and its counsel believed that the inclusion of many, if not all, of these items could be justified and the statement was submitted in order that in the argument counsel might present reasons for including these items.

The cross-examination of Mr. Marr was then resumed by Mr. Manson, who questioned the witness first regarding his discussion of a reserve to cover the difference in the investment in physical property at the expiration of the franchise and the scrap value thereof. The witness said that the reserve recommended for this purpose was based on the theory that the company may be required to realize what it could at the termination of the franchise. If, under the new law providing for an indeterminate permit in Wisconsin, the company, at the expiration of its franchise, received recognition from the authorities for its intangible values as well as the physical values, the question of a provision for the extinguishment of these values would not be of such paramount importance. No matter how responsible the parties were who guaranteed that something might be done in 1934, the witness would prefer to have his whole investment repaid in the meanwhile, or provision made for such repayment, than to wait until 1934 and then take his chances.

The subject of reserve for injuries and damages was brought up and the witness said he did not think it would be wise for the company to expect to be as fortunate in the future as in the past in the matter of accidents. After 10 years of strenuous experience this huge corporation was left with a beggarly $300,000 of reserve that had been provided out of operating. This did not seem to Mr. Marr to be unreasonable or excessive.

TESTIMONY OF CHARLES J. DAVIDSON

Charles J. Davidson, chief engineer of power plants of the Milwaukee Electric Railway & Light Company, testified on March 3.

Mr. Davidson thought that 5 per cent should be set aside annually to cover depreciation of engines due to wear and tear. He questioned whether any engineer would be justified in making a definite statement at this time as to the proper allowance for depreciation due to obsolescence and inadequacy of engines as the state of the art was more unsettled at present than it had ever been before. Mr. Davidson then described the progress of the art until the development of steam turbines and said that conservative engineers probably believed that the steam turbine may always occupy a certain portion of the field, but that did not mean that it would not be generally superseded. Two developments were in view for the generation of electricity. One was the combination of the steam engine and the steam turbine, using the higher pressure of steam in the engine and the lower pressure in the turbine, but the greater rival for popularity was the gas engine. Within even two years it may be considered to be proper economy and profitable to discard the best installation the company has now. Mr. Davidson made a trip to Europe two years ago to study the development of power-generating apparatus.

A proper allowance for depreciation of boilers, due to wear and tear, would be 7½ per cent yearly. An allowance for probable future obsolescence and inadequacy would depend very largely on the development of the gas engine. The development in boilers was toward larger units and higher degrees of superheat. For depreciation of heaters and economizers, due to age and wear, Mr. Davidson would allow 5 per cent to 7½ per cent. The state of the art was fairly well settled so long as steam apparatus remained in vogue. Piping practice was undergoing great changes. The allowance for depreciation due to age and wear only should be at least 7½ per cent annually.

For pumps and condensers an allowance of 6 per cent yearly should be made for depreciation due to age and wear. To take care of probable future obsolescence and inadequacy not less than an additional 5 per cent per annum should be allowed, but the cost might be, and probably would be, a great deal more than that. Not less than 5 per cent annually should be provided for obsolescence and inadequacy in the entire power plant. An allowance of 3 per cent annually for depreciation, due to age and wear, should be made for traveling cranes in power-plant service.

Depreciation due to age and wear of coal and ash conveyors would require an allowance of 10 per cent annually; and belting shafts, ropes, etc., also dynamos, 7½ per cent annually.

A question was asked as to how useful a building erected for a power plant would be after the power plant itself was no longer useful. The speaker thought that it would be more profitable to tear down the old building than to try to form a new plant inside of it. The arrangement of the machinery was important; after it had been arranged the architect was permitted to construct the building around the machinery. That was the only way to create a good power plant.

CONCEALED COSTS

Mr. Davidson cited an instance to show an element of concealed cost that would not be apparent when an inventory was made. A 1500-kw unit was installed in Racine last year. The estimate, based on the best data available, was $27,200, but the cost was $33,000, due very largely to conditions under the floor that could not be seen. Nothing was known of old foundations of concrete and other masonry, left from previous installations, which were very expensive to remove, and other developments occurred, requiring the rehandling of the machinery through no fault of the company; these conditions increased the cost beyond all estimates. The water-power installation at Kilbourn, Wis., generating 8000 hp, was started with an estimated cost, compiled by capable engineers, of from $1,000,000 to $1,250,000, but the actual cost would be $1,750,000. The power plant of the Union Electric Light & Power Company, of St. Louis, cost approximately $4,800,000, due partly to contingencies resulting from the construction of a river wall in strata that contained, among various difficulties, old steamboats and engines through which piling could not be driven. An engineer, not knowing of these conditions, or leaving them out of consideration, if known, would be warranted in estimating $3,000,000 as the cost of reproduction. These contingencies would lengthen the period of construction very materially.

The witness said that there would have been practically no difference in the size of the Commerce Street plant, Milwaukee, if it had been installed merely to supply the city railway and lighting system without furnishing any power whatever to the Milwaukee Light, Heat & Traction Company. An added economy resulted from the use of this plant for the city railway and city lighting system as well as to the railway company's own lighting circuits, as the peak loads rarely came at the same time. While the witness did not know the exact amount of the increased load attributable to the traction company, it was relatively a small amount and would not affect any part of the operation of the plant except the quantity of coal consumed. The labor element would not be affected at all.

The cost of labor had increased up to about the beginning of 1908, but had been about stationary since that time. From 1906 to 1908, however, the difficulties in the labor situation were rather in the direction of decreased efficiency than of further increases in wages.

TESTIMONY OF OTTO M. RAU

Otto M. Rau, chief electrician of the Milwaukee Electric Railway & Light Company, who has charge of the distribution system, was called to the stand on March 4. For depreciation due to age and wear he said he would allow the following annual percentages:

	Per cent
Poles, fittings and wire	7½
Conduits	2
Underground feeders and cables	5
Generating apparatus	5
Substation apparatus	5
Storage batteries	10
Switchboards and cables	5
Telephone system	7½

A proper allowance for depreciation due to obsolescence and inadequacy in power plant apparatus would be 10 per cent annually. There would be little, if any, depreciation for obsolescence of poles, wiring and fitting. Probable inadequacy, rather than obsolescence, should be considered in the underground system, and an allowance of 2½ per cent be made therefor.

TESTIMONY OF M. G. STARRETT

Milton G. Starrett, of New York, consulting engineer for the receivers of the Metropolitan Street Railway, of New York, was introduced as a witness on March 4.

Mr. Starrett, under examination by Mr. Curtis, defined the different elements of depreciation. Depreciation due to wear and tear depended on the average life of different parts of the structure or property used and that life de-

pended to a large extent on conditions and amount of use. There was also depreciation due to obsolescence, to inadequacy and to public requirements.

The percentage indicated in the accompanying table, 5.59 per cent, was, in the opinion of Mr. Starrett, a proper allowance for depreciation due to wear and tear. It was very difficult to give a definite percentage for depreciation due to obsolescence, because it would vary in different places and under different conditions, but for the purpose of getting a definite figure in this case, Mr. Starrett took 1.79 per cent of the total reproduction cost. For depreciation due to public requirements or such changes as the company might be obliged by ordinance, for instance, to make, and for inadequacy in making tentative figures Mr. Starrett would allow ½ of 1 per cent, making a total of 7.88 per cent.

In reaching the replacement value of a railway property Mr. Starrett would add the following allowances to the items enumerated in a unit estimate:

Engineering and superintendence	4 per cent
Organization and legal expenses	2 per cent
Interest during construction	3 per cent
Contingencies	5 per cent
Discount on bonds	9 per cent
Working capital	1 per cent
Total	24 per cent

Assuming that 7-in. 95-lb. rails were used, the cost of constructing a mile of roadbed such as is in use in Milwaukee, with concrete foundation as used in that city, would be $15,733.74, in Mr. Starrett's opinion. In this calculation 898 yd. of concrete were taken at $3.65 per yard and an allowance of 10 per cent was added for supervision, contractors' profits and incidentals.

Mr. Starrett also stated that he had made an estimate of the cost of construction of a mile of track, assuming a 6-in. 72-lb. rail costing $40 and 898 yd. of concrete and allowing 10 per cent for supervision, contractors' profits and incidentals. The estimate was $14,076. In making estimates for construction of track in streets, electrical construction or other similar work, Mr. Starrett's practice for years had been to add an allowance of 5 per cent for contingencies. If engineering and supervision had not been added separately a certain percentage was provided for those expenses and also for contractors' profits. Mr. Starrett would increase the allowance of 3 per cent for contingencies, as made by Professor Pence, to 5 per cent, and he thought that an allowance for the additional items mentioned should have been made in the valuation of the engineering staff of the commission.

Mr. Starrett had been accustomed to consider that all expense for renewals and replacements of part of a property should be charged against depreciation and that the expense of keeping part of the property in adjustment should be considered a repair item or an operating item.

The accompanying table, compiled by Mr. Starrett, showing the rates of annual depreciation of physical property due to age and wear only, was based on his own experience and that of other engineers of other properties. The amounts given by Mr. Starrett to be set aside for depreciation indicated the amounts which, if applied annually, would keep the property continually in a usable condition. If the boiler, for instance, were not superseded for obsolescence it might be used perpetually or for an indefinite period with the application of the percentages of value indicated. The supersession of the machine as a whole or of the renewed machine would occur because of obsolescence or inadequacy. The calculation of an additional percentage for obsolescence or inadequacy was made for the reason that the machine must be replaced through obsolescence or inadequacy despite the continued renewal through the depreciation fund.

Mr. Starrett was asked if he would be safe in setting aside a somewhat lower rate for depreciation and in assuming an interest accumulation to make up the difference. He said that perhaps it could be assumed that some interest would accumulate, but that these renewals would have to be made at varying times during the life of the apparatus and payment made for them from the accumulated reserve; the reserve could not draw interest and provide for renewals at the same time.

In the estimate of the average life of boilers it was considered that replacements would be made practically as

COMPUTATION OF ANNUAL DEPRECIATION DUE TO AGE AND WEAR OF PHYSICAL PROPERTY (OPERATING RAILWAY ONLY) OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, AS MADE BY M. G. STARRETT, USING COST OF REPRODUCTION AS COMPUTED BY PROF. W. D. PENCE.

Items		Reproduction cost	Reproduction cost plus 12 per cent. Items 1 to 9 inclusive	Rate of depreciation	Annual depreciation
1	Land	$597,845	$669,586	0	.....
2	Track	1,236,949	1,385,382	8	$110,830
3	Cars and equipment	2,007,876	2,248,821	6	134,929
4	Electric distributing system	1,063,818	1,191,476	7	83,403
5	Power plant equipment	1,060,615	1,187,889	5	59,394
6	Buildings	878,807	984,264	2	19,685
7	Office furniture and appliances	23,443	26,256	5	1,313
8	Tools, implements and mach'y	285,564	319,831	7	22,388
9	Horses, wagons and miscell	32,410	36,309	5	1,815
10	Stores and supplies	57,630	57,630	0	.....
11	Paving	823,871	823,871	8	65,909
	Totals	$8,068,837	$8,931,315	5.59	$499,668

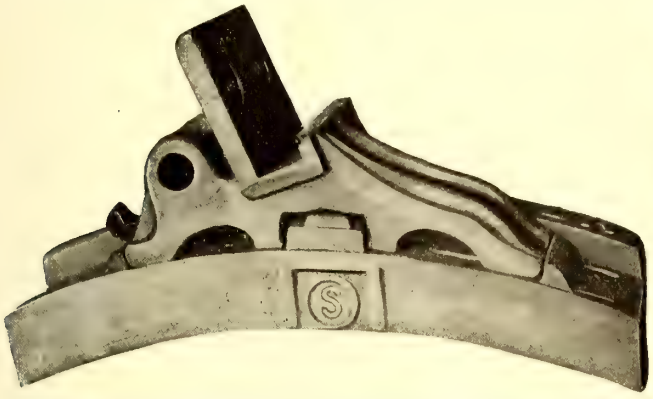
they became necessary. Anything that did not involve the replacement or renewal of parts Mr. Starrett should consider as repairs. If the deterioration or loss of value should be made good through the repair account it would not be necessary to have so much money in the reserve or depreciation account.

Under cross-examination by Mr. Manson, Mr. Starrett reiterated that it was very difficult to assign any definite value in estimating for depreciation due to inadequacy. The value which he placed was an arbitrary one. Some allowance should be made to cover possible errors in estimating the conditions which may arise in the operation of a property, such conditions rendering the apparatus provided insufficient for the purpose. The element of uncertainty as to future conditions should receive some consideration.

Rumors have been current for some time that the Washington, Baltimore & Annapolis Electric Railway, which is equipped with single-phase system, would be changed to direct current. It is understood that the equipment of the company as it now stands was never accepted by the engineers or management of the company and that, in accordance with its contract, the railway company can change to direct current under certain conditions. The officers of the company when interviewed declined to state that the change to direct current had been absolutely decided upon, but they admitted that it was being considered, and that the change might be made in the near future.

BRAKE SHOE PRACTICE ON THE PUBLIC SERVICE RAILWAY

The Public Service Railway Company has the distinction of operating over a larger area than any other electric railway system. It embraces 555 miles of standard gage and 108 miles of 5-ft. gage track, which serve almost every important community in New Jersey. These lines, when



Standard Head and Shoe Used by the Public Service Railway

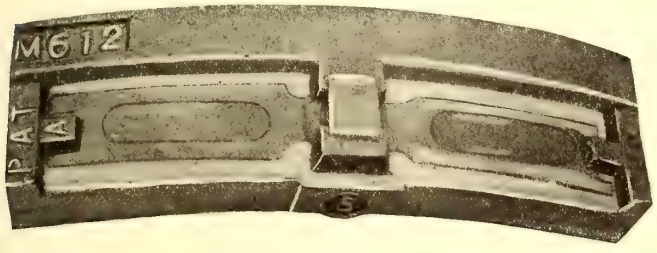
consolidated, had the most diverse practices, but within the last two or three years uniformity has been rapidly attained on that portion of the system including Newark, Jersey City, Elizabeth and Hoboken, the cars of which are maintained at the large Plank Road shops between Jersey City and Newark.

Uniform practice in brake shoes has resulted in reduc-



Standard Shoe, Type M-721, Used by the Public Service Railway

ing the number of patterns applied in these shops from about 20 to 1, except that two other shoes are required for 80 cars with maximum traction trucks. These latter are of the American Brake Shoe & Foundry Company's pattern No. 294 for pony wheels and No. 295 for drivers. The shoe which has been made the standard is the same manufacturer's pattern No. M-721, used in connection with



Standard Shoe for Narrow-Tread Wheels, New Weight 24-lb., Scrap 6 to 8 lb.

the head for both the right and left-hand wheels. This shoe is of soft cast-iron body, with special metal hard inserts, and is reinforced with a steel back and wrought steel lug. Its weight when new is 25 lb., and the average wear is 62 per cent as used on cast-iron wheels. The adoption of this design has reduced the weight of braking metal per equipment about one-half, with no reduction in the service obtained per shoe.

This brake shoe is made for 2½-in. tread, but owing to the conditions imposed by the short wheelbase of this com-



Scrap Brake Shoes at West Hoboken Shop—200 Shoes, Average Weight 9.16 lb. and Average Wear 61.83 Per Cent

pany's cars, it cannot be used with the standard head for narrow-tread shoes, as recommended by the standardization committee of the American Street & Interurban Railway Association. This short wheelbase does not permit room for the standard long head and key. The type M-721 shoe is only 8¾ in. long between end stops, as against the 12⅜ in. of the association standard, and the opening of the keyway in the lug is but ½ in., while the association standard is 13/16 in. This special shoe was designed by Charles Remelius, superintendent of rolling equipment, Public Service Railway.

CONCRETE FENCE POSTS

A report on this subject was presented at the Chicago meeting this week of the American Railway Engineering & Maintenance of Way Association. The committee reported that concrete fence posts are in use to a limited extent in all fields wherein wood posts are used and that they appear sufficiently strong for all practical purposes after being properly cured and set. An abstract of the conclusions of the committee follows:

The claim that concrete posts reinforced with steel form lightning protectors appears reasonable. They will, of course, resist the action of fire and decay. They will not float and cannot be displaced so easily as wood posts. On the other hand, concrete posts must be carefully handled in loading and unloading and well cured before using. Fence wire in contact with their surfaces should be well galvanized. The concrete post is much heavier than the wood post and the cost of distributing and setting is about 25 per cent greater. The committee believes that the concrete post is particularly adapted to railroad use. Most of the post machines are cheap and portable and the materials required are in daily use on all roads employing concrete; the materials are cheap and easily obtained.

There are over 20 manufacturers of posts and post-making machinery in the United States and Canada. A majority of these firms use or advise the use of Portland cement and gravel varying from the size of sand to pebbles which will pass a wire screen having meshes of from ½ in. to 1 in. square. The ratio of cement and gravel is as 1 to 4. The methods of reinforcing and tamping concrete posts vary almost as much as those of fastening the fence wire to the posts. The machines are of various capacities and design—from the one-post hand mold to the "post per minute" power machine with continuous mixer attach-

ment. The average total cubic content of the 7-ft. post is 0.825 cu. ft.; of the 8-ft. post, 0.95 cu. ft. The weights vary from 65 lb. to 95 lb., according to methods of manufacture and reinforcement used. Concrete posts retail for from 25 cents to 35 cents per post. End and gate posts are of about three times the volume and cost of intermediate posts. In section, concrete posts vary from square or rectangular to triangular, half-round and circular. Reinforcements are of wire, wood, strap steel, steel and wire truss, wood and wire truss, chain scrap strips and expanded metal. Fence wire fastenings are also of various forms—from the wire loop around the post to the patent staple encasement. All the posts observed taper from a smaller top to a larger base. Some have very wide concrete block bases.

In response to invitations sent to all manufacturers whose addresses were known in July, 1908, four concrete post-machine firms demonstrated their machines at Bay City, Mich., making 12 reinforced concrete posts each, which posts were tested for tensile strength at the Michigan Agricultural College at Lansing, Mich. Panels were erected to test the holding power of the fence in place as well as give the set posts impact tests and if possible to compare their strength of resistance to impact with wooden posts. They were tested in a machine of large capacity, 42-in. span, both ends supported, load applied in center; and the following results obtained as an average of 7 to 12 posts of each sort so tested:

Name—	First crack	Maximum weight post broken	Deflection in inches
"D"	458 lb.	1090 lb.	0.68
"B"	648 lb.	1071 lb.	0.70
"A"	564 lb.	1020 lb.	0.53
"C"	927 lb.	1356 lb.	0.66

A cedar post of dimensions identical with the average of these concrete posts would weigh about one-fourth as much and be four times as strong. The results in practice show that the wood posts used are much stronger than necessary rather than that concrete posts are not strong enough.

WOOD PRESERVATION*

In the practical execution of wood preservation numerous problems occur, all of which are not yet on a proper basis. Experience has demonstrated that woods vary greatly in their receptibility of preservatives. This is found to be a serious problem in the operation of a timber-preserving plant, and its proper solution is essentially a problem for this committee. Wood needs proper preparation in order to be successfully treated. This preparation often has serious effects on the wood itself. Furthermore, the application of the preservative may itself affect the wood in strength and durability. This brings out the fact that it is necessary to study the wood itself in the course of its preservation.

The work of the committee so far has fully determined that many facts are known, but these facts have not been compiled or brought together in the form to be most useful. There are a great number of statements given out as facts which are not proved. The committee, in its first year, recognizing the responsibility which rests with it and feeling that the work of its first year should be primarily an analysis, refrains in general from presenting matter to the association for positive action, excepting in a few minor cases. The report, therefore, in general contains facts, statements and analyses for the foundation of future work.

STATISTICS

Thirty-nine members of this association were selected who were likely to possess information. The committee was extremely fortunate, receiving 36 answers. The detailed reports have been filed in the association office and are open for reference.

(1) Creosoting may be relied upon to preserve piles from 20 to 25 or more years if they are injected with 16 lb. to 24 lb. per cubic foot.

(2) Creosoting at present cannot be relied upon to preserve ties more than 15½ years to 19 years, an absolute maximum, unless the ties are protected against mechanical destruction. If badly injected, they perish from decay in 5 years to 12 years.

(3) Burnettizing when well done can be relied upon to preserve ties from 10 years to 14 years. The amount to be injected varies with the proposed subsequent exposure. In arid climates ¼ lb. of dry zinc chloride per cubic foot may give good results. In moist and warm climates not less than ½ lb. per cubic foot should be injected. There are great differences in the thoroughness with which the work can be done. See also in Appendix B the difference between good and bad work.

(4) The zinc-creosote process has been too recently introduced (1904) in this country to give definite conclusions; it has given ties a life of 12 years to 18 years in the track in Germany.

(5) The Rueping and the Lowry processes are too recent to form definite opinions as to the resulting life of ties.

(6) Great waste and disappointment will result unless accurate records are kept, for 10 years at least, of the results in the track, connecting them with the way in which the work has been done. The best method of identification is by dating nails.

(7) It is indicated by the statistics given that a treated tie or timber may be destroyed by mechanical action long before it is decayed. The present general American method of rail fastening is not ample and not efficient. It is essential in order to obtain the full economic life of a preserved tie to improve the fastening by providing greater bearing surface and by the use of screws or screw spikes.

PRESERVATIVES

The work on preservatives is necessarily progressive. The committee does not wish to present at this time a detailed study of preservatives in general. It was determined to limit the work this year to coal-tar creosote and chloride of zinc, which are now being commonly used.

The increasing demand for coal-tar creosote has shown the necessity for the adoption of some standard specification. At the present time a considerable number of different specifications for this substance are in use (see Vol. 9, p. 740, of the Proceedings).

The chief requisite for a successful coal-tar creosote, i. e., one which shall preserve wood for an indefinite period of time, should be that the oil be composed of compounds which, because of their high-boiling points, will guarantee the greatest possible stability. With this end in view the following specification is recommended (see Appendix F, report of tie committee, Vol. 9, of the Proceedings). The principal points in connection with this specification are that it leaves out of consideration the question of relative properties of compounds and dwells essentially upon the necessity of obtaining fractions of a high-boiling character, as determined by fractional distillation:

STANDARD SPECIFICATION FOR COAL-TAR CREOSOTE

The oil used shall be the best obtainable grade of coal-tar creosote; that is, it must be a pure product of coal-tar distillation and must be free from admixture of oils, other tars or substances foreign to pure coal tar; it must be completely liquid at 38 deg. C., and must be free from suspended matter; the specific gravity of the oil at 38 deg. C. must be at least 1.03. When distilled according to the common method, that is, using an 8-oz. retort, asbestos covered with standard thermometers, bulb ½ in. above the surface of the oil, the creosote, calculated on the basis of the dry oil, shall give no distillate below 200 deg. C., not more than 5 per cent below 210 deg. C., not more than 25 per cent below 235 deg. C., and the residue above 355 deg. C., if it exceeds 5 per cent in quantity, it must be soft. The oil shall not contain more than 3 per cent water.

The zinc-chloride used shall be as free from any impurities of any kind as is practicable, being slightly basic and free from free acid.

METHODS FOR MEASURING COAL-TAR CREOSOTE

The committee finds that there are a good many different methods in use at the present time for determining the amount of creosote both as received at the treating plants and as absorbed by the timber. These differences relate largely to different temperatures at which oil is measured. This has given rise to a good deal of confusion, and as there appears to be no good reason why there should be so many different standards, the committee recommends that the standard temperature at which oil should be stated as 100 deg. Fahr. At this temperature practically all creosote oils in common use are liquid and can therefore be readily measured.

In view of the fact that coal-tar creosote is used at tem-

*Abstract of committee report presented before the American Railway Engineering & Maintenance of Way Association, Chicago, March 16, 17 and 18, 1909.

peratures other than 100 deg. Fahr., i. e., either above or below 100 deg. Fahr., it is necessary to reduce the volume at any observed temperature to the standard volume at 100 deg. Fahr. The factor which is almost universally in use at the present time for making volume corrections is 1 per cent expansion or contraction in volume for every 22½ deg. In making corrections for volume it is exceedingly important to state a volume at a standard temperature as indicating 100 per cent, i. e., a unit volume.

MEASUREMENT OF COAL-TAR CREOSOTE BY WEIGHT

The measurement of creosote by volume is always subject to more or less variation, owing to errors obtained in measuring large quantities, and in converting volumes as measured at a given temperature to the standard of 100 deg. Fahr. It is suggested, therefore, that wherever possible oil quantities be measured by weight. If desired, the volume can then be determined by ascertaining the specific gravity. That this is perfectly practicable is shown by one of the large oil producers who ships all oil by weight.

The committee has in progress a series of tests of treated timber which are not yet (Nov. 30, 1908) complete, and the work presented at this time is a compilation of available reports on strength of treated timber.

Experiments are under way at Purdue University for the committee on wood preservation to determine the comparative resistance of railway ties, natural and treated, to the action of the rail. These include red oak ties treated by the Lowry process and also by the zinc-chloride process. A further series of tests is arranged for on bridge stringers treated by the Lowry process.

GENERAL PRINCIPLES TO BE OBSERVED IN APPLYING PRESERVATIVES

Certain essentials must be observed to make the application of preservatives successful. First, the timber must be seasoned. It must be known to be of such character that it can be treated in the manner prescribed. Second, the element of heat is vital. Temperatures of the process must not be such as to be injurious to the wood. They must also be such that no change or injury will occur to the preservative itself. It is vital, however, that the temperature of treating be as high as possible, because this will either increase the fluidity of the preservative or tend to open the wood cells, or both. The maximum limiting temperature, however, is about 225 deg. Fahr. It is essential in order to produce economical results in the cost of treatment that tanks, retorts or reservoirs, or whatever vessel in which the timber is treated, be provided with sufficient means of heating, so that the heating may be done quickly and may be easily and surely controlled. Third, in order that there may be minimum cost of application it is necessary to have proper velocity of treatment. This involves the entire design of the apparatus for the application. It must be possible to perform every step quickly and accurately, but at the same time thoroughly. Fourth, it must be possible to apply the preservatives uniformly to all pieces of timber in any one charge; that is, each particular piece must have its full quota; this, too, means that the timber in any one charge must be alike in character so far as its ability to absorb is concerned.

THE PRESSURE PROCESS

The essentials of the apparatus of the process are, of course, the sealed retort and the pressure pump. The particular things which govern the apparatus are:

1. The character of the timber to be treated.
2. The character and amount of the preservatives used and the desired methods of application.
3. The desired capacity per day or per hour.

For refractory woods and heavy preservatives, as creosote, it must be possible to produce a pressure of 175 lb. per square inch to obtain economic velocity of treatment. For light wood a pressure of 75 lb. per square inch may be ample. These pressures, 175 lb. per square inch and 75 lb. per square inch, are in general the upper and lower limits used. If the timber to be treated is limited entirely to refractory woods as the red oaks, it must be possible to obtain the pressure of 175 lb. per square inch. When only light woods, as sap pine, are used, a pressure of 75 lb. per square inch may suffice, as stated.

The more fluid a preservative the more easily it can be injected and the lower will be the desirable pressures. High fluidity is valuable. The higher the amount of preservative to be used per unit of timber, the greater will be the necessary pressure.

In the specifications for treatment adopted by the association it is proposed to steam the ties unless they are thoroughly air seasoned, in which case it may be omitted, at the option of the purchaser. It is to be emphasized, however, that this scheme should at all times be omitted when the ties are thoroughly air seasoned and are to be treated with oils.

In applying preservatives to timber the particular result looked for is cheapness of application, and this application shall be such as to produce the full value of the preservative. There are in general two classes of preservatives used in the pressure process—oils and salts. In general the oils are injected as a whole, the salts being injected in solution.

It is to be emphasized that in the pressure process it is vital that the sealed vessel or retort must be provided with accurate measuring devices both for measuring volumes and temperatures. It must be possible to determine closely the actions within the retort.

The open-tank process is the simplest form for applying a preservative. As its name indicates, it consists in dipping the wood in open tanks or vessels filled with the preservative to be used. It necessarily follows that this is an absorption rather than an injection, of the preserving fluid It also follows that the depth of penetration obtained is small, except for particularly open or porous woods, such as sap pine, where a penetration of 1½ in. has been obtained.

CONCLUSIONS

To state the conclusions of this report in definite form they would be as follows:

(1) Coal-tar creosote and zinc chloride are efficient preservatives when properly applied and when used under proper conditions.

(2) It is necessary to keep better records than have been kept so far in order to form proper conclusions as to the merit of different methods and processes.

(3) Preserved wood may be destroyed by mechanical action long before it is decayed.

(4) The specification as given for coal-tar creosote is good practice and should be adopted.

(5) There should be a standard temperature at which coal-tar creosote is measured. The temperature of 100 deg. Fahr. as given in the report is recommended.

(6) It is essential that timber should be properly grouped in order that a successful treatment may be obtained. The species, proportion of heartwood and sapwood, condition of the timber with respect to its moisture content, and the wood structure, will in general determine this grouping.

(7) It is desirable to air-season timber in order to prepare it for treatment. Most woods can be best treated after being air-seasoned.

APPENDIX, B—PRECAUTIONS TO BE OBSERVED IN BURNETTIZING TIES, SUGGESTED BY OCTAVE CHANUTE

(1) Wood should be well seasoned. The best check on this is the weight per cubic foot previously ascertained for a particular species of wood which takes the treatment well. Some resinous woods, such as Oregon fir, may best be treated when the sap is yet liquid.

(2) Different species of wood or woods taking treatment in different degrees should not be mixed in the same charge. Otherwise irregular injection will result.

(3) If the ties are sawed, lath or iron strap should be put between the layers to give the solution easy access.

(4) When the wood is thoroughly seasoned steaming may be dispensed with and better results obtained.

(5) Steaming, when necessary, should never exceed 20 lb. to the square inch pressure to avoid injuring the fiber. It should be continued from one to three hours, as dictated by the state of seasoning and experience.

(6) Vacuum, when applied prior to injection of preservative, should be 20 in. to 26 in. for one to two hours. It is desirable to measure the amount of sap extracted.

(7) The pressure on the solution, previously heated to 150 deg. Fahr., may be varied with the species of wood

and continue from one to three hours as found best. It should not exceed 200 lb. per square inch.

(8) The strength of the solution, made from chemicals previously tested for purity, should be such as to inject an average of ½ lb. of dry chloride of zinc to the cubic foot. The strength of the solution should be tested for each run.

(9) The amount of solution absorbed is preferably ascertained by weighing each buggy load, both before and after treatment.

(10) Treated ties should dry in close piles, in ordinary weather, 20 to 30 days before being put in track, to insure the best results.

(11) Daily statements should be made of each run and be submitted to the proper authorities.

(12) Accurate records should be kept of the life of the ties in the track for at least 10 years. For this purpose dating nails should be used, and their shape may be varied to distinguish special modes of treatment, etc. It is possible to obtain a result of the life of the ties by placing them in an experimental section of track.

COMMITTEES OF THE AMERICAN STREET & INTERURBAN RAILWAY ENGINEERING ASSOCIATION

Paul Winsor, president of the American Street & Interurban Railway Engineering Association, announces the appointment of the following committees to report on the subjects stated at the next convention:

Power generation committee: Chairman, G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind.; A. S. Byrd, superintendent of power plants, Montreal Street Railway Company, Montreal, Canada; Jas. D. Andrew, superintendent of power stations, Boston Elevated Railway Company, Boston, Mass.; Wm. S. Twining, chief engineer, Philadelphia Rapid Transit Company, Philadelphia, Pa.; William Roberts, superintendent motive power, Northern Ohio Traction & Light Company, Akron, Ohio; F. Heckler, superintendent motive power, Lake Shore Electric Railway, Fremont, Ohio.

Power distribution committee: Chairman, James Heywood, superintendent lines and cables, Philadelphia Rapid Transit Company, Philadelphia, Pa.; G. W. Palmer, electrical engineer, Boston & Northern Street Railway Company, Boston, Mass.; W. J. Harvie, chief engineer, Utica & Mohawk Valley Railway Company, Utica, N. Y.; E. J. Dunne, superintendent of distribution, Public Service Railway Company, Newark, N. J.; S. L. Foster, chief electrician, United Railways of San Francisco, San Francisco, Cal.; W. G. Matthews, superintendent overhead lines, Denver City Tramway Company, Denver, Col.

Equipment committee: Chairman, L. L. Smith, master mechanic, Chicago & Milwaukee Electric Railway Company, Highwood, Ill.; W. H. McAloney, superintendent rolling stock, Denver City Tramway Company, Denver, Col.; M. V. Ayres, electrical engineer, Boston & Worcester Street Railway Company, South Framingham, Mass.; H. A. Benedict, mechanical engineer, United Traction Company, Albany, N. Y.; L. W. Jacques, master mechanic, Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.; J. S. Doyle, superintendent car equipment, Interborough Rapid Transit Company, New York, N. Y.

Way matters committee: Chairman, E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio; J. H. Hanna, chief engineer, Capital Traction Company, Washington, D. C.; J. M. Larned, engineer maintenance of way, Pittsburg Railways Company, Pittsburg, Pa.; M. J. French, engineer maintenance of way, Utica & Mohawk Valley Railway Company, Utica, N. Y.; M. Schreiber, engineer maintenance of way, Public Service Railway Company, Newark, N. J.; G. L. Wilson, engineer maintenance of way, Twin City Rapid Transit Company, Minneapolis, Minn.

Standardization committee: Chairman, W. H. Evans, master mechanic, International Railways Company, Buffalo, N. Y.; G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind.; L. L. Smith, master mechanic, Chicago & Milwaukee Electric Railway Company, Highwood, Ill.; E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio; James Heywood, superintendent lines and cables, Philadelphia Rapid Transit Company, Philadelphia, Pa.; B. Penoyer, chief engineer track and roadway, Schenectady Railway Company, Schenectady, N. Y.; M. J. Kehoe, superintendent of power, Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.; H. H. Adams, superintendent rolling stock and shops, New York City Railway Company, New York, N. Y.; J. Z. Murphy, chief engineer and electrician, Chicago Railway Company, Chicago, Ill.

MEETING OF THE COMMITTEE ON EDUCATION

The committee on education of the American Street & Interurban Railway Association held a meeting in Boston on March 11. There were present Prof. H. H. Norris, of Cornell University (chairman), R. E. Danforth, B. V. Swenson, Prof. A. S. Richey, Worcester Polytechnic Institute, and D. C. Jackson, Massachusetts Institute of Technology. Howard F. Grant, the other member, was prevented from attendance by illness.

The committee held morning and afternoon sessions. Professor Norris reported as a result of the correspondence which he had been conducting that a great deal of interest was being felt in the work of the committee. Mr. Danforth said that the experience he had had with the apprenticeship course recommended by the committee last year had been very satisfactory. He has on the Public Service Railway Company 20 graduate students in electrical engineering from different universities, and so far is very well pleased with the results secured. Other companies have shown an interest in the apprenticeship plan, but so far as is known none has adopted it on so large a scale as has the Public Service Railway Company.

The principal subject discussed by the committee was the establishment of two courses of education, one for graduates of technical colleges who have not had practical experience in electric railway work and one for non-graduates who are already engaged in the work. For the first class of men the committee has in mind an apprenticeship course somewhat similar to that now conducted by the Public Service Railway Company, which is a modification of that suggested by Professor Norris at the Atlantic City convention in 1907. For the other class the committee is considering the possibilities of establishing a correspondence course something like that conducted by the Gas Institute. With the correspondence course in the latter body a course in self-education is outlined by the institute and periodical examinations on questions applying to apparatus in use in the manufacture of gas are conducted. The answers to these questions are sent by the students to the institute, where they are corrected and returned to the students and the men are graded according to the ability shown in their replies. It was suggested that some modification of this plan might be adopted for the electric railway industry, but no definite decision was reached by the committee.

PAY-WITHIN CARS IN PHILADELPHIA

For a number of years past the management of the Philadelphia Rapid Transit Company has been making a very careful study of all of the phases of car design with a view of developing a standard type of car which would be best suited to the peculiar operating and traffic conditions in Philadelphia. Up to the time of the opening of the Market Street elevated and subway, about a year ago, all of the transportation lines in Philadelphia ran upon the city streets. The subway and elevated have relieved the con-

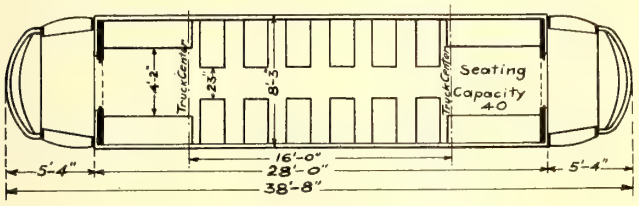


Fig. 1—Floor Plan of Standard Double-Truck Car in Philadelphia

ditions on Market Street, which is the principal east and west thoroughfare, to a great extent, but the north and south sections of Philadelphia and a large part of the area of the western section of the city which is not directly contiguous to the Market Street elevated line is still served only by surface cars. Philadelphia has a population of 1,500,000 and covers an area of 129 sq. miles. It is essentially a city of homes and is spread over a large area of comparatively thinly populated territory. The business district, however, is quite compact and occupies the site of old Philadelphia, which was built with very narrow streets. Many of the streets are so narrow that they can accommodate only a single track and cars are operated on the loop plan, running east or north on one street and west or south on the adjoining parallel street. This involves a large number of intersecting track crossings and sharp curves where the lines turn at right angles in the center of the congested district. Like every other large city, the traffic congestion during the morning and evening rush hours is very severe. The situation in Philadelphia is further complicated by the fact that there are many long-haul passengers who take the surface cars running out into the suburban towns. Cars suitable for this service must be rather more comfortable than the cars intended for strictly short-haul busi-

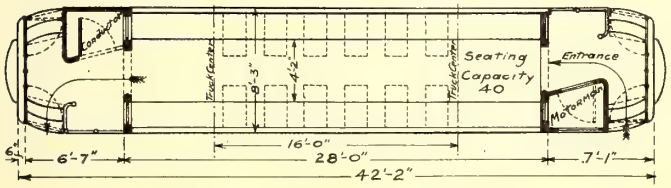


Fig. 2—Floor Plan of Double End Pay-As-You-Leave Car, Designed by W. S. Twining

ness and they must be equipped electrically to make higher speed on the outlying portion of the various lines.

When the Philadelphia Rapid Transit Company was formed in 1902 to take over the Union Traction Company and other independent traction companies it acquired with its leases a large number of small cars of many varying types and equipped with widely different types of motors, trucks and control apparatus. All new cars which have been built since the formation of the Rapid Transit Company have been built according to the accompanying plan, Fig. 1. These cars are intended for double-end operation, are 28 ft. long over bodies and 38 ft. 8 in. long over bumpers. They are mounted on double trucks with 16-ft. truck centers and have six cross seats on each side of the aisle in the center and a longitudinal seat on each side of the center at the ends. The total seating capacity is 40. The cars are of the semi-convertible type and are used for both summer and winter operation. The company now operates cars of this general type on all of its principal lines. The newest of these cars are equipped with four 40-hp motors, as on many of the outlying lines severe grades are encountered and fairly high speeds are necessary to maintain a reasonable schedule.

The problem before the company in designing a new standard car involved consideration of the fact that 800 of these old standard double-truck cars were in service, and any design for a new standard type of car, which could be generally adopted by the company, must necessarily be of such a type and dimensions as to make it possible to rebuild the old cars so as to conform with the general arrangement of the new standard, at an expense which would not be prohibitive. Another fundamental requirement was the adoption of some improved method of fare collection. The collection of all of the fares was practically impossible on a crowded trip of a standard car of the old type. These cars are entered at both ends and there is always extreme congestion near the doors and on the rear platforms. If the passengers stood in the narrow aisle between the cross seats of the center of the car it was difficult for the conductor to pass from one end of the car to the other. The difficulty of collecting fares is, of course, present in the

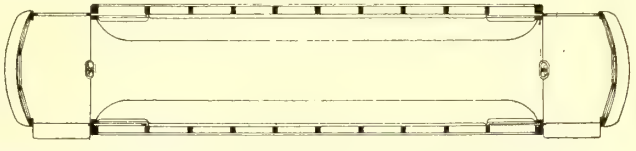


Fig. 3—Floor Plan of Pay-Within Car Remodeled from Standard Double-Truck Car, Shown in Fig. 1

operation of any car in which passengers are allowed to enter at both ends. The prepayment plan, as developed on the pay-as-you-enter cars in Montreal, Chicago, Buffalo and New York, was very carefully studied with a view of its possible adoption. W. S. Twining, chief engineer of the Philadelphia Rapid Transit Company, who was engaged in the study of this problem in conjunction with the mechanical and operating departments, developed a so-called pay-as-you-leave car. This plan also was closely studied. Certain objections were raised to both schemes, however.

Most of the car houses in Philadelphia are entered by a transfer table. The spacing of the columns on each side of the transfer-table pit is such that a car longer than 40 ft. over all cannot be accommodated on the table. Any scheme, therefore, which would require lengthening cars to more than 40 ft. would have involved practically the complete reconstruction of most of the company's car houses. Even fractional increases in length would have greatly reduced the storage capacity of the car houses and, furthermore, nearly all of the special track work downtown in the congested districts would have to be replaced with new special work designed to accommodate longer cars. The cost of this would have been almost prohibitive, and even if it was done, the operation of cars of much greater length than 38 ft. 8 in. over all would have been dangerous in rounding the curves in many of the narrow streets downtown. It will be noted from the plan of the old double-truck standard car that the truck centers are only 16 ft. apart. In order to lengthen the platforms of the old cars

the underframes would have required strengthening and the distance between truck centers would have had to be lengthened correspondingly in order to make the cars ride satisfactorily. This would have involved practically the entire reconstruction of the car body and would have been a very expensive operation.

The pay-as-you-leave car designed by Mr. Twining for double-end operation, shown in Fig. 2, was intended to be converted from the company's standard double-truck car. The body length distance between truck centers and the seating capacity is unchanged. The length of the platforms, however, was increased to 7 ft. 1 in., making the over-all length of the car 42 ft. 2 in. In this car the entrance was on the front end only and the exit was on the rear, passengers paying their fares to the conductor, who stood on the rear platform, as they left the car. The principal objections to this car were the increased length of platforms, the possible difficulty of collecting the fares from passengers who had already arrived at their destination and the position of the motorman on the front platform. As will be seen from Fig. 2, the motorman is enclosed in a cab placed on the outside edge of the front platform against the car-body bulkhead. From this position it is practically impossible for him to observe obstacles which may foul the car on the inside next to the dummy strip.

From the foregoing it will be seen that the Philadelphia Rapid Transit Company had given close attention to all of the developments in improved methods of fare collection and in car design. None of the plans proposed up to the fall of 1907 met with the views of the company's management and efforts were renewed to design a car which would be satisfactory in every respect and which would embody a plan by which the company's standard cars could be rebuilt and converted at a small expense. The outcome of this last effort to design a satisfactory type of car was the pay-within car, which embodied not only the prepayment plan of fare collection and a fixed position for the conductor, but also the use of pneumatically operated sliding doors and folding steps which were designed to prevent boarding and alighting accidents. This type of car has already been fully described in the Electric Railway Journal of Sept. 26, 1908. It will not be necessary here to enter into a technical description of the operating mechanism of the car, as the purpose of this article is to present the reasons for its adoption and the history of its success in operation to date. The plan of the car is reproduced in Fig. 3.

Briefly its principal features are as follows: Entrance is from the rear platform only and exit from the front platform or in emergencies past the left side of the conductor to the rear platform. There is no bulkhead in either end of the car body, the entrance from the platforms being entirely unrestricted except for a center post on the rear platform, against which the conductor stands facing to the rear. In the top of this post are the operating valves for controlling the movement of the doors and step of the rear platform. The door and step of the front platform are controlled by an air valve operated by the motorman and mounted alongside the brake valve. The position of the conductor standing on the raised floor of the car body and facing to the rear is such that he has a commanding view of the platform and rear steps. Grab handles are placed on each side of the doorway and around the vestibule and on the conductor's stand. Entering passengers pass to the conductor's right and pay their fares as they enter the body of the car, receiving transfers or exchange tickets only at the time of paying the fare. The conductor does not leave his post except in emergencies. The entrance and exit openings of the rear and forward platforms respectively are closed by pneumatically operated sliding doors which move back into pockets formed in the sides of the car body. The platform step is interlocked with the sliding door and when the door is closed the step is folded up against the platform sill, leaving absolutely no foothold for a person attempting to enter the car after the doors are closed. The bumper beams have been sheathed with sloping sheet steel covers so that there is no possible place for persons to ride on the outside of the car.

In rebuilding old cars in Philadelphia for pay-within operation no important structural changes were necessary in either the body or platforms. The end bulkheads were entirely removed, sliding-door pockets were built inside the walls of the car at each end and the platform floors were widened slightly so that their outer edges were parallel with the sides of the car body instead of tapering inward toward the bumpers. The fixed steps were removed and for single-end cars the inner side of the platform was permanently enclosed with a fixed glazed panel. Cars for double-end operation have sliding doors and folding steps on both sides of each platform and a stanchion containing the operating valves at each end of the car. Operating valves for the motorman are also put in at each end beside the brake valves.

The pay-within car was finally perfected in the summer of 1908 and orders were given by the Philadelphia Rapid Transit Company to rebuild 50 of its old standard cars at the works of The J. G. Brill Company and in the company's own shops. By the last of September enough cars had been rebuilt to equip one line and on Sunday, Sept. 27, operation was begun with a complete equipment of 36 cars on the Twelfth & Sixteenth Street line. Within three weeks after the cars were first put in service on this line the board of directors was so well satisfied with the results obtained that it authorized the rebuilding of 300 more cars, making a total of 350. Up to Feb. 4 150 cars had been rebuilt and the remainder of the number authorized were being turned out by the Brill works at the rate of two cars a day. As soon as the spring rush is over in the company's own shops the reconstruction will be carried on there. Late in the year the South Nineteenth & Twentieth Street line was equipped with 20 cars and on Jan. 18, 1909, the South Seventeenth & Eighteenth Street line was opened with 22 cars. The Darby line was partly equipped with 21 cars on Jan. 31 and on Feb. 15 the Baltimore Avenue line was changed, 18 cars being put on. Other lines are to follow as fast as cars are rebuilt. The schedules on all lines in the city require a maximum of 548 cars operated single end and 219 cars operated double end. By the beginning of next winter the company hopes to have every box car on the system, both of the standard double-truck type and the single-truck type, converted for pay-within operation. Plans are being made to rebuild the single-truck cars, many of which are not equipped with air brakes, along lines which will retain all of the essential features of the pay-within scheme as now applied to the double-truck cars which have air brakes and pressure available for operating the sliding doors and folding steps.

Before putting the pay-within cars in service the Philadelphia Rapid Transit Company devoted a great deal of time to the thorough instruction of the trainmen to be assigned to them. It did not, however, advertise the change

to the general public in the same widespread manner as was employed in Chicago, Buffalo and other cities where improved fare-collection schemes have been put in use. For a week or 10 days prior to making the change small dodgers describing the pay-within system were hung in the standard cars operating on the line where the pay-within cars were to be installed. These pamphlets contained illustrations of passengers boarding and alighting from the cars, a plan of the car showing entrance and exit doors and an announcement of the new service to be inaugurated. This announcement read as follows:

To Patrons of the Twelfth & Sixteenth Street Line:

Commencing Sunday, Sept. 27, 1908, this company proposes to place in operation a new pay-within car. By the use of this car the company expects to—

1st. Provide a more comfortable car.

2d. Reduce the overcrowding and jostling of passengers.

3d. Insure better ventilation, together with a warmer car in winter and a cooler car in summer.

Patrons are respectfully requested to co-operate in making this car a success—

1st. By entering the car by the rear; leaving by the front end.

Fourth. The rear door and step are to be operated by the conductor only, whether for entrance or exit. The front door is to be operated by the motorman, and for exit only.

Fifth. In order to overcome accidents, the conductor and motorman must not open the doors until the car has come to a full stop. The conductor must not give the starting bell until the rear door is fully closed. The motorman must not start the car until the front door is fully closed.

No car to be operated with either door open.

PAY-WITHIN SYSTEM

It is expected by the use of this system that many vexing troubles will be entirely removed.

First. By the use of the "Pay-Within-Car" accidents caused by the car being started while passengers are in the act of boarding or alighting from the car should be entirely eliminated.

Second. The position of the conductor is such as will insure his having a good clear view of the rear step when it is in a position for passengers to enter, and when the door is closed it will be impossible for any person to get off.

Third. Accidents that occur at the front end from persons attempting to get on a moving car will be entirely overcome, as the front door and step will be in such a position that it is impossible for a person to get on.

Also, the passengers will use the front end for exit only, and while so doing will be directly in view of the motormen, so there should be no further trouble from accidents due to people getting off the car. Motormen must not permit passengers to board car by front platform.

The equipment of the car is such that it should be impossible for an accident to a passenger boarding or leaving.

OVER-CROWDING OF CARS

By the adoption of the "Pay-Within-Car" the management expects to be able to reduce the over-crowding of cars very materially.

It is believed that the position of the conductor is such that he is in absolute control of the loading of a car.

CROWDING OF PASSENGERS WHILE ENTERING OR LEAVING THE CAR

The rear platform will only be occupied by passengers while paying their fares, all others being requested to proceed to the main body of the car or



Pay-Within Car on Market Street, Philadelphia

2d. By having the exact fare ready before boarding car, pay same to conductor and pass at once to the interior of the car.

3d. By waiting for the next car when approaching car is loaded and when so requested by the conductor.

(Signed) CHARLES O. KRUGER,
Second Vice-President and General Manager.

The same form of dodger was used in the cars of the South Nineteenth & Twentieth Street line, the South Seventeenth & Eighteenth Street line and the Darby line prior to changing over with the exception only of addressing the circulars exclusively to the patrons of these lines.

Before putting the cars in service the trainmen were given a special course of instruction lasting three or four days. A book of instructions was prepared, illustrated with engravings made from photographs of the first car built. The text of this book is reproduced here in full:

DESIGN OF CAR

Attention is called to the simplicity of the construction of the car and the method of operation, as follows:

First. Passengers must enter the car by the rear door only.

Second. Passengers may leave by either the front or rear doors, but, in order to improve the service, passengers are to be requested to leave by the front door.

Third. The sliding doors and folding steps are interlocked and operated mechanically. When doors are closed it is impossible for any one to get on or off the car.

through to the front platform, excepting only the last few passengers taken on after the interior of the car is fully loaded.

COLLECTION OF FARES

Fares will be collected while the passengers are on the rear platform and before they enter the main body of the car, except when the conductor is compelled to be absent, due to an accident or other causes.

At the commencement of the "Pay-Within-Car" service a certain amount of discretion must be used by the conductors to guard against delay to traffic or disturbances due to the misunderstanding of the regulations by passengers. We are fully convinced that a large amount of this can be avoided by the conductor securing the co-operation of the passengers with the courteous request, "Please have your fare ready."

TO COMPLAINING PASSENGERS

If the opportunity presents itself, explain that we are endeavoring to improve the service, and that is the reason for the request just made.

When it becomes necessary to allow passengers to enter the interior of the car without paying their fares, the conductor will, as soon as his duties on the rear platform permit, enter the car and collect fares in the usual manner, returning at once to his position at the rear of the car.

HEATING AND VENTILATING

In the older type of cars the platforms have always been open, but with the "Pay-Within-Car" this condition is changed, as the platforms of the car will be closed entirely while the car is in motion, and it is expected that most excellent results will be secured as to ventilation and heating.

COMFORT OF CAR CREW

In the "Pay-Within-Car" it will be readily seen that, with the sides of the platform closed, both the conductor and motorman are removed from exposure to the weather.

VENDERS

The position of the conductor in the rear of the interior of the car, together with the sliding door and the folding step, will insure against a continuance of the practice of boys or others getting on or off cars for the sale of various wares.

No unauthorized persons will be permitted to ride on the car without the payment of a fare.

SMOKING

Smoking will not be permitted on the cars.

ECONOMY OF TIME

The conductors and motormen are all interested in increasing the economy of operation by keeping the cars moving and well spaced upon the street, and this can only be brought about by the entire co-operation of all concerned, and we feel that much good can be accomplished by the hearty co-operation of both the conductors and motormen.

The company is very desirous of supplying the best possible service to its patrons. This includes clean cars, courteous, gentlemanly treatment by the conductors and motormen, frequent service and the co-operation of its patrons.

Mr. Ryan, assistant general superintendent, was put in charge of the training of the men who were to operate the pay-within cars. The crews were given an opportunity of studying the book of special instructions and examining the construction and operation of the cars in the depot car-house. Each crew was then taken separately and given a long and exhaustive drill in its duties under all possible circumstances. The conductors were supplied with iron washers representing coins of various denominations, blank strips of tickets such as are sold six for 25 cents, pads of transfers and 8-cent exchange tickets. They were placed in turn on the car and the other members of the class acted as passengers, boarding and alighting, paying fares in cash



Passengers Boarding and Alighting Simultaneously from Pay-Within Car

and with tickets, demanding transfers and in all other ways testing the ability of the conductor to keep his head, control the movements of the rear platform door and properly collect and register all fares. The motorman was required to go through the motions of stopping and starting the car in response to signals from the conductor and to operate the front exit door whenever any of the "passengers" wished to alight. Each crew was drilled in this manner until it understood perfectly what to do and could handle a rush of "passengers" quickly and accurately. Some of the men took to their new duties very readily and required only a short drill. Others required longer time, but no difficulty has so far been experienced in teaching any of the men their duties in a reasonable time.

The pay-within cars have now been in service five months on the Twelfth Street & Sixteenth Street line, and for shorter periods on other lines. The company has had an opportunity of thoroughly demonstrating the new car's advantages from an operating standpoint over the old type of car. The two most important claims made for the new type of car are that it enables the conductor to collect all fares and that it wholly prevents boarding and alighting accidents.

Receipts on lines equipped with pay-within cars have shown an increase of about 8 per cent over corresponding periods of last year. A severe test of the carrying capacity of these cars and the ability of conductors to collect all of the fares occurred shortly after the new cars were put in service on the Twelfth & Sixteenth Street line. Founders' Week, beginning Oct. 4, was given over in Philadelphia to a celebration which drew large crowds from the surrounding country. A feature of the celebration was a mammoth parade of military and civic bodies. On the day of the parade, which included Broad Street in the line of march, northbound street car traffic was thrown largely on the Sixteenth Street line, which parallels Broad Street, two blocks west. On one half trip northbound the register of a pay-within car showed 276 passengers carried without an accident of any kind. It would have been a physical impossibility for the conductor of this car to have collected all these fares if he had been obliged to move through the car to get fares from passengers boarding at the front end. Another record of a different nature was made by one of the cars of this line early in October in handling a crowd at the base ball park at the end of a game. A load of 89 passengers was taken on and all the fares collected in advance in 1 minute 49 seconds from the time the door was opened until it was closed and the car was started.

The almost unlimited possibilities which this type of car affords in the matter of preventing certain classes of accidents are of equal interest to operating officials. Especially has this proved to be the case in preventing accidents due to the recklessness of passengers in endeavoring to board moving cars, as well as in alighting from cars which are in motion. The cars have proved their value also by practically eliminating the occurrence of accidents due to the premature starting of cars while passengers are in the act either of boarding or of alighting. In connection with this feature it may be noted that all trainmen are carefully instructed to keep both the front and the rear door closed while the car is in motion and under no circumstances to open either door until the car has come to a full and complete stop or to start the car until both doors are fully closed. Under such conditions it will readily be seen that it is practically impossible for any person to either board or to alight from a car after the doors have thus been closed and the car is in motion. An additional safeguard against accidents of this character is afforded by the presence of the conductor in the extreme rear end of the car at all times, from which position he has an unobstructed view of the rear platform, door and step. This is also true of the motorman on the front end of the car. Since the installation of these cars upon the lines of the company, previously enumerated, not only have boarding and alighting accidents been practically eliminated, but to date no accident has occurred in the operation of these cars wherein any passenger, pedestrian or driver has sustained a fractured bone.

The construction of the pneumatic device which controls the opening and closing of the doors, as well as the raising of the step, is such as to preclude the possibility of a door closing or of a step raising while there yet rests upon it any weight whatsoever. This fact of itself, as demonstrated in the actual presence of a number of claimants who appeared at the company's office shortly after the installation of the cars, alleging that they had been thrown by the premature closing of the step while they were in the act of boarding or of alighting, proved unanswerable, and this particular contention has not since been advanced.

It has also been interesting to note that the car has unquestionably assisted in reducing certain other types of accidents, notably collisions between cars, collisions with teams and collisions with pedestrians at or in the immediate vicinity of intersecting streets. In the operation of the ordinary type of car motormen necessarily are obliged to divide their attention between the track ahead of them and the step of their car because of the fact that passengers oftentimes deliberately risk their safety in attempting to climb aboard a car even after it has been started. In the operation of pay-within cars it has been found that immediately upon closing the door after having made the customary stop on the near side of the street, motormen are enabled to give their undivided attention to the track ahead of them. Furthermore, it has been found that where in the past conductors have been annoyed and have had their attention frequently distracted from their duties because of the fact that boys have persisted in riding upon the rear bumpers of cars, thus often being the indirect cause of accidents, this feature has likewise been practically eliminated, for reasons which will readily become apparent upon examination of the construction of the bumpers of the pay-within car. The control stand has been so designed as to provide a convenient grab handle for the use of passengers who have just boarded the car. The top is formed in the shape of a large elliptical ring, which is above the door-operating valve handle and affords protection against accidental movement of the valve as well as providing a hand hold for passengers on the platform. A rod extends downward from this ring on each side to a band around the stand, thus providing additional parts to grasp. Another feature of the new stand is the use of a removable chain to block the exit passageway except in case of emergency, when it may be desired to unload quickly from both ends of the car or to let off an infirm passenger who cannot move to the front door.

For the five days immediately following the opening of the Darby line on Jan. 31 there occurred but a single accident, namely, a collision between a car and a wagon. This line traverses territory which contributes almost all classes of passengers. It starts from Delaware Avenue, where are situated the Camden Ferries, thence out Walnut Street through the congested business district, next through a residential section of the better class and ultimately to the suburbs, passing a considerable number of factories on the way and embracing much territory densely populated by the foreign element. No other line in the city handles so cosmopolitan a class of people or affords so excellent a test of the prevention of accident features of these cars.

There have been a few complaints from passengers relative to the change from cross-seats to longitudinal seats in the pay-within cars. This change was made to increase the carrying capacity about 30 per cent, and at the same time the same seating capacity of 40 has been maintained. The greater comfort of the cross-seats is an appreciable advantage only to long-distance passengers on cars running out into the suburbs, and the company may put them in some of the cars yet to be rebuilt. The greater carrying capacity of the cars with longitudinal seats is a benefit to the general traveling public during the rush hours, and for this reason the company was fully justified in making the change.

The public has shown its approval of the new type of car in many ways. There has been no difficulty in enforcing the rule to enter only at the rear end and leave at the front. Regular passengers on the lines already in operation quickly learned to move forward in the cars on entering, and during rush hours there is more of a crowd in the front end than at the rear. A large illuminated sign under the monitor deck in the center of the car directs passengers to leave the car by the front door, and a sign on the dasher reads, "Pay-within Car. Enter at Rear." The ticket and transfer system in Philadelphia is quite complicated, but the conductors have no difficulty in making odd change, issuing tickets or punching transfers for passengers without delay as they enter. Conductors have to collect cash fares and three kinds of ticket fares, sell six tickets in a strip for 25 cents, sell exchange tickets for 8 cents and issue free transfers which require the line and hour to be punched. Most of the regular passengers on the several lines on which the cars are operated have learned to have the exact fare ready when boarding the car, and this has greatly facilitated the loading during rush hours.

An important advantage to the company and to the traveling public is the ability to keep the cars running close to schedule and prevent overcrowding, with consequent delays. City ordinances require all cars to come to a full stop before crossing an intersecting track. If a pay-within car is behind schedule, the motorman can bring his car to a full stop and proceed immediately on signal without opening the rear door to take on more passengers. After a blockade this saves a great deal of time, as the first car can pick up a load and proceed as rapidly as possible without being delayed further by passengers attempting to board when the car is already overcrowded. Another means of saving time is the fact that the conductor at all times has a clear view of the entrance, and can close the doors immediately after the last waiting passenger has boarded. The conductor is in absolute control of the size of the load, and can prevent excessive overcrowding. As he does not have to move through the car to collect fares, a larger crowd can be handled with more comfort to the passengers than with the old type of car.

The cars can be comfortably heated in winter, owing to the fact that both vestibules are entirely enclosed and the doors are only open while the car is standing still. In summer the glass in the front and rear vestibules can be lowered and the side windows raised, thus creating a draft through the car from end to end.

The trainmen are enthusiastic over the pay-within cars for a number of reasons. Both the conductor and motorman are completely enclosed from inclement weather. The motorman is relieved of anxiety about watching the front steps to prevent passengers from jumping off before the car has stopped. The conductor is also relieved from worry about preventing accidents on the rear platform, and his duties can be accomplished with much less physical effort than formerly.

Briefly, the advantages of the new type of car, as demonstrated in Philadelphia, can be summarized from three viewpoints—advantages to the company, to the public and to the trainmen.

The advantages to the company are:

(1) Boarding and alighting accidents are eliminated.

(2) Fare prepayment plan is simple and convenient, and insures conductor securing a fare from every passenger who boards the car.

(3) Standard cars can be converted at small expense without changing the structural parts of the car, lengthening the platforms or car body or increasing the weight.

(4) Removal of end bulkheads increases standing capacity 30 per cent without decreasing seating capacity.

(5) Cars can be kept close to schedule.

The advantages to the public are:

(1) Possibility of accident reduced.

(2) Greater comfort of seated and standing passengers, as conductor does not move through car to collect fares.

(3) Cars are better heated in winter and better ventilated in summer.

(4) Schedules can be maintained and greater carrying capacity means better service with more comfort.

The advantages to the trainmen are:

(1) Less danger of accidents.

(2) Greater comfort due to complete protection in inclement weather.

(3) Less physical labor to collect fares.

From the foregoing it will be seen that the Philadelphia Rapid Transit Company has adopted a type of car which offers many advantages over the old standard car. It has solved many of the problems of operation and has met with general approval from the public.

TWENTY-FIFTH ANNIVERSARY OF THE A. I. E. E.

On March 11 the American Institute of Electrical Engineers celebrated the twenty-fifth anniversary of its establishment in 1884 by a banquet at the Hotel Astor at which a number of the past-presidents and charter members were present. In all there are 21 charter members living and those present at the dinner were: Charles L. Clarke, George A. Hamilton, C. O. Mailloux, T. Commerford Martin, Jesse M. Smith, Elihu Thomson and Elmer A. Sperry. In addition letters of congratulation were also received from Alexander Graham Bell, Charles F. Brush and Thomas A. Edison, who also are charter members. Louis A. Ferguson, president, presided and the speakers were: Jesse M. Smith, American Society of Mechanical Engineers; Prof. Elihu Thomson, past-president, A. I. E. E.; Frank J. Sprague, past-president, A. I. E. E., and Dr. A. C. Humphreys, president, Stevens Institute of Technology.

A feature of the dinner was the presentation to T. Commerford Martin, editor of the *Electrical World*, senior past-president, of a handsome silver loving cup from the other past-presidents. The cup bears on one side the following inscription: "In appreciation of 25 years of unselfish devotion to the best interests of the institute and the advancement of the electric arts." The other side bears the names of the donors, the 15 past-presidents and Mr. Ferguson. The presentation was made by Mr. Sprague at the close of his address, in which he referred to the important work which has been accomplished by Mr. Martin for the institute and for the electrical industry, and the esteem in which he is held by all those engaged in it.



Loving Cup Presented to T. Commerford Martin

BLOCK SIGNALS IN HARRISBURG, PA.

Within the last few months the Central Pennsylvania Traction Company, of which F. B. Musser is president, has commenced equipping its single-track lines with Eureka automatic block signals, after extensive experiments since the early part of 1905 with signals of several types. The general supervision of the original signals was under P. Frank Gerhart, C. E., chief electrician of the company, who, with the aid of his assistants, began a systematic and exhaustive study of the merits of the several installations.

These men followed up the tests with considerable enthusiasm, and soon discovered the strong as well as the weak points of the several signals installed. This led them to conceive certain fixed ideas regarding the construction and functions which an ideal, overhead-operated automatic signal should include. They early concluded that the signals should be of the semaphore type of ample size to be visible at good distances. They believed that the signal should indicate whether the block was occupied or unoccupied, and that when occupied it should show the direction of car movement in the block. The operating conditions dictated that the semaphores at each end of the block should normally be at danger when the section of track guarded is unoccupied by cars, and that, upon a car entering the block, the semaphore at the end entered should go to safety, while the one at the distant end should be locked at danger. This latter condition should hold as long as a car remains in the block, to make certain that when a block is being taken there is a danger signal at the distant end, despite failure of mechanism, interruption of power, broken wires or overrunning of danger signals by cars moving in the opposite direction. Intermediate signals should be placed within the block to indicate danger should cars enter the block against the semaphores held at danger. When the danger signals have been locked at danger the system should permit any number of cars to follow the first through the block, each succeeding car being given a visual signal of operation.

Other features called for were the following: Permit cars to set the proper danger signal upon entering the block from either track of siding or double main line, and to set them to safety upon leaving the block at either end on up or down track. Cars overrunning the danger signals, whether through carelessness or inability to stop, should be enabled to back out of the block without deranging the danger signals. When cars attempt to take the block at opposite ends at the same moment, the right-of-way should be given a predetermined car.

When the Central Pennsylvania Traction Company decided to equip its single-track lines with automatic signals, Mr. Gerhart's specifications, as covered by the second and third paragraphs, were submitted to the Eureka Automatic Electric Signal Company. The signals of this company installed in 1905 were found to embody nearly all of the functions specified, and had proved themselves durable, safe and generally satisfactory. The signal company thereupon modified its well-known No. 2 controller by additional parts fully to meet Mr. Gerhart's specifications. The principal feature it lacked before modification was the ability to hold the danger signals against overrunning cars. Six or seven sets of these signals, as modified, were installed by the Central Pennsylvania Traction Company in the latter part of 1907 and the beginning of 1908. They were found so satisfactory that the company has now adopted the Eureka signals as its standard apparatus.

The Valley Traction Company, entering Harrisburg from the Cumberland Valley, having learned of the very satisfactory operation of these signals, installed six sets of the same kind in 1908, and is now adding several more sets.

In equipping its single-track railways with automatic signals, the Central Pennsylvania Traction Company has specified an additional modification of the Eureka outfit to cover a device to predetermine preference of right-of-way when cars simultaneously attempt to take a block at the opposite ends. The signal company has developed such device as a part of its controller, or installed as a separate unit;

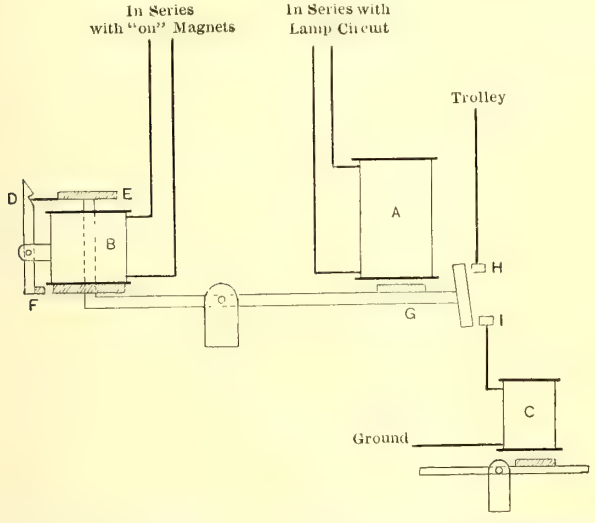


Diagram of Signal Connections Used in Harrisburg

but a similar device worked out under the direction of Mr. Gerhart by his assistants, D. B. Moist and C. W. Young, will be used.

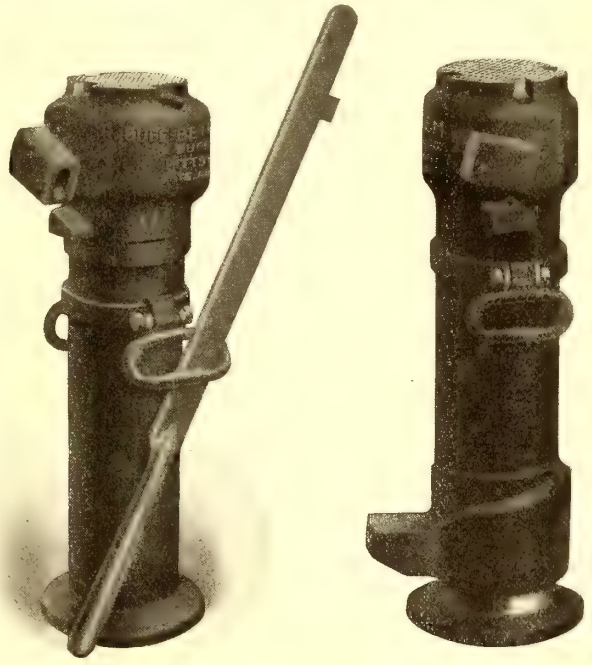
Ordinarily, when two cars get in the contact makers at opposite ends of the block at the same time both controllers operate to throw the lamp circuit into connection with the trolley current. As this simultaneous action opens the ground connections at both ends, the lamps will not burn, the result being that neither car obtains the right to proceed. The Harrisburg device to overcome this effect is installed at one controller only. Its object is to remove one trolley connection and to establish a ground, which sets the danger signal to one car and allows the other one to proceed. This operation may be explained as follows in connection with the diagram:

The car at the end where the attachment is installed allows current to pass through the magnet *B* when it enters the contact maker, thereby attracting armature *E* at the top and armature *F* at the bottom. Armature *F* releases latch *D* and keeps it released until the car clears the contact maker. In the ordinary operation the lamp circuit lights up before the car leaves the contact maker, sending current through magnet *A*, which holds its armature *G* and does not allow the grounding contacts *H* and *I* to be closed; but in case a car strikes the contact maker at the opposite end of the block at the same time, the lamps do not light up, thus allowing the contacts *H* and *I* to close and the magnet *C* to be energized. Magnet *C*, by a mechanical connection of its armature to the controller switches, opens a feed and closes a ground connection to the lamp circuit. The lamps light up and display the proper signal for one car to proceed and the other one to back out and wait. As soon as the lamp circuit is established magnet *A* opens contacts *H* and *I*, and also allows latch *D* to re-engage, so that *H* and *I* will not be closed again until the next time two cars strike the contact makers at the same time. This attachment was installed in a block in which a large number of extra cars passed through. Previous to its installation there were one or two reports a week that the signal had failed to respond because cars attempted to enter the block at the opposite ends at the same time. Since the installation of this method, or one year of service, no signals have failed on this account.

The foregoing casts an interesting light on Eureka signals which have been developed in the service of prominent railways. The instructive suggestions of the Central Pennsylvania Traction Company, of M. C. Brush, vice-president and general manager of the Newton Street Railway Company, Newtonville, Mass., of the officials of The American Railways Company and other electric railways, have all helped to bring these signals to their present state of reliability.

NEW FORGED STEEL HYDRAULIC JACKS

The Duff Manufacturing Company, Pittsburg, Pa., manufacturer of the Barrett jacks and Duff ball-bearing screw jacks, has put on the market the Duff-Bethlehem hydraulic jacks, which are forged entirely of steel. Patents covering their special features and construction have been allowed the Bethlehem Steel Company, which does the special forging necessary, but the sales are handled exclusively by the Duff Manufacturing Company. Owing to their forged steel construction, these jacks are unusually durable, yet weigh from 30 per cent to 60 per cent less than other hydraulic jacks of equal capacity and stroke. As the cylinder of the forged steel jacks has its bottom forged integrally with the shell, the troublesome feature of packing the



Forged Steel Hydraulic Jacks

bottom of the cylinder is entirely eliminated. Another packing that has been dispensed with is that for insuring closure of the ram piston from the pump socket. The new jack has a solid ram bottom forged integrally with the pump socket. There are practically only two small packings in the entire jack, and as joints are also avoided, there is neither leakage nor expense for packing renewals.

By the improved construction and location of valves, the

new jacks are capable of extending their full length in a vertical, horizontal or inclined position, without any adjustment whatever, and all sizes will operate at any angle. Any parts may be easily replaced if necessary, without special tools. The valves may be attended to without removing the packing and the packing can be replaced without removing the valves. The valves are absolutely positive, and require no special adjustments or parts to insure their operating under all conditions. The load may be tripped or may be lowered as slowly as desired, or stopped at any point when lowering.

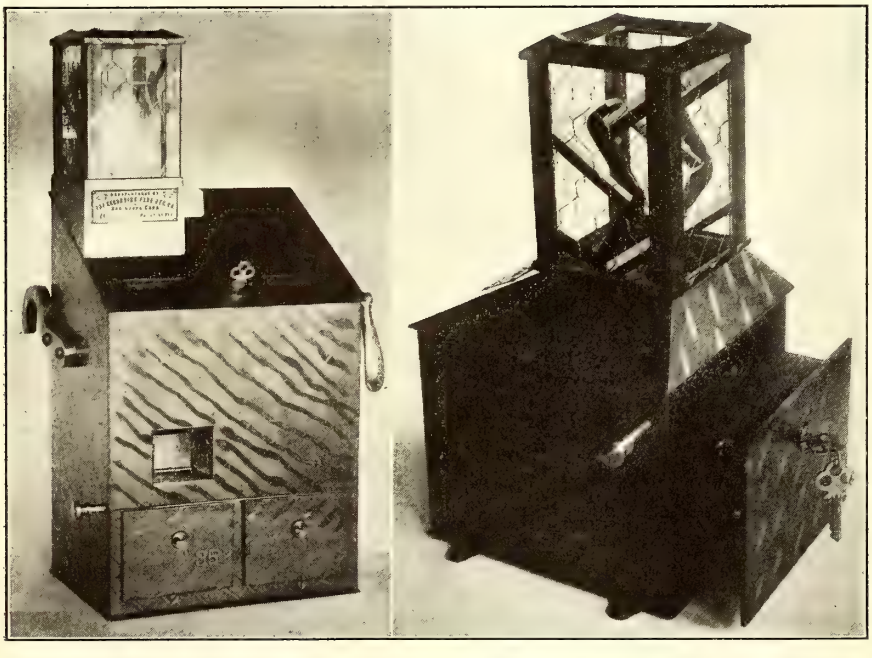
These jacks are constructed of open hearth fluid compressed forged steel and bronze, and their inside working parts are drop forgings. They are made in all types and capacities adapted to railway and general lifting purposes. The lower telescope type is fitted with an improved duplex pump, automatically regulating the change of speed in proportion to the load being lifted. They are made regularly with capacities ranging from 30 tons to 300 tons, and higher capacities if required.

RECORDING TYPE FARE BOXES FOR PREPAYMENT CARS

The Recording Fare Register Company, New Haven, Conn., has recently placed on the market three types of fare boxes for prepayment cars. Style No. 1 weighs about 40 lb. and is provided with two hooks to slip over the rail on the platform. It is supported by a pipe stand and operated by a foot lever in connection therewith. Nickels dropped in the wired glass receptacle on the top are let into the machine by the movement of the lever, recorded on the automatic register on the left and then fall into an open-top drawer on the right, where they are available for change. Cents and dimes dropped in the receptacle are recorded on a permissive register on the right of the machine and are again exposed to view before passing into a top drawer on the left, which is self-closing and intended only for opening in the cashier's office. This drawer also takes care of any overflow nickels should the conductor fail to properly register fares at any time. There also is a device on the right side of the machine to clear away and pass mutilated coins into the overflow. A novel feature is the automatic register, which cannot be operated except by the actual presence of coin in the machine. Without the coin the lever may be operated any number of times without affecting the register.

The strongest point made for this style of box is the fact that all nickels after being registered are available for making change. This obviates the necessity of supplying each conductor with $10 to $25 of small coin. At the same time the conductor has no access to any money which for any reason is not tallied on the automatic register.

Style No. 2 has a wired glass receptacle for receiving the coins which drop onto a shutter. After inspection by the conductor, pressure on a thumb button drops the coins into the cash drawer. The latter locks automatically when removed from machine, thus making it impossible for any but the authorized agent to gain access to the cash. Style No. 3 is similar to No. 2 except that it contains a hand register. The money is dropped by the passenger into a wired glass receptacle. After the coins are inspected by the conductor the operation of the lever registers and opens the shutter, causing the money to drop into the cash drawer. The three types of fare boxes are made of heavy sheet brass finished in antique copper with strong and durable mechanism.



No. 1 Recording Fare Box No. 2 Recording Fare Box

SINGLE-PHASE MOTORS FOR INDUSTRIAL PURPOSES

The continued increase in single-phase railway lines has brought forward the possibility of using single-phase motors in the shops of such roads and for factory and arm installations along the railways. As the Wagner Electric Manufacturing Company, of St. Louis, has specialized in this field for some 15 years, it may be of interest to present the following details of its single-phase motors and their operating characteristics.

The Wagner single-phase motor is of the induction type, with a commutator mounted on the rotor shaft and connected to the rotor winding. Starting with the machine at rest, brushes in pairs, cross-connected through a low-resistance conductor, bear upon the commutator, temporarily short-circuiting the rotor winding and developing a very powerful starting torque on the "repulsion" principle. On attaining full-load speed the individual segments of the commutator are all positively connected by the operation of an automatic centrifugal governor, thereby transforming the rotor winding to the squirrel-cage form. The motor then continues as an induction type machine. At the same time the governor removes the brushes from contact with the commutator to save wear.

No harm can be done this motor by sudden interruptions or by suddenly reestablishing the circuit at any stage of the cycle of its operation without the intermediary of resistance. If the power service should fail the motor returns to the starting condition and picks up its load when the power comes on again, without the assistance or attention of the operator.

The greatest difficulty in the use of a.c. motors upon lighting circuits is in the disturbance produced at the moment of starting. Polyphase motors of the squirrel-cage type take from three to eight times normal current at the

instant of starting, when full normal torque is required. If this starting current is at low-power factor considerable disturbance will result unless the feeder and transformers are both of ample capacity. In Fig. 1 are reproduced curves showing the ratio of starting current to start-

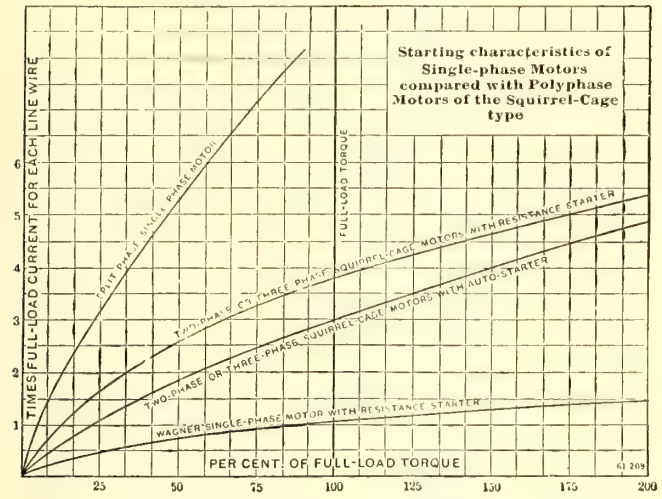


Fig. 1—Curves Showing Ratio of Starting Current to Starting Torque

ing torque for various types of a.c. motors. It will be noted that the best results in the matter of starting efficiency and line disturbance were obtained with the single-phase type and that full normal torque may be obtained at approximately full-load current.

It is asserted that for a given torque these single-phase motors cause less disturbance to the one-phase from which the entire power is taken than do the usual polyphase motor to every phase. The actual currents per line wire for full-load torque in motors wound for 220 volts is shown in the following table:

	—Amperes per line wire—			
	5 hp	7.5 hp	10 hp	15 hp
Three-phase squirrel-cage with auto-starter	54	80	105	140
Two-phase squirrel-cage with auto-starter	50	75	98	132
Single-phase without starting box	45	68	90	125
Single-phase with starting box	33	50	65	90

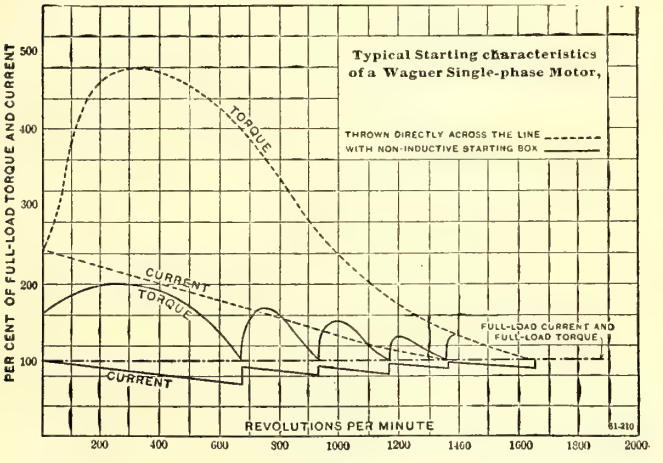


Fig. 2—Torque and Starting Current of Single-Phase Motor

From this tabulation it will be seen that the starting currents required for single-phase motors without a starter are favorable as compared with polyphase motors and that when a starter is employed the advantage of less line disturbance is in favor of the single-phase type.

Fig. 2 shows the torque and current of a single-phase motor with and without a starting box. It will be noted that the maximum current of two and one-half times normal is obtained only at the instant of starting and that it falls off rapidly to normal at full-load speed (or less if the motors are underloaded). The time required under usual conditions for the motor to attain full speed is from 8 to 12 seconds. Motors may therefore be fused for full protection without danger of blowing at starting. The maximum torque is exerted at about 15 per cent of normal speed, descending in an easy ratio to full normal torque at normal speed. The full line, indicating torque obtained

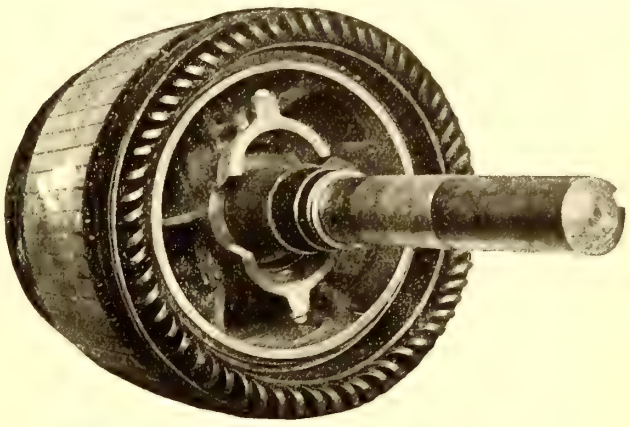
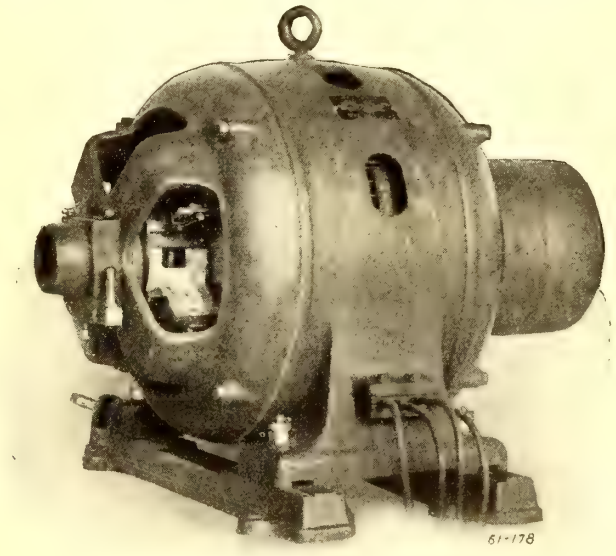


Fig. 3—Armature of Single-Phase Motor

when a starting box is employed, may naturally be varied according to the requirements by advancing the starting arm more or less rapidly.

These single-phase motors are furnished for all frequencies from 25 to 140 cycles and in various sizes from ¼-hp to 40-hp capacity. The variable speed design differs



Single-Phase Industrial Motor

from the constant speed motor, principally, in that it has a commutator of the horizontal type, which remains in service all the time. As the torque of alternating motors varies directly as the square of the applied pressure, wide speed variation may be obtained by varying the voltages applied at the motor terminals.

Owing to a contest between the supporters of rival bills for a public-service commission in New Jersey, it is predicted that neither bill will pass the present Legislature.

EXHIBIT OF RAILWAY APPLIANCES AT CHICAGO

In connection with the annual convention of the American Railway Engineering & Maintenance of Way Association, held in Chicago this week, a large exhibit of appliances used in the construction, maintenance and operation of steam and electric railways was displayed in the Coliseum. Among the exhibitors were the following, who make apparatus used by electric railways:

The Adams & Westlake Company, Chicago, Philadelphia, New York: Signal lamps, lanterns, railway specialties. Represented by W. H. Baldwin, assistant general manager; G. L. Walters, railroad sales manager; H. G. Turney, A. S. Anderson, C. B. Carson, W. J. Piersen.

American Asphaltum & Rubber Company, 219 to 227 Woman's Temple, Chicago: Model tunnels, reservoirs, floors, platforms and bridges showing water-proofing process, roofings and railway paints. Represented by Harry N. Fox, advertising manager; N. S. Kidder, Harry E. Fox, W. R. Trasher and J. Y. Hill.

American Steel & Wire Company, Chicago: Right of way fences, rail bonds, triangle mesh concrete reinforcements. Represented by R. S. Knight, C. D. Sturdevant, B. H. Ryder, R. Stanley Green and B. B. Ayres.

Barrett Manufacturing Company: Bridge water-proofing with bituminous binder protection; floor construction particularly adapted for repair shops and freight houses. Represented by W. S. Babcock, L. P. Sibley, H. B. Nichols, C. T. Bilyea.

Bausch & Lomb Optical Company, Rochester, N. Y.: Transits, wye levels, architects' levels, precise levels, dumpy levels, alidades, plane tables, theodolites, etc. Represented by L. M. Potter, sales manager; W. Louis Johnson, F. M. Storr, H. D. Skelton and Wm. E. Zeller.

Beaver Dam Malleable Iron Company, Beaver Dam, Wis.: Tie plates and rail braces. Represented by W. L. Douglas, D. P. Lamoreux, J. V. Cowling, J. N. Small and E. A. Hawks.

Blake Signal & Manufacturing Company, 246 Summer Street, Boston, Mass.: Dispatchers' selective train order signals for use with telephone train dispatching. Represented by E. J. Burke, C. C. Blake.

Bryant Manufacturing Company, sales agents for the McClintock Manufacturing Company, St. Paul, Minn.; also Sandwich Electric Company, Sandwich, Ill., 21-27 Ontario Street, Chicago, Ill.: Railway signals, appliances and supplies, train dispatchers' telegraph system. Represented by Geo. Bryant, R. I. Baird, Edw. McClintock, W. M. McClintock, M. A. Hovey, E. C. Hennis, E. Parsons, H. O. Rugh, C. S. Rhoades.

Buda Foundry & Manufacturing Company, Chicago, Ill.: Railroad motor and velocipede cars, also parts of same; track drills, portable tool grinders, ball and cone bearing and ratchet jacks, switchstands, car replacers, adjustable switch rods and electric crossing gates. Represented by H. K. Gilbert, vice-president; Wm. P. Hunt, Jr., secretary; L. M. Viles, treasurer; W. S. Weston, chief engineer; C. H. DeLano, advertising manager, and the following salesmen: J. L. Artmier, A. R. Dyer, W. C. Dyer, H. S. Evans, J. J. Gard, L. Hamill, J. T. Harahan, Jr, J M. Lovett, W. B. Paulson, G. B. Shaw and H. L. Shepard.

Carnegie Steel Company, Pittsburg, Pa.: Steel cross ties, Duquesne rail joints, Schoen steel wheels, steel sheet piling. Represented by N. M. Hench, C. D. Friday, C. G. Bacon.

The Cleveland Frog & Crossing Company, Cleveland, Ohio: Frogs, crossings, switches, switchstands, etc.; also manganese frogs and crossings, Prentice anti-rail creepers. Represented by G. C. Lucas, Geo. Stanton.

Conley Frog & Switch Company, Memphis, Tenn.: "Conley patent frog." Represented by John E. Conley.

Continuous Rail & Safety Switch Company, 1406 Syndicate Trust Building, St. Louis, Mo.: Continuous rail device eliminating present frog and guard rail. Represented by W. G. Brown and H. F. Roach.

Cook's Standard Tool Company, Kalamazoo, Mich.: Climax track drill, Standard track tool grinder, Magic high-speed bits and Standard jacks. Represented by Eugene Cook.

Detroit Graphite Company, Detroit, Mich.: Paints for structural steel, stations, power houses, water tanks, bridges, approaches, roofs, etc. Represented by T. R. Wyles, L. D. Mitchell, Edwin Booth and S. L. Brown.

Joseph Dixon Crucible Company, Jersey City, N. J.: Paint, lubricating graphite, crucibles, graphite and plumbago for different purposes, air brake and triple valve grease. Represented by De Witt C. Smith, Jersey City, and B. B. Worley, Chicago.

The G. Drouve Company, Bridgeport, Conn.: Anti-Pluvius puttyless skylight, Lovell window operator. Represented by William V. Dee, Geo. J. Adam and R. S. Adam.

Duplex Metal Company, Monadnock Block, Chicago: Copper clad wire. Represented by J. F. Kimber and Frank Chambers.

Electric Storage Battery Company, Philadelphia, and Chicago, Ill.: Chloride-Tudor-Exide storage batteries for car lighting and signal service. Represented by G. H. Atkins.

Fairbanks, Morse & Company, 481 Wabash Avenue, Chicago, Ill.: Gasoline, steam and electric pumping machinery, standpipe, motor cars, cattle guards, rail drills, jacks. Represented by C. D. Walworth, C. W. Kelly, R. E. Derby, J. A. Steele, R. H. Lincoln, R. A. Paterson, G. J Akers, A. A. Taylor, H. C. McClary (second vice-president), H. D. Smith, C. T. Fugitt, A. F. Young, R. C. Head, F. F. French, F. E. Church.

Frank M. Foster, 515 W. First Avenue, Columbus, Ohio: Foster interlocking switchstand, Foster sod liner and grader, modern right-angle drive. Represented by Frank M. Foster and Geo. E. Kalb, Columbus, Ohio.

General Railway Signal Company, Rochester, N. Y., and Chicago, Ill.: All electric interlocking machines, electric switch movements, various types of power signals, automatic signals, manual control signals, relays and other such devices. Represented by L. Thomas, Chicago, and representatives from Rochester, N. Y.

Gifford-Wood Company, Hudson, N. Y.; Chicago, Ill.; Arlington, Mass.: Models of machinery for elevating, conveying and lowering natural and manufactured ice, ice tools. Represented by W. T. Wood, N. H. Williams, G. B. Vernier.

Goheen Manufacturing Company, Canton, Ohio. Represented by A. W. Price.

Grip Nut Company, 1590 Old Colony Building, Chicago: Grip nuts. Represented by E. R. Hibbard and F. E. Miner.

The Hall Signal Company, New York and Chicago; works, Garwood, N. J.: Automatic signaling devices. Represented by W. J. Gillingham, Jr., resident manager.

The Hart Steel Company, Elyria, Ohio: Railroad tie plates and standard spikes. Represented by W. S. Miller, W. T. Bentz, G. S. Wood and A. W. DeRocher.

Hayes Track Appliance Company, Geneva, N. Y.: Hayes derails and attachments. Represented by S. W. Hayes, P. W. Moore, W. Harding Davis, Wellington B. Lee and Arthur Gemunder.

The Jeffrey Manufacturing Company, Forge and Foundries department, Columbus, Ohio: Jeffrey "Lock-Jaw" track and car wrench, Jeffrey improved spike bar and other railroad specialties; also standard Jeffrey chains for elevating and conveying equipment. Represented by J. A. Werner, E. D. Clapp, G. R. Kittle and J. W. Jeffrey.

H. W. Johns-Manville Company, 173 Randolph Street, Chicago, Ill.: Asbestos and magnesia products, fuses and electrical devices, roofings, smoke jacks, packings and rubber goods of all kinds. Represented by F. W. Gilmore, P. C. Jacobs, J. E. Meek and J. C. Younglove.

Joyce-Cridland Company, Dayton, Ohio: Hydraulic car and track jacks. Represented by F. I. Joyce, George Llewellyn and N. Kohl.

Kalamazoo Railway Supply Company, Kalamzoo, Mich.: Hand cars, velocipede cars, Moore track drills, Kalamazoo jacks, pressed steel wheels. Represented by John McKinnon, C. A. Wallace, I. W. Clock, C. L. Cushman and Geo. W. Mingus.

W. K. Kenly Company, 1540 First National Bank Building, Chicago, Ill.: Latimer switch point lock, Pioneer rail anchor, Security anchor tie plate, velocipede cars, Moore track drills, Universal carrier foundation. Chicago distributers of Jeffrey "Lock-Jaw" wrenches, Jeffrey spike bars. etc. Represented by W. J. Fauth, J. T. Wells, P. O. Wadsworth, A. P. Van Schaick.

Kennicott Water Softener Company, Chicago Heights, Ill.: Water softening machinery. Represented by Cass L. Kennicott, Edwin J. Flemming and Frank S. Dunham.

Edwin R. Kent & Company, Commercial National Bank Building, 115 Adams Street: Rigid Stag manganese steel frog, special Stag manganese steel frog, guarded Stag manganese steel frog, Stag manganese rolled rail. Represented by Edwin R. Kent, J. H. Kent, J. T. Stafford and Geo. H. Brown.

Kerite Insulated Wire & Cable Company, New York and Chicago: Kerite insulated wires and cables. Represented by R. D. Brixey and B. L. Winchell, Jr.

Lackawanna Steel Company, 2 Rector Street, New York City: Rails, rail joints, structural and bridge material, reinforced concrete bars, steel sheet piling and track supplies. Represented by C. R. Robinson, G. A. Hager, F. E. Abbott and D. H. Van Pelt.

Lufkin Rule Company, Saginaw, Mich.: Measuring tapes of all descriptions, steel rules, etc. Represented by Theo. Huss. S. B. McGee and Walter M. Sandford.

Manganese Steel Rail Company, Hillburn, N. Y.: Frogs, switches and switchstands, and rolled manganese steel rail. Represented by J. B. Strong, Arthur Gemunder, F. C. Stowell and W. C. Kidd.

Maryland Railway & Electric Supply Company, 345 North Charles Street, Baltimore, Md.: "Spike Strut" rail fasteners, track appliances. Represented by Chas. Elliott.

W. N. Matthews & Brother, 219 North Second Street, St. Louis: Matthews guy anchors, telephone jack boxes and plugs for dispatching systems, cable clamps, cable splicing joints, lamp guards, and other money saving specialties. Represented by Claude L. Matthews and W. N. Matthews.

Municipal Engineering & Contracting Company, 609 Railway Exchange, Chicago, Ill.: The Chicago improved cube concrete mixer and photographs of various special machines for railroad work. Represented by C. E. Bathrick, A. C. Cameron and J. B. Austin.

The National Lock Washer Company, Newark, N. J., and Chicago, Ill.: Lock washers and nut locks in various sizes and patterns. Represented by F. B. Archibald, Geo. E. Bake and John B. Seymour.

The Pennsylvania Steel Company, Steelton, Pa., and Maryland Steel Company, Sparrows Point, Md.: Solid Manard crossing, No. 10; Manard anvil face frog, design 160, section No. 235; No. 10 Solid Manard frog, section No. 235; No. 10 spring rail frog, design 278, section No. 235; sample Never-Turn split bolt; Never-Slip slide plate; New Process switch with rolled Manard (improved manganese) stock rail; intermediate main line safety switchstand, Model 56-B; low New Century switchstand, Model 51-A; low Steelton positive switchstand, Model 52-A; intermediate pony main line switchstand, Model 54-B; intermediate New Century switchstand, Model 50-E, with semaphore attachment; rolled Manard (improved manganese) rails; rail testing machine. Represented by Howard F. Martin, C. R. Reinoehl, B. L. Weaver, M. W. Long, Wm. M. Henderson, W. H. Allen, F. A. Robins, Jr., G. K. Reed. The Chicago sales office of the Pennsylvania and Maryland Steel Companies will be represented by John F. Hennessy, J. Drew Allen, Neil E. Salsich, Robert E. Belknap.

Percival Wood Preserving Company, Houston, Tex.: Method of wood preservation. Represented by H. W. Graves, sales agent.

The Q and C Company, Old Colony Building, Chicago; 90 West Street, New York: Bonzano joints, step joints, insulated joints, anti-rail creepers, rail saws, rail benders, guard rail clamps, guard rail braces, clutch plates, rail braces, tie tongs, castings, bolts and nuts, cement and metal ties. Represented by C. F. Quincy, E. M. Smith, G. C. Isbester, J. V. Westcott and G. L. Hall.

The Rail Joint Company, 29 West Thirty-fourth Street, New York City: Continuous, Weber and Wolhaupter types base supporting rail joints. Represented by L. F. Baine, H. C. Holloway, W. E. Clark, F. A. Poor, V. C. Armstrong, F. C. Webb, E. L. Van Dresar and J. G. Miller.

The Railroad Supply Company, Bedford Building, 215 Dearborn Street, Chicago, Ill.: Tie plates, derailers and signals. Represented by E. H. Bell, C. P. Cogswell, Jr.; M. J. Comerford, E. W. Vogel and A. H. Smith.

Ramapo Iron Works, Hillburn, N Y.: Frogs, switches and switch stands and rolled manganese steel rail. Represented by J. B. Strong, Arthur Gemunder, F. C. Stowell and W. C. Kidd.

The Ritter Folding Door Company, Inc., Cincinnati, Ohio: Horizontal folding door for round houses, machine shops, freight depots, etc. Represented by A. Ritter, president; J. M. Crowe, vice-president.

Scherzer Rolling Lift Bridge Company, 1616 Monadnock Block: Models, photographs, designs, plans, drawings and literature. Represented by John T. Dickerson, H. D. Harting and R. W. Flowers.

Scully Steel & Iron Company, Chicago, Ill.: Simplex track and car jacks, track drills, track gages and tools and tool steel spikes, bolts, sledges. Represented by H. C. Finlay, W. H. Dangel, F. K. Maus, F. W. Blume, W. B. Templeton, George Mason, Jr.; T. T. Cavanagh and H. H. Gilbert.

Sellers Manufacturing Company, Western Union Building, Chicago: Tie plates, angle bars, "Sellers Anchor Bottom Tie Plate." Represented by J. M. Sellers, J. T. Markham and L. S. Gordon.

Spencer Otis Company, 1709-11 Railway Exchange, Chicago: Railway tie plates. Represented by W. L. DeRemer, H. H. Hart and Carter Blatchford.

Standard Steel Tie Company, 714-715 Curry Building, Pittsburgh, Pa.: Standard steel railway and traction ties, standard rail fasteners, fastener attachments, angle bars, wedge members and appliances. Represented by George M. Côté and J. Harvey Harrison.

Stover Motor Car Company, Freeport, Ill.: Motor inspection cars. Represented by M. Mowbray.

The Strauss Bascule Concrete Bridge Company, The Strauss Self-Balancing Window Company, Fort Dearborn Building, Chicago: Models and photos of bascule bridges, models of car windows.

The Union Switch & Signal Company, 1535 Monadnock Building, Chicago, Ill.: Keystone insulated rail joint; New Century switch lock with New Century stand; one-arm style S, electric automatic semaphore signal; Patenall lock and block system; relays, combination rail clips; dwarf interlocking machine; high-speed electric train staff instruments; D. C. crossing gate. Represented by J. S. Hobson, W. E. Foster, T. H. Patenall, W. M. Vandersluis.

U. S. Metal & Manufacturing Company, 165 Broadway, New York City: "Diamond" tapered steel poles, Columbia lock nuts, Continental whistling post, Hillman locked clevis and turnbuckle. Represented by Frederick Atwater and Chas. R. Day.

Variety Manufacturing Company, Sacramento Boulevard and Carroll Avenue: Cross-horizontal folding door, Variety steel rolling shutter, Variety wood slat rolling shutter, cross-compound slide-up door. Represented by W. H. Barry, E. L. Beckerleg, W. B. Gervais and F. E. Kahl.

The Vulcan Steam Shovel Company, Toledo, Ohio: Photographs and blue prints of steam and electric shovels. Represented by W. S. Russell.

William Wharton, Jr., & Company, Inc., Twenty-fifth Street and Washington Avenue, Philadelphia, Pa.: Manganese steel switches, frogs and crossings, switch stands, guard-rail clamps, models of derailing switches, photographs, blue prints, etc. Represented by V. Angerer, vice-president; Arthington Gilpin, engineer; R. C. McCloy, sales agent; all Philadelphia. W. McLain, sales agent, Pittsburgh, Pa.; Arthur S. Partridge, sales agent, St. Louis, Mo.

Whiting Foundry Equipment Company, Harvey, Ill.: Photographs and drawings illustrating electric travelers, jib cranes, electric locomotive cranes, Gantry traveling cranes, transfer cranes for railroad yards and complete equipment for gray iron, steel and malleable foundries; also railroad turntable centers and transfer tables. Represented by C. A. Hardy and P. A. Dratz.

Williams Boltless Rail Joint Manufacturing Company, 1202 Great Northern Building, Chicago: Williams boltless rail joint, Twentieth Century steel tie, automatic lock nut, Smith's reinforced spike, automatic car seal. Represented by Willis D. Williams, Emil Meyer, Cortlandt F. Ames, Charles Rystrom and T. J. Dyke.

Jas. G. Wilson Manufacturing Company, 3 West Twenty-ninth Street, New York City: Rolling steel doors for car shops, freight sheds, warehouses, etc.; rolling wood doors for engine houses. Represented by H. B. Dodge & Co., Western agents, 108 La Salle Street, Chicago, Ill.

News of Electric Railways

Rapid Transit Proposals in New York

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., formally outlined to William R. Willcox, chairman of the Public Service Commission of the First District of New York, on March 10, the details of the plan of his company for extending its subway and elevated lines at a cost of $50,000,000, of which mention was made in the Electric Railway Journal of March 13. Briefly, the company proposed to extend the present subway south from Times Square, on the West Side, under Seventh Avenue, to the Battery, and north from the Grand Central Station, on the East Side, under Lexington Avenue and the Harlem River, to connect with the West Farms branch of the subway at 149th Street and Third Avenue. The company also proposes to third-track the Second Avenue and Third Avenue elevated lines. It suggests the lengthening of the station platforms in the present subway so as to permit the operation of 6-car trains on the local and 10-car trains on the express tracks. For the new subway construction the company asks a franchise similar to the one under which it operates the present subway, i. e., a 50-year operating lease with a 25-year renewal option. This evidently was the provision for new legislation to which Mr. Shonts referred on March 9, for the last conditions cannot be made part of the agreement unless the Elsberg law is amended so as to permit the construction of subway lines with private capital. In his letter to the commission Mr. Shonts said:

"We are now prepared, upon proper terms, to undertake the following construction:

"First—The extension, at our own expense, of the city's existing subway system by the construction of a two-track express subway north from Forty-second Street, under Lexington Avenue, to a terminus in the Bronx, and by the construction of a two-track West Side express subway from Forty-second Street to the Battery (with provision, in each case, for the construction of additional tracks for local service when justified by traffic conditions), thus providing the city with two longitudinal lines of subways extending from the Battery to the Bronx, one on the East Side and the other on the West Side of the city, with a connecting subway in Forty-second Street. It is estimated that these extensions can be completed within four years.

"In order that we may raise private capital, and inasmuch as it will be necessary to provide for the amortization of the entire cost of the extensions within the period of the operating lease, it will be necessary that the extensions be made under an operating lease from the city for substantially the same term as that under which the existing subway is being operated. Under such a contract the city would be the owner of the entire subway system from the outset and would come into possession upon the expiration of the term of the existing contract.

"Second—The construction of a third track on both the Second Avenue and Third Avenue elevated lines. This improvement will furnish the earliest possible relief to the Bronx, inasmuch as it can be completed within 18 months. It will be necessary that these additional tracks should be built under a franchise similar to that under which the existing elevated tracks were built.

"Third—The lengthening of the platforms in the existing subway stations so as to permit the operation of 6-car trains on the local tracks and 10-car trains on the express tracks. This improvement will increase the capacity of the existing subway by more than 25 per cent, and can be completed within 10 months. It should be made as an extra under the existing subway contract.

"Except in the case of the cost (less than $1,000,000) of the lengthening of the stations of the existing subway, all of the improvements above outlined, estimated to cost $50,000,000, would be made without resorting to the funds or credit of the city.

"We are confident that we can obtain the necessary capital to carry out the foregoing improvements if undertaken as an entirety and the laws are so modified as to permit your commission and the city authorities to enter into the necessary contracts.

"We are prepared to submit to you whenever you wish the plans which have been prepared by our engineers."

Nothing of an official nature has been given out for publication as to how the Interborough Rapid Transit Company proposes to finance the extensions and improvements.

The plan of the Amsterdam Corporation, submitted in the name of the Inter-Terminal Belt Line, for a combined elevated and subway for passengers and freight, really is an elaboration of the original proposal made to the Public Service Commission last summer by the Amsterdam Corporation for a freight subway. In urging its application the Inter-Terminal Belt Line says:

"We believe that there exists a necessity for an inter-terminal belt line which will make direct communication between all of the steamship and railroad terminals, as well as the ferries, upon Manhattan Island below Sixtieth Street. We believe that such a line will not only prove a great convenience to an immense number of people, but that it will aid in the solution of the West Side freight problem and develop sections of the city, especially on the East Side, which now entirely lack proper transportation facilities."

The conditions under which the company would be willing to accept a grant were given in the last issue. They prescribe, in brief, a full 5-cent fare, a reasonable return to the investor on the capital expenditure, the city to share in the new earnings in lieu of all taxes and charges, except those on real estate, and an extension of the franchise at the end of the grant or purchase by the city at a fair valuation. As in the case of the Interborough Rapid Transit Company, a franchise such as the company desires cannot be granted under the Elsberg law, and the request of the company is predicated upon the Legislature enacting such laws as will make it possible to grant the privileges desired. The proposed route is described in detail as follows:

"A four-track elevated railroad from the terminus of the New York Central & Hudson River Railroad's West Side tracks at or near Sixtieth Street and the North River southerly along the waterfront to the Battery; thence a two-track elevated railroad along or near the waterfront of the East River to a suitable point south of Forty-second Street; thence by subway through First Avenue and Forty-second or Forty-third Street, connecting with the Grand Central Station, to Seventh or Eighth Avenue; thence through Seventh or Eighth Avenue, connecting with the Pennsylvania Railroad terminal, to Thirtieth Street; thence by subway and elevated structure through Thirtieth Street to a connection with the main line at the North River; also by subway from a connection with the elevated structure at the North River, through Fifty-ninth or Sixtieth Street to connections with the Blackwell's Island Bridge over the East River and with the East Side section; thence southerly in First or Second Avenue to connection with the line at or near Forty-second Street or Forty-third Street. Where feasible, the privilege is desired of enlarging portions of said railroad by adding one or more tracks. The above described right of way to be furnished free of cost in so far as the same relates to any property owned or controlled by the city or State, or property which the city or State contemplates acquiring."

The only statement from the commission regarding the several proposals was made by Mr. Willcox, who said:

"Of course, like the Wilgus plans on the belt line project, the proposals of the Interborough Rapid Transit Company rest on new legislation and changes in the Elsberg law. Nothing can be done about either as the law now stands. Everything must wait the legislative action in regard to the construction of subways by private capital and certain points in the lease and franchise clauses. It is clear that the first plans received, those of the Hudson & Manhattan Railroad, can be taken care of by the commission, as they rest entirely within the rights given to the board by the present law. We will take them up first. The others will be taken up in order and considered, so that if the laws are amended to allow the adoption of such a course as is proposed we will be prepared to act immediately."

Cornelius Vanderbilt, G. M. Lane and Andrew Freedman, directors of the Interborough Rapid Transit Company, have resigned as directors of the Hudson & Manhattan Railroad. The resignation of Walter G. Oakman, president of the Hudson Companies, controlling the Hudson & Manhattan Railroad, as a director of the Interborough Rapid Transit Company was mentioned in the Electric Railway Journal of March 6.

The applications of both the Inter-Terminal Belt Line and the Interborough Rapid Transit Company were placed on file by the Public Service Commission on March 12, and both were referred to the committee of the whole. Theodore P. Shonts and August Belmont both called on Chairman Willcox of the commission on March 12, Mr. Shonts saying that as he was about to leave the city for a few days, he desired Mr. Belmont, who is chairman of the board of directors of the Interborough Rapid Transit Company, to be in touch with the situation. Following this meeting Mr.

Willcox wrote to Mr. Shonts on behalf of the commission, accepting so much of the proposal of the Interborough Rapid Transit Company as applied to the lengthening of the platforms so as to admit the use of 6-car local trains and 10-car express trains. This work involves no additional legislation and may be carried out as a modification of the present contract.

The New York Central & Hudson River Railroad also appears as a possible bidder for rapid transit rights. The company now operates a steam surface freight line on Eleventh Avenue, New York, which for years has been a source of annoyance to the public and is generally unsatisfactory to the company. Various proposals have been made from time to time by the city regarding the road, but nothing has ever come of them. At a hearing in Albany last week, however, it was announced that the company is prepared to spend $30,000,000 on an elevated railroad along the West Side waterfront. The proposals from the city to the company have been for an underground road. However, no announcement has been made by the company that it contemplates formally applying for the right to build the elevated line.

Nelson P. Lewis, chief engineer of the Board of Estimate, in a special report to Mayor McClellan, recommends changes in the Fourth Avenue subway which will necessitate the abrogation of all the contracts which have been awarded by the Public Service Commission for the construction of that line. To cut down the expense of the Fourth Avenue line Mr. Lewis proposes to eliminate the eight tracks proposed by the Public Service Commission and substitute four tracks. Two of these tracks, he points out, could be used for the Fourth Avenue subway and two for the Broadway-Lafayette Avenue loop. By making these changes the city would be spared the expense of condemning the property at Fulton Street and Flatbush Avenue. Mr. Lewis says that the Fourth Avenue route and the Broadway-Lafayette Avenue loop could be built at a cost of $17,232,000 for both routes. The Fourth Avenue route, according to his figures, could be built for $8,941,000, the Broadway-Lafayette Avenue loop for $8,341,000. Henry B. Seaman, chief engineer of the Public Service Commission, opposes vigorously all the suggestions made by Mr. Lewis. He concludes his report thus:

"It is hardly necessary to review in detail Mr. Lewis's estimate, because this estimate is reached, not by economy, but by sacrifice. This sacrifice is one which could not be remedied at any future time."

Cleveland Traction Situation

Before Master Commissioner Belford on March 8 William Greif, who served as a director of the Municipal Traction Company, testified that a difference of opinion developed among the directors of the company early in its history as to whether a 3-cent fare would ever actually pay expenses. He said that he and Edward Wiebenson served as directors at the request of others in the belief that they could be of service in the settlement of the street railway trouble, but when they became satisfied that they could do nothing in that direction they resigned. He and Mr. Wiebenson, it seems, took the reports of the company as the basis for their conclusion.

Mayor Johnson, who was on the stand on March 6 and March 8, declared that the company was justified in paying for the lunches of the directors and heads of the departments at the daily meetings. Mr. Johnson had even suggested that meals be served in the office, but no official action was taken to provide for them. He said that the minute book of the board would not show all that had been done at these meetings, because the business was not always in the form of resolutions, and that the full proceedings were not recorded. Asked if he did not think that the motormen and conductors deserved free rides if the directors did free lunch, he said that free rides are demoralizing to the service. Among those receiving salaries the Mayor named the following: A. B. DuPont, president, $15,000; Claim Agent Stage, $3500 or $4000; Messrs. Wiebenson and Greif, assistant secretary and assistant treasurer, $150 a month; Ben Cable, director, $150 per month. He stated that he and City Solicitor Baker did not receive any salary, and that no fees were paid for attending directors' meetings.

On March 9 Master Commissioner Belford began the hearing on the claims of the Cleveland Railway against the Municipal Traction Company. It was intimated that the Cleveland Electric Railway might put forward a claim for depreciation that will offset any claims for betterments that the Municipal Traction Company has made. Particular attention will be given to the fact that only $31,867 of the money turned over to the Municipal Traction Company remains in the hands of the receivers. Receiver Scott submitted the following statement of the disbursement of the funds of the Municipal Traction Company between Nov. 13, 1908, and March 1, 1909:

ASSETS TAKEN OVER BY THE RECEIVERS.

Cash in bank, office, etc	$358,613
Accounts receivable	23,859
Miscellaneous	3,853
Inventory accounts	18,376
Stock exchange	782
	$405,483

Disbursements by the receivers for obligations contracted before the receivers took charge:

Accounts payable	$85,468
Taxes	172,336
Interest	100,668
Miscellaneous	15,143
	$373,615
Balance on hand	31,868
	$405,483

Accounts taken from the books of the Municipal Traction Company show the following assets:

Cleveland Trust, Salem account	$23,950
Press guarantee	2,314
In escrow	26,765
Accounts receivable	40,626
Securities	2,000
Betterments	559,681
Stock	169,315
Dividends	29,315
Receivers' account	31,868
Prepaid and accrued accounts	13,027
Real estate	38,519
Neutral street railway	172,233
	$1,319,613

A portion of the evidence presented before Special Master Belford was introduced to show the real purpose in making certain expenditures. Much time has been spent in an endeavor to classify these claims, so that the court would be able to handle them in a settlement with creditors; but the work has proved tedious and is of little value in aiding decisions. Among other things, the attorneys for creditors endeavored to learn what use had been made of the $3,500 given F. C. Alber, assistant to the president of the Municipal Traction Company. The master finally upheld Attorney Westenhaver in his contention that the Alber matter is immaterial and in his objection to probing into the fare box matter minutely. Receiver Scott said that 25 fare boxes had been delivered by the Pay-Enter-Fare-Box Company after the receivers had given notice to stop delivery, and that he had received no reply from Mayor Johnson relative to the $2,000 turned over to the Fare Box Company by the Municipal Traction Company and not expended when the receivership was ordered. Considerable evidence was introduced relative to the advance payment of dividends to the stockholders of the Forest City Railway, who had been guaranteed in the purchase of stock, after the Cleveland Railway refused to promise to apply the payment of rental to that purpose. It is said that the receivers have demanded that the banks which took over the business of the Mayor's bank, the Depositors' Savings & Trust Company, return the money paid out for such dividends against the order of the Cleveland Railway.

A preliminary statement presented by Receiver Scott showed that of the $1,633,479 claimed as assets by the Municipal Traction Company $1,228,778 remains uncollected. The receivers have used $404,700 of the money that has come into their hands for various payments and expenses. Of the $562,681 claimed to have been paid for betterments by the Municipal Traction Company the attorneys say that many items belong strictly in the list of operating and maintenance charges.

On March 15 at a meeting of the City Council as a committee of the whole, Mayor Johnson made known his so-called peace plans which he had given to the newspapers on March 14. He proposes that two months be given to an attempt to settle on Judge Tayler's plan of a sliding rate that will insure a return of 6 per cent on the investment. While consideration is being given the Tayler plan the Mayor has advised the City Council to prepare three other ordinances, one of which would provide for 3-cent fare, to be given the Cleveland Railway on streets where franchises expire in January, 1910; the second, an ordinance providing for 3-cent fare, to be given the rejuvenated Forest City Railway on the same streets; the third, a franchise covering these streets, to be awarded the company making the best all-round bid at the lowest fare. The proposition was adopted, and the City Solicitor was instructed to prepare such ordinances and have them ready for consideration at the regular meeting of the Council on March 22.

Judge Tayler was present at the meeting on March 14 on invitation, and in a talk to the Councilmen said that he hoped the members would realize the responsibility that rests upon them and make an earnest effort to establish a rate of fare that will yield the owners a fair income on

their investment and give the people of the city such a service as they need and desire.

Judge Tayler on March 14 refused the application of the receivers to rebuild 23 miles of track. He said that they would have to repair the track and put it in as good condition as possible. He granted an application to spend $41,250 for new boilers. Application was made to extend the Payne Avenue tracks through to 105th Street and to spend $10,000 in building a storeroom at the Lake View shops.

Warren Bicknell, one of the receivers, has left for Havana in the interest of the Havana Electric Railway, of which he is president. He will probably be absent two weeks.

The Franchise Question in Detroit

The session of the committee of 50 appointed by Mayor Breitmeyer to consider the terms of a new franchise grant to the Detroit United Railways which was held on March 8 attracted considerable attention on account of the prominence of the speakers that addressed the committee. One of them was Charles V. Weston, president of the South Side Elevated Railroad, Chicago, Ill. Mayor Breitmeyer attended, but did not speak at the meeting. He did, however, express his views on the traction situation later on the same evening before the Detroit branch of the Grand Army of the Republic.

Mr. Weston said that it was unquestionably true that in a number of instances public utility franchises had fallen into the hands of men who had abused their trust, and that the public had reasoned from the concrete to the abstract to the detriment of conservative investors who desired only a fair return on their investment with a guarantee of the security of their property against confiscation. He cited the report of the National Civic Federation, and said that in any consideration of street railway conditions in Europe full appreciation was essential to the differences between conditions here and in Europe. Mr. Weston also said that as a street railway man he was talking with a full knowledge of the conditions that have to be met in street railway operation and the trying enactments of service, and concluded by saying that the rate of fare should not be less than 1 cent per passenger mile.

Charles E. Baxter reiterated what Mr. Weston said. Taking up the question of service abroad, he pointed out the difference between housing conditions in the United States and Europe, and showed that while the tendency there was to centralization, it was the opposite here, the burden falling on the railway companies. He also compared wages here and abroad.

At the meeting of the veterans the late Mayor Pingree was eulogized, and Mayor Breitmeyer found it necessary again to try to drive home the significance of his effort and the work of the committee of 50. He said that there was not a man on the committee that was not the equal of any of his auditors, and repeated the statement that the committee would consider conditions and make recommendations, and that the recommendations would then go before the voters for approval. The Mayor said that earnest consideration of the subject—not idle talk—was desired, and that critics of the committee were only obstructionists. The Mayor also reiterated his statement that he favored a working agreement with the company guaranteeing 6 per cent on the actual capital invested, all returns above that amount to be applied to reducing the fare or to be held in trust as a sinking fund for the ultimate purchase of the property. He said:

"The situation in Detroit with respect to the bonding limit is well known. Unless a decided raise in the limit be made, not a dollar's worth of general bonds can be issued for the purchase or establishment of any city-owned public utilities. I believe that if the rights of the city of Detroit are to be protected a security franchise should not contain terms more liberal than we would at this time be willing to give a private corporation, and I doubt our ability to sell bonds on a municipal street car line if the bonds are secured by the physical property on an eight-for-a-quarter or even seven-for-a-quarter security franchise."

The Detroit United Railway has presented a map to the extensions and rearrangements committee of the committee of 50, illustrating the extensions which the company believes to be necessary and practicable. The company's plan provides for about 50 miles of new trackage, and emphasizes the fact that entirely new routings will be necessary for several of the lines as a consequence of the extensions, and that these new methods of reaching a destination will in themselves tend to relieve congestion and save the time and trouble of transferring now necessary.

The Detroit *Journal* recently said that the committee as a whole favored a working agreement to run from 15 to 20 years, and gave the following as the terms likely to be proposed by the committee:

"A railway commission, non-partisan, to supervise schedules, rates and lines, under veto power of the Common Council.

"The company to be guaranteed 6 per cent on its investment. All profits above that to go to the city.

"The first rate of fare, eight tickets for 25 cents between 4 a. m. and midnight. Between midnight and 4 a. m. the rate to be 10 cents straight. Single rides at other times 5 cents.

"Universal transfers at all hours.

"The railway commission may, if it finds that the company is not making 6 per cent, at the rate of eight for a quarter, raise the rate to 15 tickets for 50 cents, and then, if a test finds that also unprofitable, to seven tickets for a quarter.

"The sum of money which the city may receive as a surplus, after the company's 6 per cent is deducted from the profits, may be deposited as a sinking fund for municipal purchase.

"The company to be bound to keep up the equipment and to pave between the tracks. Taxes are to be assessed ad valorem. The company must set aside a certain figure each year for depreciation."

Traction Rehabilitation Controversy in Chicago

The daily newspapers in Chicago devoted considerable space during a few days last week to alleged errors in the accounting methods adopted by the Chicago City Railway Company and the Chicago Railways Company in the rehabilitation of the street railways in that city. But after the excitement which the first articles caused subsided, the affair proved to be merely the result of misunderstandings of the true situation on the part of the newspapers and, to a certain extent, of the city authorities as well.

As is well known, the reconstruction work now being conducted by the Chicago railway companies is being done under the direction of the Board of Supervising Engineers, of which Bion J. Arnold is chairman and chief engineer, and under the franchise the city shares in the net profits to the extent of 55 per cent. For this reason, an important distinction is made between the expenses of construction and operation to be charged to the joint account of the companies and the city occurring after the ordinances took effect, and those properly belonging to the period before the companies accepted the ordinances. The duty of passing upon all purchases and auditing all expenditures for the joint account, devolves, by law, on the Board of Supervising Engineers. In the progress of this work, last October, a question arose as to the proper classification of expenditures of the Chicago Railways Company, some time previously, aggregating $119,000, which had been charged to the joint account by the company as an operating expense. As there seemed to be some doubt as to whether this was the proper classification, Mr. Arnold, at the request of the city and also of the company, agreed to go over all the vouchers of both companies.

About Feb. 11, before the work of auditing these vouchers, numbering over 20,000, was concluded, Mayor Busse received a letter from Philadelphia charging that secret discounts from quoted prices were being given by different manufacturers on sales made to the Chicago City Railway Company and alleging that no credit was given for these discounts in the accounts which the company filed with the Board of Supervising Engineers as the cost of the apparatus. Both the name signed to the letter and the address given in it proved on subsequent investigation to be fictitious. A full investigation was made of the matter, however, and it was found that only the net payments made by the company were being charged on the books, and that the Board of Engineers had full knowledge of these discounts and had approved them and had seen that the city had received its proper credits for them in the joint account. The examination showed, however, that the Chicago City Railway Company had in some instances been securing somewhat lower prices in its purchases than the Chicago Railways Company. The only figures made public were those on rotaries. For rotaries of the same size and type the Chicago City Company had paid $16.15 per kw and the Chicago Railways Company $16.25 per kw. During this investigation the Mayor gave to the public press the letter mentioned and this, in connection with distorted rumors of the reasons for the audit of the Railways Company's accounts, caused considerable excitement until the facts became known.

In the meanwhile, one of the sensational daily papers published in Chicago appears to have conceived the idea that the Board of Supervising Engineers was extravagantly

administered and this view seems also to have been taken by some of the local politicians who were perhaps piqued because the patronage of the board had not been placed at their disposal. The payroll of the board was published and in several days the fierce light of criticism beat unmercifully on that body. It was shown, however, that the salary of Mr. Arnold had been specified in the ordinance which was ratified at the election and that the work of the board was being conducted very economically and efficiently. Other allegations made at the same time proved utterly groundless or due to a misunderstanding of the facts. Thus, it is said that both of the railway companies kept two sets of books and that one set was for public record and the other for the company's own information. It was shown, however, that the second set of books was simply that used by the companies for keeping the record of the disposition of the 45 per cent net profit to which the companies under the ordinances are entitled, hence was perfectly proper, and there was only one set of books of construction and operating accounts relating to the joint accounts of the city and the companies, and that these books were being kept upon forms prescribed by the Board of Supervising Engineers and approved by the city comptroller.

The excitement raged most fiercely between March 7-10, but as the facts became known it quickly subsided, and by March 11 reference to it disappeared from the first pages of the city press. The net result of the controversy was to make even more evident and clear that the public interests in Chicago are being well protected.

Meeting of the Iowa Street & Interurban Railway Association

The annual convention of the Iowa Street & Interurban Railway Association will be held at Cedar Rapids, Ia., on April 22, 23 and 24. The headquarters of the association will be at the Montrose Hotel. Satisfactory arrangements for those who cannot be accommodated at the Montrose can be made with the Allison, the Delavan or the Grand hotels. An auditorium within a block of the Montrose has been engaged for the accommodation of exhibitors and will afford an ample number of rooms for the combined meetings of the street railway and the electrical associations.

The arrangements for exhibitors are more complete than have ever been made before. For their convenience a large central space, exceptionally well lighted, will be reserved. Space for exhibits and current for light and power will be furnished to the exhibitors free of charge. The only expense which exhibitors will have to assume will be that of transporting the exhibits to and from the convention hall, and the cost of erecting and taking down such booths as may be required.

The lighting and railway companies in Cedar Rapids will arrange a special program for the entertainment of delegates. One of the most important features which the association has taken up recently is the careful consideration of the Interstate Commerce Commission System of Accounting, which will be the subject of a paper at the coming meeting. The association is also paying particular attention to the matter of traffic development and to the use of safety appliances, and papers will be presented covering these subjects. The papers to be presented at the meeting, follow:

"Handling Accident Claims," by A. G. Rippey, claim agent, Des Moines City Railway, Des Moines.

"Interstate Commerce Commission System of Accounting and its Application to Street and Interurban Railways," by H. E. Weeks, secretary, Tri-City Railway & Light Company, Davenport.

"Recent Developments of Electric Railway Traffic." "A —Street Railways," by E. M. Walker, general manager Citizens Railway & Light Company, Muscatine. "B—Interurban Railways," by C. M. Cheney, general freight and passenger agent, Waterloo, Cedar Falls & Northern Railway, Waterloo.

"Inspection and Maintenance of Rolling Stock," by W. F. Raber, general manager, Ottumwa Railway & Light Company, Ottumwa.

"Operating Rules for Street and Interurban Railways," by J. D. Wardle, superintendent, Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids.

"Life-Saving Devices," by William J. Brown, manager, International Lecture Institute, New York City.

Los Angeles Company Encourages Y. M. C. A. Membership.—Robert P. Sherman, general manager of the Los Angeles-Pacific Company, Los Angeles, Cal., has notified the Young Men's Christian Association that his company will pay one-half the membership fee of any of its employees who wish to join the organization.

Minneapolis Company Withdraws Request that Suit Be Discontinued.—C. G. Goodrich, vice-president of the Twin City Rapid Transit Company, in a letter to the Aldermen of Minneapolis, has withdrawn the request that the city discontinue its suit against the company for six-for-a-quarter fares, and says the company now prefers to await the decision of the United States Supreme Court, which will fix the status of the company, with reference both to fares and the life of its franchise. Mention of this suit was made on page 480 of the ELECTRIC RAILWAY JOURNAL of March 13, 1909.

Annual Banquet of the New England Street Railway Club.—The ninth annual banquet of the New England Street Railway Club will be held at the Hotel Somerset, on Thursday evening, March 25, at 6:30 p. m. A reception commencing at 6 p. m. will precede the banquet, and during the afternoon the annual business meeting of the club will be held. The speakers at the banquet will include Hon. James F. Shaw, Boston, president, American Street & Interurban Railway Association; Hon. Arthur B. Chapin, treasurer, Commonwealth of Massachusetts; Hon. James F. Jackson, Boston; Hon. Joseph T. Robinson, Arkansas; Holman F. Day, Lewiston, Me. The price of tickets is $2.50 and they may be secured from the secretary. A large attendance is anticipated, owing to the constantly growing membership of the club and the increasing popularity of the banquets, and the tickets should be secured early.

Entertainment of Employees of Milwaukee Electric Railway & Light Company.—Employees of the Milwaukee Electric Railway & Light Company gave an entertainment on the evening of March 4, in the auditorium of the Public Service Building. The entertainment was of the same character as those usually given by the employees about twice a month, but a special feature was added in honor of the inauguration of the new President. A large flag, on which a portrait of Mr. Taft had been fixed, was lowered at the rear of the stage and the band played patriotic airs. The entertainment, which was planned and managed entirely by the employees and was attended by employees and their families, was very creditable. The members of the Railroad Commission of Wisconsin attended. At the request of John I. Beggs, president of the company, Prof. B. H. Meyer, chairman of the commission, addressed the audience. W. J. Curtis, of Sullivan, Cromwell & Curtis, New York, general counsel for the North American Company, also made a brief address.

Electric Railway Construction in Canada.—During 1907 72.27 miles of electric railway were constructed in Canada, and during 1908 32.94 miles. This year, however, the prospects are that several hundred miles of line will be built. The British Columbia Electric Railway, Victoria, Vancouver and New Westminster, B. C., alone has about 100 miles under construction, and to this must be added new systems in Edmonton and Calgary, Alta., and Regina, Sask., on which work has already begun. The Winnipeg (Man.) Electric Railway plans at least 10 miles of line. Eastern Canada will add to the total as extensions are contemplated to the systems in Montreal, Quebec, Toronto and Ottawa. The record of construction for 1908 follows: Brantford & Hamilton Electric Railway, 16 miles; Mount McKay & Kakabeka Falls Railway, Fort William, Ont., 3 miles; Montreal (Que.) Street Railway, 1.31 miles; Montreal Park & Island, Montreal, Que., 1.97 miles; Ottawa (Ont.) Electric Company, 1.80 miles; Sarnia (Ont.) Street Railway, 1.25 miles; Toronto (Ont.) Railway, 0.23 mile; Toronto & York Radial Railway, Toronto, Ont., 1.38 miles; Winnipeg (Man.) Electric Railway, 6 miles.

New York Public Service Law Upheld.—The Appellate Division of the Supreme Court of New York handed down on March 12 a unanimous decision written by Justice John Proctor Clarke affirming the constitutionality of the Public Service Commissions law. The action was brought in 1907 by Adolph Gubner as a taxpayer to obtain an injunction restraining the Mayor, the Comptroller and the City Chamberlain from paying any money to the Public Service Commissioners of the First District, or in any way complying with Chapter 429 of the Act of 1907, under which the Public Service Commision was organized. Gubner attacked the constitutionality of the Public Service Commissions law as in violation of 14 different provisions of the State Constitution and of three provisions of the National Constitution. Justice Gerard, before whom the matter came in the lower court, dismissed Gubner's application, and the case went to the Appellate Division. In that court but two issues were raised, according to Justice Clarke's opinion—first, whether the Public Service Commissions act violated Section 16 of Article III of the State Constitution, which provides that no local or private bill may embrace more

than one subject, which shall be expressed in the title, and, second, whether the act violated Section 10 of Article VIII of the State Constitution, prohibiting cities, counties and towns from increasing their indebtedness except for city, county or town purposes. In finding against Gubner with respect to these contentions the Appellate Division declares that the Public Service Commissions act is general, not private or local, and contains no matter not germane to the title which it bears. Again, on the technical point raised that the increase of city indebtedness incurred by issuing revenue bonds in anticipation of taxes for the payment of the expenses of the commission, the Appellate Division finds that this process does not differ from the issuance of revenue bonds for the payment of salaries and other current expenses of government. The indebtedness which a city, county or town is prohibited from incurring, remarks Justice Clarke, means, under the Constitution, debt created for other purposes than the maintenance of governmental instrumentalities.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Indiana.—The Sixty-sixth General Assembly adjourned on March 9. Two important bills relating to electric railways were passed. One applies to the construction of electric railways on toll roads; the other to the exchange of traffic between steam railroads and electric railways in course of construction. Two other bills which were passed relate indirectly to electric railways. One grants the right of eminent domain where property is desired for electric power plant purposes; the other provides a penalty where shade trees are destroyed in erecting a transmission system. Not one of the three bills introduced at the request of the Railroad Commission became a law. The electric railways opposed the bill providing for the separation of grades at highway crossings because it was deemed unfair to them. The bill providing heavy penalties for trespassing on electric railway or steam railroad tracks was regarded as too drastic, and was killed.

Kansas.—All public utilities bills have been defeated in the Senate. The administration desired a public utilities law in accordance with the recommendation of Governor Stubbs. The House "home rulers" were in favor of local control, and were strong enough to override the administration and passed three bills covering the whole utilities question. One regulated utilities in second and third-class cities; another regulated utilities in first-class cities and the third placed all large general utilities under the control of the railroad board. The Senate judiciary committee reported all these bills favorably. They were taken up for consideration in committee of the whole in the Senate. By joining forces with those senators who are constitutionally opposed to the State meddling with local utilities, the administration senators succeeded in forcing a motion through to knock the enacting clauses out of the bills. When the committee reported its action back to the Senate, Senator Quincy moved to reject the report of the committee on the first bill. Upon roll call, the Quincy motion was defeated by a vote of 18 to 15. The motion on the second bill was lost by a vote of 19 to 14. On the motion to save the bill, placing all general utilities under the railroad board, the vote stood 26 to 7.

Massachusetts.—The committee on railroads has reported leave to withdraw on the bill petitioned by John H. Carter for an investigation by the Railroad Commission of the issuing of passes by railroad companies and street railways. The report has been accepted by the House. The House has accepted the report of leave to withdraw by the committee on street railways of the O'Rourke bills requiring street railways to equip their cars with lifting jacks and fenders. The Senate and House have accepted the adverse report of the committee on street railways upon the Flynn bill for legislation requiring the Boston Elevated Railway to give night transfer checks free of charge between cars leaving and arriving at Hanover Street or Adams Square, Boston, between midnight and 6 a. m. The Senate has accepted the adverse report of the committee on street railways relative to the bill accompanying the petition of William French requiring conductors and motormen to be employed not more than 9 hours per day, the work being done in 11 continuous hours. A number of bills are still in committee in connection with proposed street railway legislation. Among these are the Bacon bill authorizing street railway companies to issue stock and bonds beyond the amounts fixed by charter or special law for building extensions, acquiring land for pleasure resorts, acquiring or building power houses, car houses, park buildings, acquiring or equipping additional rolling stock, changing motive power or furnishing electricity to a town for light, abolishing grade crossings, paying betterment assessments for widening or other alteration of streets, making permanent investments or improvements or acquiring real or personal property in addition to that already owned, refunding funded debt or for payment of borrowed money. The bill provides for supervision of such issues by the Railroad Commission. Hearings have been closed on this measure, and it will shortly be reported upon to the Senate. Another measure before the street railways committee and upon which hearings have been closed is the Jenney bill authorizing the selectmen of Hyde Park and Dedham to grant locations to the Boston Elevated Railway or the West End Street Railway in these towns. In this connection a bill has been heard by the committee to permit the Old Colony Street Railway Company, now operating in these towns, to lease its lines and property to the Boston Elevated Railway. Hearings have been concluded on the Elder bill to authorize the Boston Elevated Railway to build an elevated railway from Sullivan Square, Charlestown, through Somerville to Medford. Hearings have also been concluded on the petition of D. P. Abercrombie, Jr., for legislation to authorize the Connecticut Valley Street Railway to issue bonds. The bill accompanying the petition of Butler Ames, for authority for the Boston, Lowell & Lawrence Electric Railroad to construct elevated and subway structures in Boston, Lowell, Somerville and Lawrence has been withdrawn at the request of the petitioners. Among the street railway matters now before the committee on Metropolitan affairs are the bill of Mayor Hibbard, of Boston, to extend the term of office of the Boston Transit Commission; the Nichols bill to provide rapid transit in Boston by a crosstown tunnel between Park Street and the South Station, to be built by the Boston Transit Commission; the Robinson bill for the construction of a tunnel by the Boston Transit Commission under Boston Harbor between Boston and the city of Chelsea; the Hays bill providing for a tunnel by the Transit Commission between the North Station and Sullivan Square; the bill for a subway between Tremont and Park Streets, Boston, and Milton Lower Mills; the bill for a subway from Park Street to South Boston; the Bryant bill for the relocation of the Boston terminus of the new Cambridge subway from Park Street to Scollay Square; the Ham bill authorizing the use of trains in the Tremont Street subway; and the Grace bill providing for the discontinuance of the elevated railway structure on Washington Street and the extension of the Washington Street tunnel to Dudley Street. President Bancroft, of the Boston Elevated Railway, has petitioned for an amendment of the company's charter authorizing it to have all the powers of the general laws now or hereafter in force with reference to the carriage of newspapers, baggage, express matter and freight, and also allowing the company from time to time to hold the stock and securities of other street railway and electric railroad companies, subject to the approval of the Railroad Commission.

New Jersey.—Arguments for and against the Martin and Pierce bills to provide for public utility commissions were made to the House judiciary committee and the House committee on revision of laws, sitting jointly at a public hearing on March 8. The Martin bill is a copy of the measure introduced by Mr. Martin last year and which passed the House then, but did not get through the Senate. The Pierce bill is sanctioned by Governor Fort and is less radical in its provisions. The committee on revision of laws reported the Pierce bill on March 15. After a debate Mr. Martin and Mr. Pierce changed their votes on the adoption of the report bringing in the Pierce bill and sent the bill back to committee. This leaves Mr. Martin at liberty to advance his bill. A bill permitting the expenditure of $2,000,000 for a subway in Newark has been prepared for introduction in the Legislature. Mayor Haussling and the municipal committee of the Common Council of Newark have approved the measure.

New York.—The amendments providing for the modification of the Public Service Commission law placing telephone, telegraph, ferry and stage companies under the jurisdiction of the commission and the several other general amendments which constitute definitions of the powers and duties of the commission in greater detail were finally introduced in both branches of the Legislature on March 15. Perhaps the most important feature of the new legislation as it affects electric railways is that containing the general amendments of the law which has particular bearing on conditions in New York City and under which there is a provision giving the commission of the First District complete powers in fixing joint rates and regulating the issues of transfers between independent or allied lines. The power to fix joint rates for railroad and transportation companies was one of the provisions of the original act, but when an effort was made by the commission to exercise jurisdiction in this respect in New York City, the companies question the commission's authority in the courts on the grounds that "street railroads" had

not been specifically included in the provisions of the original bill. The clause of the present law dealing with the regulation of gas and electric light companies has been practically rewritten in the bill just introduced so as more closely to define the powers of the commission over gas and electric light companies. Another amendment of importance has to do with the present provision of the law giving corporations under the supervision of the commission the right to issue without consent short-term notes to meet emergencies. It is stated that in several instances the right has been abused by companies issuing notes at their own discretion and refunding the loan by another short-term issue instead of taking the issue up at expiration. The amendment introduced on March 15 prohibits refunding notes. The changes in the public-service law are contained in two bills, one of which is so drawn as to extend the supervision of the commission to the telegraph and telephone companies as before mentioned; the other is so drawn as to amend the law generally. Assemblyman McCue, of New York, in a bill introduced on March 11, proposes that the members of the Public Service Commission shall be elected for a term of four years and provides that the terms of the commissions now in office shall cease on Jan. 1, 1910. The Public Service Commission of the First District has made a report to the Legislature on the matter of the removal of the tracks of the New York Central & Hudson River Railroad on Eleventh Avenue, New York, to which reference is made in the article "Rapid Transit Proposals in New York," page 520 of this issue. The report covers the proceedings of the old transit commission and the various branches and permits under which the railroad operates. The commission asserts in the report that it has done all that is required of it according to the law. As at present restricted, the commission can lay out routes to be built with city money to carry passengers and freight, but it cannot grant a franchise to construct either a freight or passenger line with private capital. Governor Hughes has sent to the Legislature a message on the special franchise tax law, in which he says: "Present conditions with respect to legal proceedings for the collection of special franchise taxes are deplorable. The State with regard to these important rights is found to be enmeshed in a web of proceedings, and if we are to bring the litigation to an end and have the rights of the litigants determined with proper promptitude measures of relief must be provided without delay." The demand on all sides that the Elsberg law shall be so amended as to permit the construction of subway lines in New York with private capital and make it legal to grant a franchise for more thn 25 years has attracted no little attention to this measure with the result that several papers have published the law in full and then proceeded to point out how in the case of the applications of the Interborough Rapid Transit Company and the Inter-Terminal Belt Line, the law as it now stands will work seriously to the detriment of the city by making it impossible for the Public Service Commission to consider either application unless an amendment is passed at this session. The new city charter will also have to be changed as it provides for a grant of not more than 25 years.

Ohio.—A matter of interest to the residents of Cleveland, Cincinnati and other cities in Ohio is the enactment of Senator Mendelson's bill amending the Hunt elevated railway law, passed by a former Legislature so as to provide for the construction of subways. An attempt was made to transform this into political capital by some of the newspapers, which said that the amendment was inspired by Mayor Johnson, of Cleveland. Senator Mendelson says that the measure was suggested by the idea that the interurban railway companies may desire to reach a joint terminal in Cleveland by means of a subway and that the Mayor had nothing to do with the act. It is also stated that the Cleveland Terminal Railway wished the passage of the bill because of the insistence of the people of East Cleveland that it place its tracks in a subway. The new law provides that such subways be operated by electricity. The Woods tax commission bill did not reach the calendar in the Senate and, of course, is dead for the present, as the Legislature adjourned on March 12. It was opposed by many interests. During the absence of James C. Morris from the office of the State Railroad Commission on March 8, John C. Sullivan, the appointee of Governor Harmon, who had previously been approved by the Senate, took the position as Mr. Morris' successor and was recognized as a member of the commission by the other members. Mr. Morris will appeal to the Supreme Court to decide which is the legal member of the commission. Both received their appointments from a Governor of the State and both appointments were approved by the Senate.

Pennsylvania.—With final adjournment but a month away, the Pennsylvania Legislature will have plenty of work cut out for it if many of the more than 1000 bills thus far introduced are to reach the Governor. Not a measure affecting electric railway interests had passed both Senate and House up to March 15. In order that the various committees might have an opportunity to give proper consideration to measures already before them the introductions of new measures ceased on March 1. The Hunter bill, one of the most drastic measures affecting electric railway companies in second-class cities of the State, has passed the House and was up for final passage in the Senate on March 15. It was introduced in the House on Feb. 22 at the instance of Mayor-elect Magee, of Pittsburg, and gives to the mayor and councils in second-class cities (Pittsburg and Scranton are now the only cities of this class in Pennsylvania) the sole power to "regulate the street railway transportation and traffic, the carriage of passengers, the methods of carrying the same, the number, condition and movements of cars, the manner of taking on and discharging passengers and all other matters relating to the efficiency and adequacy of such public morals and comfort of the people in connection therewith, that such service shall in all respects be just and reasonable and councils are hereby empowered to pass all necessary ordinances to carry into effect the authority hereby conferred either by the creation of a municipal traffic commission or otherwise as they may deem proper and to prescribe penalties for the violation thereof." Should this bill become a law it would deprive the State Railroad Commission of all authority over the street railways in Pittsburg and Scranton and for that reason the measure is being opposed by the State Railroad Commission. The Pennsylvania Street Railway Association and the Pittsburg Railways Company are also opposed to the measure. Representatives of the Pittsburg Railways Company admit that the service now rendered by the company during the rush hours is not what it should be, but say that they will assist the State Railroad Commission in the latter's efforts to solve the problem, but can see no legitimate reason why the company should be subjected to the exactments of an incoming Mayor and Council admittedly hostile to the company. The bill is general legislation for a special purpose and would give the Pittsburg Department of Public Safety rights over the company that are positively iniquitous. The Grim bill, requiring street railway companies to transport the United States mail, has passed the Senate and is now in the House. The bill giving brothers and sisters the right to recover damages for accidents on steam and electric railways was up for final passage in the House on March 15. An attempt is being made by the representatives of the electric railways to have the Barton bill providing that the real estate of electric railway and other corporations be subject to taxation for local purposes, recommitted to committees. Should this bill pass the Legislature the revenues of boroughs and third-class cities would be largely increased at the expense of electric railways. The bill including electric railway companies among the corporations placed under the authority of courts of common pleas in the settlement of all disputes between municipalities and corporations as to the reasonableness of license fees imposed upon such corporations was up in the Senate on final passage last week. The bill giving to the mother of a minor child the right to institute suit or recover damages for injury or death on steam or electric railways was on first reading in the House on March 15. The Sproul bill prohibiting spitting in public conveyances and places was amended in the Senate to require corporations operating enclosed smoking cars to provide cuspidors. This bill has reached the final-passage stage in the Senate. Among the new bills introduced recently are the following: A duplicate of the 1907 bill providing for annulment of charters of railroads which have not done any work within two years after being incorporated unless they begin construction within six months after the passage of the act and build at least 25 miles of road each year until the road is finished; providing a fine of $10 per day for failure of a railroad or electric railway to open a road after being notified to remove an obstruction, designed to prevent the blocking of private roads and crossings; allowing five years for completion of railroads organized by purchasers at judicial sales; making regulations for incorporation of motor omnibus companies, providing route does not parallel any street railway for more than 20 per cent, the capital to be not less than $25,000. As a substitute for the Fahey bill, licensing electrical engineers and contractors in Philadelphia, a measure has been offered with this additional clause: "Nothing in this act shall be construed as applying to street railway or electric light, heat and power companies operating under city ordinances, or the employees thereof." On March 16 further consideration of the Magee measure was postponed indefinitely.

Financial and Corporate

New York Stock and Money Market

March 16, 1909.

Prices in Wall Street took a decided upward turn to-day, although there was not much activity. For the past week the tone of the market has been excellent and the sentiment of the Street sanguine, but there has been little trading. To-day, without increasing the volume of trading, prices of the most favored issues advanced sharply. The present strength of the market and its inactivity are attributed to the tariff agitation, for financial interests have become pretty well convinced that the tariff revision that is now in progress is not going to affect anybody very seriously. While this augers to steady the market, traders seem content to wait until something is actually done in the way of tariff legislation before beginning to buy for either investment or speculation. It is the prevailing opinion that there will be no substantial revival in business until after the settlement of the new basis of values. During the week the market has been little influenced by outside occurrences, although the collapse of the Government's case against the Standard Oil Company undoubtedly added to the feeling of security felt by large financial interests. The demoralization in the copper market has had little effect and Amalgamated shares were among the strongest in to-day's price advance. Traction stocks, while continuing to be rather active, have recorded only fractional price changes.

The demand for bonds has not been as insistent as during the past few months, although there is still no difficulty in placing new issues that have substantial property behind them. The trade balance for February was only $7,400,000 in our favor, as against $81,000,000 last year, and, while it explains the gold movement, still the engagement of gold for shipment is attracting attention. Money continues to be remarkably cheap and the supply is plentiful. Quotations to-day were: On call, 1¾ to 2 per cent; 90-day loans, 2½ to 2¾ per cent.

Other Markets

The stock market in Philadelphia has been dull during the past week, in sympathy with Wall Street, and the trading in tractions has been less active than in any other week since the beginning of the year. Union Traction has been rather more active than the others, but in none of the issues has there been any important trading. Price changes have been insignificant.

In the Boston market, only small lots of traction securities have found their way into the market. Boston Elevated and West End have been traded in to a limited extent and a few shares of Massachusetts Electric have been sold. Prices have remained on about the same levels that have recently prevailed.

Tractions in the Chicago market have been inactive, in spite of the active interest and discussion now in progress concerning consolidation projects. Even the various issues of the Chicago Railways, which were actively traded in for a time, have grown dull and only scattering lots are offered for sale. Prices are generally well maintained.

In Baltimore, the bonds of the United Railways continue to be popular. There is always a good market for these securities and prices are firm with a gradual upward tendency. The 4s are quoted at 87⅛ and the incomes at 53½.

Quotations of various traction securities as compared with last week follow:

	Mar. 9.	Mar. 16.
American Railways Company, Philadelphia	*46	45¾
Boston Elevated Railway	127	127¾
Brooklyn Rapid Transit Company	71⅝	71¼
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a78	a78
Consolidated Traction Company of New Jersey, 5 per cent bonds	a107	a107
Detroit United Railway	61	*61
Interborough-Metropolitan Company	15⅛	14⅞
Interborough-Metropolitan Company (preferred)	43⅜	44¼
Manhattan Railway	144	142⅛
Massachusetts Electric Companies (common)	14¾	*14¾
Massachusetts Electric Companies (preferred)	72	*71½
Metropolitan West Side Elevated Railway, Chicago (common)	19	*19
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	*28	*28
North American Company	80½	78⅜
Philadelphia Company, Pittsburg (common)	41⅝	47
Philadelphia Company, Pittsburg (preferred)	*42¾	*42¾
Philadelphia Rapid Transit Company	27½	27⅝
Philadelphia Traction Company	*93	91½
Public Service Corporation, 5 per cent collateral notes	a100¼	a100¼
Public Service Corporation certificates	a80¼	a81½
Twin City Rapid Transit Company, Minneapolis (common)	105	*105
Union Traction Company, Philadelphia	53½	53½

a Asked. *Last sale.

Report of the United Railways Company, St. Louis

The report of the United Railways Company, St. Louis, Mo., for the year ended Dec. 31, 1908, shows earnings as follows:

GROSS EARNINGS AND OTHER INCOME.

Passenger receipts		$10,410,716
Advertising privilege	54,000	
Mail	47,604	
Express	12,380	
Rental of power	20,528	
Interest (on deposits and securities)	20,847	
Miscellaneous	27,090	
Total		$10,593,165

OPERATING EXPENSES, TAXES AND DEPRECIATION.

Operating expenses	$5,577,410	
Taxes	632,193	
Depreciation (expended on the property)	527,856	
Total		6,737,459
Gross income		$3,855,706

FIXED CHARGES.

Underlying bonds	$615,550	
United Railways Company 4 per cent bonds	1,170,760	
St. Louis Transit Company 5 per cent bonds	500,000	
St. Louis & Suburban bonds	391,000	
Collateral trust notes	66,000	
Temporary loans	55,427	
Total		2,798,738
Net income		$1,056,968
Dividend on preferred stock ($16,983,200, at 5 per cent)		849,160
Surplus to profit and loss		$207,808

The traffic statistics for 1908 and 1907 compare as follows:

	1908.	1907.
Revenue passengers	211,459,570	216,779,638
Transfers and passes	99,129,708	97,165,511
Total passengers	310,589,278	313,945,149
Percentage of passengers using transfers	44.50	42.34
Average fare per passenger	3.35	3.39

The condensed balance sheet of the company as of Dec. 31, 1908, shows:

ASSETS.

Property and plant		$104,352,511
Securities in treasury:		
Preferred capital stock, United Railways (30,000 shares)	$3,000,000	
Preferred capital stock United Railways, reserve funds investment (6000 shares)	600,000	
Mortgage purchase 5 per cent gold bonds Missouri Electric Railroad	630,000	
First general mortgage 4 per cent bonds United Railways, employees' badge deposit fund ($15,000 par value)	12,000	
		4,242,000
Miscellaneous stocks		40,600
Current assets:		
Cash in banks, trust companies and depositories	$258,554	
Cash on deposit to pay bond coupons	49,210	
Cash on deposit for employees' savings	11,270	
Bills receivable	1,903	
United States, Post Office department	11,901	
City and county of St. Louis	3,782	
Bond and stock scrip	1,053	
Interest accrued on securities owned	20,625	
Insurance premiums and water license prepaid	40,869	
Open accounts	62,800	
Material and supplies	225,892	
		687,859
Total		$109,322,970

LIABILITIES.

Capital stock:			
Preferred shares	$20,000,000		
Less reserved for acquisition of capital stock of constituent companies	16,800	$19,983,200	
Common shares	$25,000,000		
Less reserved for acquisition of capital stock of constituent companies	86,200	24,913,800	
Total capital stock issued			$44,897,000
Total funded debt outstanding			59,180,000
Current liabilities:			
Audited vouchers and pay roll, payable January, 1909		$298,756	
Bond coupons matured, not presented		37,760	
Bills payable		1,035,937	
Employees' savings deposits		11,270	
Tickets outstanding		21,841	
Wages unclaimed		4,691	
Badge deposits, employees'		12,481	
Interest on employees' badge deposit fund		768	
Accrued liabilities:			
Taxes not due	$42,303		
Interest on funded debt	1,014,521		
Dividend on preferred stock, payable Jan. 11, 1909	212,290		
Sundry creditors	66,862		
Miscellaneous	5,968	1,341,944	
			2,765,448

Reserve funds:		
Injury and damage reserve	$785,087	
Fire insurance reserve	175,371	
Depreciation reserve	172,419	
Miscellaneous reserves	74,661	
		1,207,538
Profit and loss:		
Surplus, Dec. 31, 1907	$1,063,251	
Adjustments	1,925	
Profits from operation, 1908	207,808	
Surplus, Dec. 31, 1908		1,272,984
Total		$109,322,970

John I. Beggs, president of the company, in presenting the report of the company, said in part:

"Passenger earnings for 1908 as compared with 1907 decreased $248,320, equal to 2.33 per cent. Operating expenses, taxes and depreciation were reduced $306,422, equal to 4.35 per cent. The amount available for dividends increased $50,136. Dividends paid on the preferred stock for the year increased $200,000, owing to the fact that the $4,000,000 preferred stock issued for the acquisition of the St. Louis & Suburban Railroad Jan. 1, 1907, commenced to participate in dividends the beginning of the year 1908. The amount of earnings remaining available for dividends on the common stock for the year 1908 was $207,808, equivalent to more than four-fifths of 1 per cent.

"The percentage of passengers using transfers during 1908 increased to 44.50, as against 42.34 for 1907. The percentage of transfers issued in 1900 was only 25.70. The average fare per passenger in 1908 was 3.35 cents, as against 3.39 cents in 1907, showing that the revenue of the company per passenger is gradually being reduced, it having been 3.48 cents in 1900.

"Five per cent of the gross receipts each month has been credited to the depreciation reserve fund and charged to operation, as was done during the three preceding years. Of the amount so credited to this account during 1908 there has been expended on the property the sum of $513,924, leaving a balance of $13,931, which, together with a credit of $11,961 received from other sources, has been added to the balance at the beginning of 1908, leaving a credit to this account on Dec. 31, 1908, of $172,418.

"Since 1904 the amount of reconstruction and renewal of track in the city and county has been as follows: During 1904, 21.56 miles; during 1905, 8.90 miles; during 1906, 29.18 miles; during 1907, 21.65 miles; during 1908, 32.99 miles; total, 114.28 miles. These figures include work done on the tracks of the St. Louis & Suburban Railway since Jan. 1, 1907. For the three years previous to that date the St. Louis & Suburban Railway rebuilt 34.33 miles of its track in the county.

"During the year a license was obtained from the Pay-as-You-Enter Car Company, and 230 of our cars changed to that system and put into operation with satisfactory results to the company and to the public generally, it being our intention to change such of our cars as are suitable for this system and put them into operation as rapidly as possible on our several lines.

"In March, 1903, the Municipal Assembly of St. Louis passed an ordinance imposing an annual tax of 1 mill, payable quarterly, for each pay passenger carried as a car license fee. Our general counsel, Judge H. S. Priest, contends that this is double taxation, not justified by the city charter or the constitution of Missouri, and expresses great confidence in defeating the tax."

Report of the Chicago City Railway

The report of the Chicago City Railway Company for the 13 months ended Jan. 31, 1909, was made public March 16. President Mitten says:

"The within report covers a period of 13 months, this to include the extra month due to the end of the fiscal year having been changed, by action of the board of directors, from Dec. 31 to Jan. 31, in order to conform with the close of the operating year ending Jan. 31, as prescribed by the Settlement ordinance.

"Fifty-four-twelve miles of track have been reconstructed during the past year under the provisions of the Settlement ordinance, of which 22.90 miles represent replacement of cable tracks removed. The ordinance requires 94.71 miles of track to be reconstructed by April 15, 1910; 81.20 miles have been reconstructed, leaving but 13.51 miles to be reconstructed during the coming year. In addition to the foregoing, 7.99 miles of new track have been constructed since Jan. 1, 1908.

"The remainder of the 300 pay-as-you-enter cars purchased in 1907 have been placed in service, and 152 of the 300 cars purchased during 1905 and 1906 have been remodeled for pay-as-you-enter service. Two new car stations of large capacity and modern equipment have been built during the year. There are now four such stations all told with a total housing capacity of approximately 1100 cars.

"On June 1, 1908, an advantageous agreement was entered into with the Commonwealth Edison Company, whereby the railway company will purchase for a period of at least 10 years, all of the electrical energy used in the operation and maintenance of its railway system. A new substation has been built during the year and new rotary converters are now being installed therein. There are now four such substations with a total manufacturer's rated capacity of 36,000 kw. Additional rotary converters have been installed in each of the other substations, also an additional rotary converter and a large storage battery have been added to the railway company's equipment in the Plymouth Place substation of the Commonwealth Edison Company.

"The new underground conduit system for the distribution of power is practically completed and the installation of cables therein is well under way. Material improvements in the fire risk at the various buildings of the company have been effected, which have considerably decreased the liability of loss by fire."

The income account and operating statistics for the 13 months ended Jan. 31, 1909, are presented herewith:

GROSS EARNINGS.	
Passenger receipts	$8,979,735
Receipts from other sources	216,047
	$9,195,782
TOTAL EXPENSES.	
Operating expenses, taxes, renewals and interest on capital investment	$8,169,494
Net earnings	1,026,288
City's proportion, 55%, as per ordinance	564,458
Company's proportion, 45%, as per ordinance	461,830
Interest on capital, as certified by Board of Supervising Engineers	1,732,446
Income from operation	2,194,276
Other income (contractor's profit, brokerage, etc.)	655,207
	2,849,483
Interest on bonds outstanding	849,739
Net income	1,999,743
Dividends	1,620,000
Surplus for 13 months ended Jan. 31	$379,743
Percentage of net income to capital stock at par	11.11

OPERATING STATISTICS.		
Fare passengers carried	(Increase 2.90%)	180,243,173
Transfer pasengers carried	(Increase 6.97%)	111,977,693
Fare and transfer passengers	(Increase 4.43%)	292,220,866
Percentage of transfer to fare passengers		62.13
Double truck cars		805
Single truck cars		251
Total cars required by ordinance		1,056
Miles of single track owned		252.29

Denver (Col.) City Tramway Company.—The stockholders of the Denver City Tramway Company have approved the reorganization plan which has been under consideration for several months. It involves a new issue of $25,000,000 25-year 5 per cent bonds which may be issued up to 85 per cent of the amount expended for improvements and extensions.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—The application by the Maryland Trust Company, Baltimore, Md., for the appointment of a receiver for the Newport News & Old Point Railway & Electric Company, which was to have been heard by Federal Judge Waddill at Richmond on March 12, went over for future action.

Northwestern Elevated Railroad, Chicago, Ill.—The meeting of the committee of three having general charge of the negotiations for the consolidation of the elevated roads of Chicago and the committee of five representing the Metropolitan West Side Elevated Railway, which was the last to entertain the proposal to consolidate, was held on March 9, and it was announced that all the roads had given tentative approval to the proposed plan. The plan as now outlined provides for the formation of a central company to lease the property of the several companies, guaranteeing fixed dividends possibly on a sliding scale, based on the respective earnings of the several roads to be merged.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The Washington, Baltimore & Annapolis Electric Railway defaulted on its terminal bonds on March 1.

Traffic and Transportation

Stone & Webster Report on Pittsburg

The firm of Stone & Webster, which was engaged by the Pennsylvania State Railroad Commission to make a report on traffic conditions in Pittsburg, has rendered its report to the commission. The report states that the operating conditions in Pittsburg are particularly severe owing primarily to the topography, the location of the business district within a small area between two rivers, inadequate bridge approaches to this district, narrowness of the streets, etc. The report says that the physical condition of the track and overhead construction is good, but criticises the lighting of some of the short cars and says that the tendency is to overheat them, especially in rush hours. It also criticises the application of the pay-as-you-enter system to double-truck cars of the ordinary pattern, saying that owing to the small size of the entering platform considerable delay is occasioned during rush hours in loading passengers on the down-town loops. A serious cause for disarrangement of schedules is the blocking of grade crossings with steam railroads by freight trains. The better regulation of traffic by the police would improve conditions. Stone & Webster consider that the system of loops and terminals in the Terminal District appears to be the best possible attainable under the present conditions, and, in general, consider "that co-operation between local municipal and borough officials and the company would result in the removal of the same, at least of the onerous conditions under which the service is now being performed."

In conclusion, the report recommends:

"First. That wherever insufficient car clearances exist, and it is possible to do so, the condition be improved, thus providing greater safety and reduced delays.

"Second. That proper action be taken by State or municipal authorities to better regulate the use of street crossings at grade by cars and trains of steam railroads, thereby reducing delays to the minimum.

"Third. That the proper municipal action be taken looking toward better police regulation of street traffic, to the end that street cars may have a more unobstructed use of the tracks, thus reducing delays and consequent congestion.

"Fourth. That at 'rush hours' the company station inspectors or starters at important points with authority to regulate the headways of cars on the various lines and assist car operatives, to the end that a closer adherence to schedules may be maintained.

"Fifth. That at important junctions in the Terminal District during rush hours, switches be operated electrically or by employees other than those operating the cars.

"Sixth. That the company improve the lighting arrangement in the few short cars before referred to.

"Seventh. That the company instruct car operatives to give better attention to the heating and ventilation of cars, more particularly at the rush hours.

"Eighth. That additional service be provided by the company during rush hours, by adopting tripper service or more tripper service on 13 routes." The routes are here specified.

Work of Baltimore Company Commended

The storm that affected Washington, Baltimore and vicinity during inauguration week was one of the worst that has visited that part of the country in years, as is testified to by the accounts of the inauguration ceremonies. Baltimore was particularly hard hit. Despite this, however, the United Railways & Electric Company maintained service continuously and doubtless would have operated on schedule had it not been for the interference of foreign poles and wires, of which 60 fell across the tracks of one suburban line of the company. As a result of the excellent work done by the company, William A. House, the president, was the recipient of many congratulatory letters and expressions of opinion. These he transmitted to T. A. Cross, general manager of the company, with an expression of appreciation of the part played by the men in making the service complete and satisfactory. Mr. Cross, desirous that the employees should share with him the appreciation expressed by Mr. House, addressed the following letter to the heads of departments on March 8:

"I am in receipt to-day of a communication from the president, advising of messages and calls from stockholders and friends of the company, complimenting the management upon the manner in which the service was maintained upon the principal city lines, and the promptness with which it was restored on the suburban lines after the storm of March 3 and 4. I quote one of the letters received by Mr. House: 'I want to extend to you my compliments, not only to you, but to your able assistants for the splendid work in keeping up your service in the face of such great difficulties.' I also quote from Mr. House's reply:

"'On behalf of my assistants and for myself I wish to thank you for your very complimentary note, referring to our work during the blizzard. With your permission, it will give me much pleasure to inform the general manager and through him the departmental heads of your commendation.

"'The way in which our overhead structures and equipment held up in one of the most disastrous storms during my connection with the street railways of Baltimore best certifies to the policy of the company, in making large expenditures for the rehabilitation of its property. You will doubtless fully appreciate this fact when it is stated that this company did not lose a single pole, either wooden or iron; nor did it lose any of its overhead structures, except as a result of the falling of wires and poles of foreign corporations upon them. Furthermore, its snow-fighting equipment is second to none in the country and fully able to cope with the severest storms in this climate. With our property and equipment in such splendid physical condition, and with the knowledge of the marked efficiency of the operating department and the employees in the several divisions, and, above all, their great loyalty to this company's interests, any other result would have been disappointing.'

"I also desire to commend the heads of the departments and those under their supervision for their hearty co-operation and untiring efforts in opening up the lines and restoring the service as rapidly as possible to its normal condition.

"Will you kindly advise your employees of the above, in order that they may know that their loyalty and interest have been appreciated, not only by the management, but by the public as well."

In commenting editorially on the service of the company the Baltimore *Sun* said:

"President William A. House is a man of action, rather than of words, and is not given to the expression of undeserved praise, so that his open letter commending the men of the street car force carries with it added weight. The Baltimore street car men are loyal, hardworking and efficient, and their good qualities never show so plainly as in an emergency. Motormen, conductors, trackmen, wiremen, electricians—men in all departments worked together last week and kept traffic moving under the most trying conditions. From Mr. House down to the last trackman, they deserve the thanks and commendation of the citizens of Baltimore."

New Limited Service for the Ohio Electric Railway.—On April 1, the Ohio Electric Railway will adopt a schedule calling for the run between Toledo and Dayton to be made in five hours. In the beginning five trains will be maintained between the two points. This schedule will also provide limited service between Toledo and Fort Wayne, Ind., by way of Lima.

Union Depot Project at Toledo.—The interurban electric railways entering Toledo have signed a lease with the E. H. Close Realty Company for ground on the east side of Superior Street, near Jackson Street, where a union passenger station with a frontage of 96 ft. and a depth of 70 ft. will be erected. It is said to be the intention to begin work on the building at once, with the expectation that it will be sufficiently well advanced to permit its use this summer.

Officers at Railroad Crossing Improve Service at Toledo.—J. M. Enright, manager of railways of the Toledo Railway & Light Company, Toledo, Ohio, has notified Mayor Whitlock that the service has been greatly improved since the city placed policemen at the railroad crossings. When complaint was made regarding the service, Mr. Enright notified the city that cars were frequently delayed at railroad crossings by trains and asked that officers be stationed at these places to see that the crossings were not blocked needlessly.

Commutation Tickets on the Buffalo & Lake Erie Traction Company's Line.—The Public Service Commission of the Second District of New York has approved the following commutation rates of the Buffalo & Lake Erie Traction Company, effective March 12 on three days' notice: Fares per book of 46 one-way school commutation tickets, good in either direction, on school days only, between Lake View and Angola, $3.45 per book; Irving and Angola, $3.45 per book; Silver Creek and Dunkirk, $4.60 per book; Sheridan and Dunkirk, $2.30 per book; Sheridan and Silver Creek, $2.30 per book. No school commutation fares have been in force between the points specified.

Personal Mention

Mr. A. S. Flatland has resigned as master mechanic of the Jersey Central Traction Company, Keyport, N. J.

Mr. John R. Mitchell, president of the Capital National Bank, St. Paul, Minn., has been elected a director of the Twin City Rapid Transit Company, Minneapolis, Minn., to succeed Thomas Lowry, deceased.

Mr. T. H. McCauley, formerly manager of the Port Arthur & Ft. William Electric Railway, Port Arthur, Ont., has been appointed manager of the municipal electric railway being constructed at Calgary, Alta.

Mr. Fred Rapp, formerly connected with the Public Service Railway, Newark, N. J., as foreman of one of its shops, has been appointed master mechanic of the Atlantic City & Shore Railroad, Atlantic City, N. J.

Mr. C. H. Gibbs has resigned as superintendent of traffic of the Galesburg Railway & Light Company, Galesburg, Ill., and Mr. R. E. Carley has been appointed to succeed him. Mr. Gibbs, however, will remain with the Illinois Traction System in another capacity.

Mr. Horace Lowry, superintendent of the Minneapolis division of the Twin City Rapid Transit Company, has been elected a director of the Minneapolis, St. Paul & Sault Ste. Marie Railway, Minneapolis, Minn., to fill the vacancy caused by the death of his father, Thomas Lowry.

Mr. C. S. Sims has been elected president of the Schenectady (N. Y.) Railway and Mr. H. E. Andrews has been elected vice-president of the company. Mr. Sims was formerly vice-president of the company and Mr. Andrews was formerly president of the company. Mr. Sims is second vice-president of the Delaware & Hudson Company.

Mr. C. H. Walker, district passenger and freight agent of the eastern and central divisions of the Ohio Electric Railway, Cincinnati, Ohio, has been appointed superintendent of the Dayton-Richmond and Dayton-Union City divisions of the Ohio Electric Railway, reporting to Mr. F. J. Moore, superintendent of transportation of the Ohio Electric Railway. Mr. Walker's headquarters will be at the station of the Ohio Electric Railway at Dayton.

Mr. George M. Mattis, whose election as vice-president of the Illinois Traction System, Champaign, Ill., was noted in the Electric Railway Journal of March 6, 1909, was graduated from Princeton University in 1901. His first work after leaving college was with a company doing a farm mortgage business with which he remained until 1905. He then became associated with the Illinois Traction System as assistant treasurer and occupied that position for three years. During 1907, Mr. Mattis was made general superintendent of the eastern division of the Illinois Traction System, which comprises the lines of the system east of Decatur, Ill. In 1908, he was elected treasurer of the system, which position he still holds, now acting in the capacity of vice-president and treasurer of the system.

Mr. J. T. Nyhan, who was recently appointed general manager of the Macon Railway & Light Company, Macon, Ga., has assumed the duties of that office. Mr. Nyhan was formerly connected with the American Waterworks & Guarantee Company, Pittsburg, Pa., for which he was engaged in special work at Shreveport, La., recently, and before becoming connected with the American Waterworks & Guarantee Company in 1908, he was superintendent and general manager of the Macon Railway & Light Company, holding these positions from 1893 to 1907. Before entering the employ of the Macon Railway & Light Company in 1893, Mr. Nyhan was engaged in New York in construction work with the Thomson-Houston and the General Electric Companies. Mr. Nyhan is a member of the American Institute of Electrical Engineers.

Mr. S. B. Thompson, mechanical engineer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, and J. R. Townsend, electrical engineer of the lighting department of the company, have resigned, and their duties have been assumed by Mr. H. L. Patterson, heretofore superintendent of railway power, whose title hereafter will be mechanical engineer. Mr. E. H. Beil, superintendent of light and power, has been given the title of assistant mechanical engineer. Mr. Fred Finch, superintendent of track, and Mr. U. S. Sliter, superintendent of transportation, have also resigned, and their duties have been assumed by Mr. G. J. A. Paul, general superintendent of railways. Mr. Emmet D. Gault has been promoted from chief clerk to auditor, and Mr. Elton G. Dunlap, heretofore assistant chief clerk, has been made assistant treasurer of the company.

Mr. Eugene Eichel, consulting engineer, of Berlin, has been appointed editor of *Elektrische Kraftbetriebe und Bahnen,* to take the place of Dr. Eng. W. Reichel, who has been obliged to give up active editorial work on account of the pressure of professional duties. Dr. Reichel will remain, however, in an advisory capacity and will be associated on the advisory committee with Mr. K. Wilkens, manager of the Berlin Electrical Works, and Privy Councillor G. Wittfeld, of the department of public works. Mr. Eichel, upon whom the active editorial work will fall, was for five or six years associated with the engineering department of the General Electric Company at Schenectady. He presented an extensive paper on "Electric Railway Development in America" at the Munich meeting of the International Street & Interurban Railway Association, last September.

Mr. George F. Faber, whose appointment as traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., was noted in the Electric Railway Journal of March 13, 1909, began his railroad career with the Pennsylvania Railroad as clerk in the superintendent's office, where he served from 1890 to 1892. He resigned from this position to become connected with the accounting department of the East Cleveland Railroad, for which, during 1893 and 1894, he filled several minor offices of responsibility and trust. From 1894 to 1901 Mr. Faber was associated with the Warner & Swasey Company, Cleveland, Ohio. His position with this company afforded him an opportunity to obtain a thorough knowledge of general machine designing, and during 1900 and 1901 he had charge of the company's department of record of costs on all apparatus manufactured. Mr. Faber's object in resigning from this company was to re-enter the electric railway field, and he accepted a position with the so-called Appleyard Lines in Ohio, and afterward acted as superintendent of two of the properties until the termination of the receivership. He then accepted the position of superintendent of the Elgin-Belvidere Electric Railway, which was at that time under construction. After the completion of this property he organized and operated the road for a year, leaving the company to become general superintendent of the Western Ohio Railway, Lima, Ohio, in charge of transportation, car shops and power station.

Mr. Calvin G. Goodrich, vice-president and managing director of the Twin City Rapid Transit Company, Minneapolis, was elected president of the company on March 16, to succeed the late Mr. Thomas Lowry. Mr. Goodrich has long been prominent in electric railway transportation matters, both in the councils of the American Street & Interurban Railway Association, of which he was president last year, and in the Twin City Rapid Transit Company, of which he has been the chief executive officer for a long time. He has been connected with the Minneapolis system for 32 years. Mr. Goodrich was born in Oxford, Ohio, on March 12, 1856, the son of Dr. Calvin G. Goodrich and Mary A. Goodrich, and in 1868, with his father, moved to Minneapolis. When 21 years of age, on Mr. Lowry's invitation, Mr. Goodrich entered the service of the Minneapolis Street Railway Company as auditor, and for a long time he was the only man in its accounting offices. On July 2, 1878, he was elected secretary of the company, and on July 10, 1880, a director. On Aug. 14, 1883, Mr. Goodrich was appointed superintendent of the company, and shortly afterward, general manager. On June 12, 1886, he was elected vice-president and general manager of the company, resigning the office of secretary. Later, with Mr. Lowry and Mr. Clinton Morrison, he secured control of the St. Paul City Railway, and assumed the management of the property, and when the Minneapolis and the St. Paul properties were merged as the Twin City Rapid Transit Company, on June 5, 1891, Mr. Goodrich retained the title of vice-president and general manager of the consolidated company. Later he was elected vice-president and managing director of the company, and it has always been his ambition to make the system the best in the United States. Mr. Goodrich is also president of the Duluth-Superior Traction Company, is a member of the leading clubs of Minneapolis and St. Paul, and takes an active part in everything that tends to the betterment and the development of both cities.



C. G. Goodrich

Mr. F. P. Woy, who for a year and a half has been manager of the Twin State Gas & Electric Company, Brattle-

boro, Vt., operating the Brattleboro Street Railway and the Brattleboro Gas Light Company, operating the electric railway, electric light and gas properties in Brattleboro, West Brattleboro, Dummerston, Vt., and Hinsdale, N. H., has resigned to open an office as a consulting engineer in Madison, Wis., for the purpose of handling engineering work which he already has in hand and do a general consulting and engineering business for electric railway, electric light and gas companies. Mr. Woy was employed by J. G. White & Company, New York, N. Y., for a number of years in connection with their extensive construction work and operation of properties throughout the United States, and has at various times been connected with the construction and operation of plants in different parts of the United States.

Mr. Willard J. Hield, general manager of the Twin City Rapid Transit Company, was also elected vice-president of the company at a meeting of the board of directors held in New York March 16. Mr. Hield has been in the employ of the company for more than 21 years. Mr. Hield was born in Janesville, Wis. He went to Minneapolis in 1887, and entered the employ of the Minneapolis Street Railway Company immediately as clerk in the old Third Avenue North offices. In 1889 the company faced a great many operating problems, and Mr. Hield was assigned to outside work. A few months later he was made superintendent of the Old Motor Line, filling that position until it was abandoned as a steam line. His next assignment was to construction work, and he took a most active part in the electrification of the lines in Minneapolis. In the summer of 1891 the work of electrification being well in hand, Mr. Hield was appointed superintendent of the Minneapolis Street Railway, and in December, 1891, he was advanced to the position of general manager. In July, 1892, following the incorporation of the Twin City Rapid Transit Company, Mr. Hield was made general manager of the company. Still later his duties were extended to cover the lines operated by the Minneapolis, St. Paul & Suburban Railway.



W. J. Hield

Mr. Leonard S. Cairns, who has been appointed general superintendent of the Twin City Rapid Transit Company, is a native of Wisconsin, but has spent most of his life in Minneapolis. Mr. Cairns received his schooling in Minneapolis, and has been in the employ of the Twin City Rapid Transit Company for the past 12 years. He commenced work as a clerk in the office of the superintendent of the Minneapolis Division, and has held almost every position in the operating department. From a clerkship in the superintendent's office he was promoted to chief clerk and, later, to assistant superintendent. In the fall of 1905, when the company opened its new interurban line between Minneapolis and Lake Minnetonka, Mr. Cairns was put in charge of that part of the system, and soon after was given the title of superintendent of interurban lines, having jurisdiction over the Lake Minnetonka and Stillwater interurban lines and the three interurban lines between Minneapolis and St. Paul. In the summer of 1906 the company began the operation of a fleet of 12 steamboats on Lake Minnetonka, and it devolved upon Mr. Cairns to master marine operation. To his credit, it can be said that he did this added work so well that the successful operation of the steamboat fleet on Lake Minnetonka is one of the wonders of the many visitors to the Twin Cities. Up to recently Mr. Cairns has held the title of superintendent of interurban and steamboat divisions. His new title of general superintendent came as a reward for faithful and efficient service.



L. S. Cairns

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

City & Suburban Railway, Brunswick, Ga.—Application has been made to the Secretary of State by this company for a charter to construct and operate an electric railway not less than 4 miles in length in Brunswick. Principal office, Brunswick. Capital stock, $50,000. Among the applicants for the charter are: F. D. M. Strachan, Frank D. Aiken, E. F. Coney, C. Downing and Albert Fendig. [S. R. J., Jan. 11, '08.]

Paris-Northern Railway, Danville, Ill.—This company has been incorporated for the purpose of building an electric railway from Ridgefarm to Paris, connecting the traction systems of Illinois with those of Ohio and Indiana. It is stated that the company has completed the surveys and is now at work securing the right of way. Principal office, 115 North Vermilion Street, Danville. Capital stock, $5,000. Directors: W. M. Bridgett, R. C. Parks, L. C. McGee, George G. Roland and Charles Troup. [E. R. J., March 13, '09.]

***Lake Arthur, Jennings & Northern Railway, Jennings, La.**—This company has been incorporated in Louisiana to construct an electric railway from Lake Arthur through Jennings, to connect with a point on the Colorado Southern, New Orleans & Pacific Railroad, a distance of about 50 miles. Headquarters, Jennings. W. B. Conover, president.

***Sunbury, Lewisburg & Milton Railroad, Selinsgrove, Pa.**—Application has been made by this company for a charter to build an electric railway between Shamokin Dam and Lewisburg. The applicants for the charter are: Boyd A. Musser, J. C. H. Newcomer and C. M. Clements.

FRANCHISES

Atlanta, Ga.—The Atlanta & Carolina Interurban Railway has applied to the City Council for an extension of its franchise. The present franchise held by the company expires April 1, and it is desired that the franchise be extended to Nov. 1. [E. R. J., Aug. 29, '08.]

Chicago, Ill.—The ordinance granting the Kensington & Eastern Railroad a 20-year franchise was defeated by the City Council on March 8 by a vote of 35 to 18. Following the defeat of the measure permission was obtained to reintroduce it as new matter, and it was sent back to the transportation committee. The company proposes to construct an electric railway, 8 miles in length, between the Illinois Central Railroad at Pullman and the Chicago, Lake Shore & South Bend Railway at Hammond, Ind. [E. R. J., Jan. 23, '09.]

Farmington, Ill.—The Peoria & Galesburg Electric Railway has applied to the City Council for 50-year franchise to build and operate an electric railway over certain streets of Farmington. [E. R. J., Dec. 26, '08.]

Decatur, Ind.—The Common Council has passed an ordinance granting the Fort Wayne & Springfield Railway a franchise to extend its railway through Decatur. It is stated that the company contemplates extending its railway to Monroe and Berne.

Seymour, Ind.—The voters of Jackson Township, in which Seymour is situated, have voted against a subsidy tax in aid of the construction of the Brownstown Water, Light & Traction Company's interurban railway to connect Seymour and Brownstown. This is the second election held in the township for the same purpose. [E. R. J., Feb. 27, '09.]

Mineola, N. Y.—The New York & North Shore Traction Company has been granted an extension of six months' time by the Nassau County Board of Supervisors on its franchise over the North Hempstead turnpike from Foley's corner at Roslyn to the North Hempstead town line at Little Neck.

Oklahoma City, Okla.—The Oklahoma Interurban Traction Company, which proposes to construct an electric railway from Oklahoma City through Capitol Hill to El Reno, has applied to the City Council for a franchise to build its lines along certain streets of the city. L. E. Patterson is the local representative of the company. [S. R. J., Nov. 30, '07.]

Astoria, Ore.—The City Council has passed an ordinance granting a 30-year franchise to the Oregon Coast Railway for the construction of an electric railway over certain streets in Astoria. The company proposes to build an electric railway from Astoria to Seaside.

Carlisle, Pa.—The Cumberland Railway has been granted a franchise to construct an electric railway from Middlesex to Newville, via Carlisle, and along the line of the State Road westward from Carlisle. W. E. Glatfelter, Balfour, president. [E. R. J., Nov. 21, '08.]

Collingdale, Pa.—The City Council has passed an ordinance granting the Philadelphia & Garrettford Street Railway a franchise to build a railway in Collingdale. By the completion of this link through service will be established from the Sixty-ninth Street terminus of the Market Street Elevated Railway to Chester.

***Elizabeth, Pa.**—An ordinance has been passed by the Borough Council granting a franchise to the Peters Creek Street Railway. It grants right of way over certain streets, and provides for a connection with the Pittsburg Railways Company lines at Dravosburg.

Greenville, S. C.—The City Council on March 2 passed a resolution declaring the franchise of the Greenville Traction Company to be invalid. The company operates an electric railway in Greenville 12 miles in length. The franchise of the Greenville Gas & Electric Company, which is owned by the Greenville Traction Company, was also declared invalid.

***Ogden, Utah.**—An application has been made to the County Commissioners by Lyman Skeen, Joseph A. Taylor and J. M. Child for a franchise to construct an electric railway from the northern limits of Ogden through Harrisville, Far West to Plain City.

Juneau, Wis.—The Milwaukee Western Electric Railway has been granted a franchise for that section of its proposed electric railway which is to be built between Hustisford and Beaver Dam. J. W. Barber, Majestic Building, Milwaukee, secretary. [E. R. J., March 13, '09.]

TRACK AND ROADWAY

J. F. Donahoo Company, Birmingham, Ala.—The ELECTRIC RAILWAY JOURNAL is advised that this company is in the market for steel rails.

***Medicine Hat, Alta.**—It is stated that the Southern Alberta Land Company is making preparations for the construction of the electric railway which is to run out over its holdings from Medicine Hat.

Calgary (Alta.) Municipal Railway.—The City Council has awarded the contract for the steel poles required for the street railway to the Standard Supply Company at $32.50 each for 28-ft. poles.

Edmonton (Alta.) Radial Railway (Municipal).—The City Commissioners have recently awarded the following contracts for material: The Federal Electric Company, Montreal, Que., aluminum, contract price, $4,550. The Northwest Electric Company will furnish the overhead specials for $1,947.90. Wm. Stuart & Company will supply the wooden poles needed for $3,400, while copper bonds will be furnished by the Canadian General Electric Company, Peterborough, Ont., for $5,070.

***Phoenix, Ariz.**—It is said that a company will be organized within a few weeks for the purpose of constructing an electric railway in Phoenix to connect with a line to be known as the Suburban Railway. Application has already been made to the City Council for a franchise. It is the intention of the promoters to haul both passengers and freight. It is probable gasoline electric cars will be operated. Among those interested in the enterprise are: J. W. Dorris, George M. Halm, Homer B. King, F. J. Bennitt and B. A. Fowler.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—It is stated that this company has resumed work on its proposed electric railway between Fresno and Hanford. Surveys are being made and it is expected that grading will commence about April 1. W. F. Davis, of the Cleveland Construction Company, is in charge of the preliminary work. [E. R. J., Nov. 28, '08.]

Groton & Stonington Street Railway, New London, Conn.—Surveys are being made for a proposed extension of this company's railway from Mystic to Old Mystic, a distance of 3 miles. It is stated that the company will petition for a charter to build the extension.

***Elberton, Ga.**—Guy G. Rucker, Ruckersville, Ga., has, it is reported, proposed the construction of an electric railway from Iva, S. C., via Ruckersville to Elberton, Ga.

Cairo & St. Louis Railway, Cairo, Ill.—This company has filed for record a mortgage for $250,000, with the Portland Trust Company, Portland, Maine, trustee. The proceeds of the issue are to be used for improvements, chief among these being the construction of an electric railway from East St. Louis to Cairo. The new line is to pass through Belleville, Sparta and Murphysboro. [E. R. J., Dec. 12, '08.]

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This company is reported to have awarded a contract to the Western Electric Company for the overhead material to be used on the railway under course of construction from Streator to Ottawa. [E. R. J., Feb. 6, '09.]

***Turner, Kan.**—A number of business men of Turner, 2 miles west of Argentine, are reported to have organized a stock company for the construction of an electric railway from Turner to Argentine to connect with the Metropolitan Street Railway Company's line there. These officers were elected: J. J. Swingley, chairman; L. P. Hewitt, treasurer; F. L. Strickland, secretary, and F. G. Shedd, C. A. Gaither and R. H. Perkins, directors. The capital stock and a name for the company have not been decided on. At the meeting of the promoters $6,000 was subscribed for the line. It will be 1¾ miles long. The right of way from Argentine to Turner has been secured.

***Minneapolis, Minn.**—A company has been formed with C. A. Nelson, chairman, to build a railway from Minneapolis to Anoka. It is probable that the company will operate gasoline electric cars. The sum of $75,000 is said to have been pledged by C. J. Swanson, Minneapolis, and others toward the building of the railway.

***St. Louis, Mo.**—Mark L. Belt, manager of the Higginsville Switch Company, a coal railroad 6 miles long, is said to be interested in a plan to construct an electric railroad to extend from Lexington to Warrensburg, Johnson County, 44 miles. The proposed line would embrace the property of the Higginsville Switch Company, which would be extended northwest to Lexington. The southern extension, as proposed, will be a direct line from Higginsville to Warrensburg.

Rochester & Manitou Railroad, Charlotte, N. Y.—This company has awarded contracts for the construction of an 1800-ft. viaduct and a 600-ft. wood-piled trestle across Braddocks Bay. The contract for the viaduct was awarded to the Buffalo Expanded Metal Company and the trestle work was awarded to A. F. Chapman, Buffalo. It is said that the cost of the improvement under the contracts will be $25,000.

New York, N. Y.—The Public Service Commission of the Second District has ordered a hearing for March 25 on the application of the Union Railway to extend one of its lines in the Bronx from the junction of Third Avenue and Pelham Avenue easterly along Pelham Avenue to the Southern Boulevard. The Public Service Commission has also ordered a hearing for March 19 on the application of the Third Avenue Railroad Company for permission to build an extension on its Fort George Avenue line.

Newark & Marion Railway, Newark, N. Y.—It is reported that this company is planning to extend its railway northward to Williamson, on the Rochester & Sodus Bay Railway, a distance of 6 miles. It is stated that the company has already begun making the necessary surveys. The company at present operates a railway between Newark and Marion, a distance of 10 miles. Steam is being used as motive power, temporarily.

Weaverville Electric Company, Asheville, N. C.—It is stated that this company has completed the surveys for its electric railway through Yancey County to Huntdale and is now making profiles of the proposed route. The company already operates an electric railway between Asheville and Weaverville.

***Pomeroy, Rock Springs & Athens Traction Company, Pomeroy, Ohio.**—This company is said to have completed the preliminary survey for its proposed electric railway which is to extend from Pomeroy to Athens. The power plant will be located on the fair grounds at Rock Springs. A. W. Lee, Pomeroy, chief engineer.

***Brantford, Ont.**—It is stated that Paul Huffman is interested in a plan to build an electric railway from Delhi to Burford, touching Kelvin, Northfield and Harley, and connecting with the proposed Brantford & Woodstock Railway. Application will soon be made for a charter.

Lebanon & Southern Street Railway, Lebanon, Pa.—J. M. Shenk advises that this company has been formed for the purpose of constructing a railway, 20 miles in length, from Lebanon to Buffalo, Schaefferstown, Klinefeltersville, Newmanstown and Womelsdorf. It has not yet been decided what the motive power will be, but it is likely that the company will operate motor cars. As yet no contracts have been awarded. It is the intention of the promoters to begin construction work as soon as the sum of $150,000 is subscribed. The company has not yet been incorporated. Capital stock, $300,000. Officers: J. M. Shenk, president; Wm. P. Coldren, vice-president; Charles Coldren, secretary; Frank Houck, treasurer, all of Lebanon. [E. R. J., Dec. 19, '08.]

York (Pa.) Railways.—This company, on March 14, placed in operation that portion of its railway between Dallastown and Red Lion. The stretch is several miles long and is nearly a direct route between the two towns. It is stated that the remainder of the line between Dallastown and York will be put in operation within the next two months.

***Austin Springs Railway, Johnson City, Tenn.**—J. B. Cox, Johnson City, writes he has organized this company to build a railway between Johnson City and Austin Springs, a distance of about 5 miles. Surveys have been made for the route and contracts placed for the rails. It has not yet been decided what motive power will be used.

Northern Texas Traction Company, Fort Worth, Tex.—The Commercial Club of Arlington is said to have made a proposition to this company for the construction of an electric railway from Arlington to Cleburne, by way of Mansfield. It is stated that the company has taken the matter under consideration.

Seattle (Wash.) Electric Company.—This company has been granted permission to construct a new city road bridge on Fifteenth Avenue, W. Elliott Avenue and Beach Drive, and to double-track the present line.

Okanogan Electric Railway, Spokane, Wash.—This company is reported to have awarded a contract to W. C. Gray for the grading of 40 miles of roadbed. The contract for the light work in grading will be let later. The company proposes to build an electric railway from Nighthawk to Brewster, a distance of 60 miles. The power station will be located near Cuess. A. M. Dewey, Empire State Building, Spokane, president. [E. R. J., Aug. 22, '08.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company is said to be having plans prepared for an office building and terminal station which it proposes to erect at the corner of Hastings Street and Carroll Street, at a cost of $200,000. [E. R. J., Sept. 5, '08.]

Portland (Maine) Railroad.—This company has about completed its new car house in Westbrook. The dimensions of the building are 100 ft. x 120 ft. and its floor space covers an area of about 12,000 sq. ft. It contains eight tracks, which will accommodate 32 cars, a boiler house and also a machine and blacksmith shop. In addition to this there are located in the building a waiting room and the offices of the division superintendent.

Dartmouth & Westport Street Railway, New Bedford, Mass.—Announcement is made that this company expects to erect a brick freight shed 63 ft. x 125 ft., one story high, and office building 25 ft. x 83 ft., two stories high, to be located on the northeast corner of Water and Hazard Streets.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—This company has awarded John A. Maher the contract for the construction of a repair and paint shop to be located on North Warren Street, near Hanover Street. The new structure will be one story high, and will be built of stone and brick. It will extend from Warren Street to the present car house of the company, at Hanover Street and Chancery Street. It is estimated that the building, when completed, will cost $25,000.

Toledo, Ohio.—The interurban electric railways entering Toledo have signed a lease with the E. H. Close Realty Company for ground on the east side of Superior Street, near Jackson Street, where a union passenger station with a frontage of 96 ft. and a depth of 70 ft. will be erected. It is said to be the intention to begin work on the building at once, with the expectation that it will be sufficiently well advanced to permit its use this summer. Plans for the structure provide for a waiting room 60 ft. x 80 ft., rest room, smoking room, baggage room, ticket office, etc. The building will be two stories high and the second floor will be used for railroad offices.

POWER HOUSES AND SUBSTATIONS

Schenectady (N. Y.) Railway.—This company has awarded a contract to Brown & Lowe, Schenectady, for the construction of a substation on the Outlet Road, on the Saratoga division of its system. The new substation will supersede the one now in use at Ballston Lake, and in design will be similar to the one at Karners Station, on the Albany division. The work will be started at once and the plant will be in readiness, it is said, by June 15.

Denison & Sherman Railway, Denison, Tex.—This company will build a new substation at Woodlake.

Sea View Railroad, Narragansett Pier, R. I.—This company, which operates an electric railway between East Greenwich and Narragansett Pier, expects to install a 400-kw Westinghouse-Parsons steam turbine in its Sea View power station.

Manufactures & Supplies

ROLLING STOCK

Tri-City Railway, Davenport, Ia., is in the market for 10 single-truck closed cars.

Springfield (Ill.) Consolidated Railway will purchase five closed cars for delivery in the fall.

Ogden (Utah) Rapid Transit Company has ordered four cars from the Cincinnati Car Company.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont., it is reported, is in the market for some new cars.

Burlington (Vt.) Traction Company has purchased four large open cars from J. M. Jones Sons Company, Watervliet, N. Y.

Gary, Hobart & Valparaiso Railway, Valparaiso, Ind., it is reported, will purchase four cars. Standard o-60 trucks are to be used.

Springfield (Ill.) Consolidated Railway has purchased a 3000-gal. sprinkler car from McGuire-Cummings Manufacturing Company, Chicago.

Chicago & Milwaukee Electric Railroad, Chicago, Ill., has purchased one sprinkler car from McGuire-Cummings Manufacturing Company, Chicago.

Hudson & Manhattan Railroad, New York, N. Y., has placed an order with W. T. Van Dorn Company, of Chicago, Ill., for 92 pairs of large type No. 20½ drawbars.

J. F. Donahoo Company, Birmingham, Ala., desires to purchase electric interurban, logging, box, flat and coal cars. It will also buy locomotives, locomotive cranes and derricks.

Oak Bluffs (Mass.) Street Railway will purchase during the summer one or more cars to be operated with gasoline motors and run in connection with the company's electric road.

Michigan United Railways, Lansing, Mich., has purchased 9 sets of trucks from the Baldwin Locomotive Works. This company is rebuilding several of its large interurban cars at its Albion car shops.

Indiana Union Traction Company, Anderson, Ind., desires to purchase immediately three to five 30 or 40-ton second-hand ballast cars. It prefers the Hart Convertible car for use either as flat bottom gondolas or side or center dump.

Austin Springs Railway, Johnson City, Tenn., a proposed road between Johnson City and Austin Springs, wants prices on one gasoline motor car, one freight car and three or four trailers. Address J. B. Cox, Johnson City, Tenn.

Fort Wayne & Springfield Railway, Decatur, Ind., which was reported in the Electric Railway Journal for Dec. 19, 1908, as planning the purchase of two interurban cars for delivery early in 1909, advises it will not purchase any cars before the last of the year.

Augusta Railway & Electric Company, Augusta, Ga., will be in the market for cars. It has determined to purchase some cars for city service during the next few months, but has not definitely decided on the number. The company may also buy a number of interurban cars.

Omaha & Council Bluffs Street Railway, Omaha, Neb., reported in the Electric Railway Journal of Feb. 27, 1909, as constructing 25 cars in its shops, we are informed is building but 15 cars in its own shops, the other 10 cars having been ordered from the American Car Company, of St. Louis.

Rochester (N. Y.) Railway has ordered four interurban cars from the G. C. Kuhlman Car Company. Mention of the intended purchase of this equipment was made in the Electric Railway Journal of Jan. 30, 1909. The truck order was equally divided between The J. G. Brill Company and the American Locomotive Company. Smith 2-C heaters were ordered for these cars.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y., noted in the Electric Railway Journal of Jan. 30, 1909, as being in the market for four double- and four single-truck cars, has placed the order for the car bodies with The J. G. Brill Company. Smith 2-C hot water heaters were purchased for one-half of the number and Consolidated heaters for the remainder. General Electric Company's motors and air brakes were specified and M. C. B. American Locomotive Company's trucks. Sam H. Daly, of Meikleham & Dinsmore, consulting engineers, New York, who let the contracts, designed the cars and prepared the specifications.

Rochester & Manitou Railroad, Charlotte, N. Y., mentioned in the Electric Railway Journal of March 13, 1909,

as having purchased from the G. C. Kuhlman Car Company three semi-convertible cars, with a seating capacity of 44, we are further informed, has specified the length of the body 30 ft. 8 in., over vestibules 41 ft. 8 in., width over all 8 ft. 5 in., bodies to be of wood with composite underframes. Other equipment includes Brill ratchet brake handles, Curtain Supply Company's "Ring" curtain fixtures, Brill drawbars, Dedenda gongs, Consolidated electric heaters, Crouse-Hinds headlights, Monitor roofs, "Dumpit" sanders, Winner seats, Mason safety step treads, and Brill No. 27 G-1 trucks. The cars will also be equipped with Buffalo motorman's stools.

Beaumont (Tex.) Traction Company, mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1909, as having placed an order for 5 double-truck cars with the St. Louis Car Company, advises that these cars will be of the semi-convertible type, 37 ft. 4 in. long over all, and will have a seating capacity of 40. They will be finished in oak. Other specifications follow:

Wheel base.....4 ft. 6 in.	Hand brakes.....Peacock
Length of body..25 ft. 4 in.	Headlights ..... Niles
Over vestibule...36 ft. 4 in.	Motors, type and number,
Width inside.....8 ft.	2 GE-80
Body ..... wood	Roofs .....Canvas, monitor
Underframe ..... wood	Seats.....St. Louis rattan
Control system.....GE-K10	Trucks, type and make,
Couplers...St. Louis Radial	Brill 27 G-1
Curtain material...Pantasote	

Third Avenue Railroad, New York, noted in the ELECTRIC RAILWAY JOURNAL of March 13, 1909, as having ordered 100 p-a-y-e cars from The J. G. Brill Company, advises that it has specified Allis-Chalmers air brakes for 25 cars. The cars will be convertible, with a seating capacity of 52. The Third Avenue Railroad will use 75 of the cars on its lines and 25 will be put on the Tarrytown, White Plains & Mamaroneck Railway service. The following are the principal specifications: Wheel base, 4 ft. 6 in.; length of body, 30 ft. 1 in.; over vestibule, 41 ft. 9 in.; length over all, 43 ft.; width inside, 7 ft. 10 in.; over all, 8 ft. 4 in.; body, wood; underframe, wood with steel reinforcement; brakes, Peacock; brakeshoes, Lappin; couplers, Brill pull casting; curtain material, Pantasote; destination signs, Hunter; gongs, Brill Dedenda; hand brakes, Brill brake handle; headlights, United States; journal boxes, Symington; sanders, Brill; sash fixtures, Brill; seats, Brill; step treads, Mason; trucks, type and make, Brill 39E.

San Francisco, Oakland & San José Consolidated Railway, Oakland, Cal., as reported in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1907, has about completed building 10 new interurban cars in its shops, and has five more cars of similar type under construction. These cars have a seating capacity of 80, weigh 72,000 lb., are 70 ft. over all and 55 ft. 10 in. over endsills. The underframes are of composite wood and steel construction. The special equipment includes the following: Airbrakes, Westinghouse; axles, Gould Coupler Company; brake shoes, Diamond "S"; car trimmings, Adams & Westlake; center bearings, Baltimore; control system, G. E. Type M; couplers, Gould, No. 65; curtain fixtures, Curtain Supply Company; curtain material, Pantasote; markers, Armspear; paint, Lowe Bros.; seats, Hale & Kilburn; springs, Union Spring & Manufacturing Company; varnish, Chicago Varnish Company; special devices, Gould steel buffers, Anderson-Smith arc lamps, Indestructible Fiber Company's Headlinings, and Midvale rolled steel wheels.

Ithaca (N. Y.) Street Railway, mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 6, 1909, as having purchased two new and two second-hand cars, purchased the second-hand cars from MacGovern, Archer & Company, New York, and expects to receive the new cars ordered from The J. G. Brill Company, Philadelphia, by the end of next month. The new cars will be closed and built under the license of the Pay-As-You-Enter Car Corporation. They will be 41 ft. 1 in. long over all and have a seating capacity of 45. The cars will be practically the same as the closed pay-as-you-enter cars of the Third Avenue Railroad, New York. The bodies will be 28 ft. long, over vestibule 40 ft., with a width over all of 8 ft. 1½ in. The height from sill to trolley base will be 8 ft. 9 in., and from top of rail to sills 29⅞ in. The bodies will be of wood with composite underframes. Brill portable vestibules and Baldwin trucks were specified, as were also Peacock brakes, Brill center bearings, Keeler Eccentric curtain fixtures, Dedenda gongs, Brill brake handles, Consolidated electric heaters, United States headlights, Dumpit sanders, Brill side bearings, rattan seating material and Dayton ventilators.

Philadelphia (Pa.) Rapid Transit Company, as mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1909, has purchased from the Pressed Steel Car Company 10 all-steel elevated and subway cars with a seating capacity of 44. The cars will have an over-all length of 49 ft. 7¼ in., with bodies 40 ft. 6¼ in. long. The principal specifications follow:

Weight of body...30,000 lb.	Couplers..Van Dorn automatic
Wheel base.....6 ft. 9 in.	Curtain fixtures.....Curtain Supply Company
Width inside....7 ft. 7½ in.	Curtain material.....Curtain Supply Company
Over all.....8 ft. 9 in.	Gears and pinions..General Electric Company
Height inside.....8 ft. 6 in.	Headlights..Dressel Railway Lamp Works
Sill to roof.....9 ft. 7½ in.	Journal boxes....Symington
Height from top of rail to sills.....3 ft. 4½ in.	Markers....Dressel No. 100
Body ..... metal	Motors, type and number, two GE-66
Underframe ..... metal	Side bearings....Symington ball bearing
Air brakes....Westinghouse Traction Brake Company's Electric Automatic	Trucks, type and make, Curtis Special
Brake shoes.American Brake Shoe & Foundry Company	Ventilators..Auto Ventilator Company
Center bearings..Symington ball bearing	
Control system.....Sprague GE Type M	

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., noted in the ELECTRIC RAILWAY JOURNAL of March 13, 1909, as having purchased from The J. G. Brill Company two open, center-aisle, 14-seat cars, advises that the entrance to these cars will be at the ends with no side steps. There will be screens on the sides. The specifications for special equipment include the following:

Seating capacity..... 56	Curtain fixtures.striped duck
Wheel base.....4 ft. 6 in.	Curtain material.....Acme
Length of body.....34 ft.	Gongs .....Brill Dedenda
Width inside.....8 ft. 3 in.	Hand brakes.....Brill
Width over all....8 ft. 9¼ in.	Headlights....United States No. 12
Body ..... wood	Sanders ..... Brill
Underframe ..... wood	Seats .....Ash slat
Couplers ..... Brill	

The company has also specified the following for the four 20-ft. 8-in. semi-convertible motor car bodies with a seating capacity of 32, mentioned in the ELECTRIC RAILWAY JOURNAL of March 13, 1909, as having been ordered from The J. G. Brill Company. The bodies will be mounted on Peckham trucks, which the company already owns.

Length of body..20 ft. 8 in.	Gongs .....Brill Dedenda
Over vestibule...30 ft. 1 in.	Hand brakes.....Brill brake handle
Width inside.....7 ft. 8 in.	
Over all.....8 ft. 4 in.	Motors, type and number, two GE-1000
Body ..... wood	Sash fixtures..... Brill
Underframe ..... wood	Seats .....Brill Winner
Brakes ..... Peacock	Step treads.....Stanwood
Couplers ..... Brill	
Curtain material, printed duck	

Conestoga Traction Company, Lancaster, Pa., noted in the ELECTRIC RAILWAY JOURNAL of March 13, 1909, as having ordered 18 interurban cars from The J. G. Brill Company, has specified 6 cars to be of the 13-seat, open, Narragansett type, with a seating capacity of 65. The cars will have an overall length of 40 ft. 8 in. and 4-ft. 6-in. wheel base. They will be mounted on Brill 27 F-1 trucks. Other details of the specifications follow:

Body ..... wood	Hand brakes.....Peacock
Underframe, wood with steel plates	Headlights.....Imperial arc
	Journal boxes....Symington
Center bearings..Symington	Motors, type and number,
Couplers.....Brill radiating	Westinghouse 306, 4 per car
Curtain fixtures.....Acme	Sanders.....Brill Dumpit
Curtain material, striped duck	Seats.....Brill slat
Gongs ..... Dedenda	Vestibule at each end

Six more of the cars were ordered from the Wason Manufacturing Company. They will be of the semi-convertible type with a seating capacity of 44. Other items of the specifications are:

Wheel base.....4 ft. 6 in.	Hand brakes.....Peacock
Length of body..30 ft. 8 in.	Heating system.....Consolidated Car Heating Company
Over vestibule....40 ft. 1 in.	
Length over all..41 ft. 9 in.	
Width inside.....4 ft. 10 in.	Headlights.....Imperial arc
Over all.....8 ft. 5 in.	Journal boxes....Symington
Body ..... wood	Motors, type and number,
Underframe.....wood with steel plates	Westinghouse 306
	Sanders.....Brill Dumpit
Center bearings. Symington	Seats.....Brill Winner
Curtain fixtures ...Forsythe	Trucks, type and make,
Curtain material...Pantasote	Brill 27 F-1
Gongs ..... Dedenda	

It is understood that the remaining six cars will be single-truck, closed cars.

TRADE NOTES

Dorner Railway Equipment Company, Chicago, Ill., advises that it has moved its offices from 806 Great Northern Building, to 1307 Manhattan Building, Chicago.

Wagner Electric Manufacturing Company announces the removal of its district office in Pittsburg to the Lewis Block, and the appointment of Ludwig Hommel as district manager.

Grant Iron Works, Houston, Tex., recently changed their name to the Grant Locomotive & Car Works, and now intend building cars, locomotives, railway frogs, crossings and switches.

Pneumatic Vise Company, Chicago, Ill., has been incorporated with a capital stock of $50,000, to manufacture and sell machinery. The incorporators are Thomas Moore, Mr. Riley and Emory D. Fraser, all of Chicago.

Perry Ventilator Corporation, New Bedford, Mass., advises that it has received orders from the Syracuse Railroad Construction Company for ventilators to be used in cars now being built by the G. C. Kuhlman Car Company.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis., maker of electric controlling devices, has opened a district office in 1108 Schofield Building, Cleveland, Ohio. The new office will be in charge of C. J. Kruse, who comes from the engineering department of the Cutler-Hammer Company.

T. H. Symington Company, Baltimore, Md., reports that it is supplying Baltimore center bearings for two trucks being built by the Baldwin Locomotive Works for the Toledo & Western Railroad, and for two trucks under construction by the same works for the Conneaut & Erie Traction Company.

Bausch & Lomb Optical Company, Rochester, N. Y., advises that Henry Bausch, vice-president, died on March 2, in Augusta, Ga., where he had gone early in February in the hope of restoring his failing health. Mr. Bausch lived 50 years, 34 of which were spent in the service of his company, especially in microscopic work.

Col. G. S. Ackley, president of the National Brake Company, is making an extended trip in Europe, partly on pleasure and partly on business, because he numbers many European tramway companies among his customers. He was in Germany the first part of this month and plans to return to the United States by way of Liverpool about the middle of April.

Peter Kling has resigned as superintendent of the passenger car department of the Pressed Steel Car Company's plant at McKees Rocks, Pa., and has been succeeded by W. M. Peach. Mr. Peach has been associated with the company for several years. It is announced that Mr. Kling will engage in a line of business other than that of car building.

S. F. Bowser Company, Ft. Wayne, Ind., is building at its plant a heavy car elevator to be used in lowering freight cars from the track level to the level of the floor of the shipping room, to facilitate the loading of oil tanks and tank supplies into cars. The company has recently had a side track built, connecting its plant with the main-line tracks of the railroads entering Ft. Wayne.

National Car Coupler Company, Monadnock Block, Chicago, Ill., has developed a new type of coupler for use on electric railway interurban cars. The coupler is an adaptation of the company's M. C. B. type of coupler which has been used successfully for many years on steam railways. It is designed especially to facilitate the interchange of electric and steam cars and to prevent cars operated in trains from uncoupling on short radius curves.

Railway Business Association, 2 Rector Street, New York, has published a bulletin giving a list of the resolutions adopted by the business bodies throughout the country with regard to railroad legislation. The consensus of the opinions quoted is that in view of the close association between the prosperity of the country and the railroads, legislative action with regard to railroads should be more conservative than it has been recently.

Guarini's Concert Band, New York, is now booking for its regular summer tour of electric railway parks. This organization was the principal attraction at Pabst's Garden in New York for the entire winter season. Guarini's programs are prepared to meet the tastes of the various localities, after consultation with the park management as to the requirements of the patrons. The band is accompanied by vocal soloists. S. Van Horn, 245 West Forty-second Street, New York, is the manager.

Steel Furniture Company, Grand Rapids, Mich., makes a specialty of benches and chairs for park service. The particular feature of this furniture is its substantial and neat construction. The benches are made of cold-rolled Bessemer channel steel, and are guaranteed against breakage for 25 years. The seats are made of hard maple, finished and painted as desired. The chairs, which are especially suitable for park theatres, also have Bessemer open-hearth steel framing, and are furnished with any type of seat and veneer requested.

Twin City Equipment Company, Minneapolis, Minn., has completed its shops and is now prepared to build or repair railway cars and other heavy equipment. It has for immediate delivery practically new Strang cars and extra long cars for show purposes. Heretofore this company has operated on a brokerage basis, but has now taken in more capital and will purchase released machinery and build new, as well as buy old electrical and municipal pumping plants. The company has offices in New York, Chicago, Minneapolis (headquarters), Winnipeg, Spokane, Seattle and Portland, thus covering a very wide territory in the United States and Canada.

Crocker-Wheeler Company, Ampere, N. J., has recently booked a number of additional large orders. One of these is for a 600-kw, 250-volt d. c. generator for William Rahr & Sons Company, Manitowoc, Wis.; another for a 500-kw generator for the Shenango Furnace Company, Sharpsville, Pa. The Dallas Cracker & Biscuit Company, Dallas, Tex., has ordered a 75-kw, 240-volt alternator and switchboard and a number of induction motors, aggregating 33 hp, with which to operate its plant. Another similar order is that placed by the Anderson Lumber Company, Passaic, N. J., for a 125-kw generator and switchboard and 160 hp of induction motors. These motors are all of the squirrel cage type. A 225-hp wound rotor type induction motor has been ordered by the Youngstown Sheet Tube Company for operating its wire mills at Struthers, Ohio. Among the large d. c. motor sales are those for a 100-hp shunt motor for the American Car & Foundry Company; an 85-hp motor to drive an air compressor for J. M. Kohler Sons Company, Sheboygan, Wis., and a 60-hp motor for the Bridgeport Brass Company's plating department Bridgeport, Conn.

ADVERTISING LITERATURE

Frank M. Foster, Columbus, Ohio, has issued a descriptive booklet on his Type A interlocking switchstand.

Duncan Electric Manufacturing Company, Lafayette, Ind., has issued Bulletin No. 8, describing its d.c. integrating wattmeters.

Western Electric Company, New York, has printed a novel advertising card apropos of the Presidential inauguration, showing President Taft in various moods at the telephone.

Duplex Metals Company, New York and Philadelphia, has prepared a booklet describing its copper-clad steel wire, together with tables of comparisons with copper on resistance, weight, strength, cost per mile, etc.

Harrisburg Foundry & Machine Works, Harrisburg, Pa., have issued a general publication describing the special features of Fleming-Harrisburg engines, and are also sending out loose sheets, each showing a typical installation of different type engines.

Jeffrey Manufacturing Company, Columbus, Ohio, has just issued a new catalog devoted to its coal and ash handling machinery in power plants. This apparatus has been installed in various power plants, among which are those of the Scioto Valley Traction Company, Cincinnati Traction Company and Columbus (Ohio) Railway & Light Company.

Atlas Engine Works, Indianapolis, Ind., have issued the 1909 edition of their general catalog. Each type of engine is described and illustrated and a brief statement is given of the usual range of sizes. A feature of the publication is a chapter of useful information at the end about heat, boiler losses, boiler efficiency, steam, indicator diagrams, care and management of boilers, etc.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1513, describing a portable compressor equipped with an a.c. or d.c. motor. The compressor, with its various accessories, can be brought directly to the work instead of having its power transmitted through pipes and flexible tubing. The bulletin No. 1513 also describes the new AA6 compressor adapted for air brakes and other purposes.

Western Electric Company, New York, has reprinted in pamphlet form a paper entitled "The Telephone for Train Dispatching," read by W. E. Harkness, sales engineer, Western Electric Company, before the St. Louis Railway Club, Feb. 12, 1909. Mr. Harkness' paper discussed the methods and apparatus used for dispatching by telephones, relating particularly to Western Electric apparatus for that purpose.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MARCH 27, 1909 No. 13

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Automatic Signals on Terminal Loops

The installation of automatic block signals on terminal loops where the view is somewhat restricted and the frequency of service is very high will often considerably expedite the movement of traffic. Where a loop terminates in straight track alongside a loading platform it is necessary for cars to move slowly around the curves if other cars may be loading ahead and the view is more or less obscured. The capacity of such a loop is thereby decreased and time is lost when the loop is clear unless some signal is available to enable motormen to make the maximum acceleration around the loop consistent with its radius and the proper movement of the car. The cost of installing and operating a suitable signal in such cases is a small matter in proportion to the stimulation of movement at a point irregularly congested. The case is practically the same as that of the advance signal installed to protect a train or car standing at a station platform and still permitting cars to approach swiftly when the track in the station around the curve is unoccupied.

Indexing and Filing Technical Papers

An ingenious method of filing technical articles is suggested in a paper on the "Loose Leaf System of Filing," presented by Mr. Hemming at the Cleveland meeting of the Central Electric Railway Association. As Mr. Hemming says, a proper system of filing information adds very much to its value. In fact, if one cannot find what he wants when he wants it, its possession is practically useless, so far as he is concerned. Every one, we believe, has had the experience of recollecting an account in a technical paper of something which he would like to copy in his own practice, but at the time that he read the article he had no need to apply the information, and when he wanted it he could not find it. Again, a company which is considering some addition to its system, portable substations, for example, is anxious to know what has been done by other companies along these lines, and wishes to turn quickly to descriptions of such installations. For this use a good filing or index system is just what is required. We doubt, however, whether the loose leaf system of publishing magazines, proposed by Mr. Hemming, is the most desirable, even if the practical considerations of printing and binding would permit of its adoption and the Post Office Department would have no objection to it. If the magazine was sent out in loose leaves, held together simply by two stay clips, it would certainly interfere with the convenient handling of the paper by the average reader, and would also prevent its being bound substantially in a volume at the end of the year or half-year. On the other hand, it would seem that the same results secured by the system of filing suggested by Mr. Hemming would be obtained if two copies of a periodical were taken and the pages cut out and pasted on individual sheets.

There is absolutely no doubt, however, that, as Mr. Hemming says, by the intelligent use of any periodical, a subscriber would greatly increase its value to him. The methods of keeping individual indices and of filing articles are almost without number. Many consulting engineers have worked out most elaborate systems, and find that it pays them well to file clippings and record references to articles which they think they will require in the

future. Most of these plans, however, require a great deal of time, and are beyond the needs of the average reader. If the publisher includes a good index with plenty of cross references with each volume of his periodical, this is usually all that is required by the ordinary subscriber, provided he knows how to use the index. The subject of getting the most use out of a technical paper is a very broad one, and we may take it up again in these columns. We are glad, however, that attention has been brought to it at the meeting of the Central Electric Railway Association, and the fact that the method suggested by Mr. Hemming is meeting the need of his road indicates that it is worthy of consideration.

Labor Costs in Power Plants

In analyzing the cost of electric power generated by steam plants the labor expense usually stands second in magnitude, fuel cost easily coming first. A large proportion of the efforts of engineers making a specialty of power-station design and operation has been devoted to the reduction of coal costs per kw-hour on the legitimate principle of aiming at the largest mark in sight. While the labor requirements of plants have been carefully scrutinized. less is known by operating men about the number of men required properly to run a station of given size, the distribution of labor which will give the best service and the relations of station output and equipment utilized to the total number of men on duty in any given shift. It is very desirable that this matter shall be examined more generally by operating officers and if the same methods of plotting the labor service are utilized that are employed in showing the relations of engine and boiler capacity in use to the station load curve suggestive data will be secured.

Some recent labor costs which have come to hand clearly emphasize the necessity of more thorough study of this subject. They show that the size of the plant is not always the determining factor in settling the labor cost per kw-hour, although the logical conclusion would naturally be that the larger the plant the greater would be the labor cost in its total amount, but the less it would be in unit cost. This is the end toward which one must work, namely, securing the maximum output from each generating unit in service consistent with good efficiency and safe heating limits, but it is significant that large output does not in itself alone guarantee low unit cost. Thus, one plant had a yearly output of 5,400,000 kw-hours and a unit labor cost of 0.36 cent. Another station produced 4,650,000 kw-hours with a labor expense of 0.342 cent. In the former case, however, the station design with respect to apparatus arrangement called for the employment of 25 men, while the second plant required only 14 men. In the former case part of the equipment was belt driven and in the latter instance all the equipment was direct connected. The first station had about 1000 kw more capacity than the second at normal rating. The smaller plant of the two operated mechanical stokers and a motor-driven conveying system, while in the first case all firing was done by hand. In the larger plant the total wages cost was about $19,500, against about $15,800 in the smaller station. It is clear that the average station wage per man per year was much greater in the smaller plant or $1,130, against $780, in the larger station. These figures show the importance of taking into account a variety of factors in comparing labor costs in plants of dissimilar design. It is worth noting, in passing, that the smaller station turned out its power at a rate of 1.18 cents against approximately 1.25 cents in the larger plant, manufacturing cost per unit.

In two plants of practically the same general design but differing capacity of units the labor cost was .404 cent per kw-hour in the larger station and .310 cent in the smaller installation. The larger plant had a total output of 5,560,000 kw-hours and the smaller one produced 2,830,000 units. The capacities of the stations were as 2½ to 1. The smaller plant had 10 men on its payroll against 14 men in the larger plant. The total cost of labor in the larger station was $22,500, approximately, and in the smaller one about $8,700. Per man the smaller plant paid an average wage of $870 and the larger station the considerable sum of $1,600. It ought to be borne in mind, however, that in each case where the average wage per station employee per year was higher the plant was located in or near a large city, where the cost of living and the standards of expenditure are naturally much higher than are those of the smaller and more remote centers of population. These figures are not quoted to urge the desirability of reducing wages or running plants short-handed, but they clearly indicate the importance of finding out statistically just what one's plant is doing and making sure that as far as practicable the maximum yearly kw-hour output per man is attained.

Increasing Costs Argued in Milwaukee Case

Testimony before the Railroad Commission of Wisconsin in the Milwaukee fare case has brought out emphatically the effect of the advances in costs of labor and materials on the expense of operation of a street railway. These costs were considered as some of the elements necessitating increases in fares on street railways in Massachusetts during the general movement for a higher unit of revenue per passenger in that State.

Custom and laws have generally required the street railway to adopt an invariable rate of fare for its service of transportation. With the unit of fare fixed, the only source from which the street railway could expect to better its results from passenger business was through an increased density of traffic which would not be accompanied by a corresponding increase in the expense of operation. The street railway is not usually in the position of a private corporation which may advance the rates for its service if existing rates are found to be inadequate or of a manufacturer who advances or lowers the prices of his products with the fluctuations of labor and raw materials, keeping in mind always the proper return upon the investment which he expects to realize.

Since the rate of fare, in most cases, is not subject to variation, while the items of expense, founded on the market prices of labor and materials, are subject to constant movement with the influences of the times, it is apparent that the average street railway, unable to regulate its rates of fare, must regulate its expenditures if it is to preserve the proper relation between income and outgo

necessary to maintain the property on a profitable basis. Because substantially all costs of labor and materials have risen in the last few years and labor has been notoriously inefficient at times, companies have been obliged to watch their resources with constant care and to introduce new economies and equipment, designed to offset in part the influence of the rising tide of prices.

In the course of the history of every street railway a time may be reached when it will appear that the final limit of these possible economies has been attained or that further economies can be instituted only at the expense of a large addition to the capital cost of the property, which may not be warranted. If the only alternatives presented by this problem are those of reduction in service to an inadvisable level or of an increase in the rate of fare, it is certainly in the interest of the community that an advance in fares be instituted, provided it can be arranged without conflict with law or ordinances.

As the advancing costs of labor and materials have tended in Milwaukee, as in other cities, to counteract the financial advantages arising from increasing density of traffic, so the transfer privilege has reduced effectively the gross and net revenue per passenger; and all testimony presented in the Milwaukee case and in other cities where the maintenance of a street railway on a profitable basis is a problem, shows that public estimates of the cost of operation have been too low, and that until recently the baneful result of unrestricted transfer traffic has not been appreciated even by many managers of companies.

Diverse Views on Electric Traction

We always note with interest discussions on heavy electric traction, quite as much perhaps from their psychological features as for their technical importance. The discussion last Friday night at the New York Railroad Club was not greatly different in character from that at the A. I. E. E. last December, in that the claims of each system were strongly advocated by those engineers who had had experience with it. While this of itself indicates disagreement among the highest authorities on the subject, it is in reality an excellent sign. If the user of single-phase apparatus should state that he was inclined to try three-phase next time, if the employer of three-phase equipment should consider that direct current might have eliminated some of the troubles which he had experienced, and if the d.c. engineer should conclude that either one of the other "systems" might have been better, the situation would possess a different aspect.

The net result of the discussion at the club, and also at the Institute, is to show that each method has manifest advantages for certain classes of service and that each is doing excellent work under the requirements which it is called upon to fulfill. But it is equally evident that in the present state of the art none is best adapted to all conditions. It is interesting to speculate what a given railroad now equipped would do if its conditions were radically different from what they are; but the conclusions reached are not exactly illuminating, much less convincing. It reminds us of a claim once put forth by an earnest vegetarian, that Shakespeare, Oliver Cromwell and George Washington would support his views were they now alive. The fact is that there has not yet been a case in which a general solution of the heavy traction problem has been required. The excellent work that has been done thus far has had the advantage of being, in very large measure, predetermined by existing conditions. Granting these, the decisions reached have been eminently reasonable. The whole matter is still in the formative stage, and is likely to remain there for at least several years to come. The very encouraging feature of the case is that under any given condition of operation, not too broadly generalized, at least one method of electrification can be found that is capable of yielding first-class operative results. In other words, as all the speakers were ready to admit the other evening, heavy electric traction is thoroughly practicable, and between electrical and railroad engineers can be pushed through to success. Whatever branches of the service may be best justified in claiming the chief credit, the battle is in effect won, and railroad electrification is a success. How far it can be economically pushed at this or at some future epoch remains gradually to be determined. As one well-known railway man frankly stated in a recent address, the practical difficulty is in the financial problem involved in the change, rather than in the matter of successful and economical operation. He was speaking in this instance particularly of extensive suburban service, but his words had a broader significance.

It is one thing to realize an economy and quite another thing to take advantage of the knowledge. One may readily point out to the man in the tenement that it is economical to purchase his whole year's coal supply during the low prices of summer, rather than by the hod. The man in the tenement, however, has no option in the matter, and considers himself lucky to have the price of the hod. Now, the fact is that a great many American railroads are not only without large ready funds, but have very nearly reached the end of their borrowing capacity. They have issued securities beyond the limits of their normal earning capacities, and have gradually come to the point where borrowing even for improvements of undoubted value is nearly or quite impracticable when large amounts are involved. There are plenty of railways that could increase their net earnings very considerably by undertaking electrification under favorable conditions, yet cannot raise the necessary funds on account of their past financial policy. There are others that could raise the funds more easily, but still only on terms that would bring a very undesirable burden, too heavy comfortably to be carried. The result of this situation is that while there are many excellent opportunities for electrifying portions of systems, with every chance of profit, the actual work progresses very slowly indeed. In fact, unless practically driven by necessity, as in the case of the Pennsylvania Railroad tunnels and the New York Central terminal work, few railroads in these times are disposed to spend much money for improvements. This condition not only delays the adoption of electric traction, but renders it quite certain that most of the work in the near future will be, as it has been thus far, dealing with special and local problems, which always is a bad thing for progress, in that it tends to opportunist methods which may actually hinder the solution of the more general problems.

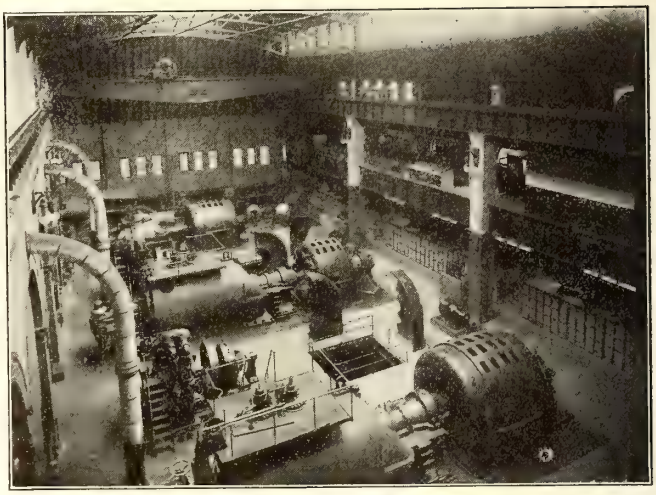
FEATURES OF RECENT ELECTRIC RAILWAY POWER STATION DESIGN

A comparison of the designs of a number of recent electric railway power stations of moderate size reveals some interesting general tendencies of arrangement and equipment; in the details of construction there are, of course, innumerable variations. For the purpose of making such a comparison, data concerning power stations, all built within the last six years, were collected and have been compiled in the accompanying skeleton plans and tables. The stations selected for comparison cover a wide range of types and sizes and represent generating plants intended exclusively for supplying current for electric railway operation and for supplying combined railway, light and power service. They include reciprocating engine, turbo-generator, combined turbine and reciprocating engine and gas engine installations and range in size from 800 kw capacity to 24,000 kw capacity. No large stations located in congested districts of cities have been included, as the size and shape of the available building site for these stations is usually the determining factor in the design.

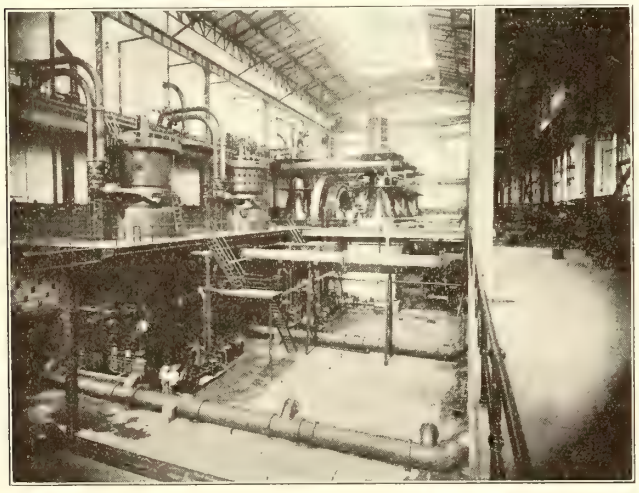
The two largest stations included in the tables are those of the Twin City Rapid Transit Company in Minneapolis, with 24,000-kw capacity, and the Potomac Electric Company at Bennings, D. C., with 23,000-kw capacity. The Minneapolis station operates intermittently in parallel with a water-power station and during the summer is seldom run at its full capacity. It was originally designed as a reciprocating engine plant with four 3500-kw units. In enlarging the station, however, two 5000-kw turbo-generators were installed in the space originally provided for the fifth 3500-kw reciprocating engine unit. The Bennings station, which supplies current for the Washington Railway & Electric Company, is a modern plant in which five turbo-generators have been installed, including two 2000-kw units, two 5000-kw units and one 9000-kw unit. The smallest steam power plant included in the list is the 800-kw turbo-generator installation of the Iowa & Illinois Railroad at Clinton, Ia., which furnishes current for a 37-mile interurban railway.

Included in the tables are statistics of two gas engine power stations. One of these, the Somerville plant of the Boston Elevated, is an emergency power station with a capacity of 700 kw and is run intermittently. It is operated with producer gas. The Oleon station of the Western New York & Pennsylvania Traction Company contains three gas engine generator units with a total capacity of 1500 kw. It supplies current for an 85-mile interurban road and operates on natural gas.

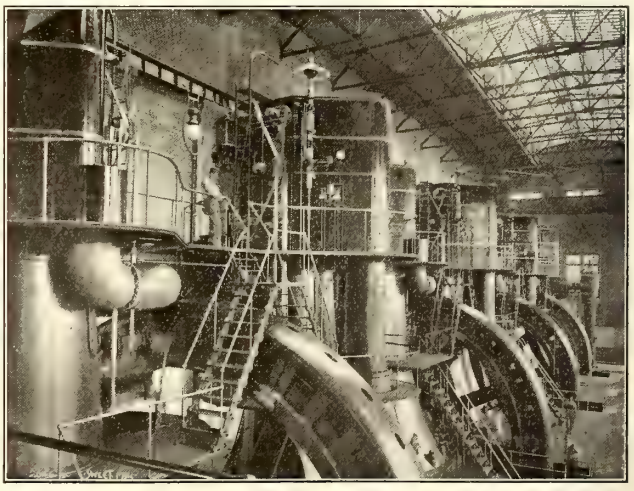
The economy of floor space in turbo-generator units of large size has led to radical departures from former practice in the relative size and shape of the engine and boiler rooms of modern stations. In older reciprocating engine plants, the several units were usually grouped in a row in a long and rather narrow engine room. The boiler room was of the same length and approximately the same width as the engine room, and the boilers were grouped on one or both sides of a firing alley running the length of the building. Batteries of from one to four boilers were sufficient to supply steam to each of the engines. This typical arrangement is well shown in the plans of the Lincoln, Charleston, Commerce Street and Harvard stations presented herewith. The departure from this arrangement in a modern turbine station is shown in the plan of the Georgetown station of the Seattle Electric Company. Here two Curtis turbines, one of 8000-kw and the other of 3000-kw capacity occupy a space 77 ft. x 62 ft., including the switchboard gallery, which is 17 ft. wide, and the boiler room covers an area 73 ft. 6 in. x 151 ft. The areas per kilowatt of station capacity are respectively 0.43 sq. ft. for the engine room and 1.01 sq. ft. for the boiler room. This unit figure for the engine room is approximately the same as for the



Turbine Room of Delaware Avenue Station of Philadelphia Rapid Transit Company

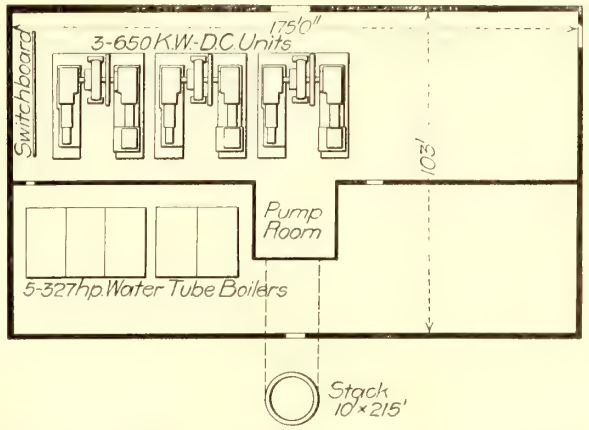


Engine Room of Kansas City Railway & Light Company's Station

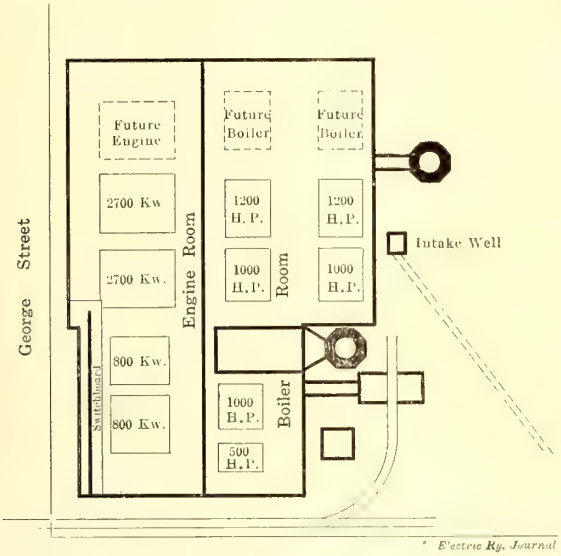


Engine Room of Twin City Rapid Transit Company's Station

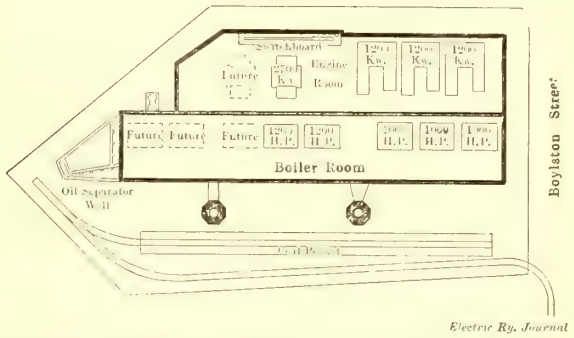
Bennings plant, which is 0.42 sq. ft. The Commerce Street station in Milwaukee, which was originally designed for eight reciprocating engine units, is a very compact station of its kind, but the unit engine room area, based on the original installation, is 0.79 sq. ft. The two turbo-units later installed under the switchboard gallery reduce this figure to 0.69, as shown in the tables. It will be seen in the plan of the Georgetown station that the stoking alley in the boiler room is at right angles to the center line



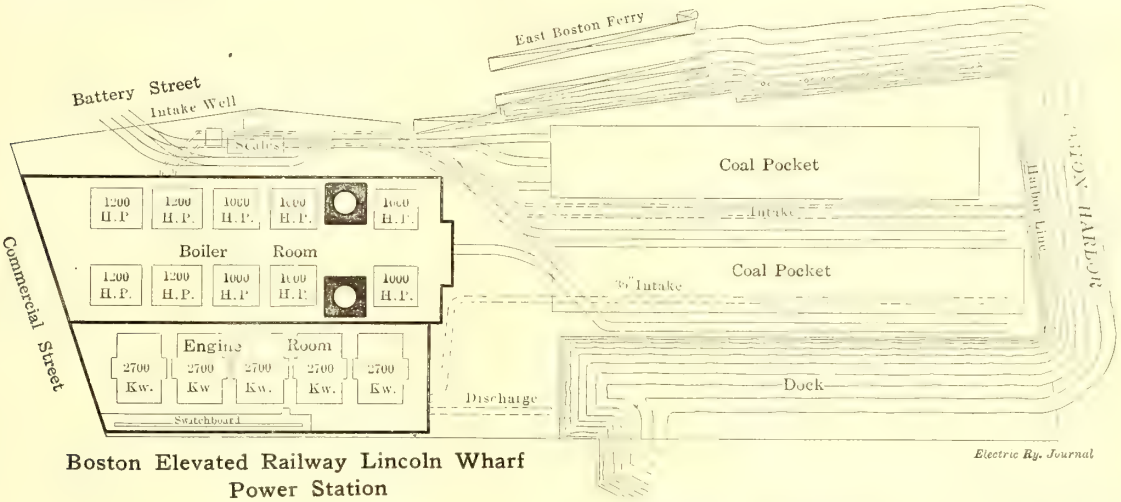
Central Pennsylvania Traction Company Harrisburg Power Station



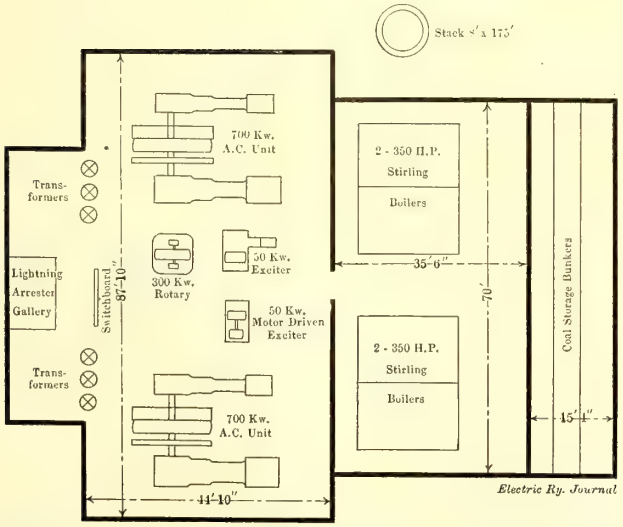
Boston Elevated Railway Charlestown Power Station



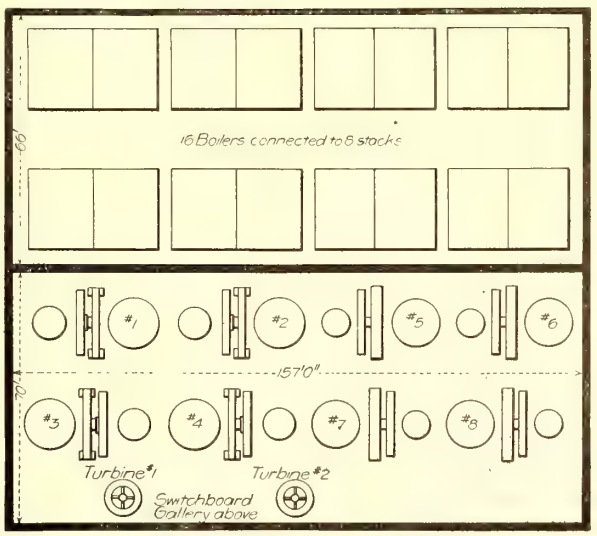
Boston Elevated Railway Harvard Power Station



Boston Elevated Railway Lincoln Wharf Power Station



Indianapolis, Crawfordsville & Western Crawfordsville Power Station



The Milwaukee Electric Railway & Light Company Commerce Street Power Station

of the two generators. The Peoria station and the Delaware Avenue station are arranged in a similar way.

Another radical departure in power-house design made possible by the use of turbines is the double-deck arrangement with the boilers on the lower floor and the turbines directly overhead. The use of double-deck boiler rooms in very large stations is not new, but the placing of the turbines on the upper floor is of very recent date. Two notable stations of this type have been included in the tables. The advantages are a saving in ground space, and in cost of the power-station building, convenient location for condensers and direct steam piping from boilers to turbines. The arrangement is especially suited to horizontal turbine unit installations of moderate size. The limiting feature is the floor area of the boilers required for furnishing steam. Modern water-tube boilers in large sizes require from 0.35 sq. ft. to 0.70 sq. ft. and even more per boiler horse-power. Assuming 0.75 boiler horse-power per kilowatt capacity of the generators, which is a fair ratio, the area of boiler setting per kilowatt runs from 0.26 to 0.52 sq. ft. The actual floor space required for horizontal turbo-generator sets varies from 0.2 for the small sizes, to 0.10 for sizes approximating 3000-kw capacity. Very large double-flow turbines would require only 0.06 sq. ft. It will be seen that unless double-deck boiler rooms are employed, there would be a large excess of floor space in the engine room in stations of very large capacity. In small stations the auxiliary equipment and the substation equipment which is usually installed in the power house, can be grouped in the engine room so as to occupy most of the spare floor space.

The size of boiler units has steadily increased in the last 10 years and single boilers are now being installed with a steam generating capacity of as high as 1000 boiler hp. The largest units shown in the tables are the Parker boilers installed in the Delaware Avenue station of the Philadelphia Rapid Transit Company. These boilers are of the horizontal water-tube type with double grates and are stoker-fired from both ends. The limiting factor in boiler capacity is not heating surface, but grate area and draft. Few large boilers are now hand fired, as the coal consumption under heavy peak loads is more than manual labor can handle and close regulation is not so easily obtained. Mechanical draft is coming into more general use in railway power plants on account of the increase in boiler capacity possible in carrying peak loads. Recent experiments of the Technologic Branch of the United States Geological Survey indicate that the normal capacity of boilers can be increased by from 100 to 200 per cent by forcing very large amounts of air through the grates. This increase in the amount of air passed through the grates is possible only with some form of mechanical draft, as the pressure required exceeds that possible to obtain with natural draft in stacks of moderate height.

TABLE I—GENERAL DATA OF ELECTRIC RAILWAY POWER STATIONS.

Name of Company	Location of Plant	Total Capacity of Generators K.W.	Kinds of Current Generated	Voltage	Service	Hours Operated Per Day	No. Men Employed	Sq. Ft. per K.W. Engine Room	Sq. Ft. per K.W. Boiler Room	Sq. Ft. per K.W Engine and Boiler R'm
Aurora, Elgin & Chicago	Batavia	6,000	A. C.	2,300	Railway	24	38	2.78	1.55	4.33
Boston Elevated Ry. Co.	Lincoln	13,500	D. C.	600	Railway	24	68	0.89	1.30	2.19
Boston Elevated Ry. Co.	Harvard	6,300	D. C.	600	Railway	24	46	....	....	....
Boston Elevated Ry. Co.	Charlestown	7,000	D. C.	600	Railway	24	49	....	....	....
Boston Elevated Ry. Co.[1]	Somerville	700	D. C.	600	Railway	..	..	4.52	....	7.43
Central Penna. Trac. Co.	Harrisburg	1,950	D. C.	600	Railway	20	16	2.50	2.50	5.00
Denver City Tramway Co.	Denver	7,500	D. C. A. C.	570 2300-13,200	Railway	24	23	1.62	1.52	3.14
Ft. Wayne & Wabash Val.[2]	Spy Run	8,500*	A. C.	390 2,300	Ry. & Lt.	24	19	0.98	1.24	2.22
Illinois Traction System	Peoria	4,000	A. C.	2,300	Railway	24	15	0.78	1.25	2.03
Iowa & Illinois Ry. Co.	Clinton	800	A. C.	360	Railway	19	9	2.20	2.68	4.88
Lackawanna & Wyom. Val.[3]	Scranton	5,000	D. C. A. C.	650 390-2,200	Railway	24	25	1.29	1.06	2.35
Little Rock Ry. & Elec. Co.	Little Rock	5,250	D. C. A. C.	600 2,300	Ry. & Lt.	24	16	1.88	1.45	3.33
Metropolitan Street Ry.	Kansas City	19,000	A. C.	6,600	Ry. & Lt.	24	91	0.86	2.03	2.89
Mil. Elec. Ry. & Lt. Co.	Commerce St.	16,000	D. C. A. C.	600 2300-13,200	Ry. & Lt.	24	60	0.67	0.61	1.28
Norfolk & Ports. Trac. Co.	Portsmouth	10,500	A. C.	11,000	Lt., Pwr., Ry.	24	38	1.25	0.99	2.24
Phila. Rapid Transit Co.	Delaware Ave.	18,000	A. C.	13,200	Railway	19	70	0.69	1.24	1.93
Toledo, Bowl. Green & S.	Findlay	2,000	A. C.	380	Ry. & Lt.	24	11	3.50	4.25	7.75
Twin City Rapid Transit[4]	Minneapolis	24,000	A. C.	13,200	Railway	20	49	0.68	0.84	1.52
Wash. Ry. & Elec. Co.	Bennings	23,000	A. C.	6,600	Ry., Lt. & Pwr.	24	25	0.42	0.84	1.26
Western N. Y. & Pa.[5]	Olean	1,500	A. C.	370	Railway	19	4	5.76	....	5.76
Youngstown & Ohio River[6]	West Point	3,000	A. C.	400	Railway	20	..	1.76	1.71	3.47

*Ultimate Capacity. [1] Producer Gas Plant—Emergency. [2] Double Deck. [3] Double Current Generators. [4] Operates in connection with water power. [5] Gas Engines—Natural Gas. [6] Double Deck.

TABLE II—TURBINE AND GENERATOR DATA OF TURBINE STATIONS.

Company	Location	Turbo-Generator Units								Exciters		Unit System of Condensers	Operating Force†	
		No. of Units	Cap. K.W.	Make Turbine	Steam Press. Lbs.	Superheat Deg.	R.P.M.	Make Generator	Voltage	Frequency	Unit System	Method of Driving		No. Men	No. Shifts
Ft. Wayne & Wab. Val.[1]	Spy Run	3*	1,500	West.-Pars'ns	200	75	1,500	West,.	390	25	Yes...	Direct connected...	Yes.....	11	2
		2	1,500	West.-Pars'ns	200	75	1,200	West,.	2,300	60	Yes...				
		1	400	West.-Pars'ns	200	75	1,500	West,.	390	25	Yes...				
		1	500	West.-Pars'ns	200	75	3,600	West,.	2,300	60	Yes...				
Illinois Traction System	Peoria	2	2,000	Curtis	185	120	750	G. E,.	2,300	25	No....	Turbo-Gen., Motor-Gen.	Yes.....	4	2
Iowa & Illinois Ry. Co.	Clinton	2	400	West.-Pars'ns	150	100	3,600	West,.	360	25	Yes...	De Laval Tur.	Yes.....	4	2
Norfolk & Ports. Trac.	Portsm'th.	1	1,500	Curtis	185	130	900	G. E,..	11,000	25	Yes	Turbo-Gen...	Yes.....	19	3
		3	3,000	Curtis	185	130	720	G. E,..	11,000	25					
Phila. Rapid Transit Co.	Del. Ave.	2	6,000	West.-Pars'ns	175	125	750	West,.	13,200	25	Yes...	West. Compound Eng	Yes...	22	3
		1	6,000	West.-Pars'ns	175	125	1,500	West..	13,200	25	Yes...				
Wash. Ry. & Elec.	Bennings	2	2,000	Curtis	185	150	750	G. E,..	6,600	25	No....	2 eng. driven and 1 mot'r dr'n	Yes...	15	3
		2	5,000	Curtis	185	150	750	G. E...	6,600	25	No....				
		1	9,000	Curtis	185	150	750	G. E,..	6,600	25	No....				
Youngst'n & Ohio River	West Point	3	1,000	West-Pars'ns.	200	None	1,500	West,.	400	25	No....	Eng. driven..	Yes.....	2	2

[1] 60-cycle units generate two-phase current for lighting; 25-cycle units generate three-phase current for railway. *Based on ultimate capacity. †Includes switchboard attendants.

TABLE III—ENGINE AND GENERATOR DATA OF RECIPROCATING ENGINE STATIONS.

Company	Location	Engines								Generators					Exciters		Unit System Condensers	Operating Force*	
		Type	No.	Make	Stroke In.	Cyl. Diam. In.	R.P.M.	Steam Press. Lbs.	Superheat Deg.	Make	Cap. K.W.	Type	Voltage	Frequency	Unit System	Method of Driving		No. Men	No. Shifts
Aurora, Elgin & Chicago	Batavia	Hor. C. C.	3	Cooper	60	32–64	75	175	None	G. E.	1500	A.C.	2300	25	No.	2 eng. driv'n, 1 ind'n m't'r d'v'n	No.	15	3
		Hor. C. C.	1	Cooper	48	32–64	94	175	None	G. E.	1500	A. C.	2300	25	No.				
Boston Elevated Railway Co.	Lincoln	Ver. C. C.	1	West	60	44–87	75	175	75	G. E.	2700	D. C.	600				Yes	37	3
		Ver. C. C.	2	R. & S.	60	44–88	75	175	75	West	2700	D. C.	600						
		Ver. C. C.	2	Tod	60	42–90	75	175	75	Bullock	2700	D. C.	600						
Boston Elevated Railway Co	Harvard	Hor. C. C.	3	A.-C.	60	28–56	80	175	75	G. E.	1200	D. C.	600				Yes	26	3
		Ver. C. C.	1	McI. & S.	60	40–82	90	175	75	G. E.	2700	D. C.	600						
Boston Elevated Railway Co	Charlestown	Hor. C. C.	2	A.-C.	48	26–50	90	175	75	G. E.	800	D. C.	600				Yes	27	3
		Ver. C. C.	1	West	60	44½–87	75	175	75	West	2700	D. C.	600						
		Ver. C. C.	1	McI. & S.	60	40–82	90	175	75	G. E.-I. P.	2700	D. C.	600						
Central Penna. Traction Co	Harrisburg	Hor. C. C.	3	A.-C.	42	22–48	100	165	None	Bullock	650	D. C.	600				No	4	2
Toledo, Bowling Green & Southw'n	Findlay	Hor. C. C.	2	McI. & S.	48	26–52	94	175	None	G. E.	1000	A. C.	370	25	Yes	Belted	Yes	5	2

* Includes switchboard attendants.

TABLE IV—ENGINE AND TURBINE DATA OF COMBINED TURBINE AND RECIPROCATING ENGINE STATIONS.

Company	Location	Reciprocating Engines								Generators					Turbo-Units									Exciters		Operating Force[1]	
		No. Units	Type	Make	Stroke, In.	Cyl. Diam. Inches	R.P.M.	Steam Press., lbs.	Superheat Deg.	Make	Capacity K.W.	Type	Voltage	Frequency	No. Units	Capacity K.W.	Make of Turbine	Steam Pres., lbs.	Superheat Deg.	R.P.M.	Make of Generator	Voltage	Frequency	Unit System	Method of Driving	No. Men	No. Shifts
Denver City Tramway Co.	Denver	3	Hor. C. C.	Gt. W.	48	22–52	...	175	75	G. E.	800	D. C.	570	...	..	....	.....	....	....	....	.....	....	....	....	.....	....	....
		1	Ver. C. C.	A.-C.	60	32–68	...	175	75	G. E.	1,600	D. C.	570	...	1	2,000	West.-Par.	175	75	1,500	West.	13,200	...	Yes	D. C. Motors.	9	2
Lack. & Wyom'g Val.[2]	Scranton	1	Ver. C. C.	A.-C.	48	30–60	...	175	75	G. E.	1,500	A. C.	2,300	...	..	....	.....	....	....	....	.....	....	....	....	.....	....	....
		2	Ver. C. C.	West.	48	30–60	95	155	None	West.	1,250	A. C. / D. C.	390 / 650	...	1	2,500	West.-D.F.	155	None	1,500	West.	2,200	...	No.	Eng. driven	9	3
Little Rock Ry. & Elec. Co.	Little Rock	1	Tan. Com.	Hamilton	42	20–40	120	150	30	G. E.	600	A. C.	2,300	60	..	....	.....	....	....	....	.....	....	....	....	.....	....	....
		1	CrossCom.	Hamilton	42	22–44	94	150	30	G. E.	650	D. C.	600	...	2	1,500	Curtis	150	30	900	G. E.	2,300	60	No.	Turbine	6	2
		1	CrossCom.	A.-C.	48	28–56	84	150	30	G. E.	1,000	D. C.	600	...	..	....	.....	....	....	....	.....	....	....	....	.....	....	....
Metropolitan Street Ry. Co.	Kansas City	3	Ver. C. C.	A.-C.	60	46–94	75	175	70	G. E.	3,000	A. C.	6,600	25	2	5,000	Curtis	175	70	750	G. E.	6,600	25	No.	Motor	35	2
Mil. Elec. Ry & Lt. Co.	Com'ce St.	4	Ver. C. C.	A.-C.	48	28–60	94	165	60	G. E.	1,500	A. C.	13,200	25	2	1,000	Curtis	165	60	1,200	G. E.	2,300	25	Yes	Turbine	40	2
		4	Ver. C. C.	A.-C.	48	32–68	94	165	60	G. E.	2,000	D. C.	600	...	..	....	.....	....	....	....	.....	....	....	....	.....	....	....
Twin City Rapid Transit	Minneapolis	4	Ver. C. C.	A.-C.	60	46–94	75	180	75	G. E.	3,500	A. C.	13,200	35	2	5,000	Curtis	180	100	700	G. E.	13,200	35	No.	1 Eng. driven, 2 Motor driv'n	15	2

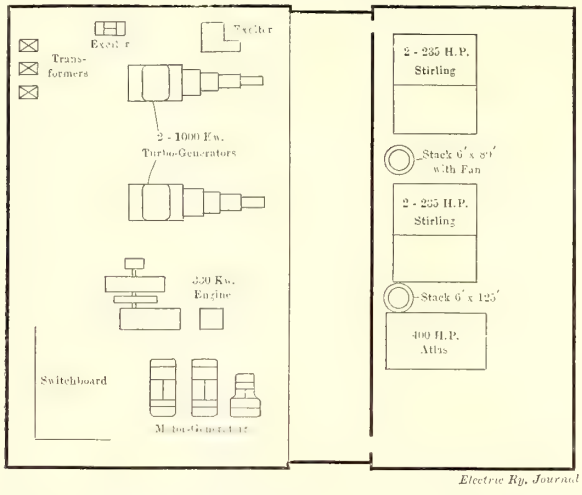
[1] Includes switchboard attendants. [2] Double current generators driven by reciprocating engines.

TABLE V—BOILER ROOM DATA OF ELECTRIC RAILWAY POWER STATIONS.

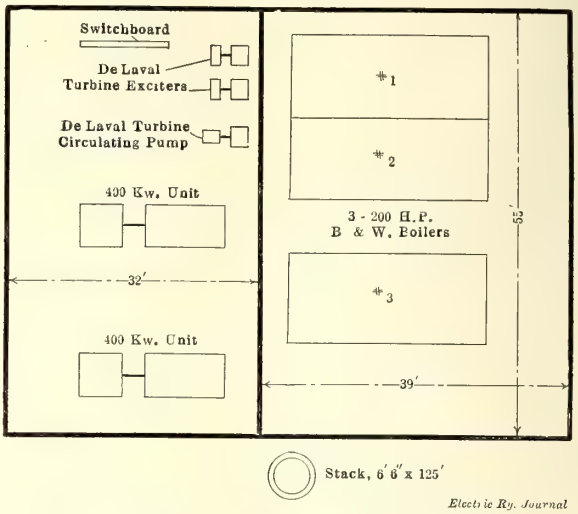
Company	Location	Boilers				Stacks				Stokers	Kind of Coal	Cost per Ton	Coal Storage		Coal Conveyors	Economizers	Superheat		Operating Force	
		Type	No.	Total B.H.P.	B.H.P. per K.W. Cap.	No.	Type	Height Ft.	Diam. Ft.				Tons Inside B'ld'g	Tons Outside B'ld'g			Type Superheaters	Deg. Superheat	No. Men	No. Shifts
Aurora, Elgin & Chicago	Batavia	Edgemoor	10	5,000	0.83	1	Brick	225	11	McKenzie-Gr'n	Ill. Screen	1.65	120	1,800	Elec. Crane	Yes	None.		14	3
Boston Elevated Ry. Co.	Lincoln	B. & W.	20	10,160	0.75	2	Brick	251	13	Roney	Pocahontas	3.60	5,000	10,000	Hunt	Yes		75	31	3
Boston Elevated Ry. Co.	Harvard	B. & W.	10	5,400	0.80	2	Brick	223	11	Roney	Pocahontas	3.60	1,000	1,000	Belt	Yes		75	20	3
Boston Elevated Ry. Co.	Charlestown	B. & W., A. & T.	11	5,900	0.84	2	Brick	200	12	Roney	Pocahontas	3.60	500	15,000	Belt	No.		75	22	3
Central Penna. Trac. Co.	Harrisburg	Heine	5	1,625	0.83	1	Concrete	130	10	Hand	Bituminous	2.35	1,000	2,000	Screw	Yes	None.		5	2
Denver City Tramway Co.[1]	Denver	Stirling	13	5,480	0.73	4	Steel	See note	See note	Stirling	Lignite Slack	1.40	1,100		McCaslin	Yes	Niclaus	75	14	3
Ft. Wayne & Wab. Val.[3]	Spy Run	B. & W.	12	4,800[2]	0.56	1	Brick	180	12	Roney	Hocking Valley	2.35	400	6,000	Gantry Crane	No.	B. & W.	75	8	2
Illinois Traction System[4]	Peoria	Stirling	8	3,200	0.80	2	Rein. Concrete	200	11	Green	Ill. Slack	0.95	800	600	Crane & Grab Bucket	No.		120	11	2
Iowa & Illinois Ry. Co.	Clinton	B. & W.	3	600	0.75	1	Steel	125	6.5	Hand	2-in. Ill. Screen	1.35	None	1,000	None	No.	B. & W.	100	5	2
Lackawanna & Wyom. Val.[5]	Scranton	B. & W.	7	2,828	0.57	1	Steel	125	10	Hand	Barley Anthra.		200	2,000	Robins Belt	No.	None.		16	3
Little Rock Ry. & Elec. Co.[6]	Little Rock	A. & T.	8	4,000	0.76	1	Steel	100	11	Hand	Ark. Slack	2.00	700	1,400	None	No.	Foster.	20	10	2
Metropolitan Street Ry.	Kansas City	B. & W.	30	17,340	0.91	2	Brick	265	16	Green	Kansas Slack		12,000	None	McCaslin	No.	B. & W.	70	50	2
Mil. Elec. Ry. & Lt. Co.[5]	Commerce St.	Edgemoor	16	10,800	0.68	8	Steel	150	8	Jones	Yough. Screen	3.00	16,000	None	Cranes	No.		60	20	2
Norfolk & Portsmouth	Portsmouth	B. & W.	14	7,000	0.67	2	Brick	220	12	Roney	Slack	2.40	1,000	1,000		No.	B. & W.	150	12	3
Phila. Rapid Transit Co.	Del. Ave.	Parker	16	12,800	0.71[6]	2	Rein. Concrete	225	14	Roney	Clearfield	2.65	2,400	1,500	Drag and Bucket	No.	Parker.	125	48	3
Toledo, Bowl. Green & S.[5]	Findlay	Cahill	6	1,500	0.75	1	Steel	60	8	Jones	Pitts. Slack	1.70	50	300	None	Yes	None.		6	2
Twin City Rapid Transit	Minneapolis	B. & W.	24	13,320	0.56	2	Brick	162	16	Roney	Nor. Ill. R. M.		2,800	12,000	McCaslin	No.	B. & W.	120	32	2
Wash. Ry. & Elec. Co.	Bennings	B. & W.	24	14,500	0.63	3	Concrete	200	12	Roney	Bituminous	3.05	1,200	25,000	McCaslin	No.	B. & W.	150	10	3
Youngstown & Ohio River	West Point	Stirling	6	2,400	0.80	1	Steel	130	8	Hand	Pitts. R. M.		500	1,500	None	No.	None.		3	2

[1] Mechanical Draft for 3 stacks. [2] Ultimate Capacity. [3] Double Deck. [4] Superheaters on 4 boilers only. [5] Mechanical Draft. [6] Boiler plant two-thirds installed.

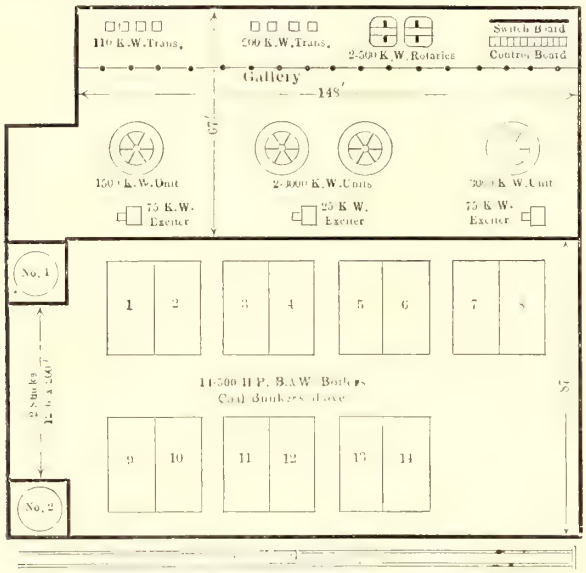
With the exception of five of the smaller plants all of the stations included in the table are equipped with superheaters delivering steam superheated to from 20 to 150 deg. Fahr. Three of the five plants which do not have superheaters are reciprocating engine stations, while a fourth, the station of the Lackawanna & Wyoming Valley, has had a turbine installed after the reciprocating engines were put in service. The West Point station of the Youngstown & Ohio River Railway is the only turbine installation which operates on saturated steam. The double-deck plan of this



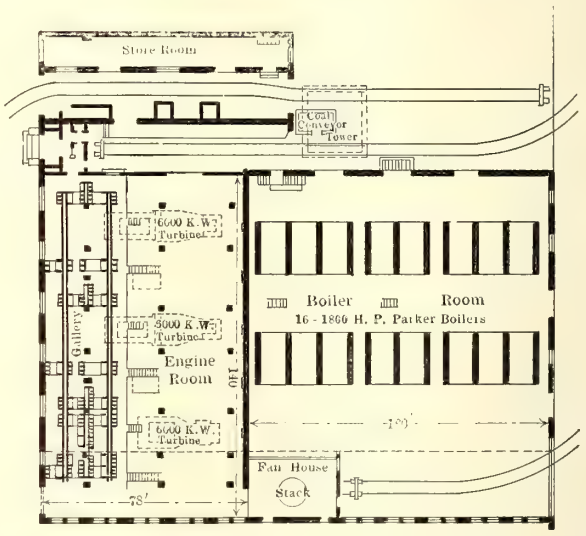
Kokomo, Marion & Western Kokomo Power Station



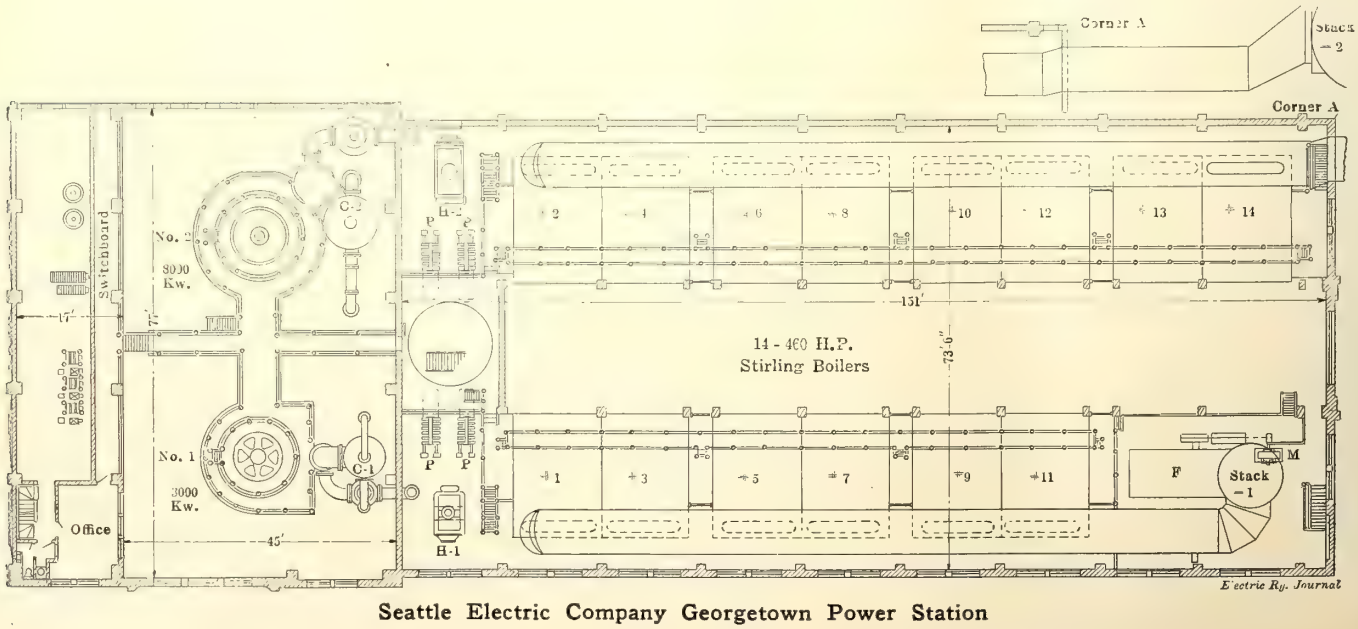
Iowa & Illinois Clinton Power Station



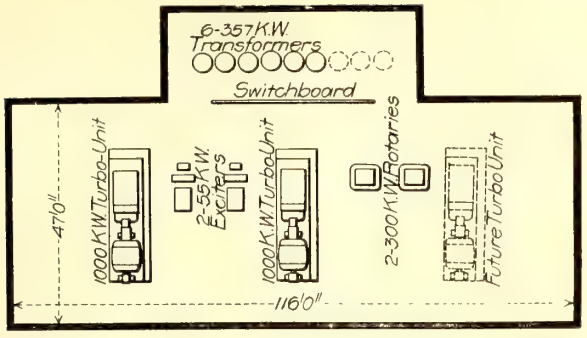
Norfolk & Portsmouth Power Station



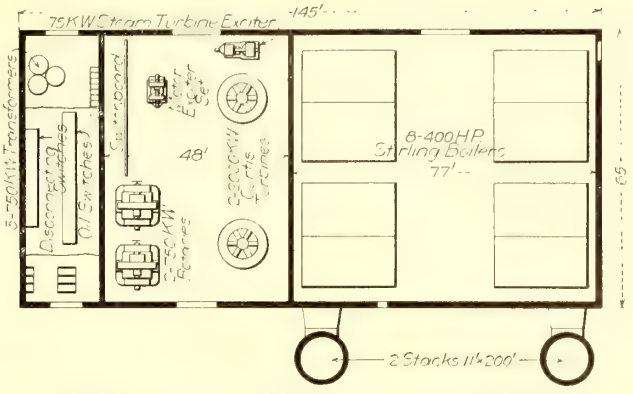
Philadelphia Rapid Transit Company Delaware Avenue Power Station



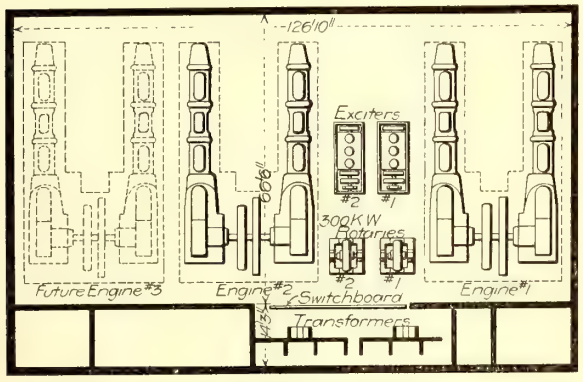
Seattle Electric Company Georgetown Power Station



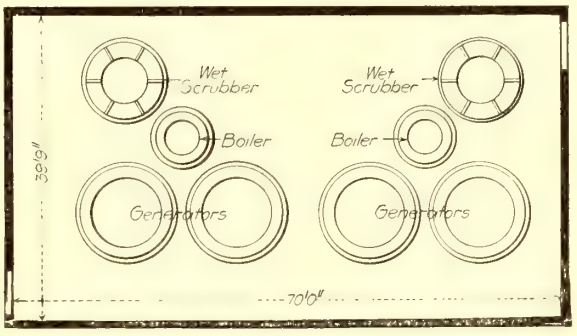
Youngstown & Ohio River West Point Power Station



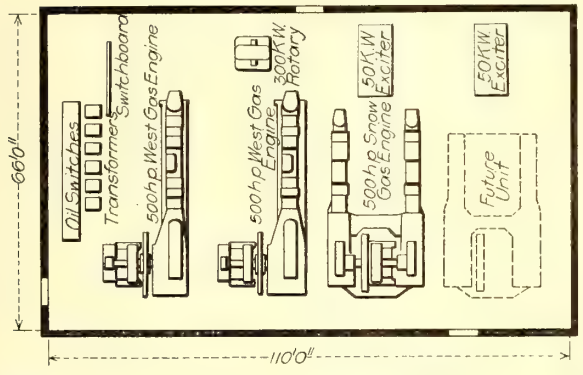
Illinois Traction System Peoria Power Station



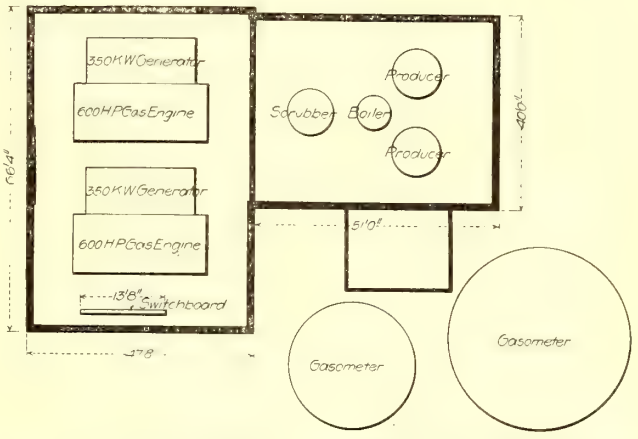
Engine Room of Milwaukee Northern Gas Engine Power Station



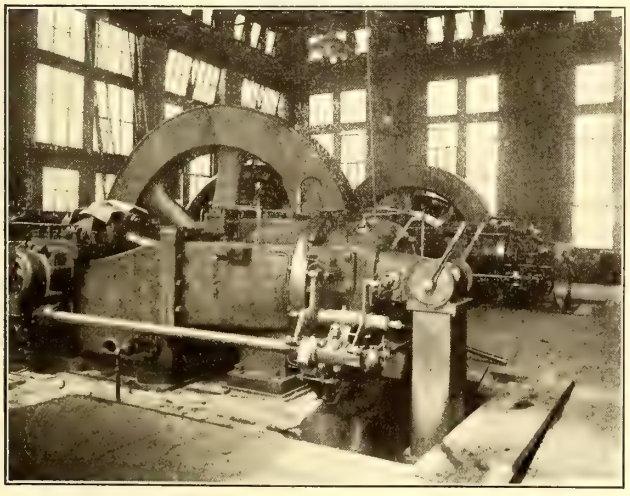
Producer Room of Milwaukee Northern Gas Engine Power Station



Western New York & Pennsylvania Olean Gas Engine Power Station



Boston Elevated Railway Somerville Gas Engine Power Station



Engine Room of Boston Elevated Railway Somerville Gas Engine Power Station



Producer Room of Boston Elevated Railway Somerville Gas Engine Power Station

station, with the turbines directly over the boilers, results in almost an entire absence of entrained moisture in the steam as delivered to the turbine throttles. The low cost of coal in the region in which this plant is situated was also a factor in deciding to omit superheaters as the gain in efficiency of the turbines when using superheated steam measured in cost of coal was hardly enough to warrant the additional cost and complication of installing superheaters.

Other features of the equipment of the stations under review are shown in the accompanying outline plans and tables.

ELECTRICAL NIGHT AT THE NEW YORK RAILROAD CLUB

The greater part of the proceedings of the New York Railroad Club on Friday evening, March 19, was given up to a discussion on the "Approaching Transfer of the Electrification Problem." The first speaker, William McClellan, said that the problem of electrification was now transferred from possibility to practicability; in other words, that the electrical engineer would have to give way to the railroad engineer familiar with the broader financial aspects of heavy railroading. The electrical engineer need not necessarily drop all connection with the work, but if he is an electrical engineer and nothing more, his sole function will be the perfection of details and methods. Railroads are now confronted with no less than five different electric systems, any one of which would probably do the work reliably with more or less economy and would be financially practicable. These systems are the 600-volt, d.c. third-rail; the 1200 volt or higher d.c. third-rail or trolley; the high-voltage a.c. single-phase; the high-voltage a.c. three-phase, and various gasoline-electric or straight gasoline cars. All of these have their own advantages under certain conditions, but they will not command real backing until there is a practical unanimity among technical men as to what simple or composite system is generally applicable. The simplest method appears to be the use of a high-voltage system for trunk lines, with either low a.c. or d.c. voltage in cities. The low-voltage a.c. was preferable to d.c. because the potentials could be varied so easily. The speaker thought that now was the time to consider the standardization of certain features of heavy electric lines, like the location and type of third-rail and shoe; location of overhead contact conductor; side and top clearances; location of end couplings; low voltage for d.c. and a.c. on third-rail and overhead contact lines; high voltage for overhead contact lines; frequency of alternating current. Such standardization might well be confided to a committee appointed by the American Institute of Electrical Engineers, acting jointly with the several steam railroad organizations. He regarded it as a maxim that no feature of electrification design should hamper railroad operation proper.

W. S. Murray, electrical engineer of the New York, New Haven & Hartford Railroad, said that electrification depended on two things, law and economy. Experience has shown that electrification must take place in cities with great terminals and on mountain divisions of railroads where the ruling grade indicates that trains can be handled more cheaply by electricity. He quoted some interesting figures on the electrification of Prussian State railways, printed in the United States consular reports, according to which the present capitalization of the Prussian State railways is $2,250,000,000; length of single track, 12,785 miles; annual operating expenses, $241,796,000; annual receipts, $404,483,000. It was assumed that power could be delivered at 0.833 cent per kw-hour, if the alien stations supplying the same were allowed 4 per cent interest on their investment and that the power was being transmitted for distances up to 125 miles. The cost of the electric system, inclusive of distribution and transformer houses, was over $234,500,000. It was estimated that the present number of steam locomotives could be replaced by electric locomotives numbering 3% per cent less. The cost per pound of electric locomotives was estimated at 18.34 cents and that of steam locomotives at 11.86 cents. The report concluded that the economies of electric traction warranted electrification. Standardization was a very dangerous proposition just at present, but certain things had been accomplished in the several systems which would bear discussion in detail. Evidently the power conditions of steam railroad operation must be different from those on street railways, for direct current had been used on the latter for 20 years without any important applications to the former. On the other hand, the alternating current had behind it the advantages of long distance and capacity long before it was applied to railway work. For the past four years he has had the opportunity of observing the operation of a.c., d.c. and steam on the same train, and he was convinced that if any railroad has a situation similar to that of his own, it should adopt alternating current. He believed, however, that low-voltage generators should be used; that is, the high voltage should come from the transformers rather than from the generators direct. The transformers may be said to introduce a softening effect between the contact line and the generators. The cost and efficiency per kilowatt installed would not be seriously affected by this arrangement, because the efficiency of the low-voltage machines is higher and the transformer losses are so low that the combination will give an output equal to the high-voltage machine alone. The difference in initial cost is slight. Mr. Murray also referred to the use by the New Haven railroad of its steel working conductor, which he compared to the use of a floor on the members of a bridge. The steel wire is easily replaced and costs but 4 or 5 cents per pound, as against 20 to 25 cents per pound for copper or phosphor bronze. The wear of the steel wire has been only 0.0005 in. in six months at the worst places on the line. As regards frequency, he did not wish to say that he was absolutely in favor of 25 cycles, but stated that its advantages should not be overlooked, especially as there are many plants where 25 cycles is the standard frequency.

Mr. Murray mentioned that the New Haven railroad's electric zone had originally been sectionalized about every 1½ miles, but said the sections were now much longer. It is useless to have the section breaks at points where they cannot be utilized by crossovers. The latter, therefore, are very important in fixing the length of sections, which, consequently, are not amenable to standardization. The electric zone of the New Haven railroad comprises three terminal runs, respectively 17.25 miles to New Rochelle, 25 miles to Portchester, and 33 miles to Stamford. The engine mileage is about 210 miles a day per annum for each electric locomotive, while statistics on 115 steam engines doing inter-division work showed an average of 158 miles. It was apparent, therefore, that in replacing the steam locomotives by electric stock one should bear in mind these differences in ability to make mileage. Mr. Murray then compared the speed-torque curves of steam and electric locomotives.

N. W. Storer, of the Westinghouse Electric & Manufacturing Company, spoke of the studies and efforts now under way toward the electrification of terminals in large cities. The recent decision of the Pennsylvania Railroad to use direct current in New York was influenced by the fact that it already had a heavy d.c. investment on Long Island and that much of the new work would be through tunnels, but he believed that should the Pennsylvania Railroad consider electrification of long distances between cities it would tend to favor the single-phase. The Great Northern Railroad was the only one in the United States which had adopted three-phase operation. There was no question that three-phase motors can be used, but not for general railway service. They are not adapted for multiple-unit trains, and with the frequency of 15 cycles the speed of a two-pole, three-phase motor is only 900 r.p.m., whereas standard railway motors are running at 1500 to 1800 r.p.m. Such a three-phase motor would be a poor one to have, and if four poles were used the speed would be reduced to 450 r.p.m., making a very large motor. On one of the Italian railways he had seen a locomotive with two three-phase motors, one having eight poles and rated at 1500 hp, the other having 12 poles and rated at 1200 hp on an hourly basis. But since the motors could not be operated together at their highest speeds, it would be wrong to state the total output as 2700 hp. The constant speed characteristic of the three-phase motors also makes them uneconomical for railway service, aside from the double overhead trolley. In conclusion, he added that electrification must not be considered simply from the point of cars and locomotives. Single-phase locomotives did not cost so much more that their price should frighten any one, and if the equipment was 10 to 12 per cent heavier, it produced a saving of 25 to 40 per cent in the cost and efficiency of the transmission system.

E. B. Katte gave the following figures on the reliability of the New York Central electrical service during 1908: There was not one minute delay because of the power station, substations or transmission lines; delays from feeders, 7 train minutes; from third-rail, 150 train minutes; from locomotives, 400 train minutes. The total locomotive mileage was nearly 1,000,000. The multiple-unit cars traversed 3,500,000 miles with train delays of 830 minutes, about equally divided between electrical and mechanical causes. The total number of train minute delays from all causes was 1400, and the average train miles per minute delays was over 3000. The average number of electric train movements per day was 450 and the amount of current generated for the service 120,000 kw-hours.

C. L. Muralt said that a great deal of standardization really has been going on in the past. Power plants, for instance, had practically adopted 25 cycles, although it might be noted that the Swiss study commission on electrification had recommended a frequency of 12 to 15 cycles. The transmission and distribution systems had also practically standardized. The one large problem which remained was the standardization of rolling stock motive power. There was no good reason why electric rolling stock should be limited to one type any more than steam locomotives are at the present day. It was not correct to assume that the three-phase motor could only operate on low frequency, as there were over half a dozen three-phase lines on the Continent now using 40 cycles or more. The 1200-hp and 1500-hp motors mentioned by Mr. Storer give in tandem a total slightly less than 2700 hp. Three-phase locomotives weigh even less than d.c. locomotives. He then criticised the weight and performance of the New Haven locomotives, and drew some speed-torque curves to indicate the superiority of the three-phase locomotive.

H. G. Stott, superintendent of motive power, Interborough Rapid Transit Company, indorsed the remarks that Mr. McClellan had made on standardization, and thought that it was time to concentrate attention on the location of the contact rail and overhead wires.

N. W. Storer, replying to Mr. Muralt, said that while three-phase motors could be used with high frequencies, they operated better on low frequencies. He had made some calculations on three-phase locomotives to fulfill the conditions of the New Haven electric zone service, and found that it would require a 1500-hp locomotive to handle the loads and give the maximum speed of 50 m.p.h., which is now given by a 1000-hp single-phase locomotive. Furthermore, the single-phase locomotive, in spite of its greater weight, would require less power, because it has no rheostatic losses during acceleration. The single-phase locomotive also has the advantage of being able to increase its speed when necessary.

W. S. Murray stated that the New Haven locomotives were intentionally designed for operation in multiple, because 80 per cent of the New Haven train-weights range between 200 and 250 tons, which is the unit capacity of one locomotive. It was thought better to have two locomotives ready for the few heavy trains than single larger locomotives, which would be operating inefficiently with most trains.

Dr. Cary T. Hutchinson said that he had decided in favor of three-phase operation on the Great Northern Railroad because he believed the three-phase motor best adapted for the heavy trains and grade on the division being electrified. The motors were extremely simple and hardy, and the power tests made were away above the guarantees. He considered it the most powerful electric motor in existence, whether a.c. or d.c. The hourly rating of each motor is 540 hp, and for the four motors 4000 hp; the continuous ratings are respectively 420 hp and 1700 hp. The operating officials of the Great Northern Railroad did not object to having a constant speed of 15 m.p.h., whether going up or down a 2 per cent grade. He had also received a report favoring three-phase from an engineer who was working on plans for the electrification of a western division of a trans-continental railroad. He felt quite certain that the Pennsylvania Railroad would seriously consider the adoption of three-phase motors on the low-grade freight line between Harrisburg and Trenton.

N. W. Storer, referring to Dr. Hutchinson's remarks, said that he was now designing a single-phase locomotive having a continuous capacity of 2750 hp and capable of running on 2 per cent grades at 20 m.p.h. Mr. Muralt said that he also had under consideration a 6000-hp, three-phase locomotive, but after all there need be no dispute as to the limits of horse-power capacity in any form of electric locomotive.

After brief remarks by other members the meeting was adjourned.

At the Cedarburg shop of the Milwaukee Northern Railway a pair of bare copper wires installed between two roof-supporting columns along a repair track are connected with the telephone circuit leading to the dispatcher's office, and afford a ready means for testing in the shop the portable telephone sets and hook attachments carried on the car.

RECORD SYSTEM OF THE THIRD AVENUE RAILROAD COMPANY, NEW YORK

In connection with its system of car maintenance, the Third Avenue Railroad Company, of New York, has developed a number of forms which have proved themselves extremely valuable in recording the performance of equipments in detail and providing a check on the general efficiency of the inspection and repair departments.

The foundation of the record is the motorman's signing-in sheet which is placed on a table in each depot. As shown

.....Division Date.....1909

Run and Car Nos.	Motorman	Badge No.	Time On	Time Off	No. Trips	Condition of Car	Inspected By
Run No.							
Car							
"							
"							

Fig. 1—Motorman's Signing-In Sheet

in Fig. 1, this form gives the name of the motorman, the run number, car number, car condition, time on, time off, trips and destination. The run number is put in by the despatcher only. All of this data is transferred to a large book, each page of which has enough rules to permit a daily record for three months. For brevity's sake, the trouble reported by the motorman is indicated by a symbol and thus one can tell almost at a glance how a car has behaved over the comparatively long period of three months and easily trace the responsibility for the defects indicated. The

Emergency "Run In" of Cars at.....Car Barn Date.....190..

Car No.	Time	Delay in Schedule	Line	Motorman's Report of Trouble	Car House Foreman's Report of Trouble

Fig. 3—Report of Cars Pulled In

form most closely related to this book record is Fig. 2, the division foreman's daily report of cars inspected at his car house. This is turned in every morning and gives the superintendent of equipment an accurate idea of what is going on throughout the system. Fig. 2, it should be understood, covers all cars. However, those which are in for emergency reasons are recorded in red on the regular three months' record. Fig. 3 is the form sent in by foremen for these emergency or pulled-in cars. This sheet gives the car number, badge number, time, delay in schedule, line, motorman's report of trouble and car-house foreman's report of trouble, the latter information being derived from the car inspector's signed slip. This run-in sheet is made out in triplicate, one remaining with the foreman, another with the main office and the third going to the Public Service Commission. The troubles shown on the run-in sheet are carefully analyzed by the mechanical department, which knows from its card records the name and type of the apparatus which gave trouble on the cars reported. This is detailed on a form, Fig. 4, which is signed by the superintendent of equipment and forwarded to the general manager every day.

DAILY REPORT OF MECHANICAL DEPARTMENT

..... Date.....
General Manager

Cars Taken Out of Service		65th Street and 3rd Avenue		Summary	
		From First	This Date	From First	This Date
Defective Equipment	W. H. 56 Motors				
	W. H. 68 Motors				
	W. H. 69 Motors				
	G. E. 210 Motors				
	Other Types				
	Broken Motor Shell				
	Motor Leads				
	Brush Holder				
	Cables				
	Controllers				
	Circuit Breakers				
	Resistance				
	Light Wiring				
	Plows				
	Trucks				
	Gears				
	Pinions				
	Journals				
	Brakes				
	Wheels (Steel)				
	Wheels (Cast)				
	Fender and Pilots				
	Car Bodies				
	Register				
	Sand				
	Total Cars Removed				
Other Purposes	Inspection				
	Cleaning				
	Damages				
	For Defects Found O. K.				
	Total Cars Removed				
	No Cars in Service 6 P.M.				
	Extra O. K. Cars 6 P.M.				
	Bad Order Cars 6 P.M.				
	Cars in General Repair Shop 6 P.M.				
	No. Cars Overhauled				
	No. Cars Rewired				
	No. Trucks Rebuilt				
	No. Cars Repainted				
	No. Men Employed (Inspt.)				
	No. Men Employed (Gen'l Over)				
	Per Cent. Cars taken out of Service for Defective Equipment				
	Per Cent. Cars taken out of Service for Other Purposes				

Supt. of Equipment.....

Fig. 4—Progressive Report of Car Defects

Division.... Date.....190
Cars in Car House from 6 A.M. to 5 A.M.

A.M. 6	7	8	9	10	11	12	P.M. 1	2	3	4	5	6	7	8	9	10	11	12	A.M. 1	2	3	4	5

Fig. 5—Hourly Report of Cars in House

THIRD AVENUE RAILROAD COMPANY
Frederick W. Whitridge, Receiver

Car House..... Date.....190....

Car No.	Armatures	Motors Oiled	Brush Holders	Motor Leads	Controller	Resistance	Circuit Breaker	Plows	Lights	Heaters	Car Bodies	Sand	Gongs	Register	Trucks	Brakes	Wheels	Remarks

Immediately after inspecting a Car, the Inspector will sign his initials under the part or parts inspected, and directly opposite the Car Number, which he will fill in.

Twelve hours ending.....190.... *Foreman*.....

Fig. 2—Daily Report of Cars Inspected at Division Car House

Fig. 4 is really a progressive report, inasmuch as the percentage of cars taken off the line for defects or otherwise is given for the part of the month already expired, besides the houses, with a summary column, as shown. It also shows what extra work is going on at each depot and how many men are employed. The information on this form is afterward worked up into equipment record curves as described in the article on this system published in the Feb. 20 issue.

Fig. 5 is a reproduction of the hourly report sheet, made daily record. This form lends itself readily to a comparison of all the car houses day by day and month by month. The actual form has parallel columns for the other car

COMPRESSOR ARMATURE RECORD

Maker's No..... Number.....
Type Maker Date Received

Car No.	Date In	Date Out	Com. Turned	Diam. Before	Diam. After	Overhauled	Mileage	Remarks

COMPRESSOR RECORD

Maker's No..... Number.....
Type Maker Date Received

Car No.	Date In	Date Out	Date Overhauled	Mileage	Remarks

CONTROLLER RECORD

Type..... Date Received..... No.....

Car No.	Applied	Removed	Overhauled	Remarks

ARMATURE RECORD

Maker's No..... No.....
Type..... Date Received.....

Car No.	Motor No.	Applied	Removed	Com. Turned	Diam. Before	Diam. After	Mileage	Gen'l Repair	Remarks

WHEEL RECORD

No.....
Maker..... Date Received.....

Car	No.	Applied	Removed	Mileage	Turned	Diam.	Remarks

MOTOR AND TRUCK REPORT

.....Shop

Truck No. { No. 1 / No. 2 } Car No. Date 19

Repairs Needed
Type Motor Gear Ratio
Repairs Made

Removed		*Cause*	*Put In*	
No. 1. Motor No.	Arm. No.		Motor No.	Arm. No.
No. 2. Motor No.	Arm. No.		Motor No.	Arm. No.
Wheel Nos. No. 1. Dr.	" "		Wheel Nos. No. 1. Dr.	" "
Wheel Nos. No. 1. Py.	" "		Wheel Nos. No. 1. Py.	" "
Wheel Nos. No. 2. Dr.	" "		Wheel Nos. No. 2. Dr.	" "
Wheel Nos. No. 2. Py.	" "		Wheel Nos. No. 2. Py.	" "

Style "Dr." Wheels Size — Style "Dr." Wheels Size
Style "Py." Wheels Size — Style "Py." Wheels Size

Foreman

Fig. 6—Headings of Equipment Record Cards

CHANGE OF EQUIPMENT

.....Shop Date.....19....

I have this day Removed *the following equipment from* Car No..... | *I have this day* Placed *the following equipment in* Car No.....

Description	No. Removed	Type	Shop No.	Cause	Description	No. Installed	Type	Shop No.
Controller					Controller			
Motor					Motor			
Armature					Armature			
Trucks					Trucks			
Resistance					Resistance			
Circuit Breaker					Circuit Breaker			
Register					Register			
Plow					Plow			
Compressor					Compressor			
Compressor Armature					Compressor Armature			

Equipment removed at.....Car Barn or Shop, and sent to.....Shop
REMARKS:.....

Foreman.....
Shop.....

Fig. 7—Record of Change of Equipment

REPORT OF TURNING WHEELS

Date..... 19....

Wheel No.....Style.....Make.....
Received from.....Shop.....19...
Reason for Turning or Grinding.....
Measurement (Diameter) before Turning.....
Measurement (Diameter) after Turning.....
Tire Loss (Calipered).....
Work done by.....Date.....19.
Inspected by.....
Foreman.....

No. of Wheel Scrapped...Date 19.
No. of Axle Scrapped....Date 19.
No. of Tire Scrapped....Date 19.
Reason for Scrapping....Date 19.

Fig. 8—Report of Turning Wheels

REPORT

Renewal of Wheel, Tire and Axle

Wheel No..... Tire No.....
Make of Wheel..... Make of Tire.....
Wheel Fitted by..... Tire Fitted by.....
Pressed on by..... Outside Diameter..
Tons Pressure.....
Axle No.....
Make of Axle.....
Size of Axle.....
Fitted by..... Date.....19....
Inspected by.....
Foreman.....

Fig. 9—Report of Renewal of Wheels and Axles

FOREMAN'S DAILY REPORT OF COMMUTATORS TURNED

Date..... Location.....

Armature No.	Tape	Size Before Turning	Size After Turning	Remarks

Foreman.....

Fig. 10—Report of Commutators Turned

ELECTRICAL CAR HOUSES DEP'T

Oil and Grease Report for.....190....

Division	On Hand 1st, 190	Received	Material	Used	On Hand 1st, 190
	bbls.	bbls.	Motor Grease		bbls.
	"	"	Gear Grease		"
	"	"	Elec. Car Oil		"
	"	"	Kerosene		"
	bbls.	bbls.	Motor Grease		bbls.
	"	"	Gear Grease		"
	"	"	Elec. Car Oil		"
	"	"	Kerosene		"
	bbls.	bbls.	Motor Grease		bbls.
	"	"	Gear Grease		"
	"	"	Elec. Car Oil		"
	"	"	Kerosene		"

Used On	Motor Grease	Gear Grease	Electric Car Oil	Kerosene
Sand Cars				
Scraper Cars				
Sweeper Cars				
Freight Cars				
Wheel cars				

.....
C. H. Foreman

Fig. 11—Monthly Oil Report

out and forwarded by the car-house foreman to headquarters every day. This report is valuable, as it shows just how each depot is handling its rolling stock.

The equipment record is kept entirely on 8-in. x 5-in. cards made out in different colors and headings for motors

MILEAGE RECORD

Date	Miles	Date	Miles	Date	Miles	Date	Miles

Fig. 12—Car Mileage Record

and trucks, armatures, controllers, etc., as reproduced in Fig. 6. The data for these cards are obtained from the several daily shop reports described hereafter. These forms contain all necessary information to keep up a card record which will show just where any given piece of equipment may be found. The shop blanks are reproduced in Figs. 7 to 10, as follows: Fig. 7, covering change of equipment on a given car; Fig. 8, report of wheels turned; Fig. 9,

THIRD AVENUE RAILROAD COMPANY
FREDERICK W. WHITRIDGE, Receiver
.....*Department*
MACHINE SHOP ORDER

To.....*Date*.....19....

.....

.....

ESTIMATED COST $.....

Signed..... Charge to.....
Foreman
Approved Approved
....
Head of Department *Supt. of Equipment*

.....19....
Order referred for Execution to.....
.....
Supt. of Equipment

This order to be used by all Departments requiring work done by the Mechanical Department. Duplicate to be retained by Issuing Department and original to be forwarded to Superintendent of Equipment.

Fig. 13—Machine Shop Order

report of wheel set renewals, and Fig. 10, report of commutators turned. Fig. 11 shows the monthly oil report.

The individual car mileage, furnished daily by the transportation department, is transferred to a card file kept on a progressive form, Fig. 12. When the car has made 10,000 miles the motor and truck report card (Fig. 6) is sent to the general foreman with the notification that the car is due for general overhauling. If any particular part has been found to give unusual trouble, a reference to that fact is made. After the overhauling is completed, the card is returned to the office, showing the numbers of all parts removed and installed, as well as a general statement of the work done in the repair shop. The 10,000-mile overhauling basis brings a daily reduction of six to four cars a day as compared with overhauling every 60 days. Car inspection was formerly on a seven-day basis, but by changing this to a basis of 800 miles, there has already been attained a reduction of 10 cars a day. The company now owns 738 passenger cars, of which 300 to 350 are used in winter.

Machine-shop orders of the type shown in Fig. 13 are made out in duplicate by the subforeman of any department desiring work done by the mechanical department. This form keeps the superintendent of equipment in touch with all non-maintenance work done by the mechanical department.

LIGHTNING PROTECTION DEMONSTRATED

At the meeting of the Railway Signal Association, held in Chicago on March 15, a feature was an interesting lecture, accompanied by experiments, on "Lightning Phenomena," delivered by Prof. E. E. F. Creighton, of Union University. Some familiar ground was gone over in this lecture, but in addition there was much in it that was new. The speaker provided apparatus with which he illustrated his remarks. The phenomena of the action of lightning discharge on railway signal lines were illustrated and an improvised circuit was set up in the room. The apparatus consisted of a 16-in. induction coil to produce unidirectional discharges and Leyden jars to produce oscillatory discharges at high frequency. A voltage sufficient to jump a 2½-in. gap at the instrument was created. The impulse was sent around the circuit, at the center of which the spark was made to jump a gap of 5 in., showing that the wave of potential on the line was higher than at the source of the impulse. Where the sparking took place at the middle of the line it was due to a stationary wave, resulting from two waves traveling in opposite directions, meeting there and combining their potentials.

A series of tests was made to illustrate the good and bad effects of the factors involved in lightning protection. Discharges of a frequency of about 3,000,000 cycles were used in connection with a choke coil and needle gap in parallel. By varying the length of the needle gap the discharge was made to take place through either circuit. This is what is called the "equivalent needle gap." The values on this equivalent needle gap were shown for a lightning choke coil, a resistance rod, a multi-gap arrester, an aluminum arrester and a signal arrester. The relative values were as follows:

Choke coil, 1¾ in.
Resistance, 1¼ in.
Multi-gap arrester either 1/3 in. or 1½ in., according to the frequency used.
Aluminum arrester, too small to measure.
Signal arrester, about 0.02 in.

Explaining the variation in the case of the value given for the multi-gap arrester, it may be said that since the induction coil gives a single impulse which is equivalent to the customary act of switching on the line, it is equivalent to a low-frequency surge. The multi-gap arrester is not sensitive to this kind of a surge. Its equivalent needle gap is, in fact, about double the sum of the separate gaps in series. The single impulse of the induction coil may be shunted out, leaving only the high frequency of the condenser circuit. It is under this condition that the multi-gap arrester shows its sensitiveness to high potentials. The equivalent needle gap is then only a fraction of the sum of the series gaps of the arrester.

Experiments were also given with a smaller choke coil of double cotton-covered wire, substituted in place of the lightning choke coil. The discharge took place between turn and turn in many sparks, instead of going around through the metallic circuit.

On the evening of March 19 Professor Creighton delivered an address on the same subject before a joint meeting of the Chicago branch of the American Institute of Electrical Engineers and the electrical section of the Western Society of Engineers. W. L. Abbott, of the Commonwealth Edison Company, presided. The speaker covered much the same ground as in his preceding lecture, but he described in greater detail with experimental demonstrations the different methods of conducting electricity. As enumerated these are:

1. Normal ionization of the air.
2. More active ionization by the application of high potential, manifesting itself in brush discharge.
3. The transition from brush discharge to spark discharge.
4. The transition from spark discharge to arc discharge.
5. Conduction in metals.
6. Conduction in special conglomerate materials used in lightning arresters.
7. Conduction in liquids as illustrated by the aluminum cell.

PERMANENT WAY ON BRIDGES

BY DANIEL B. LUTEN, PRESIDENT, NATIONAL BRIDGE COMPANY, INDIANAPOLIS

An interesting example of permanent way on a bridge is shown in Fig. 1, a view of the new concrete arch bridge on the Lima & Toledo Railway, crossing the Maumee River near Waterville, Ohio, about 15 miles above Toledo. No type of bridge is quite so satisfactory as one that can



Maumee Bridge—Electric Car Crossing in August, 1908

be filled with earth and the track ballasted, to produce the exact conditions of a ballasted roadway on an earth roadbed. This condition is fully met by the reinforced concrete arch with earth filling. So far as roadbed, track and overhead construction are concerned, neither the passenger nor the engineer of maintenance of way would have any reason to suppose that this stretch of track was not supported on terra firma itself.

The objectionable noise made by high-speed cars on truss or girder bridges is here wholly lacking. No trolley trough is required for overhead construction and broken trolley poles should be no more frequent than at other points on the line, the wires being supported in exactly the same way by poles at intervals of about 100 ft. On such a structure the grade is maintained with the same ease as on the ballasted roadbed in cuts and fills. Every engineer on track maintenance has wrestled with the



Maumee Bridge—Ballast Train on Bridge

problem of eliminating depressions by gradually raising his grade, and has found himself invariably worsted by the lack of solid roadbed across his bridges, which requires that the track shall remain at a fixed elevation at that point. The result is not only a depression as the grade is bettered at adjacent points, but also that the greatest care is required in daping the ties to fit the open superstructure of beams or girders.

The Maumee bridge consists of 12 spans of 75, 80, 84, 87, 89, 90, 90, 89, 87, 84, 80 and 75 ft. each, having a rise of 22 ft. 3 in. to 25 ft. The arches increase in span in a uniform ratio from bank to middle of stream, to emphasize the main spans, and the shorter spans are given less rise and greater loading in order to equalize the thrusts of the arches. As a result the crowns of the arches are arched in a long, graceful curve, while the springings and roadbed remain at a level grade throughout. The roadway is 16 ft. clear between copings.

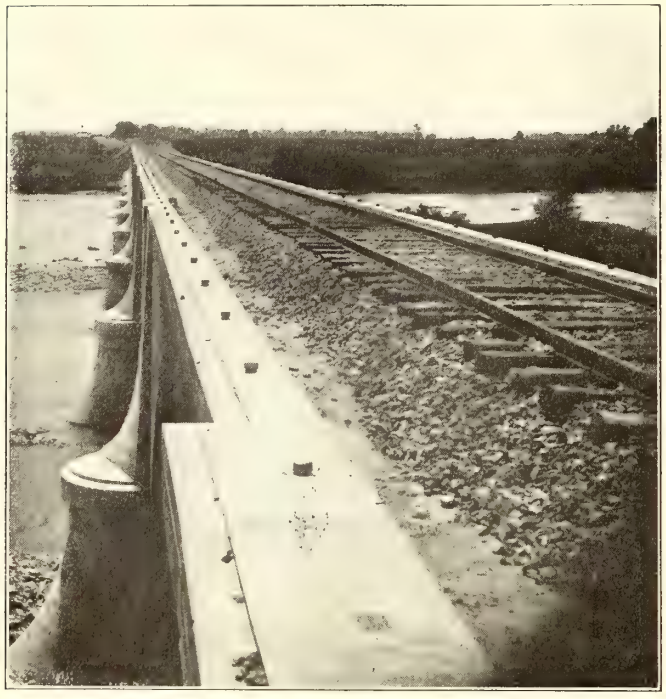
Centers were struck in the first span after five spans had been concreted in advance, in order that sufficient resistance might be afforded to prevent the completed arch from overturning the light pier on which it is balanced against its neighbor.

The arches are reinforced with 1-in. smooth steel rods following the intrados over the crown and crossing to the extrados at the haunches, spaced 6 in. in the 90-ft. span, and bonded transversely with ¾-in. rods at intervals of 4



Maumee Bridge—View of Bridge Under Construction

ft. and extending upward into the spandrels. The design of arches and reinforcing was based on the Luten patents and empirical formulas. The loading specified consisted of 200-ton cars on two trucks equivalent to 10,000 lb. per



Maumee Bridge—End View, Track Ballasted but Poles Not Erected

linear foot for single track, or about 500 tons on one span.

The contract price for the bridge complete was $77,000 and the contents of the structure were 9200 cu. yd. of concrete and 100 tons of steel. The bridge was designed by the National Bridge Company of Indianapolis and was erected by the National Concrete Company.

ACCIDENT REDUCTION BY CONTROLLER REGULATORS

In a recent investigation to determine the effect on current consumption, if any, of controller regulators of various types, it was found that an advantage in no way related to the question of current consumption had been experienced by a number of roads. This consisted in a reduction in the number of those accidents which are caused by cars starting suddenly and with a jerk sufficient to throw passengers off their feet; that is, the slow acceleration that tends to lessen the damages to motors and electrical equipment also reduces those for personal injuries. Thus one company in the Middle West which has controller regulators on all of its cars estimates that their use has brought about a reduction of 75 per cent in accidents of this character. Another company in the South has frequently demonstrated to claimants and their attorneys the impossibility of making a jerky start with cars equipped with regulators, and in this way has prevented many fraudulent cases from ever coming to trial. These devices have been found to prevent in some cases still another form of accident. They act as a check in making a sudden reverse in emergencies, and tend to hold the controller handle on the first or second point when the motorman in his excitement would try to throw the handle all the way around. In reversing to stop the car the first or second point produces more retardation than the last point and with less danger of damage to the motors.

ANNUAL CONVENTION, MAINTENANCE OF WAY ASSOCIATION

The tenth annual convention of the American Railway Engineering & Maintenance of Way Association was held at Chicago on March 16, 17 and 18. William McNab, principal assistant engineer, Grand Trunk Railway, president of the association, presided. The following officers were elected for the ensuing year:

President, William McNab, principal assistant engineer, Grand Trunk.

First vice-president, L. C. Fritch, consulting engineer, Illinois Central.

Second vice-president, W. C. Cushing, chief engineer maintenance of way, Pennsylvania lines, Southwest system.

Secretary, E. H. Fritch.

Treasurer, W. S. Dawley, chief engineer, Missouri & North Arkansas.

Members of board of directors, three years each, A. H. Rudd, signal engineer, Pennsylvania Railroad, and A. W. Thompson, chief engineer maintenance of way, Baltimore & Ohio.

The attendance at this convention (1335) was the largest in the history of the association. A large and interesting exhibition of railway appliances used in railway construction and maintenance was held during the week at the Coliseum, where there were displays by about 140 exhibitors. At the annual meeting of the Road & Track Supply Association, under the auspices of which the exhibition was held, the following officers were elected to serve during the ensuing year:

President, W. F. Schleiter, Dilworth, Porter & Company, Ltd., Pittsburg, Pa.

Vice-President, T. W. Snow, Otto Gas Engine Works, Chicago.

Secretary and treasurer, John N. Reynolds, western manager, *Railroad Age Gazette,* 160 Harrison Street, Chicago.

Executive committee, John McKinnon, Kalamazoo Railway Supply Company, Kalamazoo, Mich.; George Stanton, Cleveland Frog & Crossing Company, Cleveland, Ohio; Robert E. Belknap, Pennsylvania Steel Company and Maryland Steel Company, Chicago; John W. Duntley, president, Duntley Manufacturing Company, Chicago; A. P. Van Schaick, president, W. K. Kenly Company, Chicago; Azel Ames, Kerite Insulated Wire & Cable Company, New York.

An abstract of those parts of the proceedings which are of interest to electric railway officers follows:

SIGNALING, RAILS AND WHEELS

The committee on signaling and interlocking presented a report of 166 pages, including sample agreements between roads mutually maintaining interlockers and complete mechanical interlocking specifications.

The principal work of the committee on rails during the past year has been the investigation of the breakage and failure of rails and the drawing of conclusions therefrom; the preparation of reports on the results obtained from the use of open hearth steel rails and on changes in specifications for Bessemer steel rails. The committee urged that the various railway companies furnish it with the most complete information possible regarding rail failures, and recommended the use of rail statistic blanks earlier approved.

A sub-committee on the allowable length of flat spots on car wheels continued investigations relating to injury to bridges and railway structures caused by flat spots on wheels.

TRACK

The recommendations of the committee on track were:

(1) That the clear width of standard flangeway for all

frogs and between main rails and guard rails be 1¾ in., measured at the gage line, for all tracks of standard gage.

(2) Wide gage, due to worn rail, within the safe limits of wear, need not be corrected until the excess over the gage is equal to or exceeds ½ in., and should then be corrected by closing in.

(3) Within proper limits, a slight variation of the gage from standard is not seriously objectionable, provided the variation is uniform and constant over long distances. Under ordinary conditions it is not necessary to regage track if the increase in gage has not amounted to more than ½ in., provided such increase is uniform.

The committee also asked for an expression of opinion from the association as to which of the three following definitions and formulas should be adopted:

(1) Degree-of-curve is the angle subtended by a 100-ft. chord. Formula, $R = 50 \operatorname{cosec.} \frac{1}{2} D$.

(2) Degree-of-curve is the central angle of an arc whose length is 100.0074 ft. and is equal to 5730 ft. divided by the radius. Formula, $R = \frac{5730}{D}$

(3) Degree-of-curve is the central angle of a 100-ft. arc. Formula, $R = \frac{5729.58}{D}$

Definition No. 1 was approved by the association.

TIES

The committee on ties submitted blank forms to be used by roads in supplying the association with statistics of cross-tie data regarding renewal, kind of wood, life and treatment results. The conclusions presented by the report were adopted, as follows:

(1) Use chemically treated ties wherever practicable.

(2) Protect such treated ties against mechanical wear by means of tie plates, screw-spikes, etc.

(3) Enforce the tie specifications rigidly with particular reference to the rigid exclusion of small ties.

(4) Co-operation among the roads in any given territory, looking toward the adoption of standard tie specifications, with particular reference to making it impossible for contractors to furnish ties cut from small trees, which would naturally form sources for future tie supplies.

(5) Adopt measures for reducing forest fires.

(6) Encourage the owners to re-forest their lands either by replanting or natural reproduction.

(7) Use the proper means to aid and assist in the investigation of tax laws as far as they pertain to forest lands, with a view to having legislation enacted which would make it possible to hold lands with growing timber for the purpose of future tie production.

A sub-committee on metal and composite ties presented a profusely illustrated report outlining the practice and results obtained on steam roads with using steel, combined wood and steel and concrete ties. Its conclusions as adopted follow:

(1) Experiments with steel ties should be extended, and results carefully watched and reported to the association.

(2) The committee concludes that no form of reinforced concrete tie has been made which is suitable for heavy and high-speed traffic, but believes a properly reinforced concrete tie, with proper fastenings, may be found economical in places where speed is slow, and where conditions are especially adverse to life of wood or metal.

WOODEN BRIDGES AND BUILDINGS

The work assigned to the committee on wooden bridges and trestles included a revision of the specifications for structural timbers, co-operating with committee O of the American Society for Testing Materials, with a view, if possible, to preparing a uniform standard specification. This committee also was instructed to prepare a list of recommended safe unit stresses for structural timbers; revise the standard names for structural timbers; study the principles and current practice in pile driving, and report on the best method for classification of pine timbers for structural purposes in place of classification by botanical names.

The committee presented for adoption specifications as revised and adjusted. These specifications comprised appendix A of the report, including general requirements and standards for No. 1 railroad grade long leaf yellow pine and Douglas fir; also No. 2 railroad grade long leaf and short leaf yellow pine and Douglas fir and western hemlock; timber piles of two grades for railroad use and ties and guard rails. Regarding ties and guard timbers for bridges and trestles, the specifications are as follows:

Shall show one face all heart; the other face and two sides shall show not less than 75 per cent heart, measured across the face or side anywhere in the length of the piece; shall be free from knots over 2½ in. in diameter, and where surfaced the remaining rough face shall show all heart.

Appendix B of the report includes six curve sheets, giving a summary of the average results of safe unit stress tests made by the United States Forest Service on full-sized sticks of seven kinds of timbers. To facilitate comparison between average results as represented by the forest service tests, and to indicate the range in some cases, the modulus of rupture, the modulus of elasticity and compression parallel to the grain, according to various authorities, were presented on 11 diagram sheets. Another diagram exhibited the table of ultimate and working unit stresses recommended by the committee and approved by the association. This table is reproduced on page 552.

It is expected that the unit stresses will be revised whenever new results of timber tests are published, or when experience shall indicate that a revision is desirable. The section of the report devoted to piling included definitions for piles and pile-driving materials and machinery, illustrations of wooden and steel-sheet piling, data on driving and a discussion on the prevalent bad practice of overdriving, illustrated by engravings of overdriven piles.

RECORDS

The committee on records, reports and accounts submitted forms for estimates ordinarily handled by the engineer of maintenance of way for track work, and made recommendations as to conventional signs to be used in making track maps.

BALLASTING

The committee on ballasting recommended definitions, which were approved as here presented:

Gravel—Small worn fragments of rock occurring in natural deposits, that will pass through a 2½-in. ring and be retained on a No. 10 screen.

Sand—Any hard, granular, comminuted rock material finer than gravel, which will pass through a No. 10 screen and be retained on a No. 50 screen.

Accounts were presented outlining methods of handling ballast on various classes of work, including tables of costs and quantities for large plants. The committee outlined the approved methods for stripping, loading and washing gravel, summarized the functions of good ballast and the advantages and disadvantages of various kinds of ballast. Physical tests of ballast stone taken from a large number of quarries were presented.

SIGNS, FENCES, CROSSINGS AND CATTLE GUARDS

It was recommended by the committee on signs, fences and cattle guards, and approved by the association, that the following type of construction be used at grade crossings:

This construction will necessarily vary with conditions, but can be divided into the following general classes:

(a) Crossings where paving is required to conform to street specifications.

(b) Crossings of streets where no paving is required.

(c) Crossings of public roads or highways outside of towns or cities.

(d) Crossings of private or farm roads.

(1) For crossings where paving is required to conform to street specifications, cross-ties should be treated chemically to prolong their life to the greatest limit possible, and laid on a bed of stone or slag ballast not less than 12 in. in depth, placed in 3-in. layers, each thoroughly rammed, so as to prevent settlage. An 8-in. bed of Portland concrete mixed 1:3:6 can be substituted for the ballast if desired.

With the ballast and outside of the tracks, porous tile drains not less than 6 in. in diameter should be placed at intervals, leading to the nearest point from which efficient drainage can be obtained.

The support of the rail on the ties will vary with the character of paving used.

Where a special rail section is used, the flangeway should be rolled as a part of it.

With vitrified or paving brick, the ties should be similar and have the same foundation as described above, except that with rails of high section the use of the cast chairs is unnecessary.

A heavy tie-plate should be placed on each tie where the ordinary track rail is used.

A strip of treated timber 4 in. x 6 in., fitted to the rail and placed so as to expose 3 in. of surface next to the rail-head, should be used next to the outside rail, and this should be paved against; the strip should be ¼ in. below the rail-head.

Metal flangeways should be provided as described above, and paved against in like manner.

With asphalt paving a similar construction as for vitrified brick is recommended.

Paving between and outside of the rails should be laid in the most approved and workmanlike manner.

(2) Street crossings where no paving is required should be divided into two classes—those with plank laid the entire width and length, and those with plank only next

TABLE OF ULTIMATE AND SAFE WORKING STRESSES FOR VARIOUS KINDS OF TIMBER

Kind of Timber	Bending			Shearing				Compression						Ratio of Length of Stringer to Depth
	Extreme fiber stress		Modulus of elasticity	Parallel to grain		Longitudinal shear in beams		Perpendicular to grain		Parallel to grain		For Columns Under 15 Diams. Work'g Stress	Formulas For Working Stress in Long Columns Over 15 Diameters	
	Av'ge Ultimate	Working Stress	Average	Av'ge Ultimate	Working Stress	Av'ge Ultimate	Working Stress	Elastic Limit	Working Stress	Av'ge Ultimate	Working Stress			
Douglas Fir	6,100	1,200	1,510,000	690	170	270	110	630	310	3,600	1,200	900	$1{,}200\left(1-\frac{L}{60D}\right)$	10
Longleaf Pine	6,500	1,300	1,610,000	720	180	300	120	520	260	3,800	1,300	980	$1{,}300\left(1-\frac{L}{60D}\right)$	10
Shortleaf Pine	5,600	1,100	1,480,000	710	170	330	130	340	170	3,400	1,100	830	$1{,}100\left(1-\frac{L}{60D}\right)$	10
White Pine	4,400	900	1,130,000	400	100	180	70	290	150	3,000	1,000	750	$1{,}000\left(1-\frac{L}{60D}\right)$	10
Spruce	4,800	1,000	1,310,000	600	150	170	70	370	180	3,200	1,100	830	$1{,}100\left(1-\frac{L}{60D}\right)$	
Norway Pine	4,200	800	1,190,000	590	130	250	100	.....	150	2,600*	800	600	$800\left(1-\frac{L}{60D}\right)$	..
Tamarack	4,000	900	1,220,000	670	170	260	100	...	220	3,200*	1,000	750	$1{,}000\left(1-\frac{L}{60D}\right)$	..
Western Hemlock	5,800	1,100	1,480,000	630	160	270*	100	440	220	3,500	1,200	900	$1{,}200\left(1-\frac{L}{60D}\right)$	..
Redwood	5,000	900	800,000	300	80	.....	.....	400	150	3,300	900	680	$900\left(1-\frac{L}{60D}\right)$	..
Bold Cypress	4,800	900	1,150,000	500	120	.....	.....	340	170	3,900	1,100	830	$1{,}100\left(1-\frac{L}{60D}\right)$	..
Red Cedar	4,200	800	860,000	.....	..	.....	.....	470	230	2,800	900	680	$900\left(1-\frac{L}{60D}\right)$	..
White Oak	5,700	1,100	1,150,000	840	210	270	110	920	450	3,500	1,300	980	$1{,}300\left(1-\frac{L}{60D}\right)$	12

Note.—These unit stresses are for a green condition of timber and are to be used without increasing the live load stresses for impact. *Partially air-dry
L = length in inches. D = least side in inches.

If stone blocks are used, a substantial cast or malleable steel chair, with a base of not less than 48 sq. in., should be provided, fastened to the tie with suitable lag-screws, the rail fastenings to be a hook-headed bolt secured with nuts. Ties should be spaced so as to allow the joints to be supported by these chairs.

On long stretches of track laid in streets paved with stone blocks the use of a special rail section, not less than 9 in. in depth, is advisable, to avoid the use of the chairs mentioned; with such a rail heavy tie plates should be used as a protection.

On the outside of the rail the block paving should be laid up to the rail-head, but left slightly below it on the inside. An old rail or a suitable form of rolled filler should be placed to provide a flangeway, this to be fitted into the space between the head and base of the track rail; if an old rail is used the flange should be placed as nearly vertical as possible, the paving between the rails to be limited by the flanges or fillers. The flangeway should be supported by the same chairs carrying the track rail, with a clear opening of not less than 2 in

the rails and at the ends and filled between with suitable material.

For the first style, the plank should be of such timber as can be most economically obtained, not less than 3 in. in thickness, the outside planks to be shimmed, so as to be ¼ in. below the rail-head, and those inside similarly shimmed when necessary.

An old rail laid on the side of some suitable form of rolled metal shape should be used as a flangeway, its ends to be slightly bent inward, so as to give an opening of not less than 4 in. at the ends, the flangeway through the balance of the crossing to be not less than 2 in.

The intermediate planking should be closely fitted to the base of the old rails or other metal forming the flangeway, so as to avoid the necessity of further securing them to the ties.

For fastening the planking to the ties, ⅜-in. x 8-in. cut spikes should be used for rails 5 in. in height and under.

The ends of the planking should be beveled both between and outside the rails to a thickness of 1 in., commencing at a point 10 in. from the end.

One plank not less than 10 in. in width should be used on the outside of the track rails, and the total length of the planking should conform to the required street width.

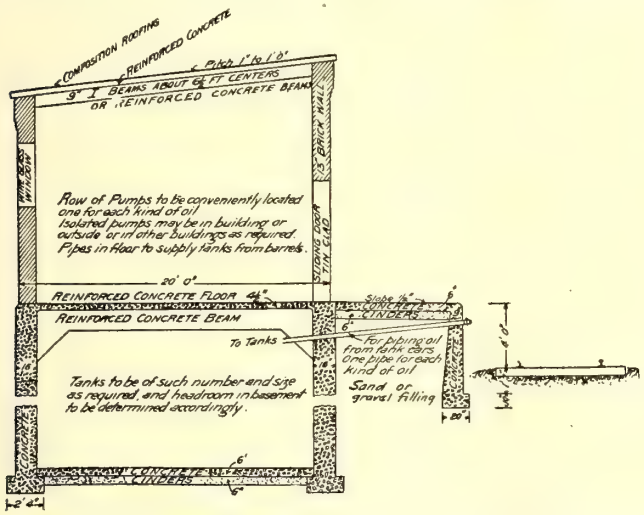
Concrete, slag or other suitable material should be used from the plank outside of the rails to such distance necessary to properly complete the crossing.

Where the requirements do not call for continuous planking over the tracks, one plank should be placed each side of each rail, with the flangeway rails or metal shapes as described above and similar in other details, with the exception that a filling of concrete, slag, gravel or other suitable material should be used between the planks, the material to be filled in level with the top of the planking after a thorough compacting.

In the description of street crossings for cities and towns no limits as to approach grades are given, such physical characteristics being governed by local laws and conditions. The width of the street crossings are also governed by local requirements.

(3) For public roads and highways outside of towns and cities, the crossing construction should be similar to that described for streets which have the minimum amount of planking and ballast filling between them. Such crossings should be level for a distance of 5 ft. on each side of the outside planks; on a fill the approach grade should not exceed 6 per cent.

Where the crossings are in a cut, ditch drainage should be provided for by the use of terra cotta pipe where feasible, but if the volume of water is too great, box culverts or bridges of similar width to the crossing should be provided.



Recommended Design of Fireproof Oil House

The width of highway crossings should be not less than 16 ft.

(4) Crossings of farm or private roads should be constructed by filling with ballast or other suitable material level with the rail-head, on the outside and inside, leaving a proper flangeway inside the rails. Such crossings should be level for not less than 3 ft. each side of the rails, and the approach grades should not exceed 8 per cent.

In cuts, proper provision should be made for drainage as for highway crossings.

The width of farm or private road crossings should be not less than 12 ft.

BUILDINGS

The committee on buildings presented a report on roundhouse and oil-house construction. A recommended design of oil-house construction is illustrated.

The conclusions of the committee as adopted follow:

(1) When practicable, oil houses should be isolated from the other buildings at a terminal.

(2) Oil houses should be fireproof, and the storage in large houses should preferably be either underground or in the basement.

(3) Oils that are stored in sufficient quantities should be delivered to the tanks in the house direct from tank cars; for oils that are stored only in small quantities provision should be made for delivery to storage tanks from barrels by pipes through the floor.

(4) The delivery system from the storage tanks to the faucets should be such that the oil can be delivered quickly and measured; the delivery should also be such that there will be a minimum of dripping at the faucet and that the drippings be drained back to the storage tanks.

ROADWAY

The committee on roadway presented a report dealing with track elevation and depression inside of cities and grade and curve improvement work outside of cities, and submitted recommendations covering more particularly questions of detail relating to handling the work.

MASONRY

Included in the report of the committee on masonry were specifications for Portland cement concrete and reinforced concrete, together with specifications for the steel reinforcement and the preparation of placing the mortar and concrete.

ELECTRICITY

S. E. Coombs, New York Central, chairman of the committee on electricity, said that this committee, with two exceptions, was the special advisory committee appointed to report upon the propriety of establishing a standing committee. The standing committee has been appointed and will soon begin work.

The committee on electricity appointed for the ensuing year follows:

Geo. W. Kittredge, chairman, chief engineer, New York Central.

J. B. Austin, Jr., vice-chairman, engineer maintenance of way, Long Island.

A. S. Baldwin, chief engineer, Illinois Central.

R. D. Coombs, structural engineer, Pennsylvania Tunnel & Terminal.

E. P. Dawley, engineer of construction, New York, New Haven & Hartford.

L. C. Fritch, consulting engineer, Illinois Central.

G. A. Harwood, chief engineer electric zone improvements, New York Central.

W. W. Drinker, assistant engineer, Erie.

C. E. Lindsay, division engineer, New York Central.

H. R. Talcott, engineer surveys, Baltimore & Ohio.

THE LOOSE LEAF FILING SYSTEM OF MATTERS IN PERIODICALS

An interesting paper on this subject was read March 25 at the Cleveland meeting of the Central Electric Railway Association by Robert N. Hemming, assistant superintendent, Ohio & Southern Traction Company, Columbus, Ohio. The first part of Mr. Hemming's paper was devoted to an argument in favor of indexing by subjects the articles relating to the different topics connected with electric railway construction and operation. In the plan followed by him a subclassification by companies is also employed. The index saves the trouble of going over all the pages to obtain a particular item desired and also assembles all the information on the practices of different companies and even of the manufacturers of any particular line of apparatus. Whether the company whose practice is described has perfected a piece of apparatus or not, knowledge of its success or failure is equally important to another company which may be considering its adoption.

A very important kind of items to classify are those relating to the legal decisions on accident claims. Most of the technical papers give considerable space to this information. If these decisions are so arranged that the information is readily available, it may be found to be of great

assistance to the management and the attorneys of the company. Without some systematic method of filing these decisions the company would be, in many instances, ignorant of suits and claims which have been decided on by the courts and which bear a close resemblance to the cases in which it may be at the time engaged. Another direction in which the filing system can be of great value is in keeping records of the financial reports made by other companies. By comparing these reports with those of one's own company, especially the details of expenses, valuable suggestions could often be obtained.

Mr. Hemming described his plan for filing articles which can be carried on with magazines of the usual form, but the speaker thought that if the magazines were published in a different form it would be more convenient. He suggested that the leaves be separated and the folios held together by inserting in punched holes in the margin two substantial stay clips which could be easily removed without injury to any part of the book. This would make it possible for those who desired to retain the book in its present form to do so, but those who wished to file the sheets separately would only have to remove the clips. He also suggested that the date, volume and page be printed upon each sheet and that a place at the top of the page be reserved for the section number, alphabetical indices and other memoranda. The pages could then be filed in a loose-leaf ledger binder with adjustable posts. He said:

This may seem like an expensive cover to apply to these periodicals, but through this systematic means of filing we might be able in some one instance to obtain information that would be the cause of saving the cost of 100 such binders. On account of the manner in which we now take care of our periodicals, we obtain little or no value from them. While some of us make it our business thoroughly to digest the news that is published in them, others will merely glance at them and cast them in the waste basket. How desirable it would be to turn back at any time and obtain all of the news published on one subject through the current year. Many times this information which is handed down to us through these periodicals is just the matter which we are seeking. In some cases it is technical, but in most cases it is derived from practical demonstration, tests and operation. Further than that, we are able to make comparisons on these subjects with the various railroads scattered throughout the country. Two roads, one on the Atlantic Coast and one on the Pacific Coast, might be experimenting along the same line and the desire of both might be to accomplish the same thing. Neither would perhaps know anything of what the other was doing, nor the balance of the roads lying between, but through the various periodicals which are published we are kept in touch with the operations of the entire country. Why, then, should we not value this information to a higher degree than we now treat it and care for it?

The few periodicals which I have embodied in this book for demonstration have already shown me what a valuable thing it could be made to be. As I began to file them by subjects I read with interest a great many pages bearing on the same topics and these articles were gathered from the four corners of the globe. Had I not brought these periodicals together I would not have known, perhaps, that these things ever transpired.

Mr. Hemming thought there were several ways in which advertising pages could be arranged without lessening the value of the paper as an advertising medium. One was for the railway companies to classify the advertisements and preserve them temporarily in binders in the way suggested for the reading pages. He doubted whether advertisements more than 30 days old were of much value except from an historical standpoint. Mr. Hemming had with him at the convention a copy of his file to illustrate his method of filing articles.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

Supplementing the testimony before the Railroad Commission of Wisconsin in the Milwaukee fare case, published in previous issues of the Electric Railway Journal, additional evidence on behalf of the Milwaukee Electric Railway & Light Company has been presented by C. N. Duffy, comptroller, and Edwin W. Olds, superintendent of rolling stock. Abstracts of the testimony of Mr. Olds and Mr. Duffy follow:

ADDITIONAL TESTIMONY OF MR. DUFFY

Upon taking the stand on March 11 Mr. Duffy was asked by Edwin S. Mack, of counsel for the company, to define depreciation. He read part of a paper presented by him in January, 1908, before the Northwestern Electrical Association, defining depreciation and discussing the results thereof. In his judgment, it was not practicable to set aside funds to provide for depreciation in any other way than by the installment plan. To provide a depreciation reserve fund on this plan involved nothing more than charging the amounts based on the proportionate life of the physical property used in the operation of the railway. This charge should be made periodically, preferably monthly, but at least annually, in equal apportionments unless the income from the operation of the property would result in a deficit by reason of such charge. In this event it would be presumed that the charges could be dealt with in such a way that the "lean" years would stand only part of the charge and the "fat" years would stand such additional proportion as to equalize the "lean" years.

The installment plan was in accordance with the Wisconsin public utilities law, which provided in addition that if the depreciation fund should be invested the income on such investment should also be carried in the fund.

Mr. Duffy explained what he meant by "lean" and "fat" years. A street railway on beginning operation frequently required a number of years before it could take care of operating expenses and interest charges out of earnings. That would preclude the possibility of setting aside anything for a depreciation fund. Assuming that the life of the property of a street railway company, valued at $1,000,000, was computed, in the light of the experience of the past, after careful analysis of the different classes of property and the lives thereof, conditions of use, etc., at 15 years, the probabilities were that for the first five years of operation there would be comparatively little that could be taken out of earnings for a depreciation fund. The ideal way would be to charge against earnings each year one-fifteenth of the value of the property, setting this amount aside annually. The principal difficulty would be that in the past five years, and possibly within other years during the time, the results of operation would leave nothing to be set aside. It would be a question of the ability of the earnings to make up 100 per cent within the period required, including "lean" as well as "fat" years, in order to keep the property in the necessary condition of physical efficiency. Mr. Duffy stated his objections to the sinking-fund method of providing for depreciation, presenting the theory of A. C. Humphreys, of the American Gas Institute. These objections Mr. Duffy stated as follows:

OBJECTIONS TO SINKING-FUND METHOD

1. The complications arising from the fallacy in the application of the sinking-fund method of calculating the sinking-fund requirements as one annual sum charged on the average life of the plant. A company, having $1,000,000 of property with a life of 10 years and $1,000,000 of prop-

erty with a life of 30 years, would have $2,000,000 of property with an average life of 20 years. According to Inwood's tables, the sinking-fund requirements at 5 per cent per annum (and a return of 5 per cent per annum on such an investment would be doubtful) necessary to replace the $1,000,000 of property in 10 years would entail a charge of $79,505 per annum, and to replace the $1,000,000 of property in 30 years an annual charge of $15,051 per annum, making a total of $94,556, whereas the sinking-fund requirements necessary to replace $2,000,000 of property in 20 years would be only $60,486. Consequently the sinking-fund requirements as provided would fall short of the amount needed by approximately 36 per cent.

2. If the sinking-fund requirement was calculated on the estimated lives of the different classes of property making up the plant, the same complication arose, although to a less extent. An estimate that a car would run an average of 20 years would not mean that every car would run 20 years, but that some would last more and some less than that time. The sinking-fund requirements would be built up on the theory that the 100 cars would be replaced in 20 years and would not therefore be adequate to provide for the replacement of the 100 cars at the rate of, say, 20 cars in the sixteenth year, 20 cars in the eighteenth year, 20 cars in the twentieth year, 20 cars in the twenty-second year and 20 cars in the twenty-fourth year, although the average life of the 20 cars would be 20 years.

3. Sinking funds are subject to the uncertainty that the rate of earnings assumed in calculating the actual requirements may be less than the actual amount earned.

4. Sinking fund requirements are based on the assumption that the income from the operation of the property will be sufficient to enable the annual sinking-fund provisions to be made regardless of "lean" or "fat" years.

RESERVE FOR TAXES

When the hearing was resumed on the afternoon of March 11 the direct examination of Mr. Duffy was continued by Mr. Mack, who asked about the reserve for taxes, which had been criticised as excessive. Prior to 1908 the Milwaukee companies paid 5 per cent of the gross earnings for their operative property and an ad valorem tax for the non-operative property. The custom was to charge 6 per cent of the gross earnings annually to take care of both taxes. The criticism of the city accountants was that this percentage was more than had been actually paid, which Mr. Duffy believed was true according to the figures of the accountants and the books of the company. At the same time the reserve for taxes was built up on the principles and for the same reasons as the other reserves of the company. The tax situation in 1908, the first year that the ad valorem tax became operative, resulted in a charge to both companies of something like $300,000, which was an increase of about $70,000 or in round figures 30 per cent. Then there were in addition the taxes on the non-operative property, which, with the cost of paving, sewer improvements and other expenses of that nature, aggregated, as Mr. Duffy recalled the figures for 1908, $15,000 additional. The effect was that the reserve for taxes, which the city accountants said had been charged more heavily against earnings than was warranted, was very nearly exhausted. The surplus, which had been accumulating through prior years because of the policy of charging 6 per cent on the gross earnings tax and the ad valorem tax on the non-operative property, was very nearly exhausted by the taxes for the one year 1908. In 1909 the company was reserving 7 per cent. In 1908, Mr. Duffy thought, the taxes were about 6.7 per cent of the earnings in addition to the $15,000 for other taxes on non-operative property.

LENGTH OF POSSIBLE RIDE

A question was asked about the advantage to the public arising from the consolidation of the various street railway properties in the city. Mr. Duffy emphasized the length of the ride. In 1890 the length of ride possible was 4.25 miles; in 1896 it was 9.25 miles; it was possible now to ride 11.21 miles for one 4-cent ticket. The increased transportation facilities made it possible to carry passengers from one part of the city to another by a continuous ride in the most direct way for one fare with the universal transfer system, contrasting with five companies and seven lines and practically seven 5-cent fares before the consolidation.

There existed in Milwaukee with the present company 14 separate initial lines. To ride on each one of these lines and continue the journey with the use of a free transfer to the farthest possible point would make a total ride of about 128.13 miles or an average ride over the 14 lines of approximately 9 miles. Cars must be operated over the 14 lines, furnishing the long rides regardless of the average length of ride per passenger and whether there were passengers to be carried or not. The Milwaukee company did not have what was found in some other cities—a valuable short-haul traffic.

MILWAUKEE AND GLASGOW

A comparison of the results of operation of the Glasgow Corporation Tramways for the year ended May 31, 1908, and the operations in Milwaukee was made by Mr. Duffy. The average fare per mile in Glasgow was forty-five-hundredths of a penny or 0.9 cent. In other words, the average rate of fare charged per mile by the Glasgow Corporation Tramways was double the rate in Milwaukee, and the rate of wages paid the Glasgow employees was about one-half the rate paid the employees in Milwaukee. The following additional statistics were presented:

Population: Glasgow, 1,500,000; Milwaukee, 350,000.

Miles of revenue single track operated: Glasgow, 178; Milwaukee, 119.

Average number of cars operated daily, based on 14 hours per car per day: Glasgow, 548; Milwaukee, 270.

Revenue passengers carried: Glasgow, 226,948,290; Milwaukee, 74,720,783.

Glasgow, with three times the population of Milwaukee, had only 50 per cent more trackage than Milwaukee and operated only twice as many cars as Milwaukee, but carried three times as many revenue passengers. The trackage of Glasgow showed clearly the congestion of population. The number of cars operated showed that the cars in Glasgow carried approximately 45 per cent more passengers per car than the cars in Milwaukee, independent of the difference in size and type. The Glasgow cars, Mr. Duffy understood, were small single-truck cars of the double-deck type, the carrying capacity of which was approximately only 50 per cent of the carrying capacity of the Milwaukee cars.

ELEMENTS GOVERNING RATE OF RETURN

Responding to a question asked by Mr. Mack regarding the elements necessary to consider in fixing a rate of return on the investment Mr. Duffy said that organization and management, with ability to conceive and achieve and to accomplish the results sought to be attained, constituted elements which should enter into the question of what should form the basis of return on the investment that produced the service.

The character of the service as to transportation facilities and the benefits of consolidation of the different lines should be considered.

Another element was the discipline of conductors and motormen. The cost of injuries and damages was much less in Milwaukee than in any other city of corresponding

size as to population or system and very much less than in the larger cities. This relative freedom from accident meant that the lives and limbs of passengers were in less jeopardy than they would be without the existing facilities. The efficiency of the operation of the cars and operation of the power station, making the service as reliable as was practicable with human effort, should enter into a calculation of the fair amount of return on the investment required to provide the service.

Quotations were read by Mr. Duffy from a report made by Commissioner Milo R. Maltbie to the New York Public Service Commission, First District, stating that the exercise of care, economy and ingenuity in operation and good judgment in the selection of employees on the part of corporations should be encouraged and that enterprise and thrift should be rewarded.

Referring to this statement, Mr. Duffy, in discussing further the efficiency of the management of the Milwaukee property, spoke of the relations between the company and the employees. There had been no labor trouble since Mr. Beggs had been president and general manager of the company. Everything that was consistent and practicable for the benefit of the employees was done and the officials felt that the employees gave their loyal support to the work of the company. Reference was made by the witness to the practice of the company, mentioned by Mr. Beggs in his testimony, of loaning money to employees who were in need of funds because of sickness or death in the family. In the cashier's office there were due bills of employees of the company aggregating over $1,000, ranging from $50 to $150 in amount. One man to whom the company advanced $150 was paying it back at the rate of $2.50 each pay day. That was an element of good management which should be reckoned with.

ELEMENT OF GOING COST

Supplementing the testimony given by Prof. M. E. Cooley, stating that the element of going cost should be taken into consideration in making a valuation of a business, Mr. Duffy gave figures showing the results of operation of the Milwaukee Central Heating Company from the time its operations started up to the close of the year 1908. Objection was raised by Lester C. Manson, counsel for the city, to the introduction of this testimony. Mr. Mack, of counsel for the company, said that he did not pretend that the results of operations of the heating company in the years 1906 to 1908 were necessarily similar to those of a street railway company in the years 1890 to 1908, but when Professor Cooley made his demonstration showing how long a time a company might be in operation before it could be a successful enterprise the attorneys were anxious to obtain the history of some company which could be traced back to the beginning of its operations, disclosing exactly what had been spent to establish the business. After a search it was found that the only company to the figures of which access could be had was the Milwaukee Central Heating Company. As the purpose was simply to illustrate the principles laid down, Halford Erickson, member of the commission, said that the statement would be received. This statement is published herewith.

MILWAUKEE CENTRAL HEATING COMPANY, EARNINGS AND EXPENSES, 1906, 1907, 1908.

Statement Submitted by C. N. Duffy, Comptroller, to Illustrate Going Cost, or Expenses During Initial Period of Development of Business, Constituting Part of the Cost of the Property.

	Year 1908.	Year 1907.	Oct. 1-Dec. 31, 1906.
Gross earnings	$48,249.86	$27,314.66	$7,719.91
Operating expenses	42,286.58	28,720.27	8,947.56
Taxes	8,400.00	7,506.90	.....
Depreciation	.....	.....	.....
Net earnings	.....	.....	.....
Deficit	2,436.72	8,912.51	1,227.65
Cost of property close of year	700,855.00	652,431.85	326,496.35
Capitalization close of year	500,000.00	500,000.00	.....

Explaining the statement of the Milwaukee Central Heating Company, Mr. Duffy said that the deficits shown represented simply subtraction of the operating expenses and taxes from the gross earnings, without provision for depreciation of any character, wear and tear, obsolescence, supersession, or any charge of that nature, and that the heating company participated in the advantages of the unified organization. The heating company paid the Milwaukee Electric Railway & Light Company 35 cents per 1000 lb. for steam. This price was fixed with the idea that the heating company should pay the Milwaukee Electric Railway & Lighting Company for depreciation of the property and interest on the investment. The price was regarded as equitable with due consideration of all the elements involved and taking into account what had been done under similar circumstances in St. Louis and Detroit and with other companies in which the North American Company had an interest.

The property of the heating company was constructed by the Milwaukee Electric Railway & Light Company under a work order. During the construction period the Milwaukee Electric Railway & Light Company furnished the capital required, having to borrow it most of the time, and the interest on the labor and material furnished and the work performed incident to construction of the property was charged to the heating company by the Milwaukee Electric Railway & Light Company. Beginning Oct. 1, 1906, when the heating company began operation, as construction progressed the interest on the work done was charged against operation. To charge interest against operation during the construction of property is the policy pursued by the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company. It would be entirely justifiable to charge to construction account the interest on the cost of construction up to the time the property began to produce revenue, but as a matter of conservatism the Milwaukee companies had not done so.

INTEREST DURING CONSTRUCTION

It was estimated by Mr. Duffy that a proper charge for interest during the construction of the entire property of the Milwaukee Electric Railway & Light Company would be 9 per cent. This figure was based on an assumed construction period of three years. To show the time required frequently to complete construction work, Mr. Duffy referred to several work orders indicating various costs and delays in construction. The work order for the Public Service Building was dated Dec. 19, 1902; the building was occupied and used in its entirety about June 1, 1906, or about three and one-half years after the date of the order. Up to the date there had been expended $1,531,344.67. A work order was closed only when all the work had been completed and in this case the work order was not closed until April 30, 1908, making a period of nearly five and one-half years. The figures of cost as of April 30, 1908, were $1,926,567.12.

DISCOUNT ON BONDS

The subject of discount on bonds was then discussed by Mr. Duffy. He said that discounts and commissions on securities issued for construction purposes or to raise funds for construction were properly capital expenditures, as were other expenses incurred in connection with financing properties, as such expenses represented the cost of pro-

curing the money and were as much a cost of the property as any other expenditure made in connection therewith.

This principle was sound and correct from an accounting standpoint, just so far as the public was concerned, equitable from the standpoint of investors, and a vital question that must be dealt with in financing public-utility properties.

Under the laws of the State of Wisconsin bonds issued under the authority of the Railroad Commission may be sold at a discount, not more than 25 per cent, which was a recognition of the principle laid down that discount on bonds was a part of the cost of properties, constructed or acquired.

Discount on bonds was treated as a capital expenditure, carried into cost of road and equipment under the old Interstate Commerce Commission classification of accounts as applied to steam railways. The standard system of electric railway accounting of the American Street & Interurban Railway Accountants' Association formulated in 1897, officially adopted by the association in 1898 and adopted by the National Association of Railway Commissioners in 1899, also treated discount on bonds as a capital expenditure. The new Interstate Commerce Commission classification of accounts for steam railways, as well as the Interstate Commerce Commission classification of accounts for electric railways, did not treat discount on bonds as a capital expenditure.

The American Street & Interurban Railway Accountants' Association, at its last convention held in Atlantic City in October, 1908, officially adopted the Interstate Commerce Commission classification of accounts for electric railways as the standard for the American Street & Interurban Railway Association, with this exception: "Discounts and commissions on securities issued for construction purposes or to raise funds for construction should be considered a proper capital expenditure and therefore be charged to expenditures for road and equipment."

From this it would appear, Mr. Duffy said, that in so far as the Milwaukee Electric Railway & Light Company was concerned, the city's accountants had neither authority, warrant nor right to exclude from cost of the property the item of discount on bonds.

Responding to a question by Mr. Curtis, Mr. Duffy said it had been his uniform practice as auditor and comptroller to include discount on bonds as cost of capital and property. Electric railway properties could not have been financed without selling bonds at a discount or offering some other kind of an inducement to lead capitalists to invest money in a hazardous business. Attention was called by Mr. Duffy to the provision of the ordinance passed by the City of Chicago allowing the Chicago City Railway and the Chicago Railways Company 10 per cent on the actual cost of rehabilitation as a fair and proper allowance for conducting the work and furnishing the equipment and 5 per cent for services in procuring funds, including brokerage. Discussing the disposition of bond discount in the reports of the accounts for the said company, Mr. Duffy said that so far as the net earnings of the property were concerned it was practically immaterial whether the bond discount was charged to capital account or set up as an item of expense and written off during the life of the bond.

THE INVESTOR A PARTY IN INTEREST

The point of view of the investor whose earnings were placed in the property was discussed by Mr. Duffy. He said that it seemed to him that there were three parties in interest who should be considered. First, there was the public that required and should be furnished proper transportation facilities; second, there was the corporation whose duty it was to furnish the necessary facilities; third, there was the investor who advanced the money that made it possible for the public to have the facilities and for the corporation to furnish the facilities. In all of the problems of this nature it had been generally considered that there were only two parties in interest—the company and the public which made use of the facilities. The investor was a very important element.

Mr. Duffy showed what had happened to the Chicago City Railway after its claim to a 99-year franchise had been denied by the United States Supreme Court and to the New York City Railway system in New York. In speaking of the New York situation Mr. Duffy said that through the unreasonable transfer requirements by legislative enactments, the 5-cent fare had been reduced to approximately 3 1/5 cents. This condition, together with the enormous increase in taxes, including the "special-franchise tax"; the congestion of streets, resulting in increased cost of operation; injuries and damages, requiring about 10 per cent of the gross earnings, and the competition of the subway, built with the aid of the credit of the City of New York, were the reasons given for the receivership of this property, representing a capitalization of approximately $240,000,000, 83 per cent of which, it was claimed, represented cash or property.

The situation in Cleveland was also discussed by Mr. Duffy. In a prospectus of the Forest City Railway, issued in July, 1906, the capitalization and construction cost of the property had been mentioned as $50,000 per mile of track. The cost of the Forest City Railway on May 31, 1907, without land or buildings for power plant, without concrete foundation under tracks, with rails that were largely seconds and with ties that were partly culls and approximately 25 per cent of the car equipment second-hand trailers that were formerly the property of the Nassau Electric Railway, of Brooklyn, the cost was about $72,000 per mile of track. The published report of the operations of the Forest City Railway for the quarter ended June 30, 1907, showed net earnings of $3,774.19. As corrected by an eminent accountant, the report showed a deficit of $17,457.22.

Continuing, Mr. Duffy said that the average annual return on the investment in the Milwaukee properties had been anywhere from as much as 5.92 per cent to as little as 4.37 per cent, depending on how it was figured.

TESTIMONY OF EDWIN W. OLDS

Edwin W. Olds, superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, testified on March 12. He said that an allowance of about 7½ per cent per annum should be made for depreciation due to age and wear on car bodies and trucks. If the two classes of equipment were separated the allowance should be about 8 per cent for car bodies and about 4 per cent for trucks. The following other allowances for depreciation due to wear and tear were recommended:

	Per cent
Electrical equipment	6
Fenders, headlights, clocks, etc	10
Car and car equipment	6¾
Buildings	3
Office furniture and fixtures	5
Shop tools and machinery	7½

The allowance for depreciation of electrical equipment due to age and wear was figured at the percentage stated

because the expense resulting from rapid wear and replacement of parts was charged to maintenance. The same practice was followed with trucks; a pair of wheels or a wheel would wear out in about 10 months' actual service. Practically all of the upkeep of motors, trucks and cars was charged to maintenance; the depreciation, as treated by Mr. Olds, was intended to take care really of the life of the car.

In order to store the larger types of cars the company had been obliged to make extensive alterations in car houses as the changes in cars took place.

Radical changes had been made in car construction within the last few years. The speaker mentioned the pay-as-you-enter development, the increase in size of the car and the use of steel in the construction. The general design had also been changed. In cars which are being constructed for Chicago the original plans provided that the windows should drop down into the side pocket or channel. In the latest Milwaukee cars the sash are raised, making a more substantial, sanitary and satisfactory car, and the Chicago plans have been modified to introduce this method. Motors and trucks were also passing through a stage of improvement that was radical. Exhibits were submitted by Mr. Olds of pictures of obsolete equipment.

During the cross-examination, Lester C. Manson, assistant city attorney, asked Mr. Olds where the line was drawn between charges to maintenance and to depreciation reserve. As an illustration, the witness said that if new equipment purchased was strictly an addition to the property it would be charged to property account; if it was not it would be charged to depreciation. When motor service were rewound, cars painted, car bodies and trucks repaired, wheels and axles replaced, etc., the expense was charged to maintenance. Mr. Olds referred to some cars that were purchased in 1896, subsequently rebuilt and then continued in regular service up to three or four years ago. The cost of maintenance then became excessive, and the cars were retired from all-day service and used only for extra trips or when one of the later types of cars had been temporarily disabled. To rebuild the car bodies at the time they were retired from all-day service would have cost from $500 to $1,000 apiece, but it would not have been good business to have expended the amount of money that would have been required. The cars could be maintained at comparatively small expense for the service of one or two hours a day, and while the value of the cars was small, they would help out for the extra service without putting the company to the expense of investing in more modern cars for that service. The line must be drawn at some point in the life of the cars when they should be scrapped or sold to a small company. The link pin of a wagon could be taken and a new wagon built around it; a screw could be taken from a car and used in a new car, but in order to use the parts of the old car that could be saved it would be necessary to build the new car from the same design as the old, and, although a good car, it would be out of date and practically obsolete after it had been rebuilt. Cars were not built like the one-horse shay; the parts did not all wear out at one time.

In ordering new cars Mr. Olds' motto had always been that the best was not good enough. At the present time the company had under consideration the construction of cars for city service that would be a departure from any type yet produced. The cars would have steel underframing, with the construction simplified so as to make them more satisfactory for operation and the general use of the public. The steel would extend to the bottom of the window sash.

The experience of the speaker had been that while a better motor was secured now than in the past, it was subject to increased service, more rapid acceleration, and consequently greater electrical strain, hence the actual maintenance cost had not been reduced to the extent that many had hoped would be the case. The average life of axles was from two to five years.

Mr. Olds named the years in which the cars now in service were purchased. Twenty cars purchased in 1896 had not been in regular service for about four years; they were practically obsolete and had depreciated to such an extent that repairs were excessive. These cars made one or two trips at night. The single-truck cars originally owned by the company had been sold from time to time for summer kitchens and playhouses, while a number were purchased by roads in smaller towns; at present about 20 of these small cars were owned by the company, but, with the exception of a few which had been converted to line cars, work cars, hand cars, etc., they were not used for any purpose. When the operation of electric railways was first started a complete car of this description cost about $4,000. That price was reduced as the art advanced, so that the single-truck car of the same dimensions would be worth now about $2,000, with electrical equipment and trucks. There would be in the car purchased now better equipment, trucks and motors.

A car axle under the old type of cars would become crystallized and liable to break in about two years. Improvements had been made, which had increased the strength of the steel and iron and reduced crystallization.

CONVENTION COMMITTEE TO TAKE WESTERN TRIP

It will be remembered that at the midwinter meeting of the executive committee of the American Street & Interurban Railway Association, held at the association headquarters in New York City on Jan. 29 last, the committee decided that the 1909 conventions of the association will be held west of the Mississippi River. The cities considered as possibilities by the committee in taking this action are Denver, Kansas City, Omaha, St. Louis and Minneapolis. The committee which will finally decide upon the time and place of holding the conventions consists of the following-named gentlemen: James F. Shaw, Boston (chairman), Chas. N. Black, San Francisco, and E. C. Foster, New Orleans. Past-President John I. Beggs, Milwaukee, will also be a member of the party, and Past-President C. G. Goodrich, Minneapolis, has stated that he would accompany the committee on the trip if possible. A committee from the American Street & Interurban Railway Manufacturers' Association, consisting of Jos. R. Ellicott, New York (chairman), James H. McGraw, New York, and C. C. Peirce, Boston, by special invitation will also accompany the committee of the American Association for the purpose of looking after the business arrangements of the Manufacturers' Association in connection with the coming convention.

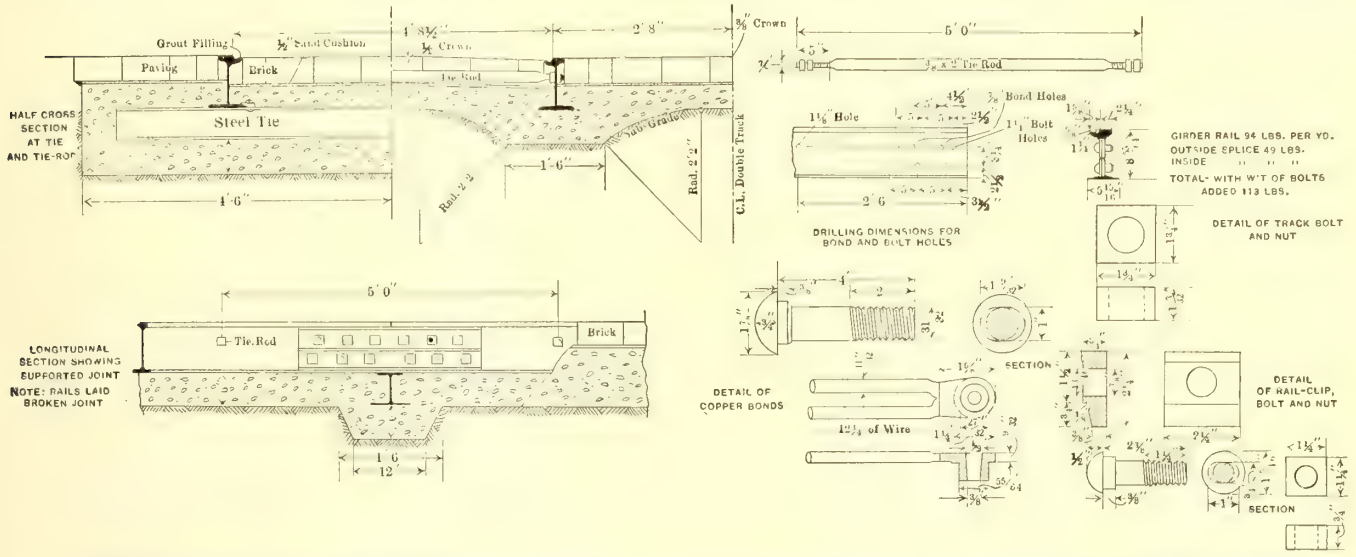
The Eastern members of these two committees expect to leave New York on Saturday, April 17, arriving in Chicago on April 18, and will meet the other members of the committee either in Chicago or Denver. The committees will spend April 20 and 21 in Denver, and will proceed from there to Kansas City, visiting such of the other cities above mentioned as have indicated a desire to be considered in this connection.

IMPROVEMENTS ON THE HAMILTON RADIAL ELECTRIC RAILWAY

The Hamilton Radial Electric Railway is one of several interurban lines entering Hamilton, Ont., owned by the Dominion Power & Transmission Company, Ltd. It is one of the oldest interurbans in Canada, the section to Burlington Beach having been constructed in 1896 and the one to Oakville in 1904. Eventually this railway will be continued eastward through Port Credit to Toronto, thereby affording the means for a high-speed electric service between the latter city and Hamilton, a distance of 40 miles. Considering the class of service which this through line will give, it was determined to make every effort to cut down the mileage on the streets and highways to a minimum and to widen the roadbed and bridges of the present single-track section extending from Burlington to Oakville, 11 miles, to accommodate two tracks. The total length of the line from Hamilton to Oakville is now 22½ miles, of which half is single track.

In Hamilton the company is placing about two-thirds of its track on recently purchased private right of way. The initial expense of securing this improved land has been considerable, but it will cut down the running time and the maintenance of track. A private right of way has also been bought through the village of Burlington. These changes will remove most of the curves on the line and give many long tangents in level country. One tangent is 10 miles long.

The city section of the Hamilton Radial runs through a manufacturing district and therefore has a 10-minute local service with ordinary urban cars. About 1 mile of this part of the line is on a brick-paved street (King Street East) in which the company laid down in the summer of 1907 the steel-tie track construction shown in the accompanying cross-section and details. The ties are Carnegie I-beam type, 8 ft. long, weighing 160 lb. each and laid 10 ft. centers. Tie rods, ⅜ in. x 2 in., are put in every 5 ft. The rails are of the Lorain 313-94 section, 9 in. high, and are placed on concrete stringers. The concrete ballast extends 6 in. under the ties at joints and is carried 4 in. up from the base of the rail. The pavement is plain brick on a ½-in. sand cushion. The approximate cost of this track construction was $4.50 per lineal foot. The exact cost cannot be given, as this work was carried on with the street widening, setting back of curbs, new drains, etc.



Hamilton Radial Electric Railway—Details of Steel Tie—Concrete Construction on King Street East, Hamilton



Hamilton Radial Electric Railway—Double-Track Section with Alternating High-Tension Poles on one Side



Hamilton Radial Electric Railway—Single-Track Section, Span Type and Double Trolley

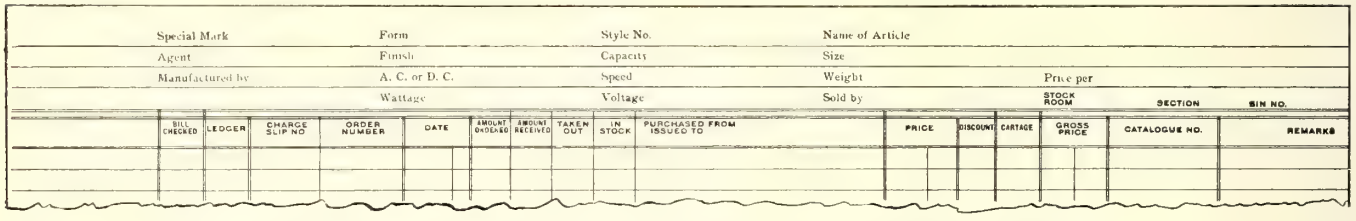
The old section from Hamilton to Burlington was laid originally with 64.5-lb. T-rail. This has now been replaced by 80-lb. rail which was used in building the Oakville extension and will be the standard section hereafter. Most of this section has been re-ballasted with 10 in. of slag from nearby smelters, but beach sand is used on the narrow isthmus separating Burlington Bay from the rest of Lake Ontario. Burlington Beach is a very popular bathing resort and can be reached only by the cars of the Hamilton Radial line. This run via the Burlington isthmus also gives the shortest possible route to Toronto, as it avoids a detour around Burlington Bay. The Burlington-Oakville section contains the only bridges on the line. Both are of steel, one 560 ft. long and the other 410 ft. long. They are built for future double-track service.

The overhead construction throughout is of the span-wire type with double trolley on the single-track sections, a practice which appears to be favored by many Canadian interurbans because of its superior flexibility to brackets with single trolley. As on other lines operated by this company, the standard pole spacing is 90 ft., the alternate poles on one side being higher to carry the high-tension transmission wires. Acknowledgments are due C. K. Green, superintendent of construction, for data on the Dominion Company's railways.

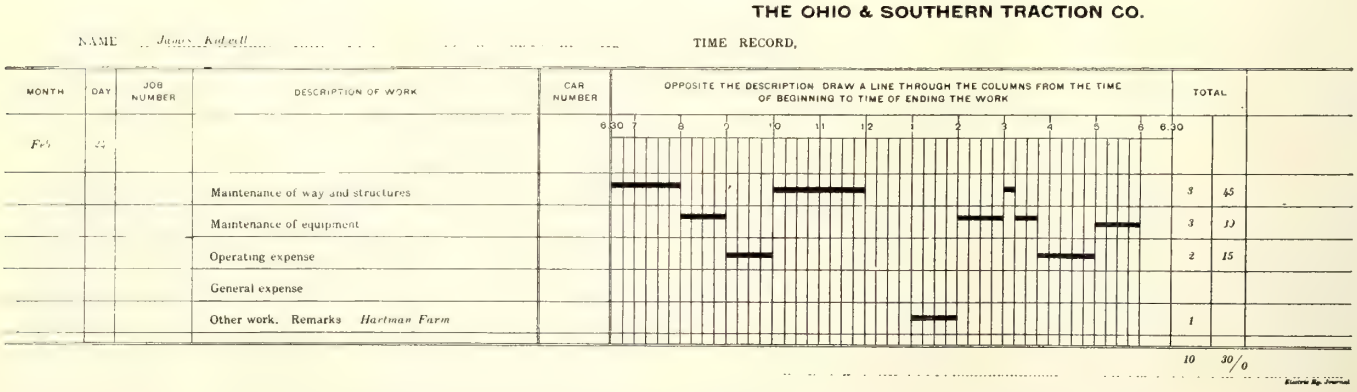
NOVEL STOCK LEDGER AND TIME SHEET

There are many small roads whose size does not warrant the exclusive attention of one set of officials. On such roads the bookkeeping is often conducted in the same office as the other lines of business and it is desirable to keep a record of the time spent in each class of work by the different officials. A situation of this kind exists on the Ohio & Southern Traction Company, which connects the Hartman stock farm with the city of Columbus and is owned by the Hartman interests, which also control the Peruna Company. The railway stock ledgers are kept at the office of the Peruna Company, in Columbus, and the same stock-ledger system is used by the railway company, the stock farm and the Peruna Company. The novel character of the service makes the reproduced heading interesting. As shown, the headings are arranged to cover a wide range of material and the ledger shows the complete history of all purchases until they leave the stock room. Both sides of each sheet bear the same headings, and the records are carried on to the opposite side of the sheet when one side is full.

The second diagram shows a time chart which is used to record the time spent by employees upon different classes of work. As will be seen it is arranged somewhat like a station log. For the convenience of the employees a list of the primary accounts, classified under each of the four main divisions, is printed on the back of the sheet, so that if the employee is in doubt as to the proper distribution of the work on which he was engaged, he can be set right by referring to the back of his time sheet. This plan is especially convenient for new men since it helps them to make a proper record of their time. On the front of the sheet, opposite the description of the work, is space in which he marks in numbers the class of the work shown graphically by the lines.



Stock Ledger Used for Various Purposes, Including Railway Supplies



Blank for Recording Time Spent by Employees on Different Classes of Work

INTERURBAN CARS FOR THE BUFFALO & LAKE ERIE TRACTION COMPANY

The Cincinnati Car Company has just delivered to the Western New York Construction Company for its Buffalo & Lake Erie line eight very handsome interurban cars, four of which are of the combination passenger, smoking and baggage type and four combination passenger and smoking cars. These cars will be operated on limited service between Buffalo, Dunkirk and Erie, and are geared for a speed ranging from 55 to 65 m.p.h. The general dimensions of the cars with baggage compartments are: Length over all, 51 ft. 2 in.; width over all, 8 ft. 7 in.; height from bottom of sill to top of roof, 9 ft. 2 in.; seating capacity of main passenger compartment, 30; smoking compartment, 12, and baggage compartment, 12.

The general dimensions of the combination passenger and smoking cars are: Length over all, 51 ft. 10 in.; length over body proper, 40 ft.; width over all, 9 ft. 2 in.; height from bottom of sill to top of roof, 9 ft. 2 in. The main compartment has 38 seats and the smokers' room 16 seats.

In both types the underframing is the same. The side

sills are formed of two pieces of yellow pine with a ⅜-in. x 24-in. steel plate between, running the full length of car body from end sill to end sill. A 2½-in. x 2½-in. angle is riveted near the top of the same to stiffen the steel plate, besides forming a support for the cross seats, a foot rest and a heater pipe cover. The intermediate sills are of yellow pine strengthened with 5-in. x ⅝-in. steel plates on each side. The center sills are formed of 5-in. I-beams with yellow pine fillers. Both the intermediate and center sills run the full length of the car from buffer to buffer. The end sills are made of white oak, supported by a 6-in x 4-in. x ½-in. steel angle bolted to the underside the full width of car. The body bolsters are built up with 10-in. steel plates, of the truss pattern, with bearings on all the longitudinal sills. Besides the steel plate the car body has an over truss and an under truss.

The platforms are flush with the car floor, being supported by the intermediate and center sills, which are reinforced with steel angles running along those sills to a point back of the bolster. Step openings are provided on both sides of each platform. The steps are of the steam coach pattern, having double treads, which, together with the vestibule floors, are covered with knob rubber matting. The edges of the step hangers are bound with brass. The trap doors over these are fitted with O. M. Edwards Company's balanced trap-door fixtures.

The body framing of the cars is very substantial, all the vertical members being of white ash. The sides of the cars below the sash rest are sheathed with ⅝-in. x 2-in. face, vertical poplar sheathing backed with ⅞-in. poplar blocking. This blocking is gained over and glued and screwed to all the side posts. The roof is of the monitor deck type, with a steam coach style of hood at each end. The roof is strengthened by steel carlines, two of which are placed at each pier post.

The side windows are of the double Pullman design. The lower sash are arranged to raise into the roof, and have Edwards sash locks and racks. The upper sash of the side windows are semi-elliptic and glazed with leaded art glass. The deck windows are also semi-elliptic and glazed with green opalescent glass. The deck windows are hung on Hart's deck sash ratchets. The center vestibule window is stationary and the two wing drop-windows also have Edwards sash racks and locks.

Both the main passenger and smoking compartments are finished throughout with Honduras mahogany, all the main panels having a neat border of marqueterie inlay. The baggage compartment is handsomely finished in dark golden oak. There is a salon in each car, located in the rear left-hand corner of the main passenger compartment. It is finished to correspond with the interior finish of the car, and is fully equipped. The ceilings in both the main passenger and smoking compartments are of the full Empire type, painted dark green and decorated in gold.

Illumination is furnished by seven 12-in. hemisphere Holophane globes in the upper ceiling and some single lamps on the face of the deck sill. The wiring is all run in loricated conduits, no part of which extends below the sills. The seats are of the Hale & Kilburn reversible type, 37 in. long and having high headroll backs, spring-edge cushions and mahogany arm rests on the aisle side. The seats in the main passenger compartment are upholstered in figured green mohair plush, and those in the smoking compartment with dark green leather.

The cars are mounted on Baldwin trucks, class 78-25, with 6 ft. 6 in. wheel base, 36-in. forged wheels, Symington journal boxes and ball center bearings of American Street & Interurban Railway Association standard, and inside hung brakes. The motor equipment consists of four GE No. 204-A commutating pole motors, with double-end type "M" control. The cars are also equipped with Westinghouse AMM schedule air brakes, D-2 compressor and American automatic slack adjuster.



Interurban Car for the Buffalo & Lake Erie Traction Company

The miscellaneous equipment of the cars consists of the following:

Curtain Supply Company's curtains, No. 88 ring fixtures.
Peacock hand brake mechanism.
Tomlinson couplers, each end.
Nickeline water cooler.
Side window screens of the removable type.
Nichols-Lintern air-operated sand boxes.
Locomotive wooden type pilots, each end.
Germer hot water heater.
General Electric magnetite arc headlight.
Illuminated dash signs.
Tornado tail lamps.
Dayton Manufacturing Company's individual bronze rod parcel racks.
Knutson "Peerless" trolley retriever.
Emergency tools.

This rolling stock left the builders' shops complete, ready for operation, with the exception of the motors, which are being installed at the railway company's shops at Blasdell, N. Y.

GAME OF RAPID TRANSIT IN LONDON

An ingenious manufacturer of games in London has brought out a colored map of the city, with the subway routes and stations marked on it, designed to be used as a game. Each player is provided with a miniature pasteboard car and, after drawing a ticket, attempts to move the car between the two points mentioned on the ticket, according to directions on a dial which is spun around on its axis. The winner is the one who reaches his destination first.

News of Electric Railways

Cleveland Traction Situation

The evidence taken before Master Commissioner Belford on March 16 concerned the fund that was turned over to the Municipal Traction Company to pay debts of the Cleveland Railway as they came up. Items have been charged against this fund which the Cleveland Railway claims should have been charged to expenses of the Municipal Traction Company or some other fund, as the Cleveland Railway had nothing to do with the payment of the debts so incurred. The lease provided that all payments from this fund should be approved by the Cleveland Electric Railway, but the Cleveland Railway says that payments were made without such approval.

Herman Schmidt applied to the Council on March 15 to be allowed to bid on 13 lines on which the franchises expired in January, 1910, and later. This, it seems, is in line with the ideas of Mayor Johnson. Mr. Schmidt is said to represent the Forest City Railway, which has no property and no capital stock outstanding except about 300 shares which were not turned over to the Cleveland Railway.

At the meeting on March 16, the Mayor announced that the conferences in private which he, City Solicitor Baker, Judge Tayler, Attorney John G. White, Mediator F. H. Goff and Attorney D. C. Westenhaver attended, had proved failures and that public meetings of the Council committee of the whole should be held in the future. The Mayor said the question of adapting the Tayler plan of settlement would be taken up first, and he expressed some hope of it being accepted, but that in the meantime the necessary formalities requiring 60 days to institute bidding for new franchises on the Superior, Payne and St. Clair lines should be started. In case the Tayler plan is rejected, one of the other plans will be taken up. For that purpose he had a resolution adopted directing the city solicitor to prepare four sets of ordinances for introduction at an early date. These the Mayor outlined as follows:

1—The Tayler plan for a general settlement, so far as this plan can now be reduced to writing.

2—Grants to the Cleveland Railway on a 3-cent fare basis and revocable, the grants when passed to be tendered to the Cleveland Railway.

3—The same grants to the Forest City Railway.

4—Competitive bidding for the franchises among such companies as may wish to enter.

In addressing the Council on March 15, Judge Tayler said:

"We have those two correlated rights—the proprietary interest of the city in the streets, the necessity that methods of transportation be placed on the streets, and the right of the people who furnish that to have a fair return, and no more.

"We have been going here for a great many years on a certain theory of giving franchises, all based upon a wrong view of the rights of both sides, so far as the people were concerned, the giving of a monopoly without suitable restraint, and on the other side such a condition of things that the necessities of their situation, the expiration of their grants at some time in the future, compelled them as business men to make the very best bargain they could, with the result that scandal and injustice have from the beginning characterized a large number of street railway enterprises in all of the great cities of the country.

"Now, it seems to me that the time has come when that fundamentally unjust basis of the settlement of a great public question like this no longer exists, and that we should reach a settlement of it on the foundation that the public owns the streets, and that the people who furnish transportation are entitled to a fair return, a sure return, and nothing more.

"However the gentlemen with the duty of framing an ordinance whose fundamental features I have described may go about it, the people are unconcerned. There ought to be no grave difficulties in the way. An accommodating spirit, a spirit accommodating itself to that settlement, anxious to bring about that settlement, on both sides of this controversy, will necessarily result in a settlement of this controversy, because the differences can only arise from details which in and of themselves are not vital to the working out of the plan whereby this settlement can be reached.

"While it is not for me to criticise any plan which Mr. Johnson may have, I would regret, gentlemen, very much indeed, if any element of any character was injected into these negotiations that would leave an impression that a threat of ultimate war was in the air.

"I think that in Cleveland we have left behind us the day when any fixed rate of fare shall be said to be the rate of fare which the people must pay or which the corporation which furnishes the transportation can charge; for any rate of fare may be too high or any rate of fare may be too low.

"What we are entitled to is good service at the cost of the service, whether it is 1 cent, 2 cents, 3 cents or 4 cents. That is the only sound basis upon which a street railway settlement can rest.

"I appeal to you (the Council) on behalf of the entire community, which wants repose and settlement and adjustment after all these long years of warfare, that they may have better service everywhere, that the property may be put into first-class condition, that the service may be all that is required."

The Cleveland Chamber of Commerce has appointed a committee to draft and present an ordinance in case the committee of which Judge Tayler, Mayor Johnson and others are members fails to agree upon terms, as has been indicated by their not meeting for some time. Business men are in accord with Judge Tayler's plan of settlement, realizing that the Mayor is not benefiting the city or any of its people by insisting upon the unreasonable—and to the Cleveland Railway the impossible—condition that would be imposed by inserting an option clause to the effect that the property may be taken over by the city at 110 any time after the lapse of two or three years. If a 25-year franchise is given the company with the provision that the rate of fare shall be governed by the net surplus and fixed by a committee of business men, it would seem that all cause for objection would be removed. Unless a franchise is given that will properly secure the money necessary to rehabilitate the property thoroughly the company will be unable to finance the improvements.

The Cleveland Railway has asked that the $220,000 rental due it on Oct. 1, 1908, and the $150,000 of its notes used by the Municipal Traction Company be made preferred claims. Judge Tayler will hear arguments on this point this week. The receivers have set aside about $179,000 as a maintenance fund at the rate of 5 cents per car mile. As there is about $600,000 cash to the credit of the company, after making these deductions, about $300,000 would be at the disposal of the court. Since the receivers have taken charge of the property their reports have contained charges for rental to the old company and the Municipal Traction Company. The court has intimated that rental must be paid or the property turned over to the owner; so it remains to be seen just what can be done for the creditors, who are insisting that their claims be paid, or partially paid, at least.

The retail merchants' board of the Chamber of Commerce on March 19 adopted a resolution to the effect that the long-continued strife has held back the commercial development of the city to a degree that can hardly be overstated, and that no suggestions which would tend to continue the struggle ought to be entertained. A copy of this resolution was sent to each newspaper, with such changes in one clause as would make the resolution applicable to the paper receiving it.

In the résumé of the Cleveland situation in the Electric Railway Journal of March 13, it should have been specifically stated that the operating statement of the Cleveland Railway which was published in that issue was for February.

Chicago Subway Report

A subway bureau, working under the direction of the local transportation committee of the Chicago City Council, has just published a three-volume report setting forth the desirability and the feasibility of an immediate beginning of subway construction to take care of part of the present street and elevated car traffic and runways for other utilities. Detail plans for building, with estimates for costs, are given, and the suggestion is made that the aim of the city should be to reduce surface congestion in the central district, rather than afford rapid transit to distant parts. The present report makes definite recommendations for the routes to connect the North, South and West Sides with the loop district. Information and a large number of maps provide a complete exposition of the underground structures now below the streets of the proposed subway district from Chicago Avenue to Twelfth Street and from Lake Michigan

to Halsted Street. An analysis of the water supply also has been given to determine the adequacy of the present piping and to plan for the future. The report also presents a study of the underlying soil and building foundations necessary for determining the proper methods of subway construction.

The plans for this subway system as outlined in the report contemplate excavating from curb to curb with the tracks placed about 18 ft. below the pavement and a mezzanine floor on which the transfer passageways and ticket stations will be located 7 ft. below the pavement. Underneath the four tracks a clear space for the width of the street and 7 ft. 8 in. high is contemplated for the accommodation of pipes, wires, conduits, cables, etc., of the various public utility companies. The level of this utility space is directly above the existing tubes of the Illinois Tunnel Company.

The authors of the report suggest that it will be desirable first to construct four-track subways, or their equivalent, north and south along the east margin of the city, extending from the vicinity of Chicago Avenue and Orleans Street on the North Side to the vicinity of State and Twenty-second Streets on the South Side; and following this, or contemporaneously with it, to construct other subways in the form of a horseshoe closely paralleling the north and south subway through the business district and with the western termini at Halsted Street and Blue Island Avenue and at Halsted and Lake Streets. It is proposed to provide outlets at all four of the immediately built subway terminals so that surface or elevated cars may pass to and from the underground tracks. It is suggested that two tracks in the north and south subway might be used for surface lines and two tracks for elevated trains; also that the trains of the Northwestern Elevated Railroad might enter the subway in the vicinity of Chicago Avenue and run through to an outlet in the vicinity of State and Twenty-second Streets, there to turn and repass through the subway and out to the North Side. The trains of the South Side Elevated lines might use the same tracks as proposed for the Northwestern Elevated, entering at Twenty-second Street, passing through and turning at Chicago Avenue, then traversing the same route southward to emerge at Twenty-second Street. Likewise, the surface cars might be diverted to the subway entrances and use two of the tracks to and from the crowded loop district. It is not intended to divert all the trains or cars of the elevated and surface lines, but only a sufficient number to relieve congestion on the streets within the Union Loop district. The subways suggested would not constitute an entire system, but merely would be parts of the comprehensive system to be built in accord with the growing demands of the city.

The present report comments on the details of trial subway structures and makes suggestions for the arrangement of tracks, platforms, etc. Island platforms 16 ft. wide are recommended to be longer than necessary for accommodating one train of nine cars on each side. A wide mezzanine gallery or vestibule above the tops of the cars and with stairways at each end leading to the street surface is proposed as a means for passengers to reach any of the platforms or to cross a congested street. These vestibules would be located approximately in the middle of a block. Reinforced concrete is recommended as the material for the walls, with possibly steel columns, beams and arches.

With regard to the method of proceeding with the work the report recommends that the side walls at curb lines should be built first, followed by a transverse trench for temporary bracing across the street, when the construction of interior footings, transverse girders and the erection of columns may be completed and the walls permanently secured prior to excavating the main portion of the subway prism.

Figures on the cost of constructing the subways are as follows:

	Cost per mile.
Four-track subways, as in Wabash Avenue	$3,750,000
Three-track subways, as in Washington Street	3,375,000
Two-track subways, as in Van Buren Street	3,000,000
One-track tunnels, as under the rivers	800,000

Another Subway Proposal in New York

On March 18 the Bradley, Gaffney, Steers Company, New York, filed an application with the Public Service Commission of the First District of New York to build the proposed Lexington Avenue subway in New York with private capital. This is the fourth plan for building subway lines in New York to be proposed within two weeks. The letter of Henry Steers, president of the Bradley, Gaffney, Steers Company, to the Public Service Commission in which the offer to build the line is made follows:

"We have a considerable degree of familiarity with the rapid transit situation in New York and a wide experience in the construction of tunnels. We have made a careful study of the increasing traffic needs of the city with the aid of the best engineering and financial advice obtainable. We are prepared to make and accordingly submit to you the following proposition for the construction and operation of a subway system of rapid transit.

"We will contract, for the city of New York, the Lexington Avenue subway from a point in the Bronx to a junction with the bridge loop, the exact location to be determined by you, and will equip, maintain and operate the same upon the following basis:

"1. The said railway and equipment shall belong to the city of New York, but the possession of and the right to operate the same shall remain with us until the cost, which shall be deemed to be the actual expenses incurred plus 15 per cent, as an engineering profit to us, shall have been fully paid with 5 per cent interest per annum.

"2. The operation of said railway shall be lodged in a board of seven members, four of whom shall be named by us and the remaining three to be the Mayor of the city, the Comptroller of the city and the chairman of your commission, subject to the rules and regulations of your body.

"3. The proceeds of such operation, after paying the expenses of operation and maintenance and interest upon costs, shall be devoted one-half to the payment of cost and the remaining half paid to us.

"4. We will make such connections with such other existing lines of railways and exchange transfers therewith at such points and upon such terms as may be agreed upon, subject to your approval and direction.

"5. Should the cost not have been paid prior thereto, at any time after 25 years the city may have the option of taking over the operation of said railway upon paying to us the unpaid portion of said costs.

"We have the necessary equipment and organization and upon the execution of the contract substantially embodying the foregoing and the completion of necessary legal steps and engineering plans we are prepared to proceed with the said work upon 30 days' notice without calling for aid or credit of the city."

The Lexington Avenue subway route, as adopted by the Public Service Commission in December, 1907, runs from the Battery through Greenwich and Vesey Streets and Broadway to Ninth Street, thence under private property and streets to Irving Place, thence up Irving Place and Lexington Avenue to the Harlem River, thence to 138th Street, where it divides into two branches, one going north through Mott, River and Jerome Avenues; the other northeast through 138th Street, Southern Boulevard and Westchester Avenue to Pelham Bay Park.

Famous Private Car Burned.—The Josephine, the private car of H. A. Everett, president of the Northern Ohio Traction & Light Company, Akron, Ohio, was destroyed in a fire at the paint shop of the company at Silver Lake Junction recently. The car was undergoing repair at the time of the fire.

April Meeting of Central Electric Traffic Association.—The next meeting of the Central Electric Traffic Association will be at the Lima House, Lima, Ohio, Friday and Saturday, April 16 and 17, 1909, to continue the checking of rates in the tariff that is under consideration as well as to consider other matters which may be properly brought before it. There will be an evening session on Friday evening.

Hudson & Manhattan Railroad Leases Uptown Terminal Site.—The Hudson & Manhattan Railroad, New York, has leased its uptown terminal site on the west side of Broadway, between Thirty-second and Thirty-third Streets, to Gimbel Brothers, Philadelphia and Milwaukee, who will erect a department store on the property. The station of the Hudson & Manhattan Railroad will be in the new building.

Meeting of the Massachusetts Street Railway Association.—A meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, on March 16. The address of the evening was presented by Calvert Townley, vice-president of the Connecticut Company, on "The Combined Operation of Steam and Electric Railways." Mr. Townley briefly described the combined service operation of the Connecticut Company, in which an electrified section of steam track is connected at each terminal with existing city trolley tracks and a through service instituted on the order of the regular trolley interurban service, with this difference, however, that the steam tracks still continued to be used by steam trains. The three places where this service has been instituted are from Norwich to Central

Village, from Middletown to Meriden and to Berlin, and from East Hartford to Rockville and Melrose, all in Connecticut.

Hearing on Boston & Eastern Electric Railroad's Tunnel Project.—The committee on metropolitan affairs of the Massachusetts Legislature gave a hearing on March 15 on the bill providing for the construction by the Boston & Eastern Electric Railroad of a tunnel under Boston Harbor and a subway in Boston connecting with a terminal in or near the Post Office Square district. W. E. Chappelle, former president of the Senate, appeared as counsel for the company and outlined its plans as previously printed in these columns. He stated that the question of necessity has already been determined by the Railroad Commission, the formal approval being withheld pending the legislative sanction of the tunnel construction. The total cost of the road would be about $11,000,000, the tunnel cost being estimated at $2,800,000. The company has now expended about $75,000 in engineering studies, and is prepared to build as soon as authorized. The tunnel bill is practically the same as the Cambridge subway bill. The company stated that if the Legislature desired it would consent to have its bill modified so that Boston could build the subway and tunnel, but that it cannot afford to wait until the city is ready to take up the burden. The hearing was largely devoted to cumulative testimony in favor of the project, the opposition being expected at later hearings.

Minneapolis Company Explains Its Position in Fare Suit.—The letter of C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., to the Aldermen of Minneapolis withdrawing the request that the city discontinue its suit against the company for six-for-a-quarter fares explains the position of the company in regard to the suit. The letter follows: "The Minneapolis Street Railway desires to withdraw its request under date of Feb. 26, 1909, that your honorable body appoint a committee to meet the representatives of this company for the purpose of considering the question of dismissing the so-called 'six-for-a-quarter' suit now pending in the United States Supreme Court. This withdrawal is prompted by a desire on the part of the company not to ask your honorable body to take any action which may meet with disapproval from any source. We prefer to let the judgment of the Supreme Court finally decide the question at issue. On behalf of the company, I desire to thank your honorable body for the appointment of the special committee to which our communication of Feb. 26 was referred, and regret that, through a misunderstanding on our part as to the date when your committee was to meet, no representative of the company was present at the meeting held on March 9. We also desire to thank our many friends for their encouragement and the interest shown by the voluntary circulation and signing of a petition to the City Council requesting a settlement of the case." References to the suit were contained in the Electric Railway Journal of March 13, 1909, and March 20, 1909, pages 480 and 523, respectively.

Hearing on Proposed Transit Extensions and Changes at Boston.—The committee of the Massachusetts Legislature on metropolitan affairs gave a hearing on March 16 on the bills providing for the restoration of elevated train service in the Tremont Street subway, the replacement of the elevated structure in Washington Street by a subway, new subway construction to the South Station, and the change of the location of the Cambridge subway's Boston terminal from Park Street to Scollay Square. Corporation Counsel Babson of Boston protested against the city assuming any more burdens at present on account of transportation improvements. Regarding the proposed subway and removal of the elevated structure from Castle Street to Dudley Street, Mr. Babson said that this would cost from $6,000,000 to $10,000,000, and the city could not afford the expense the improvement would entail. Neither the city nor the Boston Elevated Railway wants to restore train service in the Tremont Street subway. The cost would be at least $300,000. President Bancroft of the Boston Elevated Railway described the improvements of the past few years, and stated that the use of the Tremont Street subway by elevated trains was from the first understood to be merely a temporary arrangement. The Washington Street tunnel and the Atlantic Avenue elevated line could be used to only about two-thirds of their capacity as designed if the train service should be again undertaken in the Tremont Street subway, which was never intended for train service anyway, and which required great skill and expense for successful train operation. The Cambridge subway is to be terminated at Park Street because the Boston Transit Commission so decided the matter, and this was favored by the company as the destination of its patrons. General Bancroft also emphasized the increase in fixed charges which all the subways impose upon the company in the face of a decreasing rate of revenue gain. It is estimated that by 1915, when the improvements now under way are taken over by the company, the income will be inadequate to pay any dividends if the present conditions hold. The company and the city have invested $67,000,000 and are committed to an additional investment of about $44,000,000.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Missouri.—The bill creating a public utilities commission, mention of which was made in the Electric Railway Journal of March 13, has been introduced in both the Senate and the House and referred to committees. Up to March 20, neither of the committees had reported it back, but it is generally expected that the measure will be reported favorably. On March 19 Senator Gardner, of St. Louis County, introduced by request a bill providing for a 3-cent fare on street railways in all cities of the State from 5 a. m. to 7 a. m. and 6 p. m. to 8 p. m. The bill stipulates that tickets must be issued in coupon form and that 10 tickets be sold for 30 cents, 20 for 60 cents, 50 for $1.50. A transfer must be issued upon each ticket when demanded. Violation of the law entails a fine of not more than $1,000 nor less than $250. Each refusal to sell tickets as prescribed by the ordinance will be considered a separate offense. On March 19 Mr. Carter introduced a bill in the House at the request of Attorney-General Major to place the regulation of railroad passenger rates under the supervision of the State Railroad and Warehouse Department. The act, which was drawn by Mr. Carter and approved by the attorney-general, authorizes and empowers the Warehouse Department or any public service commission which hereafter may be created by law, to prescribe and affix the maximum rate of fares for passenger travel over railroads within the State.

New Jersey.—Governor Fort sent a special message to the Legislature on March 16 in which he said that if the Legislature adjourned sine die without enacting his reform election laws he would reconvene the House and Senate in special session. The Pierce public utility bill is still in committee, and the Martin public utility measure has not been advanced. Thus there is no change in this respect over a week ago. An effort was made in the Senate to amend the Gaunt electric railway freight bill so as to make it operative only in cities of less than 40,000 population and to provide for the construction of terminals and limit rights under the act to five years. Both amendments were lost, and the bill was passed as originally presented and published in the Electric Railway Journal of March 16. A special measure has been introduced to authorize the Atlantic City & Shore Railroad to control and operate the Central Passenger Railway, Atlantic City. Chancellor Pitney, as noted on page 484 of the Electric Railway Journal of March 13, recently held that the Atlantic City & Shore Railroad was not authorized by law to acquire the Central Passenger Railway.

New York.—There was a hearing before the judiciary committee of both houses on March 17 on the Travis-Lee constitutional amendment exempting income-producing bonds for transit, water supply and dock purposes from New York City's debt limit. Chairman Willcox and Commissioner Bassett, of the Public Service Commission of the First District, delegations representing civic bodies of both New York and Brooklyn and individuals all appeared to favor the measure. Senator Wagner, who recently made a special study of the city debt problem for one of his clients, issued a formal statement urging the adoption of the amendment. It will be recalled that the majority of the Cassidy commission, which conducted a special investigation of the finances of New York City, reported in opposition to the constitutional amendment exempting income-producing bonds from the debt limit. Mr. Willcox said that the conclusion of the Cassidy commission that additional subway construction should be accomplished by private capital solely was erroneous. He concluded by saying that the amendment was needed for the best interests of the city even though resort to its provisions never became necessary. No one was present in opposition to the measure. Another amendment to the public-service law has been introduced. It gives the commissions authority over water companies. On March 18 Senator Wainwright introduced a bill authorizing the New York, Westchester & Boston Railroad and the New York & Port Chester Railroad to consolidate with the approval of the holders of two-thirds of the outstanding stock of each company and the Public Service Commission of the Second District. The Supreme Court is authorized to fix the value of the holdings of stockholders not assenting. On March 19 Chairman Willcox and Commissioners Bassett, McCarroll and Maltbie, of the First District, conferred with Governor Hughes at the Hotel Astor, New York, but refused to discuss the meeting for publication other than to say that it concerned the rapid-transit situation in New York.

Ohio.—The session of the Legislature which convened on Jan. 5 and adjourned on March 12 was a special session called by the Governor principally for the purpose of electing a United States Senator. The feature that attracted most attention, perhaps, was the reappointment of J. C. Morris as a member of the Railroad Commission by former Governor Harris and the appointment of John C. Sullivan by Governor Harmon as a successor to Mr. Morris. Both appointments have been confirmed and the matter now goes to the courts for settlement. Only one bill affecting the electric railways passed both houses and has been signed by the Governor. It provides for the free transportation of peace and safety officers while on duty by electric railways. The measure follows: "Section 1. That hereafter upon the granting of franchises to traction companies throughout the State of Ohio, for the use of streets, roads and highways for the transportation of passengers, it must be provided, as one of the considerations for such use of the public highways, that said traction companies carry free as passengers on any and all regular cars peace and safety officers, such as police and firemen, when on duty and in uniform." The most pretentious measure of the session, the Woods bill, which provided for a commission of two members to appraise the property of public-utility corporations, after being amended and passed by the House, was permitted to die in committee in the Senate. One member of the commission was to be a Republican and the other a Democrat, with an arbiter to be appointed by the Supreme Court if necessary. The board would have succeeded 12 boards of elective officials.

Pennsylvania.—On March 15 two important measures affecting electric railway interests were introduced in the House by Representative Keister of Harrisburg, giving to street railway companies the power to enter upon and take for trackage any portion of the highway upon which their lines are laid, without the consent of any abutting property owners. Mr. Keister stated that he introduced the bill at the request of Secretary Stine of the Pennsylvania Street Railway Association. The title of the bill is "To enable street railway companies operating in whole upon a public highway or highways to straighten, relocate and otherwise improve their lines or railway, and lay additional sidings." It is provided that the owner of the land shall be compensated and that when an agreement as to the compensation cannot be reached the value is to be determined as is provided in the act of 1889, authorizing companies to locate or relocate their lines on public highways and granting them the right of eminent domain. The Reynolds bill granting companies like the McCall's Ferry Power Company the right of eminent domain will be vigorously opposed by certain interests, but it is thought that the measure will pass. A similar bill was defeated in the Legislature two years ago. The bill provides for the merger and consolidation of electric light and power companies, and another bill from the same author contemplates the incorporation of the consolidated companies. The Railroad Committee of the House gave a hearing on March 23 to representatives of steam and electric railway companies who are opposing the bill extending the powers of the State Railroad Commission to embrace the control of stock and debt increases of corporations. Attorney W. H. Allen of the State Railroad Commission has submitted a brief to the Railroad Committee setting forth that "many of the serious complaints made to the commission involving questions of public service are directly traceable to the evil of overcapitalization." The brief stated that the greatest evils were in reorganizations, and it was said that by placing a check on increases the public might be spared many impositions. The Houck bill to increase the membership of the State Railroad Commission from three to seven was amended in the House to make the commission five members instead of seven. It was then sent to the Appropriation Committee. The Sproul anti-spitting bill has passed the Senate and is quite certain to pass the House. Committing magistrates are empowered to fine offenders $1 and costs or sentence them to five days' imprisonment. This bill has the backing of the State Health Department. The House has also passed the bill allowing brothers and sisters to bring suit for damages for injury causing death. The same body has passed the bill to permit the merger of corporations having the same objects but chartered under different laws. This act will replace the present merger law. No more new bills are now being introduced unless unanimous consent has first been obtained by the author.

Utah.—The public-utilities bill, introduced in accordance with the recommendation of Governor Spry, as noted in the Electric Railway Journal of Feb. 27, has been killed in the Senate. Senator Badger, author of the measure, said that in the event of its defeat, he would endeavor to resuscitate it in the form of an amendment, but he has not made good his threat.

Financial and Corporate

New York Stock and Money Market

March 23, 1909.

The feature of the stock market to-day was the startling break in the shares of the traction companies operating in Manhattan and the Bronx. Without any apparent development that had not been known for several days, prices began to decline soon after the opening, and at the close of the day the Interborough-Metropolitan common recorded a loss of 2¼, the preferred 4⅝, and Third Avenue 7⅝. A week ago Interborough-Metropolitan preferred was selling at about 45 and Third Avenue in the neighborhood of 40. At the low point to-day they were 36¾ and 27¾. The order of the United States Court for the sale of the property of the Metropolitan Street Railway Company is of course sufficient to disturb the holders of Interborough-Metropolitan securities. The latter road owns 90 per cent of the stock of the Metropolitan company. To protect this enormous interest a large sum must be raised. As the date of the sale is fixed for June 1, there is very little time left to perfect a reorganization, if it has not been planned. The sudden break in Third Avenue may be attributable to a sympathetic alarm. While that road is now separate from the Metropolitan System, it is still in the hands of a receiver, and no one knows when the court may order a process similar to that directed for the Metropolitan.

Throughout this demoralization of tractions, Brooklyn Rapid Transit was unaffected. The strength of the general market is well indicated by the fact that, in spite of this small flurry in traction securities, the general list was not materially disturbed. For the last week trading has been very dull, but prices have been firm, and yesterday there was the sharpest advance in the active issues that has occurred within the last month.

The money market continues to be in a very satisfactory condition, cash being plentiful and rates easy. Bonds are still taken with sufficient eagerness to make the market altogether pleasing to those who have in contemplation large developments. The quotations for money to-day were 1¾ to 2 per cent for call loans and 2½ to 2¾ per cent for 90 days.

Other Markets

Philadelphia Rapid Transit has again become one of the active stocks in the Philadelphia market. Union Traction also has been prominent in the market, daily sales having run into the hundreds, but with no material advance.

In the Chicago market there has been little activity in tractions, Subway being the only stock in which any interest has developed. While trading in this has been fairly active there has been little improvement in price, and 26½ is still the prevailing figure. There has been limited trading in Chicago Railways, Series 2 and 3.

While the trading at Boston has not been particularly heavy, public interest has been more in evidence. Boston Elevated and Massachusetts Electric have been particularly favored. Prices remain practically unchanged.

Trading in Baltimore is still confined to the bonds of the United Railways. The 4s are especially active but prices are little changed, 86¾ being the ruling figure. The incomes are selling at 53⅜.

Quotations of various traction securities as compared with last week follow:

	Mar. 16.	Mar. 23.
American Railways Company, Philadelphia	45¾	*45¾
Boston Elevated Railway	127¾	126¼
Brooklyn Rapid Transit Company	71¼	71¼
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a78	a77½
Consolidated Traction Company of New Jersey, 5 per cent bonds	a107	a106
Detroit United Railway	*61	*61
Interborough-Metropolitan Company	14⅞	12
Interborough-Metropolitan Company (preferred)	44¼	37¾
Manhattan Railway	142⅛	143
Massachusetts Electric Companies (common)	*14¾	14¾
Massachusetts Electric Companies (preferred)	*71½	71
Metropolitan West Side Elevated Railway, Chicago (common)	*19	*19
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	*28	*28
North American Company	78⅜	*78⅜
Philadelphia Company, Pittsburg (common)	47	41¾
Philadelphia Company, Pittsburg (preferred)	*42¾	*42¾
Philadelphia Rapid Transit Company	27⅝	28
Philadelphia Traction Company	91½	92½
Public Service Corporation, 5 per cent collateral notes	a100¼	a100½
Public Service Corporation certificates	a81½	a82½
Twin City Rapid Transit Company, Minneapolis (common)	*105	*105
Union Traction Company, Philadelphia	53½	53⅞

a Asked. * Last sales.

Decree of Foreclosure and Sale Against the Metropolitan Street Railway, New York

Judge Lacombe of the United States Circuit Court on March 18 filed a decree of foreclosure and sale of the Metropolitan Street Railway, New York, N. Y., in the proceedings instituted against the Metropolitan Street Railway by the Guaranty Trust Company, New York, as trustee of the $12,500,000 general collateral trust 5 per cent bonds, on which the interest was defaulted in February, 1908. The decree gives the Metropolitan Street Railway 20 days within which to pay $13,589,270.83 with interest at 6 per cent. in default of which payment William L. Turner, special master, is directed to sell the company's property at public auction to the highest bidder, on June 1.

The foreclosure decree does not include the Central Park, North & East River Railroad, the Twenty-eighth & Twenty-ninth Street Crosstown Railroad or the Fulton Street Railroad. The owners of the Central Park, North & East River Railroad are operating that property, having taken it over when the Metropolitan Street Railway defaulted on the lease. The receivers of the Metropolitan Street Railway have also abandoned the Twenty-eighth & Twenty-ninth Street Crosstown Railroad and the Fulton Street Railroad. The receiver of the Twenty-eighth and Twenty-ninth Street Railroad is operating that road, but the receiver of the Fulton Street Railroad has abandoned operation entirely. Foreclosure suits are pending against both companies.

Alexander J. Hemphill, acting president of the Guaranty Trust Company, New York, and chairman of the committee representing the holders of the 5 per cent. bonds of the Metropolitan Street Railway, says that no definite plan for action has been decided upon nor has a plan been formally adopted for the reorganization of the company. Edwin S. Marston, president of the Farmers' Loan & Trust Company, New York, is chairman of the committee which represents the holders of the $16,604,000 of refunding mortgage 4 per cent. bonds.

Theodore P. Shonts, president of the Interborough-Metropolitan Company, which acquired $42,740,000 of the $52,000,000 capital stock of the Metropolitan Street Railway, intimated recently that the Interborough-Metropolitan Company might be a bidder at the foreclosure sale. It was stated at the time that the preferred stockholders of the Interborough-Metropolitan Company might possibly be assessed to raise the funds with which to buy the Metropolitan Street Railway.

Judge Lacombe's memorandum, which was filed with the decree, after providing for obtaining the fullest information about the property, said:

"The date of sale is fixed as June 1 in order that any one who wishes to review any of the provisions of the decree may have ample opportunity to present the same to the Circuit Court of Appeals. The record is printed and there is nothing to cause delay in the presentation or hearing of such appeal, which will be given preference in that court.

"The property hereby directed to be sold shall be subject to all taxes, assessments or liens prior to the mortgage to the complainant, existing in favor of any person or persons, corporation or corporations not a party to the cause, except such as are herein specifically directed to be paid out of the proceeds of the sale.

"Under the right reserved to the purchaser to refuse to adopt any particular lease or traffic agreement, it is impossible that one or more of the leased lines may be thrown off, but the court is unwilling at this stage of the proceedings to permit a complete disintegration of the system. To do so would put it in the power of the owners of roads which are now money makers for the system to take them out of it. So far as the Court may be able to preserve the road as a going concern, it should do so.

"In the event of the insufficiency of the proceeds of sale to pay in full the amounts herein directed to be paid out of such proceeds prior to the principal and interest secured by the mortgage to the complainant, the Court reserves the right from time to time to require the payment of the deficiency by the purchase under this decree. In the event of the refusal or omission of any purchaser to pay the amount so required to be paid within 30 days, the Court reserves the right to retake and resell the property sold under this decree to such purchaser, and to apply the net proceeds of such resale to the payment of the deficiency with which such purchaser is chargeable, rendering unto such purchaser the surplus, if any."

American Railways Company, Philadelphia, Pa.—The American Railways Company has addressed the following communication to the holders of the 4 per cent collateral trust gold bonds of the Interstate Railways Company: "Having purchased a large amount of the 4 per cent collateral trust gold bonds of the Interstate Railways Company, we will buy any or all of the remainder of said issue on the same terms and conditions, viz.: At 50 per cent of their par value, giving in exchange therefor our 50-year 4½ per cent gold bond, bearing interest from Jan. 1, 1910, and convertible into stock of this company, at par, at the option of the holder, on and after Jan. 1, 1911, and prior to Jan. 1, 1915. Under the terms and conditions and upon the provisions contained in the agreement securing the same, made and executed to the Equitable Trust Company, Philadelphia, as trustee, and deposited with it, if the American Railways Company does not acquire the collateral securing the Interstate bonds on foreclosure sale, or otherwise, the American Railways Company will, on request of the holder of the said 4½ per cent bonds, on or before Jan. 1, 1915, pay said bonds at par, and the company will also pay each depositor his pro rata share of one-half of any amount over and above 50 per cent of the face value of said Interstate Railways Company bonds, less expenses, which may be realized in cash by the American Railways Company on distribution of proceeds of sale of such collateral or otherwise prior to said sale. Holders of any of said Interstate bonds may deliver their bonds to the Equitable Trust Company on and after this date and receive in exchange temporary bonds of this company. Any holders desiring further information are requested to communicate with the undersigned (American Railways Company), by whom it will be fully given. The right is reserved to withdraw this offer at any time without notice." Referring to this notice, Edward J. Moore, Caleb F. Fox and William Ratch Wistar announce that they have sold their Interstate bonds to the American Railways Company under the conditions set forth.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has authorized the Buffalo & Lackawanna Traction Company to execute a first mortgage for $1,500,000 in favor of the New York Trust Company to secure an issue of $1,000,000 of 5 per cent 20-year gold bonds of the denomination of $1,000 each to be sold for cash at a price not less than 80 per cent of the par value.

Chicago (Ill.) City Railway.—The City Council has passed the ordinance authorizing the Chicago City Railway to lease the Southern Street Railway. The transportation committee of the City Council appraised the property and franchises of the Southern Street Railway at $750,000. The Chicago City Railway will operate the Southern Street Railway under the same conditions that it does its own lines.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky.—At the recent annual meeting of the stockholders of the Cincinnati, Newport & Covington Light & Traction Company, the following directors were elected: Louis J. Hauck, James C. Ernst, J. M. Hutton, Charles Thurnauer, Julius Fleischman, Clayton Garvey, and Richard Neff, Cincinnati; C. S. Hamilton, Covington, Ky., and C. Rodman, Newark, N. J.

City Traction Company, Oswego, N. Y.—The City Traction Company, the incorporation of which was noted in the Electric Railway Journal of Feb. 27, 1909, page 393, will take over the property of the Oswego Traction Company, which was sold under foreclosure during the summer of 1908. The directors of the company are C. B. Benson, Minetto; William Nottingham and Clifford D. Beebe, Syracuse, and Harold C. Beatty, Skaneateles. The directors have not yet organized.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—At the annual meeting of the stockholders of the Columbus, Delaware & Marion Railway on March 18, the directors were re-elected and they organized by re-electing the officers. As the fiscal year of the company has been changed to end June 20 in accord with the rules of the Railroad Commission of Ohio, no reports were submitted at the meeting.

Dayton & Xenia Transit Company, Dayton, Ohio.—In answers filed by the defendant a few days ago in the foreclosure suit of the Worcester Trust Company against the Dayton & Xenia Traction Company to the petition of the plaintiff and the intervening petition of the Old Colony Trust Company, most of the allegations were admitted. The Worcester Trust Company holds a balance of $480,000 of an issue of $800,000 of 20-year bonds issued by the Dayton & Xenia Traction Company in 1901, while the Old Colony Trust Company holds $300,000 of second mortgage bonds, the interest on which is in default.

Forty-Second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—An order signed by Judge Lacombe in the United States Circuit Court on March 17, makes Frederick W. Whitridge, receiver of the

Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, a party defendant in foreclosure proceedings instituted against that company by the Union Trust Company. The Central Trust Company, which is the owner of 1460 out of a total of 1600 of the second mortgage income bonds of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, requested the Union Trust Company, because of default in the payment of interest, to declare the principal sum of $1,600,000, secured by the mortgage, to be due and payable. A petition to that effect was filed by the Union Trust Company, with the request that Mr. Whitridge be made a party defendant.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.—At the annual meeting of the Ft. Wayne & Wabash Valley Traction Company, held recently, directors were elected as follows: J. Levering Jones, Randall Morgan, Howard H. Henry and Jno. J. Collier, Philadelphia, Pa.; J. M. Barrett, Ft. Wayne, Ind.; S. T. Murdock and Chas. M. Murdock, Lafayette, Ind.; H. J. McGowan, Indianapolis, Ind. The report of the company for the year ended Dec. 31, 1908, shows as follows: Gross receipts, $1,322,720; operating expenses, $737,134; net earnings, $585,586; deductions, $488,756; surplus, $96,830.

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—Judge Carter, of the Superior Court of Indianapolis, has taken under advisement the interests of all parties connected with the affairs of the Indianapolis, New Castle & Toledo Railway, which is in the hands of the Union Trust Company, Indianapolis, as receivers. Some of the creditors favor the completion of the road and others oppose it. The promoters contributed $200,000 to the trustee to be used as security for receiver's certificates for the completion of the road. Some of the creditors urge that this fund be distributed among them to satisfy their claims against the company.

Louisville (Ky.) Railway.—The Fidelity Trust Company, Louisville, Ky., has purchased at 97¾ the entire $1,000,000 of 40-year 4½ per cent second mortgage gold bonds of the Louisville Railway. They are part of an authorized issue of $2,000,000, $1,000,000 of which had been previously sold.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The Mahoning & Shenango Railway & Light Company has made public the following comparative statement of earnings for the years ended Dec. 31, 1908, and Dec. 31, 1907: Gross earnings from operation of company and controlled companies for 1908, $1,747,927, as compared with $1,900,662 for 1907; operating expenses (including taxes of operating companies) for 1908, $1,159,174, as against $1,149,859 for 1907; net earnings for 1908, $588,753, as against $750,803 for 1907.

Maryland Electric Company Railways, Baltimore, Md.—Bioren & Company, Philadelphia, Pa., announce that all of the $4,000,000 of 5 per cent gold bonds of the Maryland Electric Railways have been subscribed.

Montoursville (Pa.) Passenger Railway.—A. L. Scholl, J. Harry Spencer and Dr. F. L. Moyer, Montoursville, have secured an option on the Montoursville Passenger Railway and the property of the Montoursville Electric Light, Heat & Power Company, owned by the Railways Company General.

New York & Harlem Railroad, New York, N. Y.—The directors of the New York & Harlem Railroad have decided to pass the dividend of 2 per cent usually declared at this time. The property of the company comprises a steam railroad extending from Forty-second Street, New York, to Chatham, and a portion of the New York Central & Hudson River Railroad's terminals—a distance, with branches, of 136.48 miles—and the city or street railway extending from the New York City Post Office to 138th Street, a distance of 9.88 miles. The street railway portion of the system was leased to the Metropolitan Street Railway in July, 1896, and subsequently the lease was taken over by the New York City Railway. Since 1901 the New York & Harlem Railroad and the lessee companies have been in litigation over the State franchise tax imposed upon the New York & Harlem Railroad. The accrued taxes now amount to between $800,000 and $1,000,000. The lessee company asserts that the tax should be paid by the New York & Harlem Railroad, and in consequence of the dispute the directors of the New York & Harlem Railroad have decided that it would be advisable to suspend the dividend.

Philadelphia, Coatesville & Lancaster Passenger Railway, Parkesburg, Pa.—The certificate of reorganization of the Philadelphia, Coatesville & Lancaster Passenger Railway as the Christiana & Coatesville Street Railway has been filed at the State Department. The capital stock is $400,000, of which W. S. Griest holds $5,000, W. U. Hensel $137,500 and J. S. Grayhill $257,500. The officers are: W. W. Griest, president; C. Edgar Titzel, J. S. Grayhill, A. E. Rauch, W. Hensel Simpson, H. E. Leuft and W. W. Griest, directors.

Public Service Investment Company, Boston, Mass.—Stone & Webster, Boston, Mass., have issued a circular briefly describing the Public Service Investment Company, which they have organized for the purpose, among other things, of holding and dealing in stocks, bonds, notes, or other securities. Its original holdings as listed in the circular include $350,000 common stock of the Jacksonville Electric Company, $350,000 common stock of the Minneapolis General Electric Company, $500,000 common stock of the Houghton County Electric Light Company, $700,000 capital stock of the Pacific Coast Power Company, $100,000 preferred stock of the Columbus Electric Company, $100,000 common stock of the Seattle Electric Company, $75,000 capital stock of the Tampa Electric Company. Stone & Webster now offer subject to sale the entire $1,000,000 par value of preferred stock, together with $400,000 par value of the common stock of the Public Service Investment Company, in blocks consisting of 10 shares of preferred stock and four shares of common stock for $950.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—The Harris Trust & Savings Bank, Chicago, Ill., is offering for subscription at 98 and interest an issue of $500,000 of first mortgage 5 per cent bonds of the Salt Lake & Ogden Railway, due Feb. 1, 1934, subject to call at 105 and interest on and after Feb. 1, 1914. The bonds are part of an issue of $2,000,000, of which $650,000 are issued to electrify the company's line.

Second Avenue Railroad, New York, N. Y.—Justice O'Gorman, in Special Term, Part I, of the Supreme Court, on March 23 filed an opinion in which he set forth that he can see "no advantage at this time in giving instructions to George W. Linch as receiver of the Second Avenue Railroad." Morris Heimerdinger and other bondholders of the Second Avenue Railroad recently applied to Justice O'Gorman for an order instructing Mr. Linch as receiver to take legal measures to compel the receivers of the Metropolitan Street Railway to carry out that company's lease of the Second Avenue Railroad. Justice O'Gorman said that the mere refusal of the receivers of the Metropolitan Street Railway to assume the obligations of the lease did not terminate it. The Court also said that the public obligation imposed by Section 104 of the railroad law in relation to transfers "did not attach to the receivers."

Third Avenue Railroad, New York, N. Y.—Argument was heard on March 11 by Judge Martin, in the United States Circuit Court, on the application made by the Central Trust Company, New York, N. Y., for a final judgment in the foreclosure proceedings against the Third Avenue Railroad. John M. Bowers, counsel for the Central Trust Company, said that the Third Avenue Railroad had defaulted in the payment of interest on $37,560,000 gold mortgage bonds. John M. Perry, counsel for the Third Avenue Railroad, contended that the court was without jurisdiction because all parties in the case were citizens of New York State. Mr. Bowers, in reply, said that the insolvency of the Third Avenue Railroad was alleged by the Pennsylvania Steel Company and the Degnon Construction Company in an action brought in the United States Circuit Court, in which action Judge Lacombe had appointed Frederick W. Whitridge receiver of the Third Avenue Railroad, and that this brought the affairs of the company under the control of the United States Circuit Court. Following a continuation of the hearing before Judge Martin on March 23, the Judge said he is satisfied "that this Court has jurisdiction of the case, and as there is no other mooted question the complainant may have its decree."

United Railways Company, St. Louis, Mo.—The directors of the St. Louis & Suburban Railway have re-elected officers as follows: Richard McCulloch, president; John I. Beggs, vice-president; James Adkins, secretary and treasurer; H. B. Taylor, auditor. The directors of the St. Louis Transit Company have re-elected officers as follows: John I. Beggs, president; Robert McCulloch, vice-president; James Adkins, secretary and treasurer; H. B. Taylor, auditor, and Judge H. S. Priest, general counsel.

Winnipeg (Man.) Electric Railway.—A special meeting of the stockholders of the Winnipeg Electric Railway has been called for April 7 to vote on approving a by-law passed by the directors authorizing an issue of $1,500,000 4½ per cent perpetual consolidated debenture stock and the execution to the British Empire Trust Company, Ltd., of a mortgage securing the stock.

Traffic and Transportation

Hearing on Fares on Boston & Worcester Street Railway

The Massachusetts Railroad Commission continued the hearing on March 18 on the petitions of the selectmen of Framingham and Marlboro for a reduction in the fare unit from 6 cents to 5 cents on the Boston & Worcester Street Railway. W. M. Butler, president of the company, stated that the original locations in Framingham, Southboro and Marlboro, granted in 1907, contained a fare provision. The line extended from Framingham Centre to the Southboro line and a 5-cent restriction applied to the effect that this fare should hold in any direction in Framingham. The company contends now that this 5-cent fare provision is invalid because the selectmen have no power to impose such conditions, subsequent legislation annulling the right of local authorities to fix fares. The selectmen endeavored to make the fare restriction apply to other portions of the system than that covered by the original franchise, extending the restriction to a location never acquired by the company. In 1907, the Boston & Worcester Street Railway secured a location for altering its route in connection with double tracking. This involved a new layout of tracks in the district between Framingham Centre and the Southboro line. The company holds that this physical relocation of the route by a new organization removes the force of the restriction originally imposed, regardless of the right of the selectmen originally to impose a sweeping fare requirement.

Mr. Butler then took up the question of fares in Marlboro. The line now operated by the Boston & Worcester Street Railway in Marlboro covers a location originally granted in 1888 to the Marlboro Street Railway, which ultimately went into the hands of a receiver. The original location contained no provision relative to fares, but in 1894 the city granted the company an extension on provision that the fares within the city limits should not exceed 5 cents. The Boston & Worcester Street Railway holds that the city had no right to impose a fare restriction or condition in connection with a location or extension of a location and cited the case of the city of Springfield vs. the Springfield Street Railway.

G. A. Butman, secretary and treasurer of the Boston & Worcester Street Railway, then stated that the earnings are not sufficient to enable it to pay a 6 per cent. dividend. He submitted tables showing the earnings and traffic in January and February, 1909, compared with the same months in 1908. The 6-cent fare unit was adopted by the road on Jan. 1, 1909. A summary of these figures follows:

	January			February		
	1909.	1908.	Decrease.	1909.	1908.	Decrease
Revenue passengers	554,076	633,124	79,048	555,113	602,934	47,821
Passenger earnings	$29,441	$30,482	$1,041	$29,412	$29,265	$147
Car-hours	8,420	8,585	165	7,670	8,141	471
Car-miles	134,170	135,217	1,047	122,172	127,931	5,759

Chairman Hall stated that the commission has jurisdiction over the reasonableness of the rate rather than over the legality of the franchise restriction, and that it would consider the situation of the company as a whole in going into the matter. The case was then taken under advisement.

Philadelphia Fare Complaint Dismissed

The Railroad Commission of Pennsylvania has dismissed the complaint of D. R. Harper, 3d, against the Philadelphia Rapid Transit Company, that the company was accepting commutation tickets sold at the rate of six-for-a-quarter on one group of lines and declining to accept the same and demanding a straight 5-cent fare on lines entering the subway. Mr. Harper alleged that on the haul from the mouth of the subway at Thirty-fourth Street and Chestnut Street, Philadelphia, to Darby, Pa., route travel and service were identical on both lines and the company was discriminating when it refused to accept "strip tickets" on westbound cars between Thirty-fourth Street and Chestnut Street, Philadelphia, and Darby, Pa. The decision concerned an alleged discrimination. It follows:

"A very careful consideration of your complaint, in connection with the answer thereto, and your reply to said answer, does not convince this commission that that complaint is well founded. It would seem impracticable for the railway company to make any distinction in fares to its patrons on the subway line no matter at what point thereon the cars may be boarded, and the fact that the tracks traversed by the two lines which you compare coincide for part of the distance is an incidental but not controlling factor in the case. In theory, as well as in practice, the fare of a passenger on a street car carries him to the terminus of that line at the will of the patron. The distinction for which you contend would necessarily apply in both directions, and there seems to be no practicable method, when cars are approaching the subway, of guarding against the strip-ticket passenger entering the subway and continuing his journey thereon. Moreover, in this particular case, the patron has choice of two lines and can select the one on which strip tickets are accepted, so that, unless he wants to enter the subway, there seems to be no reason why he should select that line. When you concede the justice of the straight 5-cent fare on the subway and consider that in general practice no two different rates of fare are ever demanded on the same line, we think you must recognize the impracticability of the operation of any such proposition as you make."

Ohio Electric Railway Reduces Limited Schedule.—On April 19, the Ohio Electric Railway will reduce the schedule for limited cars to one hour between Bellefontaine and Lima, a distance of 33 miles.

Readjustment of Fares Asked on Michigan Interurban.—The City of Kalamazoo has applied to the Michigan Railroad Commission for a reduction of fare by the Michigan United Railways on its lines between Kalamazoo and Battle Creek. It is alleged by the city that the rate from intermediate points to Kalamazoo is greater than to Battle Creek if based on the rate from the point specified to Battle Creek.

Sunday Service on the Winona Interurban Railway.—The Winona Interurban Railway operated its first Sunday car on March 7. Hereafter there will be regular service on Sunday. At present a schedule of one hour is in force. Traffic is reported to be very satisfactory, and is expected gradually to increase in volume as weather conditions become more favorable. The announcement that the company would begin Sunday service was made in the Electric Railway Journal of March 6, page 443.

New Indiana Law Applies to Interurban Railways.—J. F. McClure, of the Indiana Railroad Commission, has ruled that the amendment to the 2-cent fare law which was enacted by the recent Legislature applies to electric railways except for distances covered in incorporated cities where the franchise controls the fare charge. The amendment to the 2-cent fare law provides that when tickets are not bought at a station an extra charge of 10 cents may be made on each trip. In fixing fares under the new provision, the charge shall be according to the nearest multiple of 5 from the product of the rate at 2 cents per mile times the distance. Thus for 13 miles at 2 cents per mile, the charge shall be 25 cents, while for 14 miles at 2 cents per mile, the charge shall be 30 cents.

Baltimore Accident Fakir Sentenced.—David A. Howard, age 28, colored, of Baltimore, Md., who was arrested on Feb. 2, 1909, charged with attempting to defraud the United Railways & Electric Company, Baltimore, Md., out of $50 by false representation, as mentioned on page 309 of the Electric Railway Journal of Feb. 13, 1909, has been sentenced by Judge Wright in the Criminal Court at Baltimore to nine months in jail. In passing sentence on Howard, Judge Wright said: "This is the third case which has been brought into these courts within the last few months, and it must be stopped. In my observation a large number of cases have been brought into the law courts which have no merit, which tend to block the dockets of those courts and which, in many instances, lead to perjury. I cannot for a moment consider the question of a parole, and Howard must go to jail for nine months."

Ticket Swindle in New York.—The Interborough Rapid Transit Company, New York, recently caused the arrest of three men and a woman who were implicated in a scheme of swindling the company by means of counterfeit subway and elevated railway tickets. The offenders had just started to use the tickets and had a counterfeiting equipment which included a small hand press, two dies, plates, etc. This and some 15,000 tickets were seized by the authorities. The counterfeit tickets were discovered in sorting tickets in the company's office. The plan of those implicated was to sell the tickets at 2½ cents each in lots of 100 and for 2 cents each in lots of 1000. The paper stock on which the counterfeit subway tickets were printed is said to have been a very good substitute for the stock of the regular subway tickets, but the stock of the counterfeit elevated tickets was by no means a good substitute for the stock of the regular elevated tickets. Sentence has not been passed on the counterfeiters.

Funeral Car for Los Angeles.—The Los Angeles (Cal.) Railway has placed in service the first of its new funeral cars, the Paraiso, designed by E. L. Stephens, master car builder of the company, and built under his direction in the company's shops. The car is 34 ft. long. The outside is

finished in pearl gray and gold, with stained-glass windows. The interior is mahogany with upholstering in soft green. There are 20 willow chairs cushioned in green, and a folding willow seat which can be placed in the center aisle to accommodate 10 more passengers. The floor is heavily carpeted. Adjustable curtains are provided with which to form a private apartment for members of a family. The incandescent globes are frosted. The receptacle for the casket is at one end, and there is a door on each side of the car through which the casket may be passed on rollers. Special arrangements are provided above the casket for carrying floral pieces. Another car of the same general design, but somewhat larger, is now under construction, and will be completed about July 1.

Proceedings to Penalize Brooklyn Company.—The Public Service Commission of the First District of New York, on March 16, instructed its counsel to bring suit for the recovery of a penalty provided by statute for failure to obey an order issued by the commission last fall requiring increased service on the bridge local cars operated by the Brooklyn Heights Railroad over the Williamsburg Bridge. The order issued by the commission required the company to operate daily, including Sundays, over every part of the bridge local service a sufficient number of cars past any point of observation to provide during every 30-minute period of the day or night a number of seats at least equal to the number of passengers at that point, the number of cars to be never less than 6 per hour in each direction, except that between 1 a. m. and 5:30 a. m., it shall be never less than 2 in each direction. In the periods in which this provision is not complied with the company was ordered to maintain a minimum service of 24 cars during each 30-minute period.

Hearing on Side-Door Subway Cars in New York.—A hearing was held before Commissioner Eustis, of the Public Service Commission of the First District of New York on March 23, on the question of side doors for subway cars. Bion J. Arnold, consulting engineer to the commission, presented a report covering his observation of the operation of the experimental side-door trains for 10 days. He concluded: "The 10 days' operation of the train confirms my original conclusion that the double-end door car possesses the elements of maximum comfort, decency and capacity that can be obtained with cars that are to be operated in the present subway, and that unless stops at the present curved station platforms are eliminated, the platforms straightened or those stations moved so as to be on a straight track the center door type of car is impracticable." Mr. Arnold recommends that when the side-door cars are again tried the eight cars now equipped be put on as many separate trains so as to accustom the public to their use so far as possible pending the completion of the other equipment of this type. Commissioner Eustis said that the commission was satisfied with the showing made by the train as contained in Mr. Arnold's report, but at the request of A. A. Gardner, counsel for the Interborough Rapid Transit Company, he adjourned the hearing until March 25.

Special Excursion Service.—William B. Wheeler, superintendent of the Westchester Electric Railroad, Mt. Vernon, N. Y., proposes to run a special excursion service this summer. Mr. Wheeler will use the company's regular 12-bench open cars and will advertise the trips by folders to be placed in the hotels, railroad depots, excursion and information bureaus in surrounding cities, and by cards in the regular cars of the company, calling attention to special cars, the cities, towns and villages through which they will pass, and the points of interest along the route. As an instance of the service he has in mind, Mr. Wheeler cites the proposed excursion from the West Farms station of the New York Subway at White Plains Road to Mt. Vernon, via East Mt. Vernon, Pelham Manor, New Rochelle, Tuckahoe, Bronxville and West Mt. Vernon to Bronx Park or West Farms, a distance of 25 miles. Cars will be chartered to parties and special efforts will be made to encourage ladies and children to ride. Conductors will be instructed to point out and announce all places of interest in the different cities, towns and villages as cars pass through them. Saturday, Sunday and holiday riding on special cars will not be encouraged, as regular riding is very heavy on these days. The object in making the special trips during the week is to keep the men and cars occupied on non-rush days. Mr. Wheeler is co-operating with T. C. Perkins, vice-president of the Hartford & Springfield Street Railway, and other managers in an advertising campaign to stimulate vacation and excursion riding, particularly through riding from New York to Boston. Information bureaus will be established in New York, Mt. Vernon, New Rochelle and the principal cities in Connecticut, Massachusetts, Rhode Island and Maine.

Personal Mention

Mr. W. P. Graydon has been appointed master mechanic and superintendent of power of the Western Ohio Railway, Lima, Ohio, to succeed Mr. Malcolm Baxter, resigned.

Mr. L. L. Perry, for some years employed as electrical engineer by F. S. Pearson, D. Sc., has resigned his position. Mr. Perry has devoted his time largely to hydro-electric power house and transmission line work.

Mr. Edward P. Burch, of Minneapolis, is scheduled to present a series of lectures before the department of electrical engineering, University of Minnesota, during March and April on the subject of electric traction for railway trains.

Mr. Charles J. Fifer has resigned as general manager of the Philadelphia, Coatesville & Lancaster Passenger Railway, Parkesburg, Pa., to become general manager of the Columbus, Magnetic Springs & Northern Railway, Delaware, Ohio.

Mr. J. R. Townsend, who recently resigned as electrical engineer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been appointed sales engineer of the Detroit office of the Westinghouse Electric & Manufacturing Company.

Mr. John I. Harrington, who has been connected with the Chicago (Ill.) City Railway for more than 20 years, has resigned as claims attorney of the company, and Mr. Charles E. Troxell, formerly assistant claims attorney, has been appointed to succeed him.

Mr. H. E. Buck has resigned as general manager of the Columbus, Magnetic Springs & Northern Railway, Delaware, Ohio, effective on April 1, but will continue as secretary of the company. As noted elsewhere in this column, Mr. Buck will be succeeded as general manager by Mr. Charles Fifer.

Mr. G. K. Jeffries, who has been superintendent of the Eastern division of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., for three years, with headquarters in Greenfield, has also been appointed superintendent of the Brazil and Danville lines of the company, with headquarters in the Traction Terminal Building, Indianapolis.

Mr. Alexander Gordon, who has been connected with the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., at Richmond, Ind., for some time, has been appointed superintendent of the Eastern division of the company to succeed Mr. G. K. Jeffries, whose appointment as general superintendent of the company is noted elsewhere in this issue.

Mr. Charles H. Clark, who from 1901 to 1907 was chief engineer of way, Cleveland Electric Railway Company, is to return to Cleveland to take up the work which he resigned at the time of the absorption of the road by the Municipal Traction Company. After leaving Cleveland Mr. Clark was connected for about a year with the International Railway Company, Buffalo, as engineer of way, and during the last nine months has been associated with the Andrews and Stanley interests, first on the New York & North Shore Traction System and later as engineer of maintenance of way, Rochester Railway. Mr. Clark has had an extended electric railway experience. A biographical sketch of him was published in the Electric Railway Journal for Sept. 5, 1908.



Charles H. Clark

Mr. O. J. Semmes has resigned as superintendent of transportation and claim agent of the Pensacola (Fla.) Electric Company. Mr. Semmes has been connected with the company 11 years. His first work with the Pensacola Electric Company was in supervising track construction. Mr. Semmes then became foreman of the shops of the company and subsequently entered the operating department.

Mr. C. E. Armstrong, who was recently appointed general superintendent of the Cairo City Gas Company, Cairo Electric & Traction Company and Cairo & St. Louis Railway, Cairo, Ill., was graduated from the University of Illinois in 1905, and entered the service of the Illinois Trac-

tion Company at Danville immediately thereafter. Subsequently Mr. Armstrong was appointed superintendent of the lighting and heating departments of the company.

OBITUARY

John Butterfield, Utica, N. Y., is dead. Mr. Butterfield was a pioneer of the horse car period and was prominent in transcontinental transportation in the early days. He was one of the promoters of the Utica Belt Line, and was connected with the company as superintendent and an officer for many years. He was 82 years old.

Henry Seibert, a prominent resident of Brooklyn, N. Y., has died. Mr. Seibert was for many years connected with the Brooklyn Rapid Transit Company and its constituents and at the time of his death was a director of the Brooklyn Rapid Transit Company, the Brooklyn Union Elevated Railroad, the Coney Island & Gravesend Railway and several other properties leased by the Brooklyn Rapid Transit Company. He was a member of the firm of Henry Seibert & Brothers, but had not been active in business affairs for several years.

Washington F. Willcox, Chester, Conn., who was Railroad Commissioner of Connecticut in 1897 and in 1901, is dead. Mr. Willcox was born in Killingworth, Conn., in 1834, was graduated from Yale Law School in 1861 and practised law at Deep River for many years. He served in the State Legislature and subsequently was elected to Congress. By resolution of the General Assembly of 1907 Mr. Willcox was named as a member of the special public service commission committee, which recently reported favorably on the proposal to create a public utilities commission in Connecticut.

NEW PUBLICATIONS

The Armour Engineer (semi-annual). Chicago; January, 1909. Price per copy, 50 cents; per annum, $1.00.

The technical semi-annual published by the student body of the Armour Institute of Technology begins its life with a set of valuable articles contributed by the school's alumni. These contributions are all of practical character and their quality and range afford a good criterion of the Armour Institute's instruction courses. H. C. Abell, chief engineer of the American Light & Traction Company, discusses the problems before public service commissions; Morris W. Lee, chief engineer of the Keuffel & Esser Company, describes the reinforced concrete structure his company has built for making instruments of precision; and W. R. Wilson, superintendent of erection, Horgan Engineering Company, tells about his company's gas producers at Gary.

Morrison's Spring Tables. By Egbert R. Morrison. Sharon, Pa.: Morrison & Martin, 1908; 84 pages. Price, $2.00 net.

This is a hand book of springs for engineers, draftsmen and students. For convenience, the author has divided springs into two classes, heavy and light, considering a helical spring whose bar is less than 1/16 in. in diameter or an elliptical spring whose plate is less than 1/16 of an inch in thickness to be a light spring. The properties of light springs, however, have been arranged under graduated values of the fundamental ratio, so that the property of any light spring may be quickly determined from its particular ratio. The properties of heavy springs are tabulated under each size bar or plate. The work is divided into three parts in their logical order, the first devoted to formulas, the second to mathematical tables and the third to the spring tables.

Social Engineering: A Record of Things Done by American Industrialists Employing Upward of One and One-Half Million of People. By William H. Tolman, Ph.D., with an Introduction by Andrew Carnegie. New York: McGraw Publishing Company; 384 pages; illustrated. Price, $2 net.

Readers of this paper are familiar with what has been done in this country in the direction of railway employees' club houses, co-operative benevolent associations and pensions, but in other industries welfare work—or one might better say industrial engineering—has been carried much further. Thus Dr. Tolman's book describes the progress made in housing, which has been initiated by several electric railway systems abroad but not in this country, and in systematic hygiene, profit sharing, co-operative purchasing associations and the introduction of safety devices. In the introduction Mr. Carnegie expresses the opinion that the best direction by which to secure an improvement in the condition of the laboring people is through well-directed efforts of individual firms rather than through socialism, although the socialist may often call attention to the evil which the individualist can cure.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Denver & Fort Collins Interurban Railway, Denver, Col.**—Incorporated in Colorado to build an electric railway from Denver via Lafayette, Erie, Longmont and Berthoud to Fort Collins, also to Colorado Springs, Greeley, Golden and Morrison. Capital stock, $1,000,000. Incorporators: John Olson, Leslie De Remer, Fred O. Olson, Ralph Dougherty, R. E. Inskeep, Demerit E. Brown and Abner Graves.

Middle Georgia Interurban Railway, Atlanta, Ga.—A charter has been granted to this company to build an electric railway, 70 miles in length, between Griffin and Social Circle, with branches to Flovilla and Monticello. Capital stock, $200,000. Incorporators: Charles F. Howe, Milledgeville; L. W. Roberts, Atlanta, and W. F. Smith, Flovilla. [E. R. J., Oct. 3, '08.]

***Galesburg, La Salle & Kankakee Railway, Springfield, Ill.**—This company has been incorporated to build an electric railway from La Salle to a junction with the Chicago, Indiana & Southern Railroad in La Salle County. Capital stock, $300,000. Incorporators: William J. Parks and John W. Scott, La Salle; Frank O. Lash, Bloomington, and Harry F. Hamlin and James D. Flood, Chicago.

***Calumet Traction Company, Hammond, Ind.**—This company has been incorporated in Indiana for the purpose of building an electric railway from Hammond to East Chicago, North Calumet and Center. Headquarters, Hammond. Capital stock, $100,000. Directors: Walter J. Riley, East Chicago; Wm. P. Ijams, Terre Haute; E. L. Keating, Patrick Harrahan and Edward Bailey.

New Orleans & Seashore Railway, New Orleans, La.—This company has been organized and incorporated at New Orleans to carry out the plans of the New Orleans & Seashore Air Line Railway, announced several months ago. It is reported that the New Orleans & Seashore Railway will immediately begin the construction of an electric railway from Amesville, opposite New Orleans, to Grand Isle, La., 55 miles. It is said that practically the same interests which backed the New Orleans & Seashore Air Line Railway several months ago are also behind the new concern, but on account of necessary changes a new charter was filed. This document also gives authority to extend the railway the full length of Grand Isle, and it may build a branch to Bayou Lafourche and along that bayou from Rockport to the Gulf of Mexico. Capital stock, $2,000,000. Incorporators: James W. Porch, J. H. Menge, Jr., D. W. Benson, Leo A. Marrero and Lamar C. Quintero, all of New Orleans. [E. R. J., July 4, '08.]

***Plattsmouth & Southwestern Interurban Railway, Plattsmouth, Neb.**—Incorporated to build and operate an electric railway from Plattsmouth to Minley and Murdock. Capital stock, $100,000. Headquarters, Plattsmouth. Incorporators: Charles C. Parmalee, R. B. Windham, H. D. Travis, J. P. Falter and W. W. Coates, all of Plattsmouth.

Eastern Ontario County Electric Belt Line Company, Toronto, Ont.—The bill to incorporate this company, capitalized at $1,000,000, is now before the Provincial Government. The company proposes to build an electric railway from Lancaster township, running along the St. Lawrence to Cornwall, thence to Brockville, thence northwesterly through to Dundas and Lanark to Darling township, passing through Athens, Lanark, Perth, and connecting with the Lanark Counties Electric Railway, and from Morrisburg through Dundas, Russell and Carleton. C. S. Cossett, Brockville, president. [E. R. J., Dec. 26, '08.]

Mountain Railway, Chattanooga, Tenn.—This company has applied for a charter to build an incline from the property of M. H. Ward, at Mountain Junction, to a point near the Lookout Mountain House. The applicants for the charter are: Boyd Thompson, Charles M. Fox, S. B. Strang, J. S. Fletcher and E. S. Myers. J. V. Williams, Temple Court, Chattanooga, attorney. [E. R. J., Oct. 24, '08.]

FRANCHISES

Colorado Springs, Col.—The City Council has granted the Colorado Springs & Interurban Railway two 17-year franchises, one for the construction of an extension to the Printers' Home and the other for a line to the golf grounds. The company is to have the first line in operation within six months and the second within a year from the time construction is begun.

Elgin, Ill.—The City Council has granted the Elgin, Woodstock & Lake Geneva Railway a 20-year franchise to build its proposed electric railway into Elgin. This route into the city will have its terminus at the corner of Milwaukee Street and River Street, and will be used for freight traffic only. [E. R. J., Feb. 13, '09.]

***New Castle, Ind.**—Mark E. Forkner, a local attorney representing W. L. Davis and L. S. Nichols, Findlay, Ohio, has applied to the City Council for a 50-year franchise to operate a city and interurban electric railway in New Castle.

Vincennes, Ind.—The Vincennes, West Baden & Louisville Traction Company, which proposes to build an electric railway from Vincennes to Jasper via Petersburg, has been voted a subsidy of nearly $50,000 by Vincennes Township by a vote of 1452 to 799. A. M. Yelton, Vincennes, secretary. [E. R. J., Dec. 19, '08.]

New Orleans, La.—An ordinance has been introduced in the City Council directing the comptroller to advertise for sale at public auction a franchise right-of-way to operate for a period of 50 years a double-track street railway in Franklin Avenue between Prieur Street and Lake Pontchartrain. The franchise is to be advertised for 90 days and will be sold to the highest bidder.

***St. Joseph, Mo.**—I. A. Miller, C. A. Shoup and John E. Dolman have petitioned the County Court to grant them a franchise to construct and operate an electric railway on Ashland Avenue, from Frederick Avenue and Twenty-eighth Street, north and northwest to the Karnes Road, a distance of about 1 mile.

Camden, N. J.—The City Council, meeting as a committee of the whole for the purpose of considering the franchise of the Delaware Tunnel Railroad, on March 10 adopted several amendments which forbid the sale or lease of the franchise without the consent of the city and impose a tax of $1 per lin. ft. for tracks for 25 years. At the expiration of that time the sum is to be increased to the satisfaction of the City Council or other governing body. The members of the Council were taken over the proposed route on March 15 by Chief Engineer Ashbridge, of the company. The matter of granting the franchise will be taken up on April 8, when the City Council will again meet as a committee of the whole.

New York, N. Y.—A resolution has been adopted by the Board of Estimate granting franchises to the Union Railway to lay double-track extensions to its surface railway in the Bronx, one in Pelham Avenue and the second crossing the University Heights bridge.

***Oklahoma City, Okla.**—It is stated that A. N. Munden, of Munden & Staley, attorneys at law, will apply to the City Council for a franchise for the construction of an electric railway, connecting Oklahoma City and surrounding towns. The petitioners guarantee to build at least 25 miles of the proposed railway in six months following the granting of the franchise and agree to put up a forfeit fund of $25,000 with the Council in the event the enterprise fails, the money to be withdrawn if the franchise be not granted.

Philadelphia, Pa.—The City Council has repealed the ordinance giving a street railway franchise between the upper end of Frankford to Byberry and Bustleton, which was granted to the Bustleton & Byberry Rapid Transit Street Railway on March 13, 1906. The privilege was then given to the Bustleton & Byberry Street Railway, which was recently organized for the purpose of constructing the railway. It will be about 4½ miles in length. [E. R. J., March 13, '09.]

***Pittsburg, Pa.**—It is stated that within a few weeks the Pittsburg Subway Company will introduce a new ordinance in the City Council providing for the construction of an underground electric railway system. The subway ordinance provides a 50-year franchise, and that the company shall be exempt from taxation for the first 10 years of its operation, after which the city shall receive as compensation for the franchise 1 per cent of the gross receipts for the second 10 years, 2 per cent for the third, 3 per cent for the fourth and 4 per cent for the last 10 of the 50 years. The ordinance provides for a central loop beginning at Grant Street and Oliver Avenue, running underneath that thoroughfare to Liberty Avenue, to Ferry Street, to Third Avenue, to Grant Street, and thence to Oliver Avenue, the place of the beginning. The bill provides for a main branch, beginning at Grant Street and running eastwardly to Fifth Avenue. Another branch is specified to run from the first branch to a right angle to Forbes Street and Brady Street, and still another from the first branch at Bouquet Street and Bayard Street. A. O. Fording is attorney for the company.

Lewisburg, Pa.—The Town Council has granted a primary franchise to the Sunbury, Lewisburg & Milton Electric Railway to operate an electric railway in Lewisburg. The company has recently applied for a charter to build a railway between Shamokin Dam and Lewisburg. [E. R. J., March 20, '09.]

New Oxford, Pa.—An ordinance has been introduced in the Borough Council for the granting of a franchise to the Hanover & McSherrystown Street Railway to build its proposed railway over certain streets of the borough. W. H. Lanius, president.

Columbia, Tenn.—The Board of Aldermen has granted the Nashville Interurban Railway, which is building an electric railway from Nashville to Franklin, Spring Hill, Columbia, to Mount Pleasant, a month's extension of time in which to complete its railway to Mount Pleasant. H. H. Mayberry, Nashville, president.

Beaumont, Tex.—The Commissioners of Jefferson County have granted a franchise to H. J. Myers and S. A. Price, Dayton, Ohio, for building a street railway system in Port Arthur. The franchise, conferred by the county commissioners, gives the grantees a right of way along, across and upon a width of 22 ft. on either side which they shall select of the public roads of Jefferson county. [E. R. J., March 13, '09.]

Milwaukee, Wis.—The Milwaukee Western Electric Railway has applied to the City Council for a franchise for a street railway with terminals at the west end of the Union depot of the Chicago, Milwaukee & St. Paul Railroad at Fourth Street and Everett Street. The company agrees to have the railway ready for operation in two years and to furnish a $250,000 bond to perform its part of the contract with the city. The franchise sought from the Council would expire Dec. 31, 1934. A franchise from the Town Board of Wauwatosa has been asked by the same company which desires to enter the city on Lisbon Avenue near Washington park. [E. R. J., March 13, '09.]

TRACK AND ROADWAY

***Greenville-Fillmore Northern Transit Company, Greenville, Ill.**—It is announced that F. A. DeMoulin, E. M. Gullick, A. E. Dunn, Theodore Fisher and Ezra Wright, the directors chosen by those who subscribed toward the preliminary expense of an electric railway from Greenville to Fillmore, have organized the Greenville-Fillmore Northern Transit Company, and elected officers as follows: F. A. DeMoulin, president; Elmer Walcott, vice-president; A. E. Dunn, secretary, and E. M. Gullick, treasurer. About $2,800 of the desired $3,000 has been subscribed toward the expense of a survey of the proposed route.

Tri-City & Northeastern Interurban Railway, Moline, Ill.—The stockholders of this company, which has been organized for the purpose of constructing an electric railway line between Watertown and Albany, Ill., have elected the following officers: J. W. Simonson, Port Byron, president; Wm. Ashdown, Coe, vice-president; G. W. Turner, secretary; C. E. Peck, Albany, treasurer. Directors and officers: F. M. Mitchell, Rapids City; E. Cool, Cordova, and James Crowley and C. M. Hodges, Davenport. [E. R. J., Jan. 16, '09.]

Peoria (Ill.) Railway.—This company expects to begin work as soon as permission is obtained from the City Council for a loop to be about a mile in length. In order to handle the added traffic which this new loop will create, a double track will be built in Hurlburt Street for nearly half a mile.

Illinois Inland Electric Railway, Springfield, Ill.—A special meeting of the stockholders of this company, which proposes to build an electric railway to Springfield through Taylorville, Pana and Shelbyville, to Decatur, will be held May 15, in Springfield, the principal office of the company, for the purpose of voting on a proposition to increase the capital stock from $50,000 to $2,500,000. [E. R. J., March 6, '09.]

Fort Wayne & Springfield Railway, Decatur, Ind.—Work is said to have been begun by this company on the grade for the southern extension to its railway. A. W. Fishbaugh, chief engineer, is in charge of the work.

Evansville, Mt. Carmel & Olney Electric Railway, Evansville, Ind.—This company has completed the final surveys for its proposed electric railway, which is to extend from Olney to Mt. Carmel, Ill., and to Evansville. The new route, as it is surveyed, will be 64½ miles long, and will run through Highland, Darmstadt, Cynthiana, Owensville, Mt. Carmel, Friendsville, Lancaster, Berryville and Olney. [E. R. J., Dec. 19, '08.]

Fort Wayne & Toledo Electric Railway, Harlan, Ind.—R. T. Bastress, Harlan, general manager of this company, writes that this company has been formed for the purpose of building an electric railway, about 55 miles in length, to connect Fort Wayne, Maysville, Ind., Hicksville, Farmer,

Bryand and Montpelier, Ohio. A permanent organization will be formed within a few days. It is the intention of the company to start construction work about May 1. Headquarters, Harlan. Capital stock, $100,000. [E. R. J., March 13, '09.]

Columbus, Greensburg & Richmond Traction Company, Indianapolis, Ind.—At a meeting recently held in Indianapolis of the stockholders of this company, the following officers were elected: August M. Kuhn, president; R. E. Moore, Indianapolis, secretary; Walter J. Maconaha, Richmond, treasurer. The old board of directors was elected to serve another period. Plans were discussed for taking up the work of constructing the railway from Columbus to Richmond by way of Greensburg. Several committees were appointed with that view and another meeting will be held to receive their reports. The railway as projected would be about 89 miles in length.

***Burkittsville, Md.**—Local citizens are reported interested in a plan to build an electric railway from Brunswick via Horsey's Distillery and Burkittsville to Middletown, Md., about 15 miles, to connect with the Frederick & Middletown Railway. Thomas Hightman was chairman and Chas. T. Maught secretary of a meeting on the subject.

***Cambridge, Md.**—Clarence Morfit, representing the McCay Engineering Company, Baltimore, is said to have begun a preliminary survey for an electric railway which it proposes to build from Cambridge to the Delaware, near Seaford, and from Salisbury to Claiborne. It is said that the enterprise is being promoted by John H. Burgess, Jr., Cambridge, and will be backed by New York capital. The company will operate under a charter granted by the legislature. T. Hughlett Henry, Easton, is counsel for the company.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company has awarded to Scheidt & Turner, Elkhart, the contract for the grading of its property at Pine Lake and vicinity.

St. Louis, Creve Cœur & Western Railway, Clayton, Mo.—This company is reported to have placed the financing of its proposed railway in the hands of the Union Finance Company, New York. It is the intention of the company to experiment with both a storage-battery car and a gasoline-motor car. The railway will leave St. Louis on Etzel Avenue and follow the Olive Street road to the upper end of Creve Cœur Lake. It will be double-tracked, and will have about 14 miles of track. [E. R. J., Jan. 30, '09.]

***Macon, Mo.**—It is stated that Henry Funk is promoting a scheme to construct an electric railway from Hannibal to Kirksville. The railway will be midway between the Chicago, Milwaukee & Burlington Railroad and the Quincy, Omaha & Kansas City Railroad. The plan is to build a power plant on Salt River. Current will be furnished for light and power for small machinery. The main line of the road will be about 110 miles, with spurs branching off into the larger towns.

United Railways, St. Louis, Mo.—This company has applied to the Board of Public Improvements for permits to reconstruct a large portion of track on several of the lines.

***Lakewood, N. J.**—It is said that Charles R. Le Compte and James H. Butcher, of Lakewood; R. A. Clark, Joseph W. Johnson, A. C. S. Havens and William K. Blodgett, of Point Pleasant, are interested in a plan to construct an electric railway from Lakewood to Point Pleasant, a distance of 9 miles. It is planned to take over the right-of-way of the Trenton, Lakewood & Atlanta Railway, which is now in the hands of a receiver.

***Rolla, Mo.**—It is reported that E. E. Young, Spokane, Wash., is considering a proposition to build an electric railway from Rolla to Cabool, via Licking and Houston.

***Freehold, N. J.**—It is stated that R. C. Jones and J. Aspinwall Hodge have made a proposition to the Merchants' Association to construct an electric railway between Trenton and Asbury Park. The plan of the promoters is to build either directly to Trenton or connect at Princeton Junction with the Trenton & New Brunswick Railroad.

***Yadkin River Railway, Raleigh, N. C.**—This company has been organized to build and operate, by either steam or electricity, a railway from East Bend to Donnaha. W. A. Martin is one of the stockholders.

Valley Electric Railway, Hood River, Ore.—This company has been organized to build an electric railway out the West Side of the valley into the Mount Hood country. Directors: E. T. Folts, W. S. Gribble, G. W. Dimmick, O. H. Bailey, B. F. Gray, A. M. Kelly and H. B. Langille. Officers: E. T. Folts, president; A. M. Kelly, vice-president, and H. B. Langille, secretary. It is stated by the directors that they have already secured a large part of the right-of-way necessary for the completion of the railway, and that the rest has been promised as soon as the work of construction is commenced. A franchise to operate the proposed railway in Hood River is now pending before the City Council. [E. R. J., Nov. 21, '08.]

Portland Railway, Light & Power Company, Portland, Ore.—This company is considering the advisability of building a bridge across the Willamette River, estimated to cost about $300,000. No site has yet been selected for the proposed bridge, but it is likely that it will be built across the river either at Washington Street or Salmon Street.

Corry & Columbus Street Railway, Corry, Pa.—This company is said to be making preparations for the extension of its railway to Chautauqua and Union City. The work will be undertaken during the coming summer and the new extension will make a detour through Sugar Grove to Ashville, connecting with the Chautauqua Traction Company's line.

Pittsburg (Pa.) Railways.—It is stated that this company has a plan under consideration for the construction of an elevated spur along Liberty Avenue from Fourteenth Street to Thirty-sixth Street.

Pittsburgh & Suburban Company, Pittsburgh, Pa.—J. Toner Barr advises that this company is making surveys and securing the right-of-way for its proposed electric railway to be built from Pittsburgh to Steubenville via Carnegie, a distance of 40 miles. Capital has been partly secured, but contracts will not be ready for at least a year, as all the necessary franchises have not yet been obtained. F. W. Mueller, Pittsburgh, president; J. Toner Barr, 237 Fourth Avenue, Pittsburgh, chief engineer.

Inter-County Electric Company, Topton, Pa.—It is officially stated that this company will award contracts within a few weeks for the construction of its proposed broad-gage, high-speed electric railway between Lyons and Allentown, 21 miles. All franchises and rights-of-way have been secured, and it is the intention to begin work during April. A number of amusement parks will be reached by the railway. The power station and repair shops will be located at Alburtis. The company expects to furnish power both for lighting and manufacturing purposes. Headquarters, Topton. Capital stock, authorized and issued, $250,000. Officers: Maxwell H. Bochow, Topton, president and general manager; J. L. Hinterleiter, Topton, secretary; Bateman Saddington, Philadelphia, treasurer. [E. R. J., March 13, '09.]

Chambersburg, Greencastle & Waynesboro, Waynesboro, Pa.—It is announced that this company has decided to begin work on the extension of its railway from Chambersburg to the Red Bridge, several miles north, where a park will be established, and another extension to Pen-Mar. Work will also be started shortly on the extension to Shippensburg.

Waynesburg & Monongahela Electric Railway, Waynesburg, Pa.—Organization of this company, which proposes to build an electric railway from Waynesburg to Monongahela, has been effected as follows: Peter Langsdorf, McKeesport, president; Charles Koehler, McKeesport, treasurer; J. Carson Sheldon, Buffalo, N. Y., secretary; W. J. Sheldon, Waynesburg, vice-president and general manager. The board of directors will consist of these officers and James F. Woodward and David Hardy, both of McKeesport. W. I. Coursin, Pittsburgh, has been chosen chief engineer, and W. Edgar Reed, Pittsburgh, consulting electrical engineer. [E. R. J., March 6, '09.]

Tioga Traction Company, Wellsboro, Pa.—A meeting of the officers and board of directors of this company was held recently in Wellsboro for the purpose of perfecting the organization, the necessary amount of stock, $26,000, having already been subscribed. The company has already applied for a charter. It is stated that work will be commenced next month to secure the right-of-way for the proposed electric railway from Wellsboro through Whitneyville, Catlin Hollow and Covington to Mansfield. The company expects to purchase two 60-ft. interurban, semi-convertible cars. Seventy-pound steel rails will be used on the roadbed. W. A. Seltz, Jersey Shore, Pa., is promoting the railway. [E. R. J., Sept. 19, '08.]

***Cleveland, Tenn.**—J. W. Adams, Chattanooga, is said to have announced that the promoters of the proposed electric railway from Cleveland to Chattanooga, Tenn., have had engineers making a preliminary survey, but a company has not yet been formally organized.

***Amarillo Improvement Company, Amarillo, Tex.**—This company has placed an order with the Illinois Steel Company for 300 tons of steel rails to be used in the construction of the proposed street railway to San Jacinto Heights.

Twin City Light & Power Company, Chehalis, Wash.—This company has filed for record a mortgage for $400,000,

with the Merchants' Savings & Trust Company, Portland, Ore., trustee. The company proposes to build an electric railway between Chehalis and Centralia. It has already purchased the lighting plants in both cities. [E. R. J., March 6, '09.]

Columbia & Walla Walla Traction Company, Walla Walla, Wash.—It is reported that negotiations are under way between this company and W. S. Mathias, Spokane, representing a company composed of Eastern and local capitalists, for the purchase of the railway company's property. It is stated that the new company will take over the franchise and right of way of the original organization, and will begin active work on the road April 1. Bids are now open for grading work, and as soon as a contract for this has been completed, it is announced that a force of men numbering about 200 will be put in the field with Walla Walla as headquarters. [E. R. J., Jan. 16, '09.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—It is stated that this company has about 3 miles of roadbed graded and expects to begin laying track about April 1. This electric railway is proposed from Morgantown, W. Va., via Granville, Randall, Barker, Cassville, Core, Pentress, Blacksville and Wadestown, W. Va., which is 30 miles, with a branch of about 5 miles to Mt. Morris, Pa. The company has a franchise from the County Court for a right-of-way along the county road; also rights-of-way from most of the land owners along the proposed line. J. A. Martin is the engineer in charge. It is said that the company will not build by contract. [E. R. J., Nov. 28, '08.]

SHOPS AND BUILDINGS

Denver City Tramway, Denver, Col.—It is stated that this company is preparing plans for the erection of a new passenger station, connecting with the present loop, at the southeast corner of Fourteenth Street and Lawrence Street. The plan is also said to include a new union station, executive building, car house and depot for its interurban business, which will take in nearly the entire block from Lawrence Street to Arapahoe Street and from Fourteenth Street to Fifteenth Street.

Illinois Traction System, Champaign, Ill.—It is stated that this company is about to commence the construction of a 48-ft. x 300-ft. wood mill, brass foundry and some other additional buildings adjoining the company's shops at Decatur. Considerable new wood working machinery will be installed and improvements will be made in the main erecting and machine shop since the wood working shop will be removed from that building.

Winona Interurban Railway, Winona Lake, Ind.—Plans and estimates are being prepared by this company for the construction of a new passenger and freight depot at New Paris.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company has engaged Sheaff & Jaastad, Boston, to prepare plans and specifications for a car house and for a machine and repair shop to be used by the Auburn & Syracuse, the Rochester, Syracuse & Eastern, the Syracuse & South Bay and the Syracuse, Lake Shore & Northern Railroads. The building will have accommodations for 60 cars, and it is proposed to use it almost exclusively for the Syracuse, Lake Shore & Northern Railroad. The building will be of fireproof construction, steel and concrete being the principal structural materials.

Northern Ohio Traction & Light Company, Akron, Ohio.—The car house of this company at Cuyahoga Falls, together with two cars, one the private car Josephine, was destroyed by fire on March 9. The loss is estimated at over $20,000.

Lakeview Traction Company, Memphis, Tenn.—This company has purchased the Young Men's Christian Association Building, 80 ft. x 200 ft., and will make a number of improvements to it in order to use it for an interurban depot.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Victoria, B. C.—It is reported that this company is considering plans for the erection of a power plant on the Jordan River near Victoria. R. H. Sperling, Vancouver, general manager.

Augusta Railway & Electric Company, Augusta, Ga.—This company is said to be arranging for proposed improvements to its power plant on Augusta Canal, including the installation of an auxiliary steam plant and improvement of water power machinery. James R. League, general manager.

Charlottesville & Albemarle Railway, Charlottesville, Va.—This company has recently purchased one 150-kw General Electric generator and a 500-hp Corliss-Nagle engine. R. R. Case, general superintendent.

Manufactures & Supplies

ROLLING STOCK

Grand Rapids (Mich.) Railway has ordered 12 cars from the St. Louis Car Company.

Sioux City (Ia.) Traction Company is reported to be planning to purchase six cars.

Saginaw & Flint Railway, Saginaw, Mich., is reported to be in the market for two more cars.

Syracuse & Suburban Railroad, Syracuse, N. Y., is reported to be in the market for three interurban cars.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has ordered five cars from the American Car Company.

Vancouver (Wash.) Traction Company has ordered one 28-ft. semi-convertible car from the American Car Company.

Omaha & Council Bluffs Street Railway, Omaha, Neb., has placed an order with The J. G. Brill Company for 25 sets of trucks.

Springfield (Mo.) Traction Company has purchased two second-hand 27-F Brill trucks from the Dorner Railway Equipment Company, of Chicago.

Quincy Horse Railway & Carrying Company, Quincy, Ill., has placed an order with the American Car Company for eight Brill standard 10-bench cars.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., contemplates installing parlor cars on its lines, and is asking for bids on about 6 cars of this type.

Westchester Electric Railroad, Mount Vernon, N. Y., recently had 25 of its cars equipped with side doors for vestibules by J. P. Sjoberg & Company, of New York.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has just received from the Russell Car & Snow Plow Company, Ridgway, Pa., a size 1, single-truck snow plow, with flanger.

Mississippi Valley Interurban Railway, Springfield, Ill., noted in the Electric Railway Journal of Dec. 26, 1908, as contemplating the purchase of 10 or 12 interurban cars, advises that it is preparing to order at once.

Chicago & Milwaukee Electric Railway, Chicago, Ill., is in the market for 12 pay-as-you-enter cars to have 34-ft. bodies and an over all length of 49 ft. These cars are to be used on the company's lines for city service at Milwaukee.

Marquette County Gas & Electric Company, Ishpeming, Mich., has purchased through the Dorner Railway Equipment Company, Chicago, four second-hand, 21-ft. trailer cars. The cars were originally built by the Pullman Company for the Chicago Union Traction Company.

Municipal Tramways of Calgary, Alta., has made up practically the same specifications for the four cars ordered from the Preston Car & Coach Company, as for the 8 purchased from the Ottawa Car Company, mention of which was made in the Electric Railway Journal of March 13, 1909.

Northern Ohio Traction & Light Company, Akron, Ohio, has placed an order with the G. C. Kuhlman Car Company, of Cleveland, for a new private car for Henry A. Everett, which will be a reproduction of the old car Josephine (destroyed by fire recently), with a number of improvements. The car will be 52 ft. long, and will be fitted up with dining-room, kitchen, parlor and observation apartments, the same as the old one.

Indiana Union Traction Company, Anderson, Ind., has purchased five open and three closed second-hand trail cars from the Dorner Railway Equipment Company. These cars, which were formerly used on the lines of the Chicago Railways, will, it is said, be used on the city lines at Muncie and Anderson. The Indiana Union Traction Company also purchased from the Dorner Railway Equipment Company four Westinghouse No. 56 motors and three Peckham trucks.

Chicago & Southern Traction Company, Chicago, Ill., mentioned in the Electric Railway Journal of Jan. 2, 1909, as contemplating the purchase of six or seven trail cars for interurban service, has placed an order for four enclosed trailer cars with the Niles Car & Manufacturing Company. The cars are to be delivered on May 15, 1909. They are to have the following length: Over-end plate, 36 ft. 6 in.; over vestibule, 46 ft. 6 in.; overall, 47 ft. 10 in. Special equipment specified are Baldwin trucks and Hale & Kilbourn rattan seats.

Ogden (Utah) Rapid Transit Company, noted in the Electric Railway Journal of March 20, 1909, as having purchased four cars from the Cincinnati Car Company, ad-

vises that the cars will be of the semi-convertible type, with a seating capacity of 40, an overall length of 41 ft., a length over vestibules of 40 ft., and a body length of 28 ft. Other specifications follow:

Weight of car body..17,780 lb.	Headlights ..... Dayton
Width inside.....8 ft.	Motors, type and number, 4 GE-80
Over all.....8 ft. 5 in.	
Height inside.....8 ft. 2 in.	Registers ..... Ohmer
Sill to trolley base.....9 ft.	Roofs .....seven plank
Underframe ..... wood	Sanders .... Nichols-Lintern
Air brakes.....National "A"	Seats..Cincinnati Car Company
Brakes ..... Sterling	
Couplers...Van Dorn No. 5	Step treads ..... Stanwood
Destination signs....Hunter	Trolley poles and attachments .. General Electric
Fenders or wheelguards Berg sliding	Trucks, type and make Standard 0-60
Heating system.Consolidated	

TRADE NOTES

Allis-Chalmers Company, Milwaukee, Wis., advises that it has received the order for air brakes to be applied on the 18 cars for the Conestoga Traction Company of Lancaster, Pa., recently purchased from The J. G. Brill Company.

National Brake & Electric Company, Milwaukee, Wis., announces that A. C. Loose has been appointed purchasing agent. Mr. Loose will combine the duties of that office with those of his present work as advertising manager of the company.

United States Brake Shoe Company, New York, N. Y., has recently established a foundry at Pittsburg, Pa., from which it will be able to deliver brake shoes. The foundries of the company now are at Walton, N. Y.; Corry, Pa., and at Pittsburg, Pa.

W. N. Matthews & Bro., St. Louis, Mo., are perfecting a ratchet wrench to be used to facilitate installing the guy anchors which they manufacture. By the aid of this wrench the anchor can be set at angles and in places which were formerly impossible. The firm exhibited the wrench at the last annual convention of the American Railway Engineering & Maintenance of Way Association at Chicago.

Western Electric Company, New York, N. Y., reports that its February business was at the rate of about $45,000,000 a year, about 15 per cent ahead of the corresponding month a year ago and the first quarter of the company's fiscal year which ended Feb. 28, 1909, ran about 30 per cent ahead of the first quarter of 1908. The increase in the number of the customers on the books of the company was 40 per cent.

Root Spring Scraper Company, Kalamazoo, Mich., announces that it is now making the Root spring scraper for street and interurban railways, formerly manufactured by the Root Railway Supply Company. The Root Spring Scraper Company was organized recently to continue the manufacture of this scraper, and F. N. Root, its inventor, will have charge of the manufacture and sales. Mr. Root advises that he has made several improvements in the device.

Rabok Manufacturing Company, 104 South Commercial Street, St. Louis, Mo., has made very extensive tests of its "Liquid Carbon" paint and has secured some strong testimonials from managers of railroads, street car builders, steel constructors and metal workers as to the excellent properties of this product. "Liquid Carbon" is claimed by the manufacturers to be impervious to acid, climatic conditions, sulphuric fumes and gases. It is being especially recommended for use on railway bridges, steel smokestacks and roofings and steel cars and for all purposes where it is essential to preserve the metal.

McKeen Motor Car Company, Omaha, Neb., advises that two more of its standard 55-ft., 75-passenger, all-steel, 200-hp gasoline motor cars, coupled together and moving independently, left Omaha on March 19 en route to California, where 15 of this design car are in service on the branches of the Southern Pacific and private lines. This is the sixth shipment of McKeen cars to California in less than a year, and all made the trip on their own wheels and under their own power. Altogether, there are 40 of these cars in use in the United States, and 25 additional cars are under construction. Several of these cars have been adopted for interurban lines on account of the small initial investment and the cheapness of operation. Five of the new 70-ft. cars, which seat 105 passengers, are also on order. C. B. Smyth has resigned as assistant mechanical engineer of the Union Pacific Railroad to become superintendent of the McKeen Motor Car Company, Omaha, Neb. The Santa Fé Railroad has ordered two all-steel gasoline motor cars from the McKeen Motor Car Company.

Union Switch & Signal Company, Swissvale, Pa., has been awarded a contract for the installation of alternating current automatic block signals between the Raunt and Far Rockaway, on the Rockaway Beach Division of the Long Island Railroad. This is an extension of the system of automatic signals that is already in service in connection with the Atlantic Avenue improvement electrified zone of the Long Island Railroad, extending out on the Rockaway Beach division to the Raunt. This system will be different from the large contract executed by the Union Company in connection with the Atlantic Avenue improvement work from Flatbush east, put in service two years ago, inasmuch as the signals will be operated with alternating current motors and lighted by alternating current from the transformers, taking current from the 2200-volt alternating-current signal mains. This installation involves 29 two-arm home and distant style "B" electric motor signals and 16 electrically slotted mechanical home signals with special control at interlockings, including annunciators and indicators, etc.

ADVERTISING LITERATURE

D'Olier Engineering Company, New York, N. Y., announces Catalog "T" on horizontal centrifugal pumps.

Western Electric Company, New York, is distributing a booklet on its automatic intercommunicating telephone.

American Blower Company, Detroit, Mich., has printed a handbook on boilers and exhausters for forges and furnaces.

Keystone Lubricating Company, Philadelphia, Pa., has printed a pamphlet on high-grade petroleum grease lubrication.

Harry de Steese, New York, has issued a folder explaining his facilities for coil and commutator manufacture and repair.

Thomas Paulson & Son, Brooklyn, N. Y., are sending out a folder descriptive of the Hecla anti-friction bronze, brass and bronze castings and Babbitt metals.

W. S. Barstow & Company, Engineers, New York, N. Y., have published an attractive pamphlet descriptive of the Oregon Electric Railway system, constructed under their supervision as constructing engineers. The pamphlet is entitled "Bulletin No. 21."

Green Engineering Company, Chicago, Ill., is sending out catalog "G," describing the Green chain grate stokers. A valuable feature of the publication are the tables giving the properties of the bituminous coals of Ohio, Illinois, Pennsylvania, Indiana, Kentucky and other States.

Breinig Construction Company, Terre Haute, Ind., is distributing circulars describing the novel riding devices which it makes for park service. Among them are "The Jollier," a coaster having tub-shaped cars; the circle dip or scenic coaster, figure 8 coasters, scenic railways and dip the dips.

Keufel & Esser Company, New York, N. Y., has published a very extensive catalog showing the drafting instruments, drawing materials, surveying instruments, slide rules, precision instruments and other of their manufactures and importations. A special section is devoted to drafting office furniture.

American Ship Windlass Company, Providence, R. I., has published a comprehensive illustrated study of the principles and operation of the Taylor gravity underfeed stoker. The selling agent for this stoker in New York, New Jersey and Pennsylvania is the Lenher Engineering Company, New York.

George H. Gibson Company, New York, N. Y., has published a neat calendar and blotter entitled "Fear Not to Sow." This firm advises manufacturers of engineering supplies and equipment to prepare the way for large sales during the resumption of business by means of intelligently directed educational publicity.

The Nelson Valve Company, Philadelphia, Pa., has prepared an elaborate 220-page, cloth-bound catalog, showing its great variety of valves, including gate, globe, angle and check valves, in various metals. Among the new types shown are bronze swing check valves and hydraulically and electrically operated gate valves. Test and working pressures are given throughout to help the user in selecting the valves most suitable for his service.

Goldschmidt Thermit Company, New York, N. Y., has issued a revised edition of its pamphlet "Shop Instructions for the Use of Thermit in Repair Work," which was first issued in February, 1908. Important additions have been incorporated in the present pamphlet and considerable matter which appeared in the former edition has been omitted. All new matter has been printed in heavier type in this pamphlet, making it a simple matter to determine what changes have been made. Directions for welding motor cases and repairing flaws in castings are now printed separately.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, APRIL 3, 1909 No. 14

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL 11,250 *copies are printed.*

Brush-Holder Tension and Commutator Troubles

Failure to ascertain and keep up the correct brush-holder tension is one of the more insidious reasons for the difference in the stand and service trials of electric railway motors. When the machines are tested in the laboratory there is so little vibration that the commutators run sparklessly on full loads with only 2 lb. or 3 lb. tension on the brush-holder springs. Under a car in actual service the motors behave differently, however, because the unavoidable pounding over the roadbed causes the brushes, which are held against the commutators with only light spring pressure, to pull away and produce excessive sparking. In consequence, the commutators are roughened and find their way to the repair shop much too soon. If the track is unusually good, the brush arcing may not be severe enough to attract much notice. Loose brush-holders are also responsible for undue heating and losses in conductivity and copper. The necessity for raising the brush-holder tension 3 lb. to 4 lb. above that used in the manufacturer's shop tests is becoming better understood by electrical engineers. It has been found that 7 lb. to 8 lb. is sufficient to get good brush contact under ordinary city track conditions, but trouble cannot be completely avoided unless a uniform standard is maintained, depending upon the condition of the track. On the motors on one large railway system, variations in tension of from 1 lb. to 15 lb. were found. Such wide differences emphasize the necessity of a definite standard for each class of service. Not all will agree that the brush-holder tension should be as high as 7 lb., but it must be admitted that it is cheaper to shorten the life of the brushes somewhat than needlessly to damage the delicate and costly commutators.

Preventing Air-Brake Leakage

The prevention of leakage in the air-brake system is one of the most important details to be looked after in the routine maintenance of rolling stock equipped with power brakes. The necessity of avoiding any failure of the brakes through insufficient pressure and the expense of almost continuous operation of compressors are the chief reasons why it is so essential not to neglect this part of the auxiliary apparatus on cars. The trainmen may easily overlook serious leaks in the brake system while the car is running, as the compressor will operate perhaps 80 per cent of the time without attracting any special attention, and unless a time test is made of the drop in pressure after the reservoir is fully charged, faulty conditions may exist unnoticed for a long time. A standing car in good condition and fully charged should ordinarily remain without cutting in the compressor for at least 10 minutes. This would represent a drop in pressure due to leakage of a pound a minute, which amount ought not to be exceeded. If the frequency of a compressor operation can be reduced the tendency will be to increase the life of the armature and commutator of the compressor motor a proportionate time, and will be accompanied by a reduction in maintenance expenses as well as in power consumption. There are many places in an air-brake equipment where leaks can take place when the system is under pressure. There is no excuse for leaks which are bad enough to hiss audibly. After all the audible leaks are stopped, by moving the brake-valve handle to the lap position and noting the pressure conditions in the train line and main reservoir

gages, it is possible to determine approximately where the worst leaks are. Several small leaks may cause trouble through their cumulative effects. The use of soapsuds, applied with a brush around the joints, will show up small leaks by the resulting bubbling. When compressor valves leak, the trouble is frequently due either to carbonized oil on the valves and guides or to the failure of the valves to seat properly. In the latter event, a slight blowing will be caused at the suction strainer at each stroke of the compressor when operating. Cleaning the valves will remove the trouble caused by burned oil, and if the valves are reseated by grinding with pulverized quartz, good results may be secured when the fitting is imperfect.

Timber Handling and Preservation

Few years have passed since electric railways began to take a serious interest in the conservation of timber, so that it is not unusual to find that track engineers are not fully informed as to the most effective methods of installing ties or of preserving them in the best manner. Experience has shown moisture to be such a powerful help to decay that the use of a slow-drying ballast like sand will materially shorten the life of almost any kind of tie. Of course, rock ballast is often unavailable, but the factor of earlier tie replacement ought to be more seriously considered in the calculation of roadway cost. If it were generally understood that rotten wood disseminates the decay spores or fungi which can and do inoculate sound timber near by, the track engineer would insist on the burning of all replaced ties, instead of permitting them to be abandoned within a few feet of the ones just installed. Another cause of premature impairment arises from the injuries inflicted on the ties by installing them with pickaxes or sharp-edged shovels, instead of placing them with carrying hooks. To attain the maximum life of railroad timber, even under the most favorable roadway conditions, preservation is absolutely necessary. It should be pointed out, however, that some engineers who have experimented with preservatives have failed to attain the results anticipated, because they assumed that the chemical treatment was in itself a complete preventive of decay. This is erroneous. It is equally essential to use the best tie plates, spikes and other fastenings, coating them with a preservative to prevent both the rusting of the metal and the decay of the adjacent wood.

Pull-In Records

The pull-in record is the best gage that the general manager has to measure the efficiency of the car maintenance department. It follows, then, that such a chronicle should be absolutely correct. Unfortunately, this accuracy is not obtained in many cases because the pull-in record is made up by the transportation foremen from crew reports, and often is sent to headquarters without verification by the maintenance forces. Even soiled seats and broken windows have been responsible for the swelling of the pull-in record. Division superintendents are not ignorant of the fact that when two grades of equipment are on the line the motormen are liable to find a great deal of fault with the poorer kind if there is a chance of getting the better apparatus. It is so much easier to handle a car with air than without it that one can hardly blame the motorman for turning in a hand-brake car with the laconic "Brakes out of order." This may be easier for the motorman, but is apt to prove quite serious business for the shop foreman, who is wasting time and getting an undeserved black mark in the bargain.

A successful cure for this trouble is to have the pull-in record made up to show in parallel columns the cause assigned by the crew and that actually found by the shopman upon examination. The objection may be raised that this method would hold up the daily report to the general manager. However, there is nothing to prevent the number of pull-ins being transmitted in gross at the end of the day, leaving the detailed comparative statement to follow later.

When once the trainmen understand that their reports are being checked by the maintenance department for the scrutiny of the general manager, they will abstain from illegitimate causes for reporting their cars unfit for service. On the other hand, the shop foremen will breathe easier in the knowledge that they are being judged according to their merits.

Standardizing Overhead Material

In preparing the excellent specifications published elsewhere in this number, the Connecticut Company has made a most valuable contribution toward the attainment of standards in overhead material. Brake shoes, journal boxes, axles and other car parts have been brought into the fold by the American Street & Interurban Railway Association, but as yet no like official action has been taken to codify line material for d.c. railways. The work of the Connecticut Company would form a very suitable basis for such regulations, because its 600 miles of track embrace almost every variety of urban, suburban and interurban construction. Hence the standards chosen necessarily are elastic, and can be more readily followed by other railways than if they represented the practice for but one set of conditions. "Whoever brings much must bring something for everybody." The common sense which guided the engineers of this company is apparent from the fact that these specifications call for few items of unusual character. Too often the ambitious originator of a specification feels that his labors are incomplete without some radical departures from current practice. In this case it was realized that unique or uncommercial designs would prove equally embarrassing to maker and user. A careful study of the field showed that the ends of the railway company would be best served by a judicious selection from the offerings of all the manufacturers and then making the most liberal variations practicable to secure free competition and prompt deliveries. The efforts of the Connecticut Company were heartily encouraged by the manufacturers, who gave the company's engineers every opportunity to study the practical limitations affecting the production of line material. Thus the specifications eventually were drawn up with a full knowledge of what the factories could do to obey them. These overhead line standards also embrace a very extensive set of rules regarding the pole line, the transposition of high-tension wires, the setting of insulators, and many

other construction details. This code covers the same wide field as the line material standards, and so will be found equally serviceable to other railways. By thus adopting uniform materials and methods for the guidance of the overhead department, the Connecticut Company has given a powerful impetus toward the thorough overhauling of this branch of electric railway equipment.

The Size of Technical Papers

Many of the technical papers have now grown to be so large that the inquiry is occasionally heard: "Is it possible for the busy man to read and digest the 50 or 60, or more, pages a week published in the paper devoted to his industry, and if all be not read what rule can be followed in reading some and skipping others?" This is a very practical question, and one which calls for an answer. Is there a call for so much information as that contained in each issue of the average leading technical journal of the day? So far as the electric railway field is concerned, we answer, unhesitatingly, yes, and we believe the same conditions hold in any other field of endeavor and knowledge which is developing as rapidly as that of electric railway transportation. Confusion on this point disappears when the extent and number of the problems to be solved are considered. Progress is being made in electrical and mechanical engineering, in accounting, operation, legal and transportation, and the conclusions reached by one road in each of these lines are certain to be of great assistance to others engaged in the industry. Every article in every issue of a progressive technical paper may not be of interest to every reader, but it is safe to say that every number contains some articles which are of interest to every one, and the captions and sub-captions usually give the cue to what should be followed up. A very successful street railway operator said recently that his plan upon receiving his paper was to glance over it quickly to obtain a general idea of its contents, then to turn back and read those articles which appealed particularly to him. If the habit is acquired of reading the paper immediately on its arrival, or, at least, of going over it carefully to determine just what articles to read, and then of taking those up later in the day, but little actual time will be required, and one will be sure of not having missed anything of importance.

Generalized vs. Specialized Knowledge

The technical journal not only covers each field of the industry which it represents, but it covers, or should cover, all departments, and there is no easier and quicker way of keeping in touch with the developments in other branches besides one's own than through its pages. This is a point frequently overlooked in connection with the technical journal, that through it one can keep in touch with the entire field. The statement is often made that this is the age of specialization, and that success awaits those who can do a certain kind of work as well or better than any one else. This is to a certain extent true. But there is even a greater demand, in most industrial undertakings, for the man with capacity to direct specialists and co-ordinate their work so as to secure the most fruitful results. The shop foreman is not selected for his position because he has a better knowledge of any one kind of work than some of the other shop men. He probably would not be able to wind an armature better or turn a wheel more true than the men who are engaged upon this work continuously. His usefulness lies in the fact that he is able to do those things and the 20 other things required in the shop equally as well as any one, or else he knows how they should be done and sees that they are done properly. We can apply the same reasoning to the master mechanic, the accountant and the superintendent of transportation; in fact, to the head of each department of an electric railway company. As a rule, these officials are valuable to the company not because they are specialists in any one branch of their department, but because they have a broad knowledge of all of the work which has to be conducted under their direction; and also because they are sufficiently acquainted with the conditions in the other departments of the company so that they can work in harmony with them. Finally, the manager, from the nature of his duties, has to be conversant with the needs of all departments, and his success as a rule will depend very largely upon his ability to give to each its proper weight in the work of the entire organization. It is safe to say that the man who knows how to do only one thing and makes no effort to know about anything else, is inferior even in that kind of work to the man of broader attainments.

Verbal Transfers

The question "When is a transfer not a transfer?" was answered by the Michigan Supreme Court in a recent decision by saying, when it is a verbal one. The case came before the court as the result of a "car-ahead" ordinance passed by the Detroit City Council some time previously. No person but an unreasonable one should have any objection to transferring from one car to another when the needs of others require the car to be turned back before it has completed its run and another car is immediately at hand to take him to his destination. But many otherwise estimable persons seem to be unreasonable when public corporations are concerned and prefer to stay obstinately in a car which has been turned back and travel to the car house rather than suffer the slight inconvenience of stepping from one car to another.

In the case of People vs. Detroit United Railway (118 *Northwestern Reporter,* page 9) the complainant alleged that on a certain day the company violated the car-ahead ordinance which required the cars to be run through to the end of their route, except in cases of delay due to causes beyond control, when cars having passengers aboard may be turned to restore service in the opposite direction, provided there is a car following in the same block and going through to the end of the route and provided transfers shall be given to all passengers thereon entitling them to free transportation to their destination. The testimony showed that the car in question had been sent out to take the place of one which was crippled, and so was late; that when the car was ordered back by the inspector another car was immediately behind it, and that to save time the conductor of the first car told the conductor of the second car that all of the passengers to be transferred had paid their fares and that they should be allowed to continue their journey. Counsel for the com-

pany urged that this was in fact a transfer as called for by the ordinance, and that to have required the conductor to go through the car, punching and distributing transfers, would not only have accomplished no good purpose, but would have delayed the service as a whole and that of these passengers in particular. But the court said, in part:

It is evident that the company did not comply with the letter of the law as to transfers, compliance with which was also a condition precedent to the right to turn the car, and in our opinion it did not comply with the spirit of the law. It has been repeatedly held that it is the duty of passengers to secure evidence of payment of fares, and that a conductor is under no legal obligation to accept their statements that they have paid such fares [citing several cases]. The ordinance manifestly intended that the usual paper transfers should be delivered to the passengers, as conclusive evidence of their rights, before the company should have the right to turn the car. If the consent of the passengers that the company might violate the provisions of the ordinance would furnish a complete protection to it for such violation, certainly such consent must be shown or facts from which it would be necessarily implied. While the passengers did not demand transfers, and perhaps did not remain on the car for that reason, still they were entitled to them, and, before the conductor could legally insist upon their leaving the car and taking the following car, it was his duty to comply with the provision for transfers. The passengers were insisting upon their right to remain upon this car and go through to their destination, and they waived none of their rights. There is no evidence that they knew of the conversation between the two conductors as to transfers, or of the practice of the company to only give transfers when there was no car following. The company could not compel the passengers to accept its practice in place of the ordinance method. They were entitled to the printed evidence of their right which the ordinance required.

Similar ordinances, it might be said, prevail in most large cities, and the decision is along the lines of one in New York a decade or so ago, where a conductor, by mistake, had given a passenger a transfer which appeared on its face to have expired by limitation, and the conductor on the connecting line attempted to eject the passenger. In a civil suit the company was held liable. So, too, in New Jersey, where a street railway company had established, by practice, a right in its passengers to change from one car to another without a transfer ticket, it was held that the company could not change such practice without notice to the passengers.

The Michigan decision also recalls an action defended a few years ago by one of the surface railway companies in New York. The city sued under an ordinance for a money penalty on complaint of three passengers, who refused to leave a car which was run into the barn before reaching the destination marked on its sign. The counsel for the company believed he had a good defense because the car was reported disabled. The foreman produced his record book of necessary and immediate repairs to the brakes, but in rebuttal two of the complaining witnesses qualified as experts and testified that during the night, while remaining on the car in the barn, they had tested the brakes and found them in good condition! There was a ripple of surprise in court; cross-examination seemed useless, and the penalty was paid without appeal. The tendency of the courts to a strict construction of these ordinances is apparent, and the law seems well settled in this regard.

The Investigation in Detroit

The Committee of Fifty appointed by Mayor Breitmeyer, of Detroit, to investigate the street railway question, has made steady progress in the consideration of the large problem upon which it has entered. It appears from the outline of the organization of the committee, whose plans have been given full publicity, that its investigation will include an inquiry into the fundamental questions of the average cost of carrying a passenger and the tangible and intangible values of the properties of the Detroit United Railway located within the city of Detroit. That the committee has ignored no important subject, however, in preparing for its labors is indicated by the titles of the 11 sub-committees: Ways and means, statistics and regulation, appraisals, cost of service, legal, franchise, schedules, conference, extensions and rearrangement, municipal ownership, taxation and paving. The committee as a whole is composed of men who represent different walks of life, prominent business enterprises as well as the labor element, and its efforts are founded on a desire of the citizens to effect a real settlement of the street railway question. To assist in this end the company is offering the committee every facility within its power.

In any fair solution of this question full consideration should be given to all of the various and somewhat conflicting interests involved. From whatever just standpoint the subject is treated there can be no satisfactory settlement which does not comprehend a fair measure of equity for each interest. What is usually termed the public in a case of this character is, after all, but one element in the great body politic of the community. The passengers who ride on the cars are not more of an element of the public than the employees and officials of the corporation or the investors who buy the stocks and bonds of the property.

Accepting, however, the common designation of the public as the passengers on the cars, it requires no emphasis to show that its chief interest is in the quality of the service given. Irrespective of the rate of fare charged, the traveling public desires a service that is dependable, reasonably rapid and safe. This was shown clearly by the recent experience in Cleveland. If satisfactory service is rendered, the public of this country is willing to pay its cost, and it needs no special ability to understand that the same quality of service is not possible for a low fare as for one that permits the payment of all expenses and charges and a fair return on the investment.

The solution of the problem in Detroit is of no less importance to the traveling public than to the employees. The welfare of the employees is dependent upon the success which follows the operation of the property to a greater degree than many realize. A duty is owed by the working forces to the corporation which employs them and, because of the public service in which they engage, to the traveling public which makes use of the facilities provided by the corporation.

Separated in a measure from the classes of the public outlined, dependent upon the officials and employees of the corporation for the faithful discharge of obligations, and upon the revenue from passengers in order that a

fair return may be realized from the funds exchanged for stocks and bonds, are the investors. Public justice demands that the capital which they place in a public service corporation shall receive recognition, and if the service rendered by the corporation meets a need of the community there should be no question, with reasonably good management and proper accounting and financial methods, of the right of the capitalists concerned to a full protection of their principal and payment of regular interest thereon.

It is in the best interest of the whole public that the street railway problem in Detroit be settled promptly and equitably.

Electric Railway Maintenance

Following the plan adopted last year, this issue of the Electric Railway Journal for the first week in April is devoted largely to a presentation of the matters pertaining to the maintenance of the physical property of electric railway companies. The time is opportune, because at this season of the year active work is begun in all departments to put in order the track, overhead line, cars, power houses and other equipment after the long winter, and to prepare for heavy summer traffic. For the past 18 months maintenance expenditures on most roads have been kept down to the lowest point in an effort to reduce operating expenses proportionately to the general reduction in revenue. Expenditures for maintenance cannot be deferred too long, if the property is to be kept in operating condition. The deficiencies of last year must be made up sooner or later, and the improvement in business conditions, the prevailing low prices for material and labor, and the greater efficiency of labor, offer inducements for planning maintenance and improvement work for the coming summer on a large scale.

The special articles in this week's issue cover a wide range of subjects; each relates, however, to some phase of maintenance of electric railway equipment. A typical example of the development of an economical system without the expenditure of much money is found in the description of the car repair and inspection methods of the South Side Elevated Railroad, of Chicago. This company is operating many old cars, and its repair shops are inadequate. By careful and systematic inspection and the elimination of all unnecessary delays and expenditure of labor in the shops, largely through the adoption of specialized piece work, the facilities available have been made to serve efficiently.

The description of the remodeled shops and car house of the Third Avenue Railroad, of New York, presents the other side of the problem of economical maintenance. The physical rehabilitation of the street railways in New York has been taken up systematically by the receivers of both the Third Avenue and the Metropolitan systems. In each case the belief is evident that the preservation of the properties and the economical operation of the cars are impossible without proper maintenance, and that real economy lies in liberal appropriations to the repair account. We published a few weeks ago some curves on the cost of maintaining different parts of the equipment of the Third Avenue Railroad, illustrating some noteworthy reductions. A full understanding of the way in which these results have been secured is made possible by the account of the shop facilities of the company contained in the article published this week.

One of the most effective methods of reducing the average expense of maintenance is the adoption of standards of construction. The work of the standardization committee of the American Street & Interurban Railway Engineering Association has paved the way for the adoption by many companies of the fundamental details of cars, including wheels, axles, journal boxes, brake shoes and couplers. These standards are based largely on those adopted by the steam railways. Companies which have any intention, now or in the future, of interchanging equipment with steam roads must adopt these standards. The Illinois Traction System has begun a systematic overhauling of all of its cars with a view of equipping them throughout with standard steam railway parts, which will permit cars to be offered and accepted at interchange points. This and other interesting details of the Illinois Traction System's rolling stock maintenance work are described on another page.

A new and profitable field for standardization has been entered by the Connecticut Company, whose standard details of overhead line construction, adopted recently, are described in this issue. The preliminary steps in this elaborate work involved a selection of the best designs of various manufacturers and the submission of the draft of the proposed standards to these manufacturers for criticism and suggestions. As a result, all new work and renewals will be carried out with apparatus which costs no more than under the old plan of using many different patterns of the same parts. The saving in maintenance by reason of the elimination of weak and unsatisfactory designs and the very large reduction in the amount of stock required to be kept on hand for emergency repairs will amount, it is believed, to a considerable sum. These standards might well prove a basis for future profitable consideration by the standardization committee of the Engineering Association.

The largest element of cost in the current maintenance of overhead lines is the renewal of decayed or corroded poles. The paper of Mr. J. M. Nelson, read last week before the Central Electric Railway Association, is a clear exposition of the causes of decay in wooden poles and cross-ties, and describes an economical method of preservative treatment which will yield large returns on the small additional investment required. Timber preservation is not a philanthropy. Assistance in the conservation of the forest resources of the country is to-day a commercial necessity. Its importance will increase from year to year as the supply of poles and ties decreases. The statement that at least three times as many ties and poles are consumed as are produced annually by the forest growth is significant and sinister.

It is not possible here to comment on all of the other interesting articles in this week's issue. The two methods of reinforcing poles which are described, the painting practice of the Boston Elevated, the Harrisburg shops of the Central Pennsylvania Traction Company and the machine used in Philadelphia for grinding corrugated rails are particularly worthy of mention.

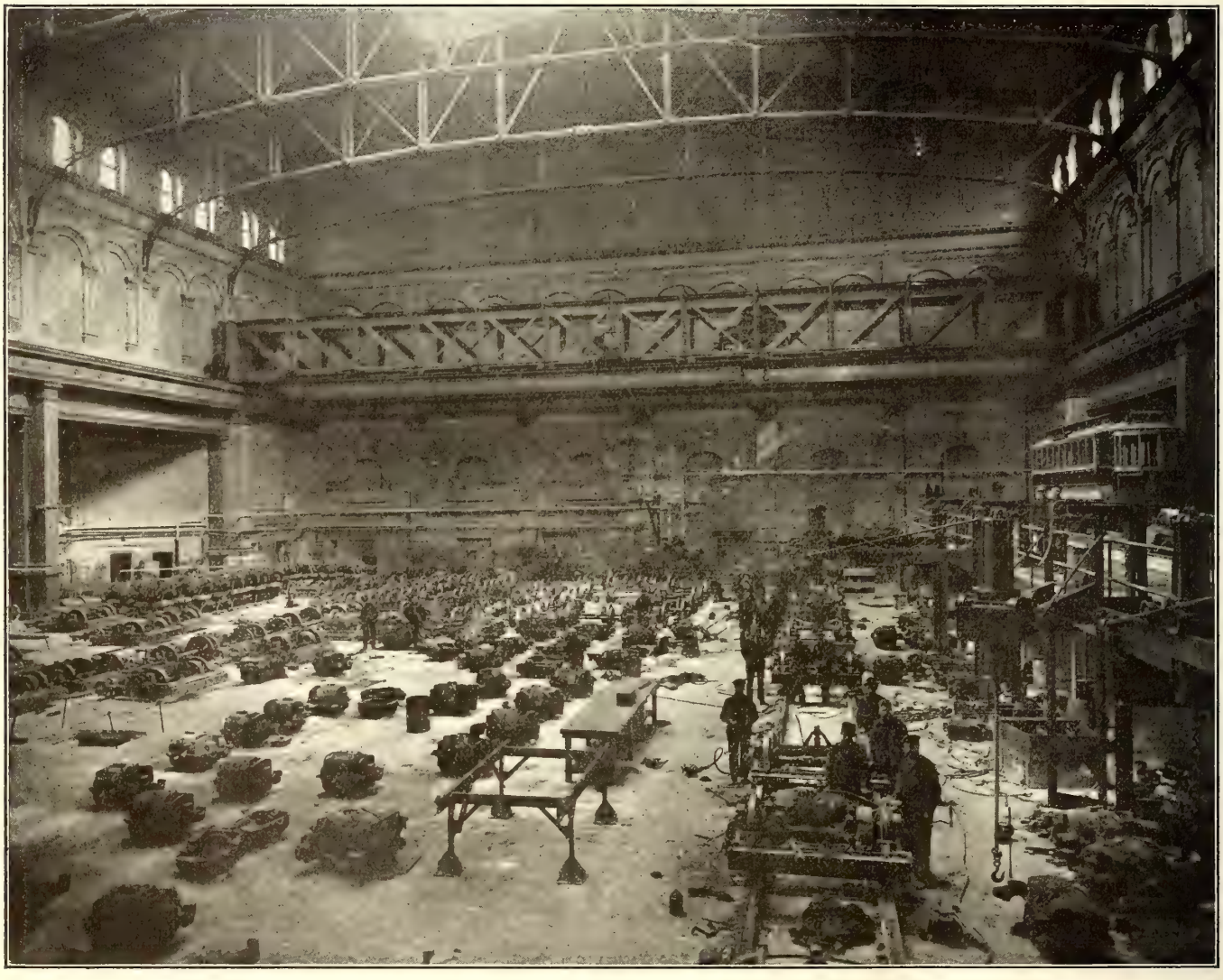
THE RECONSTRUCTED CAR HOUSE AND SHOPS OF THE THIRD AVENUE RAILROAD COMPANY

The Third Avenue Railroad Company is now completing the reconstruction and rearrangement of its main shop buildings which occupy the block bounded by Third Avenue, Second Avenue, Sixty-fifth and Sixty-sixth Streets, New York. These structures have passed through a great many changes, the car-house building having been erected in 1861 for the general offices of the Third Avenue Railroad Company. The original walls, which are still standing, are of brick; the roof framing and floor supports were made up of round cast-iron columns, wrought-iron I-beams and trusses, and the floors were of brick arches covered with wood. As cable and electric conduit systems successively followed the abandonment of animal traction, a cable power station and electric substation were added, and later were adapted for shop purposes without any radical building changes.

When the Third Avenue Railroad Company was placed in the hands of F. W. Whitridge, as receiver, it was determined to reconstruct the entire installation of 625 ft. x 200 ft. to convert it into a thoroughly equipped headquarters for the repair and maintenance of all rolling stock. The buildings are now used in their entirety for these purposes, the general offices having been removed to 129th Street and Third Avenue.

The changes made in the construction of the car house facing Third Avenue were of particular importance, first, because of the necessity of strengthening the floors to carry heavier cars, and the attention given to fireproof construction. It is very creditable to those who have carried out the work along these lines that the buildings in their present condition show very little signs of patchwork, and if they had been built anew they could not be more substantial or better arranged.

The building consists of three continuous structures with several different ground levels, because of the steep grade between Second and Third Avenue. The portion fronting on Third Avenue consists of a basement, street floor and second floor, extending as far as the new truck shop, which originally was an engine room for cable service. Excepting a gallery on the Sixty-fifth Street side, this truck shop has no intermediate floors from the floor to the roof, but it is bounded on three sides by several shop departments, flush with the second floor of the car house and in communication therewith. Beyond the truck shop is another building with several floors containing other shop departments. The following paragraphs describe the changes in detail:

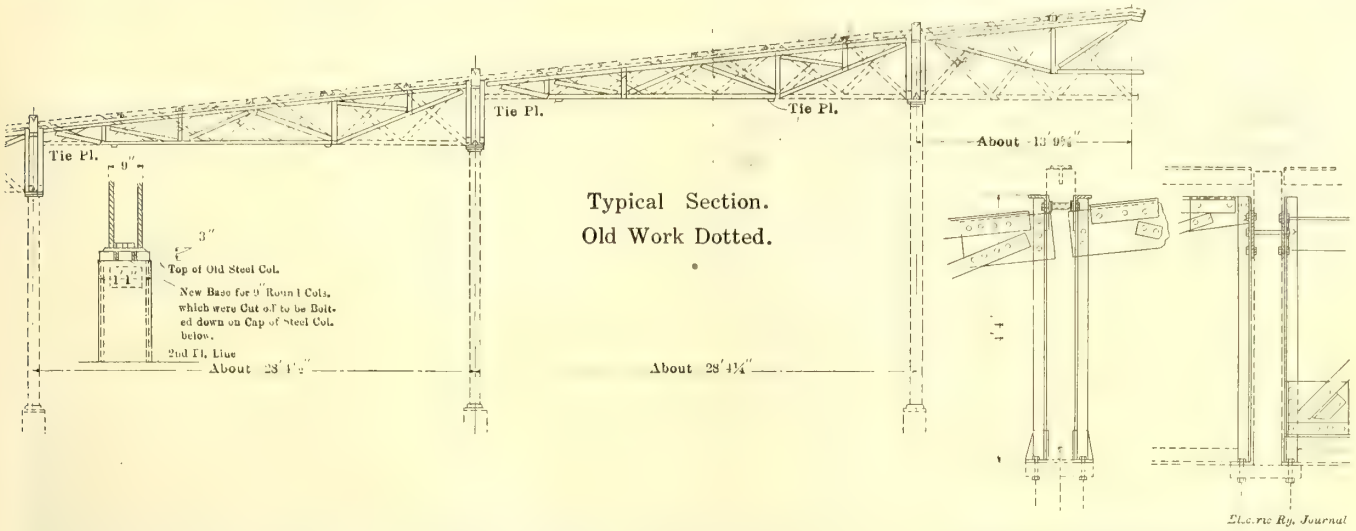


Third Avenue Shops and Car House—Truck Overhauling Shop, with New Gallery at the Right

CAR-HOUSE ROOF

The roof covering of the car house, which has not been altered, consists of 2-in. planking and slag, but it is intended to replace this eventually with a concrete or fire-

tile construction. The roof trusses, however, were found to be too light to carry the additional weight of the sprinkler piping and therefore were reinforced with new trusses. The reinforcement has been designed to take 50 lb. of the total live and deal load of 75 lb. per sq. ft. bolted to the new trusses on both sides of the old truss to make the latter absolutely rigid. In putting up the new trusses it was not deemed advisable to drill the old cast-iron pedestals which rested on cast-iron columns and carried the old trusses. This connection, therefore, was made



Third Avenue Shops and Car House—Typical Section Showing Old and New Roof Trusses; also the Connections of the Trusses to the Columns

Since the old trusses had tie members, it was found unnecessary to use such sections on the new lattice trusses. This difference in construction is illustrated herewith. The diagram shows how the new trusses were carried up at an angle at the ends to save unnecessary members.

To connect the old and new steel framing, cast-iron by means of a new steel strut consisting of four angles which rested on the bottom flange of the square pedestal. These angles are battened together top and bottom and bolted to the cast-iron base.

The longitudinal struts which run from column to column at right angles to the trusses are of the latticed type.



Third Avenue Shops and Car House—View in the New Truck Shop Looking Toward the Car House

shoes of the type shown on page 582 were installed at all junctions of the purlins and trusses. This cast-iron shoe was shimmed up with 1/16-in. or ⅛-in. steel plates inserted between the shoe and the new trusses until the new and old trusses together carried the load. The shoes were

They have been reinforced like the trusses and connected to the columns in the same way. The sprinkler storage tanks are independently supported by a steel tower construction resting on a special foundation.

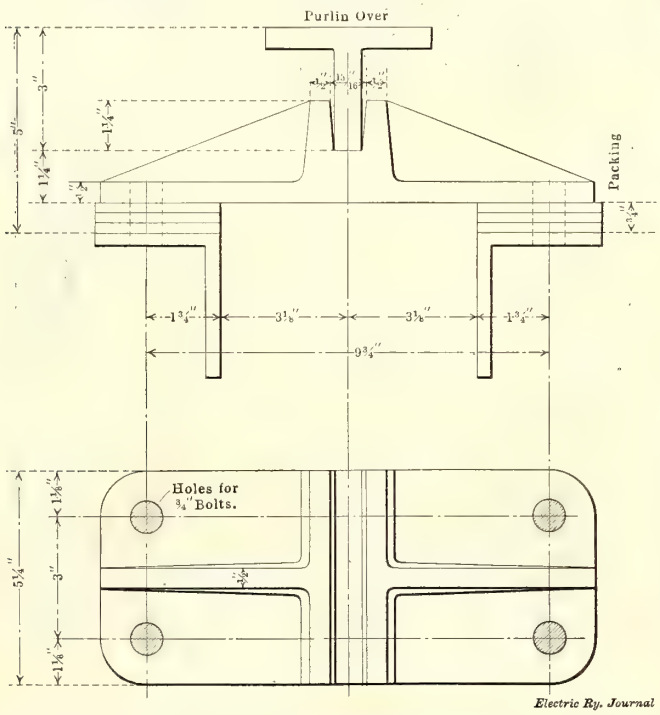
Another change in the roof framing was required by the

installation on the top floor of a north and south transfer table 30 ft. long. As the largest cars to be handled are 41 ft. in length and the longest bay was only 29 ft., it was necessary to change two bays into one. Consequently, one



Third Avenue Shops and Car House—Reinforced Ceiling, Concrete Floor and Pit in the Car Inspection Quarters

row of six columns was taken out and the load is now borne by 47-ft. 6-in. span trusses running east and west. Angles that would have been carried on the old columns



Third Avenue Shops and Car House—Chair and Shims Used to Connect the Old and the New Trusses in the Car House

are carried from the new trusses. The 7-in. columns at the western end of the new trusses were also replaced by 9-in. columns, but the eastern columns were originally 9-in. diameter and were strong enough to be kept in place without change.

CAR-HOUSE SECOND FLOOR

The second floor of the car house is composed of 15-in. I-beams arranged in 29-ft. spans with brick arches. The spacing of the I-beams is 7 ft. center to center, and the carrying capacity was figured at 110 lb. live and dead load per square foot. This floor originally was used for the storage and repairs of the old-time light cars, and it was necessary to make it strong enough to carry the new 18-ton cars. The old beams have been reinforced their full length by installing latticed girders 2 ft. 5 in. deep beneath them. The new trusses were designed to carry the wheel loads and the old trusses to carry the dead load and any additional live load. In order to make the trusses carry their portion of the load before the I-beams deflected, they were built so that the assembled truss would have a slight camber in the top chord. The top chord was erected alone while it was straight and then the lower part was con-



Third Avenue Shops and Car House—Pay-as-You-Enter Car over New Pit

nected up, which, of course, resulted in the return of the camber. The trusses are attached to the floor beams by ⅞-in. diameter turn bolts.

In order that the wheels of the transfer table might be carried directly on I-beams four of the original brick arches under the site of the transfer table were torn out for a length of over 200 ft. and four 18-in. 55-lb. I-beams were installed. The brick arches were then replaced with flat concrete arches 4½ in. thick. The longitudinal plate girders under the transfer tables on this floor were of comparatively recent construction and were found strong enough for the new conditions. The cast-iron columns used on this floor also were kept in place.

The middle bay of this floor, where sidewalk lights are installed, has been strengthened with channels placed at right angles to the I-beams, each channel going under the middle of one of the two tracks in this bay, so that the wheel load instead of being concentrated on one I-beam is divided among the adjoining ones. Cars are taken up to this floor for carpentry and painting on an elevator behind the transfer table near the Sixty-fifth Street side.

CAR-HOUSE FIRST FLOOR

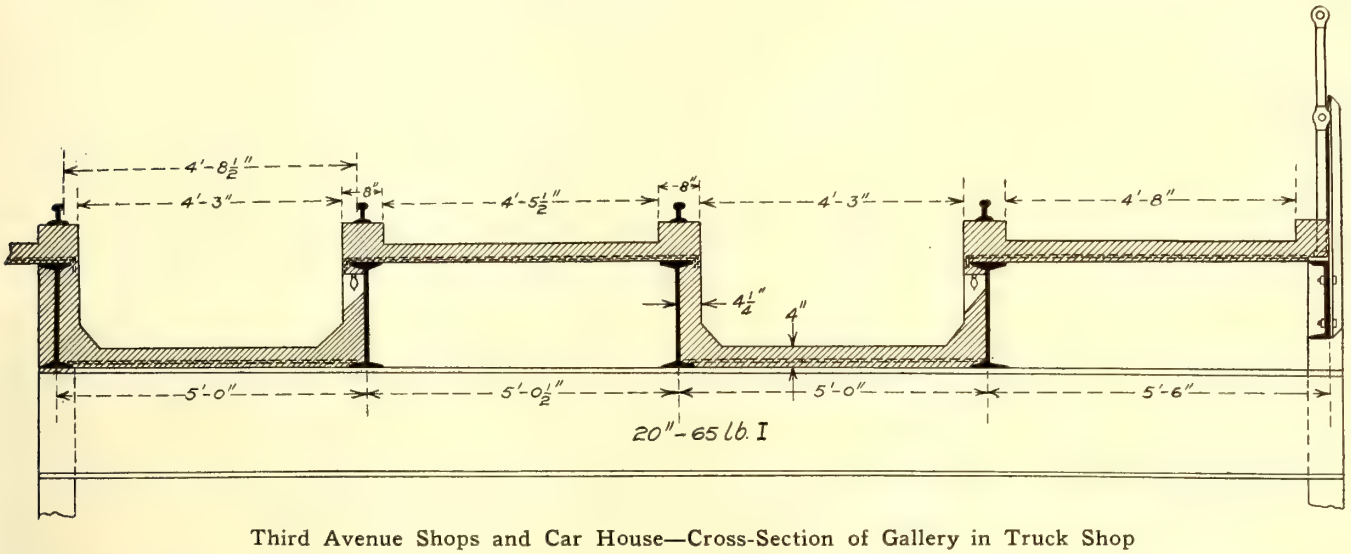
The first story was originally a horse-car barn and the animals were kept in the cellar. The floor was made up of 6-in. I-beams spaced 4 ft. on centers with brick arches. These I-beams were supported on 4-in. cast-iron columns every 4 ft., thus dividing the cellar into 4-ft. squares. Nine-inch columns were also installed in the cellar at intervals to form 26-ft. squares.

When cable operation began the cable conduit was formed by building a new wood floor 2 ft. above the brick arches, this floor being carried on wooden posts and stringers. Later on, when the lines were changed to electric conduit operation, the flooring in the front portion was left practically as before except that conductor rails were installed in place of the cables. Beyond the new transfer table inspection pits were made by tearing out the old 6-in. I-beams and brick arches and substituting for this a heavy floor built of 18-in. 55-lb. I-beams and brick arches. The level of this floor was 5 ft. below that of the rest of the car house. On top of the new floor and directly under each rail brick walls were built for the pit sides. The floor between the tracks rested on top of these walls and was of wood.

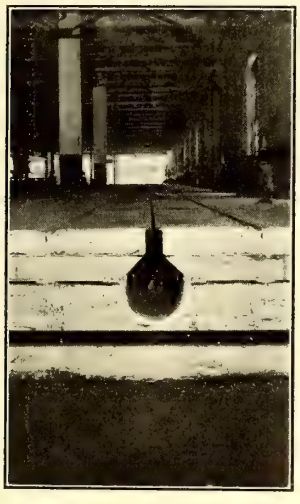
Later a center bay was torn out in the cellar for a storage room and a floor of heavy I-beams and brick arches installed with the same double floor as in the adjoining sections. The final result of these earlier changes was that an electric-car house was being operated with wooden construction covering an area of over 60,000 sq. ft. and that fires occurred with undesirable frequency.

It was determined, of course, to eliminate wood in all the overhauling. The small columns and I-beams were taken out and only the heavier members erected within the last 10 years were allowed to remain. The old iron posts were replaced by plate and angle columns which have reinforced concrete footings and are set under the center line of the tracks in such a way that two columns carry two tracks. The transverse girders resting on two of these columns are made of two 15-in. channels back to back so that the plate of the column runs up between them. These girders carry longitudinal I-beam stringers. On top of these stringers and at right angles to them are 7-in. I-beams spaced 4 ft. 6 in. centers and running from center to center of the tracks. The floor is made up of 4-in. slabs reinforced with twisted rods and is strong enough to carry 150 lb. live load and 50 lb. dead load per square foot. The 7-in. I-beams under the rails are cantilevered over the stringers to receive the conduit supports, which are formed of angles bent to the exact shape of the conduit and bolted to the bottom of the 7-in. I-beams.

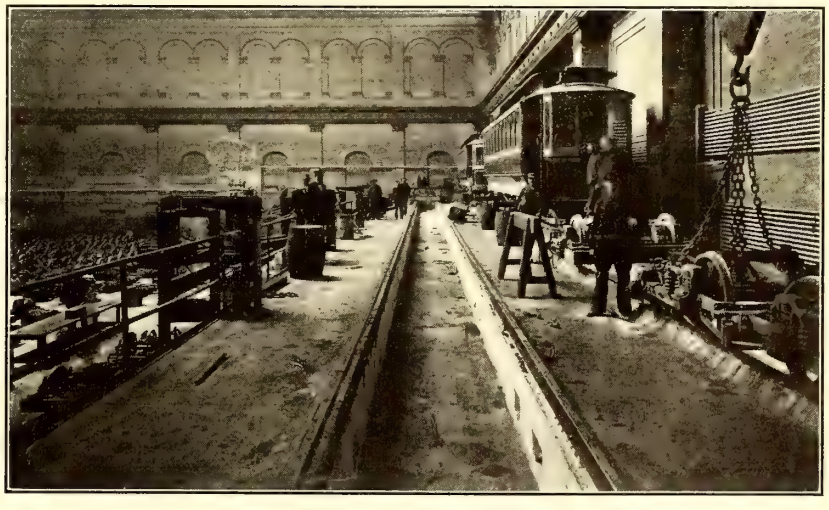
A distinctly novel feature of the conduit construction was the use of reinforced concrete instead of longitudinal steel members between the conduit angles. The concrete is reinforced by Kahn "Hi-Rib," which is a metal lath with



Third Avenue Shops and Car House—Cross-Section of Gallery in Truck Shop



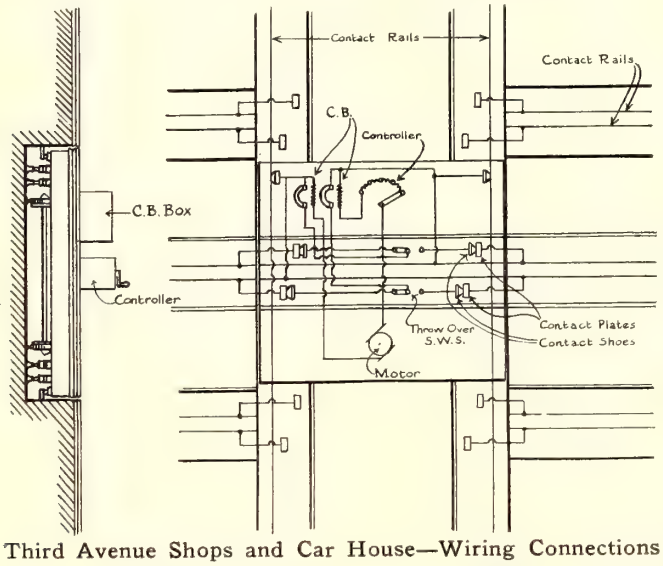
Section along Transfer Table in the Car House



Third Avenue Shops and Car House—Concrete Gallery for Cars Brought into the Truck Shop

ribs at intervals of about 6 in. It was found that this material lent itself very readily to building the odd shape required for a strong, fireproof and economical conduit.

Four inspection pits, each 200 ft. long, were added in the front part of the building, with side walls of latticed girders imbedded in concrete 12 in. thick. The new pits are 5 ft. deep and can take a 4-ton jack load at any point on



Third Avenue Shops and Car House—Wiring Connections between Transfer Table and Tracks

the floor. All of the woodwork between the old pits in the back of the car house has been replaced by reinforced concrete, but no change was needed in those built with recesses for wheel changing. Some of the old pits have check-plate-covered openings between them at intervals of about 18 ft. and others have such passageways bridged with reinforced concrete. Beveled recesses are installed in all pit walls for lamps and jumper plugs. It was not considered necessary to heat the pits directly, as the structure is steam heated.

GENERAL FEATURES OF THE CAR HOUSE

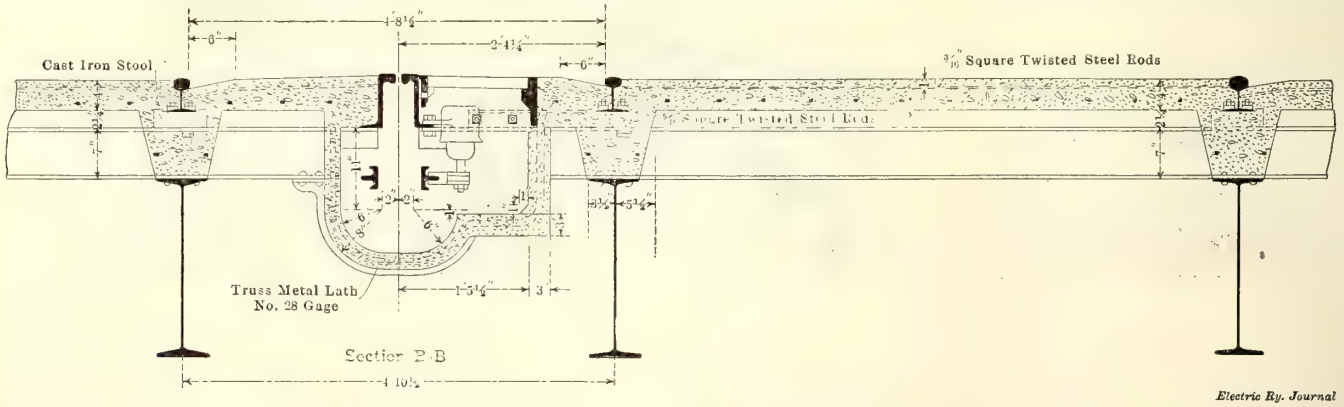
In setting up the new steel trusses in the car houses the precaution was taken to have the steel erectors provide holes for carrying hangers for sprinkler pipes, wiring conduits and other lines of piping which may be installed from time to time in the building. Ordinarily trusses are put up without regard to future pipe lines, and it is left to the shop personnel to drill holes through the trusses without regard to dangerous weakening of their strength. In this case not more than a single rivet hole has been left in any one section and there will be no excuse for tampering with the trusses.

It was decided to install doors so that in winter the car house would be kept warm. The arrangement of two of the four doors required is rather unusual as they have been placed inside a distance of 45 ft. from the front of the building. This was done to avoid having entering cars block the street while waiting for the car doors to be opened. Third Avenue is a busy thoroughfare and if this method were not used it would be necessary either to have the doors open all the time or cause annoyance to traffic. These doors are of the sliding type and are made of wood covered with crimped iron for fire protection. The swinging doors used where room is limited are of similar construction.

A very important feature of the electrical arrangement in this building is the system of having all the tracks dead except the one which happens to be directly in line with the transfer table. In the past considerable fire danger and appreciable waste of current resulted from the carelessness of motormen and conductors who left their cars with the lighting and heating switches in circuit. As shown in the accompanying wiring diagram, all tracks are dead until contact is made by closing by hand two circuit-breakers mounted on the transfer table. The tripping coils of these breakers are in circuit with the transfer table motor, so that as soon as current is supplied to that motor the tripping coils open the breakers on the first notch of the transfer table controller, leaving the track dead. Two circuit-breakers are required, because the circuit is not grounded. It will be understood that this method of keeping the tracks dead can be applied in any type of car house having a transfer table, whether the latter takes current from contact rails in the pit or from an overhead trolley.

THE TRUCK SHOP

The truck shop occupies an area of 170 ft. x 149 ft. with a free headroom of 80 ft. except for the new gallery on the Sixty-fifth Street side. This gallery carries two truck-overhauling tracks extended from the street floor of the car house. When this structure was erected the central portion was used for a cable station and the machinery was set on large brick piers. After the cable engines were removed the space between the piers was bridged over and the entire area covered with a wooden floor. This floor now has been removed completely and replaced by I-beams covered with 5-in. concrete slabs which are reinforced with



Third Avenue Shops and Car House—Cross-Section of First Floor, Showing Reinforced Concrete Floor and Conduit

Kahn rib metal to support a live load of 200 lb. per square foot. The floor was given a granolithic finish at the same time that the concrete was laid and a similar finish 1 in. thick was placed over the rough concrete laid on the brick piers.

The gallery is 10 ft. 4 in. above the main floor, extend-

ing the full length of the shop. It is 26 ft. 2½ in. wide and is carried from the wall on transverse box girders framed to plate and angle columns. The longitudinal I-beams above these girders which carry the rails and flooring were deep enough to permit the construction of 2-ft. 4-in. pits. The concrete stringers bring the head of the rail 7 in. above the devil-strips for greater convenience in working alongside the trucks. The pits and flooring are made of reinforced concrete slabs. An angle-iron guard along the outer edge of the gallery prevents tools or other objects from dropping into the truck shop.

Part of the truck-shop basement opening on Sixty-sixth Street has been made available for a new blacksmith shop by removing an interior brick wall 16 in. thick and carrying the floor beams on steel columns. The floor of the blacksmith shop and the basement of the car house have been brought to the same level by transferring soil from the latter to the former. The blacksmith shop has abundant light from large side windows. It has a paved runway to an adjacent iron storage chamber on the car-house end.

A driveway for supplies extends between Sixty-fifth and Sixty-sixth Streets about 10 ft. below the level of the truck-shop floor. Heavy materials unloaded in this passage are kept in a storeroom under the truck-shop floor and all other wood and metal stores are carried to other storerooms above. Paint and oil are kept in separate storerooms on the Sixty-fifth Street side.

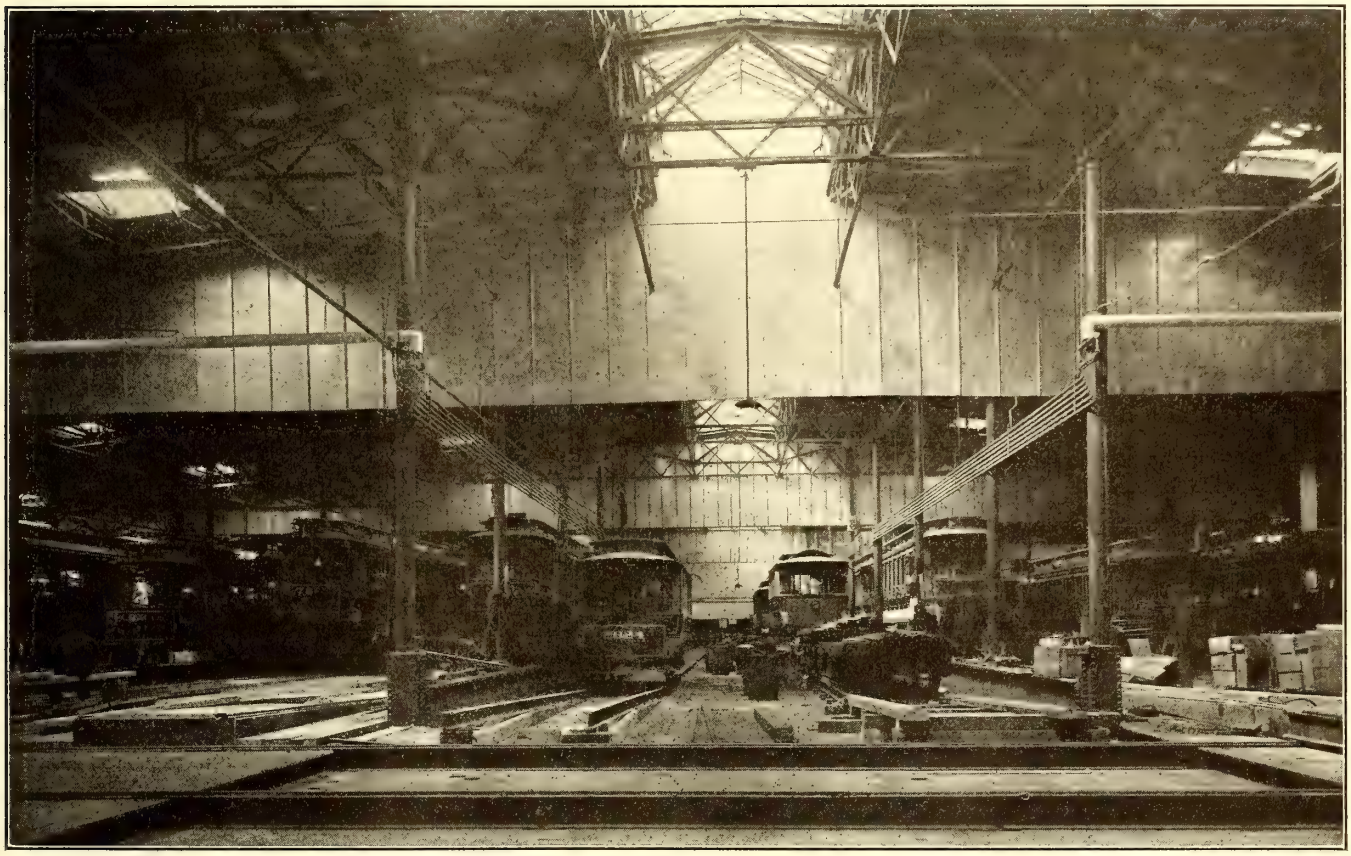
The section above the driveway level with the truck-shop gallery floor is used for general stores except an area of 78 ft. x 15 ft., where cars receive sand from chutes above. A 6-in. wall of terra-cotta separates these compartments except for the opening protected by a sliding fire-door. The other storeroom on this floor is on the Sixty-fifth Street side below and in back of the truck-shop gallery. The supply quarters are isolated by heavy-wire screens from the hallways.

All employees reporting for duty enter the building via the driveway at Sixty-fifth Street and proceed up the double school-type fireproof stairways with intervening barrier, which are carried from the cellar to the upper floors and communicate directly with nearly all the shops.

Several utility rooms are behind three sides of the solid walls of the truck shop on a level with the second floor of the car house. The space is now occupied in the following order: Pipe-bending and plow shop, on the Sixty-fifth Street side; blacksmith and machine shops at right angles thereto, and the carpenter shop and millroom, on the Sixty-sixth Street side. The machine tools are to be transferred to the truck shop, and as the blacksmith shop will also be in new quarters, the space thus made will be used for millroom storage.

SUBSTATION BUILDING

The last structure in the group is known as the substation building. It is three stories in height. The substation apparatus is on the first floor on the Sixty-sixth Street side, the balance of the floor serving for a boiler room and coal storage. The second floor is divided into an armature shop and a sand storage. The third floor is also used for sand storage.



Third Avenue Shops and Car House—Second Floor of Car House at Transfer Table, Showing Fire Curtains

FIRE-PROTECTION FEATURES

It will be apparent from the foregoing description that the changes in construction have all contributed to the decrease in the fire risk. In addition, all openings in the car house and between buildings are protected by approved automatic sliding fire doors, except that rolling steel doors close the entrance to the truck-repair shop. Galvanized sheet-iron fire curtains have been hung from the trusses over the second floor of the car house, as shown above.

The principal fire protection for all parts of the installa-

tion except the truck shop, substation, boiler, armature and battery rooms is afforded by sprinklers installed by the Worcester Fire Extinguisher Company. As the second floor of the car house is fully enclosed and heated in the winter, it was equipped with the wet system of sprinklers, whereas the dry system is installed on the ground floor. On both floors the sprinkler heads are of the ceiling type and are placed about 10 ft. apart, or about four per 100 sq. ft. The complete sprinkler installation consists of 2600 sprinkler heads, six dry and nine wet valves. In general the sprinkler heads are set to open at the standard temperature of 150 deg. Fahr., but those in the blacksmith shop are arranged for 160 deg. Fahr. The water for the

THIRD AVENUE RAILROAD COMPANY

42nd STREET, MANHATTANVILLE AND ST. NICHOLAS AVE. RAILROAD CO
DRY DOCK, EAST BROADWAY, AND BATTERY RAILROAD CO.

GENERAL FIRE RULES.

1. Men in charge of buildings, or sections thereof, will be held responsible for the proper condition of fire apparatus, which should be frequently tested, and for the clean and tidy condition of the premises of which they have charge. They must make daily surveys thereover, repair minor defects at once, and report serious ones to proper authorities.

2. Free access to fire pails, extinguishers, hose reels, standpipes, alarm boxes and all other fire equipment must be had at all times.

3. Fire pails and all other fire apparatus will be used only for fire purposes.

4. Electric circuits must not be changed nor tampered with, except by the electrician in charge. Under no circumstances is copper wire to be used to replace blown out fuses.

5. Rubbish and debris of every sort must not be littered around, but must be put in the proper receptacles. Dirt or rubbish must never be swept into the conduits or track pits. Stairways, hallways, closets, cupboards, etc., must not be blocked up by nor used for storage of rubbish of any kind. Rubbish boxes and waste cans must be emptied daily, or oftener, if necessary, and the accumulation therefrom disposed of.

6. Ashes must be placed in metal receptacles which must be emptied once a day. Ashes must not be allowed to accumulate under the grate bars of boilers or stoves.

7. Steam or other heated pipes must not be in contact with wood or other inflammable material. Special care must be used to see that dirt, paper or other rubbish does not accumulate around, under or near radiators, steam or other heated pipes, or stoves. Stoves must be set on stone, brick or metal, and all woodwork near stoves or pipes must be protected by metal. Flues and stove pipes must be examined regularly and be kept in good condition.

8. Pits should be kept clean, and trolley slots cleaned thoroughly once a week.

9. Oily or greasy waste, greasy rags and paper, or other inflammable material must be put in the covered metal cans supplied for the purpose. Such supplies must not be mixed with clean material of like character.

10. Oils, paints, surplus supplies of oily waste and similar material must be kept in fireproof rooms provided for this purpose, except when actually being used. Benzine, gasoline, naphtha, or other similar highly inflammable substances must not be allowed on the premises except where actually needed. At such places only the minimum quantities necessary will be kept on hand. These substances will be handled with the greatest care, being kept in fireproof rooms whenever possible.

11. Gas lights and brackets must be protected so that they cannot be swung against woodwork, papers, curtains or other inflammable substances. Lamps and lanterns must be kept well filled with wicks in good order, for when oil is low it generates gas, which is liable to explode. Lamps or lanterns must not be filled after dark, or near fire or flame.

12. If oil or like substances are on fire, use sand; never use water, for water spreads the burning material. Use sand when live wires, short circuits, or charged rails are involved.

13. Sand only must be used on floors, in spittoons, or for catching oil drippings.

14. Smoking is prohibited in this building.

15. All shutters and all fire doors must be kept closed at night.

16. All clothing must be kept in lockers provided for the purpose, and only clothes actually used and needed may be kept on the premises.

17. Remember that most fires are caused by neglect and carelessness. Familiarity with these rules is enjoined upon all employes.

EDWARD A. MAHER, General Manager.

April 10, 1908.

Third Avenue Shops and Car House—General Fire Rules

sprinkler supply consists of two gravity tanks, each having a capacity of 30,000 gal., and three pressure tanks of 7500 gal. capacity each. Through the medium of National air compressors, the latter tanks are kept at 91 lb. pressure. The tanks are always two-thirds full and are connected up to steam piping to prevent freezing. The pressure tanks are in a concrete structure on the car house and the gravity tanks are mounted on the steel framework above, as shown on this page. As previously noted, the weight of the storage tanks is supported independently of the car house.

Besides sprinklers, the car house is supplied with 39 2½-in. diameter standpipes with the usual water and sand pails, extinguishers, axes, etc. Similar protective apparatus is installed in the other buildings. The fire-alarm system comprises 82 Gamewell boxes of the combination type—that is, the same box can be used for both local and city fire-department alarms. About 29 fire-alarm gongs are distributed throughout the buildings.

The home fire-fighting force comprises several companies, each numbering 15 to 30 men, including a chief and

FIRE DRILL REPORT.

Third Avenue Railroad Company.

_____ Depot. _____ 190

Still Alarm Sounded at _____ A. M. _____ P. M.

Alarm Box Number _____ Located _____

Number of Men responded _____ Pails _____ Axes _____

Chemical Extinguishers _____ Hosemen _____ Transfer Table Men _____

Car Shifters _____ Elevator Men _____ Condition of Fire Apparatus _____

Total Number of Fire Extinguishers (Chemical) _____

Total Number of Sand Pails on premises _____

Total Number of Water Fire Pails on premises _____

Total Number of Rubbish Cans _____ Oily Waste Cans _____

REMARKS.

Barn Foreman.

After filling out please forward to Superintendent of Buildings.

Superintendent of Buildings.

Third Avenue Shops and Car House—Fire Drill Report

assistant chief. Every man is trained for a specific task, such as the shifting of cars, handling buckets, hose or axes, etc., and consequently knows just what to do in emergencies. Fire drills are held from two to five times a week, so that both old and new men will not lack experience in handling the available fire-fighting apparatus.



Third Avenue Shops and Car House—View Along Sixty-sixth Street, Showing the Gravity Sprinkler Cisterns Over Concrete House Containing the Pressure Tanks

Much attention is given toward keeping the structures clean, self-closing waste and rubbish cans being provided for the inevitable odds and ends of inflammable matter. The reinforced concrete conduit has minimized the danger from the conductor rails and elsewhere all wiring circuits are run in conduit.

One day and one night man besides the watchman are assigned to this installation to examine the fire-protection equipment every day and report its condition to the general manager. By placing this important department in the care of individuals who make it their specialty, the company has the assurance that the least impairment of the fire-protection apparatus will be discovered and corrected immediately.

The accompanying blanks are those used to record the surveillance and operation of the fire-protection equipment. One is a daily report on the automatic sprinkler system and covers the condition of the pressure tanks, gravity tanks, dry valves and main valve-controlling header system. The automatic sprinkler protection, maintenance and inspection report is made out at irregular intervals and goes into much more extended detail on the condition of the apparatus. Any fires which occur in the car house are reported on a form which must be signed by the car-house foreman and superintendent of equipment. Besides describing the cause and extent of the fire, this report shows how many employees responded to the alarm and when the city fire department was called. The fire-drill report, signed by the car-house foreman, goes to the superintendent of buildings with all necessary details as to the number of men and character of apparatus available to answer an alarm. The general fire rules posted throughout the buildings are reproduced in full to illustrate other practices which tend to diminish the fire risk. The superintendent of buildings gives particular attention to the absolute enforcement of these regulations, which are also prescribed for the other car houses of this company.

MR. EDWARD A. MAHER:—
General Manager.

Date . . . . . .

DEAR SIR:—

Beg to report that fire was discovered in Car Barn . . . . . at . . A. M. . . . P. M.
by . . . . . Car No. . . . . was on fire
on track No. . . . . Fire was extinguished by the use
of Chemical Extinguisher or . . . . . .
Local alarm was . . . . . sounded at . . A. M. . . P. M. No. Men responded . . . .
City Department was . . . . . called at . . . . . and
arrived at . . . . . Services . . . . . needed.
The damage consists of . . . . . .
. . . . . .
. . . . . .
. . . . . .
The cause of fire was . . . . . .
. . . . . .
. . . . . .

REMARKS.
(Make detailed report of facts.)

After filling out please
forward to Supt. of Buildings.

Barn Foreman.

Supt. Buildings.

Supt. Equipment.

This report to be made out for every fire and forwarded to Supt. of Buildings.

Third Avenue Shops and Car House—Report on Car House Fire

ENGINEERING AND CONSTRUCTION

The entire reconstruction of these buildings was carried out under the direction of E. A. Maher, general manager, and T. F. Mullaney, chief engineer to F. W. Whitridge, receiver. The architectural plans were prepared by Axel S. Hedman; the steelwork in the car house was fabricated and installed by Post & McCord and that in the truck-repair shop by Levering & Garrigues; the concrete work was done by the Turner Construction Company; the school stairways and part of the blacksmith shop by John H. Parker & Company, and the remodeling of the repair shop by John Weber & Son.

Automatic Sprinkler Protection, Maintenance and Inspection Report.

LOCATION . . . . . NAME OF INSPECTOR . . . . . .
DATE OF INSPECTION . . . . . .190 BY WHOM EMPLOYED . . . . . .
TIME MAKING INSPECTION . . m to . . m BUSINESS ADDRESS

Describe any changes to equipment since previous inspection . . . . . .
. . . . . .
. . . . . .
State of protection impaired since previous inspection What portions of supplied? Effect as to entire risk? . . . . . .
. . . . . .
. . . . . .
VALVES CONTROLLING SUPPLIES
Gravity Tanks No . . . . . Pressure Tanks No . . . . . .
Wide Open? . . . . . .
Strapped? . . . . . .
Sealed? . . . . . .
VALVES CONTROLLING SYSTEMS
Total number . . . . . Wide open . . . . Strapped . . Sealed . . . .
VALVES CONTROLLING HEADERS.
Total number . . . . . Wide open . . . . Strapped . . Sealed . . . .
If any valve found other than wide open and sealed or strapped give reason and state how left by inspector . . . . . .
. . . . . .
. . . . . .
DRY VALVES.
Number . . . . Dry . . . . Wet . . . . Fittings in place . . Flange dummy in each house . . . .
Lbs. air pressure . . . . . Lbs. water pressure . . . . . Gauges in order . . . . . Was test pipe valve at supply side opened wide? . . . . . .
State number of drum off valves . . . . . for cooling equipments . . . . . .
for aisle equipments . . . . . Was each found tightly closed and secured? . . . . . .
If not, state reason . . . . . .
VALVE HOUSES
Number . . . . . Doors locked . . . . . Temperature in each . . . . .
Clean . . . . . Lights in order . . . . . Drains free . . . . . .
Describe any additions to buildings, any rooms, closets or enclosures not equipped with sprinklers and construction since previous inspection . . . . . .
. . . . . .
. . . . . .
Describe any communication with other property made since previous inspection . . . . . .
. . . . . .
Describe any obstruction of water from sprinklers by machinery, partitions, shelves, benches, etc, ...
. . . . . .
Indicate any sprinklers corroded, painted, whitewashed, loaded with dirt, or damaged . . . . . .
. . . . . .
(over)

GRAVITY TANKS.
Number . . . . . Level of water below overflow pipe . . . . . Telltale in order . . . . . .
Ice in tank . . . . . Steam heating operative . . . . . Covers and trap door in order . . . . . .
Ladders in order . . . . . Condition of hoops . . . . . .
PRESSURE TANKS
Number . . . . . Level of water above or below two-thirds full mark . . . . . .
Lbs. air pressure . . . . . Glass gauge in order and with valves shut . . . . . .
Tank house properly heated . . . . . .
STEAMER CONNECTIONS.
Number . . . . . Free from obstructions external and internal . . . . . Drained . . . . . .
Caps in place, started with wrench or spanner and secured by chain . . . . . .
FILLING PUMP
In order . . . . Tested . . . . . Electrical connections in need of repairs . . . . . .
Filling pipes drained . . . . . .
AIR COMPRESSORS
In order . . . . Tested . . . . . Electrical connections in need of repairs . . . . . .
Automatic from . . . . lbs. to . . . . lbs.
ALARMS
Tested Did each drop of annunciator operate properly? . . . . . .
Did all bells ring properly? . . . . . .
Condition of Curtain Boards . . . . . .
Any new departments or changes of departments? . . . . . .
. . . . . .
. . . . . .
Watchman's records good Rounds hourly . . . . Sundays and holidays . . . . hourly . . . . Stations . . . . . .
Car pits and transfer pits clean . . . . . .
Any broken wood flooring about premises? . . . . . .
. . . . . .
What disposition or receptacles for oily waste? . . . . . .
Any paints, oils and varnishes? . . . . Where and how kept? . . . . . .
Benzine or Gasolene . . . . . .
General condition of premises . . . . . .
Wired glass windows . . . . . Location . . . . . .
Condition . . . . . .
Shutters . . . . Location . . . . . Condition . . . . . .
Standpipe and hose . . . . . Number of hose lines each floor . . . . . .
Condition . . . . . .
Fire Pails . . . . . Number on each floor . . . . . Condition . . . . . .
Chemical Extinguishers . . . . Number . . . . When charged . . . . . .
Condition . . . . . .

Third Avenue Shops and Car House—Detailed Report on All Fire Protection Apparatus

DAILY REPORT.
AUTOMATIC SPRINKLER SYSTEM.
LOCATION:—129th-130th Streets and 3rd-Lexington Avenues, N. Y. C.

Name of Inspector . . . . . .
Date of Inspection . . . . . .
Time of Inspection . . . . . .
Temperature . . . . . .

PRESSURE TANKS.

	Lbs. Air Pressure	Water Level	Controlling Valve Open	Secured
No 1				
No 2				
No 3				
No 4				
No 5				

GRAVITY TANKS

	Water Level	Controlling Valve Open	Secured	Ice in Tank
No 1				
No 2				

DRY VALVES (129th Street Header) 128th Street

	Lbs Air Pressure	Controlling Valve Open	Secured
No 1			
No 2			
No 3			
No 4			
No 5			
No 6			

(130th Street Header)

No 1			
No 2			
No 3			
No 4			
No 5			
No. 6			

129th Street (Lexington Avenue Header)

No 1			
No 2			
No 3			
No 4			
No 5			
No 6			
No 7			
No 8			
No 9			

Main Valve Controlling Header System.

	Open	Secured
128 128th Street		
129 130th Street		
Lexington Avenue		

Alarm connections in order . . . . . Tested . . . . . .
If any controlling valve found other than wide open, give reason, and state how left by inspector . . . . . .
Note any portion of sprinkler system in need of repairs, ...
Examined by . . . . . .

Third Avenue Shops and Car House—Daily Report on Automatic Sprinkler System

ADVANTAGES AND COSTS OF OPERATING LIGHT CARS IN DENVER

BY JOHN A. BEELER, VICE-PRESIDENT AND GENERAL MANAGER, DENVER CITY TRAMWAY COMPANY

The ordinary surface car should be light, strong and durable. All unnecessary weight should be eliminated. The cost of moving a passenger car on the tracks for one year has been variously estimated at from 5 to 10 cents per pound. These figures include fixed charges, cost of distribution, etc., but it readily will be seen at a glance that it is of the utmost importance that all unnecessary dead weight be eliminated.

The heaviest car we use in Denver is a four-motor car 43 ft. long over all, which weighs 43,400 lb. and seats 52 passengers. This represents a dead load per seated passenger of 834 lb. During the rush hours we attach to these cars a 38-ft. enclosed trailer with a seating capacity of 46 and a total weight of 13,000 lb., which represents a dead weight per passenger of 282 lb. This brings the average dead weight per seated passenger for the two-car train down to 575 lb. On our standard combination 39-ft. and 40-ft. cars, which are used without trailers, the dead weight per seated passenger varies from 575 to 623 lb.

The cars of this company are built with a combination steel and wooden frame floor, the I-beams extending from the extreme front to the rear of the vestibule. There are no drop platforms to telescope or collapse in case of collisions. Entrances are made near the center of the right-hand side of the car. This form permits of light but very durable construction.

As Denver is a comparatively level city, it is particularly adapted to the use of trailers. The trailers used are enclosed, 38 ft. long, with side entrances. Passengers and employees neither can step from one car to another nor are they allowed to transfer from one car to the other.

The advantages of these light trailers during rush hours are very marked. The regular carrying capacity can be doubled by the addition of a single trailer in charge of one conductor; and, although doubling the car capacity, the increase in the platform expense is but 50 per cent, the power consumption increase about 40 per cent, and car repairs and maintenance about 33 per cent, instead of an increase in these items of 100 per cent in case extra motor cars were employed. Accidents also are reduced, for the reason that the regular experienced motormen handle these units, doing away with the less efficient and less experienced motormen handling the extras.

During the year just passed for one of our principal lines operated by single units, it required approximately 22 per cent of the passenger receipts to pay the trainmen. On a similar line, operated with trailers during the rush hours, it required only 16 per cent of the passenger receipts to pay the trainmen, which alone meant a saving of 6 per cent in operating expenses. Nearly all other expenses in connection with the trailer operation were reduced in this or greater proportion. The importance of using trailers under proper conditions can be seen readily.

The following discussion of this subject by W. H. McAloney, superintendent of rolling stock, Denver City Tramway Company, introduces some figures to amplify my remarks:

TRAILER OPERATION

BY W. H. M'ALONEY

A recent editorial in the Electric Railway Journal stated that the cost for power was one of the largest factors in operating expense. Surely the high proportionate cost for power with some roads is brought about from either or both of the following reasons: (1) Excessive weight of cars; (2) poor controller handling by motormen. Both of these power-consuming factors may be made less. The experience of the Denver City Tramway Company with light cars may be of interest in illustrating the value of light-weight cars. The problem of controller feeding will always be vexatious to handle until automatic acceleration apparatus for all classes of cars is fully developed.

One of the first questions confronting the designer of rolling-stock equipment is to determine whether two-motor cars or four-motor cars and trailers shall be used. We have seen records of various tests which showed that the two-motor equipments were the most efficient; this result, of course, being dependent on grades, climate and general track and operating conditions. In a Western city where the soil is sandy, traction is good 95 per cent of the time and two-motor equipments with the consequent reduction of care and attention are no doubt economical. In 1905 our company considered the number of motors to be used per car and found that the "electrical equipment" (standard expense account No. 7) on our two-motor cars for the year cost 0.63 cent per car-mile, whereas the four-motor cars cost 0.88 cent per car-mile, the seating capacity and earning power of the rolling stock being practically the same. As a result of these comparisons it was determined that the four-motor cars should increase their earning capacity by hauling trailers for the rush-hour work, these trailers to be about equal in seating capacity to the motor cars (see accompanying table). This table shows that the dead weight per passenger on the basis of seating capacity on our heaviest four-motor cars is 834 lb. and that when hauling a trailer the dead weight is cut down to 575 lb. per passenger seating capacity.

The average current consumption at the motor on four-motor cars is 2.5 kw-hours per car-mile and with the standard trailer added this increases to 3.5 kw-hours, an increase of power of only 40 per cent with no appreciable lessening of the schedule time. We have a recent record of a 40-ft. two-motor car seating 48 passengers, requiring 2.42 kw-hours per car-mile, while on the same day and line a 41-ft. four-motor car with the same seating capacity used 3.78 kw-hours per car-mile, showing an excess cur-

Car Weights and Seating Capacity.

Type.	Length over all.	Motors. No.	Motors. Total H.P.	Weights. Body complete.	Weights. Trucks.	Weights. Motors.	Weights. Total.	Gear ratio.	Speed cap. level track.	Seating capacity.	Dead wgt. per pass. seat. cap.
39-ft. combination	39 ft. 6 in.	2	75	12,000	9,000	4,300	25,300	17—67 / 3.9 to 1	20	44	575
40-ft. closed	40 ft. 3½ in.	2	100	13,794	10,600	5,506	29,900	15—69 / 4.6 to 1	22½	48	623
41-ft. closed	41 ft. 6 in.	4	150	17,800	10,600	8,600	37,000	17—67 / 3.9 to 1	21	48	771
43-ft. closed	43 ft. 3½ in.	4	172	18,760	13,500	11,140	43,400	17—67 / 3.9 to 1	22½	52	834
38-ft. closed trailer	38 ft. 1 in.			8,000	5,000		13,000			46	282
41-ft. 4-motor car and trailer										94	532
43-ft. 4-motor car and trailer										98	575

rent consumption over the two-motor car of 56 per cent.

Denver's heaviest car (43 ft., see table) was designed for city and short interurban work. It has four 43-hp motors and weighs 43,400 lb. empty. On the basis of 10 cents per pound per year for operation the cost for service with this car is $4,340. The combined weight of the same car with a 13,000-lb. trailer is 56,400 lb., which, on the basis of 10 cents per pound, costs $5,640 per year. This shows an increase in cost of only 31 per cent, yet the carrying capacity is increased practically 100 per cent. On this basis of calculation, referring to the above-mentioned weights of the two-motor 40-ft. car and the 41-ft. car, it will cost $2,990 per year to operate the two-motor car weighing 29,900 lb., whereas it will cost $3,700 to operate the four-motor car weighing 37,000 lb. The two cars have practically the same earning power as single units, but on the power basis the four-motor car costs 24 per cent more to operate.

It has been shown that with the conditions in Denver the use of trailers is the cheapest solution of the rush-hour problem and by their use the company is fully prepared to meet fluctuating conditions in travel. The headway easily may be kept uniform, accidents have been reduced and, as the city grows and traffic congestion becomes more troublesome for the operation of street cars, the two-car units become more valuable.

The original first cost of a trailer is one-third and the upkeep is about one-third of that of a motor car. Also, the increase in power required is only 40 per cent and

Car.			Weights.			
Type.	No. Trucks.		Motors.	Body.	Air brake.	Totals.
34-ft. comb.		2	5,000 lb.			23,000 lb.
39-ft. comb.	9,700 lb.	2	5,125 "	10,475 lb.	None	25,300 "
41-ft. comb.	9,700 "	2	5,125 "	13,475 "	None	28,300 "
41-ft. comb.	11,150 "	4	10,000 "	15,150 "	500	36,800 "
43-ft. comb.	13,500 "	4	13,000 "	15,200 "	800	42,500 "
38-ft. trailer.....	4,900 "			8,100 "		13,000 "
Open St. L. trailer						5,750 "
Combination ... 1		4	5,200 "			33,700 "
Colfax Ave.....		2	5,000 "			23,600 "
Brill-Recon.		2				20,300 "
West End.....		2	5,125 "			24,570 "
Open Berkeley...		2				21,500 "
Open Woeber...		2				21,500 "

labor 50 per cent when trailers are operated, while their use at the same time assists materially in solving the extra list problem.

The trailer used in Denver (which, owing to favorable climatic conditions, may be lighter than could be used elsewhere) weighs only 13,000 lb. complete, and has a seating capacity for 46 persons, making a dead weight per passenger (seating capacity) of 282 lb. After four years of service it has not been found necessary to increase or to strengthen any part of this car.

When attempting to reduce power costs for car operation great care should be taken to secure that equipment best suited for the service and local conditions. Dead mileage causes a severe increase in power consumption as well as bringing about unnecessary wear and tear on the rolling stock. Therefore, to keep maintenance cost and platform expense low it is required that car houses and storage points should be located convenient to the district served.

Low initial cost should by no means be the governing factor in buying equipment, material or supplies, and manufacturers as well as the railway companies should collect and study all available data possible bearing on the proposed service. Maintenance is a great big word and there are no doubt times when in studying operating figures it becomes magnified by comparisons. In a few years when street railway systems are more closely allied by standards this question will be more seriously studied. As the costs for power and upkeep of equipment are the heavy items of expense, no doubt before long we shall see the motormen under the supervision of the mechanical departments. In addition to this, better and more improved methods of work and inspection on cars should have a tendency to reduce equipment repair charges.

METHOD AND COST OF PAINTING A LARGE ELEVATED RAILWAY STRUCTURE

The Metropolitan West Side Elevated Railway, Chicago, has 26 miles of double-track elevated structure, which is repainted every five years. Succeeding portions of the structure, amounting to about one-fifth of the total length, are painted every fifth or sixth year, so that the work proceeds from section to section each year. Three kinds of paint are used: The column bases are protected by a coal tar paint and the superstructure is given two coats of paint made up from two different formulas, presented later.

PAINTING COLUMN BASES

The bases of the large columns which support the elevated structure are frequently found to be affected by moisture, ammonia from refuse and ashes piled about them in alleys. Some of these bases are so corroded that a cleaning with wire brushes and chipping hammers will not serve to remove all the scale and dirt. Because of the difficulty of cleaning these badly corroded bases, the company has built a sand-blast outfit which may be drawn from post to post and operated by current taken from the third-rail. Compressed air for blowing the sand is had from two large car-equipment air compressors. With this sand-blasting outfit the company's men so thoroughly clean the scale from the steel work that it is said, to be as bright as new silver. Soon after cleaning, the steel is coated with a paint made according to the following formula:

COAL TAR PAINT FORMULA

The coal tar paint for use in covering the column bases and those parts of the structure over steam railroad tracks is made up of the following ingredients: Coal tar, 16 parts; cement, 4 parts, and kerosene, 3 parts by volume. These proportions are varied slightly according to the original consistency of the tar and the use to which the paint is to be put. The variations should not exceed the following proportions:

Eight parts coal tar, 1 part Portland cement, 1 part kerosene.

Sixteen parts coal tar, 4 parts Portland cement, 3 parts kerosene.

The Portland cement first should be carefully stirred into the kerosene oil to form a creamy mixture; then this mixture should be well stirred into the coal tar. To obtain the best results especial care should be used in mixing and stirring. The paint may be used after it has been mixed for some time, but it is impossible to state what results will be obtained without first experimenting. The cost of the paint is about 15 cents per gallon.

PAINTING THE SUPERSTRUCTURE

The regular schedule for painting the superstructure requires that 10,000 tons of steel be covered per year. This amount does not include the painting of the stations, but only the elevated structure, which has solid plate girder spans with latticed channel columns. The structure weighs about 800 lb. per running foot.

Above the column bases the steel work, if corroded, is first gone over with chisel-end hammers and 4-in. scraping

knives to remove scale and other loose dirt. Then the steel work is cleaned with stiff wire brushes, which leave it ready for the application of paint. As done by the company's forces, the cleaning of the steel work costs 40 cents per ton.

After this thorough cleaning two coats of structure paint are applied. The specifications according to which this paint is made follow:

FIRST COAT STRUCTURE PAINT

Paint to be delivered in barrels on the right of way of the railway company or at its storehouse, 139 Throop Street, Chicago, Ill.

Paint to be made in accordance with the following formula:

Two parts by weight "Double Brand Prince's Metallic," one part strictly pure red lead, one part graphite. This pigment to be ground in 25 per cent of raw linseed oil to form a thick paste; the paste so formed to be reduced and reground in raw linseed oil; the finished product to be in liquid form weighing 12 lb. to the gallon.

The "Double Brand Prince's Metallic" to be the highest grade of this kind of material; the graphite to contain not less than 60 per cent pure carbon.

A small amount of turpentine oil Japan may be used to accelerate drying if weather conditions require same.

SECOND COAT STRUCTURE PAINT

Paint to be delivered in barrels on the right of way of the railway company or at its storehouses, 139 Throop Street, Chicago, Ill.

Paint to be made in accordance with the following formula:

Pigment to consist of 52 per cent strictly pure American zinc, 40 per cent strictly pure carbonate of lead, 8 per cent coloring matter.

Coloring matter shall consist of best French yellow ochre and lampblack.

The above percentages have reference to weights of substances. The grinding and mixing of paint shall be done in an approved and thorough manner and will include chasing. The zinc and lead in above proportions shall be ground first in paste form in a sufficient quantity of pure raw linseed oil to make a thick paste; this paste then to be reground and thoroughly mixed, including the chasing above specified, with the proper amount of coloring matter and raw linseed oil with best turpentine Japan drier. This amount of drier used in any given mix shall not exceed 1 gal. to every 10 gal. of linseed oil used in the entire paint mixture.

No turpentine shall be used in paint except that contained in the drier.

The paint when ready to put into barrels shall weigh not less than 13 lb. per gallon and not more than 14 lb. per gallon.

The paint required under these specifications shall be mixed in quantities of 500 to 1000 gal., which mixing shall be done subject to the inspection of the railway company's inspectors, and contractor shall afford the inspector all necessary facilities for the purpose of measuring and estimating the amounts of the various materials placed in the mixture.

The finished paint, as well as the elementary parts of same, shall be subject to such tests as the railway company's inspector may deem necessary, and the contractor shall furnish samples of oil or pigment when required for such purpose. The color of the paint shall be as per Metropolitan second coat color, sample of which will be furnished contractors.

No other oil than linseed oil shall be used except in case of drier, which drier shall consist of turpentine Japan.

When paint is mixed according to these formulas its compounding is carefully watched by the company chemist, who analyzes the raw materials, examines their brands and checks the grinding at the factory. Each barrel of paint is numbered by its manufacturer, and when received by the railway company sample cans are filled from the barrels and correspondingly numbered. One sample taken from each barrel is analyzed by the company chemist. By this procedure the company has a complete check on the character of the paint from the time of the receipt of the raw materials at the paint factory until the application to the steel structure.

These methods have been used for first and second coats to protect the Metropolitan Elevated structure for 15 years, and the results have been satisfactory. The preparation of tar for the column bases has been used for two years, and the results have been satisfactory to date. Just how long it will stand is yet to be determined by the future.

The cost of applying what is known as a spot coat, covering spots where the steel is bare, and then a full second coat over this spot coat is, with the company's forces, 35 cents per ton, and the cost for the paint and paint brushes is 41 cents per ton of structure.

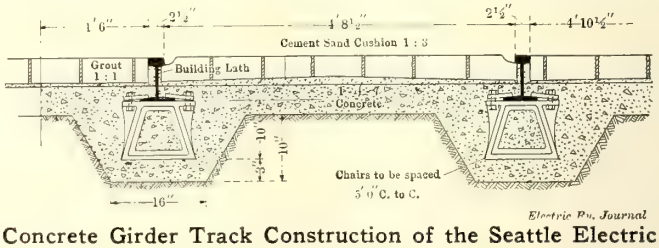
These detail costs, when added to the cost of 40 cents per ton for cleaning, give $1.16 per ton as the total cost of the work when done by the company forces. In years past, when the cost for labor was higher than it is now, the structure has been painted by contract to the same standards at about the same cost per ton.

The work of painting the elevated structure of the Metropolitan West Side Elevated Railway is carried on under the supervision of B. J. Fallon, engineer maintenance of way. Acknowledgment is made to B. I. Budd, general manager, for information contained in this article.

CONCRETE GIRDER TRACK CONSTRUCTION IN SEATTLE

The Seattle Electric Company has experienced trouble with track laid several years ago in which wooden ties were used, and therefore has decided to experiment with a more permanent type of track substructure. The accompanying illustration shows the track design which is now being followed for track laid in brick paving. Similar designs have been prepared where granite or asphalt is used.

The substructure under each rail comprises a stringer of concrete 16 in. wide at the bottom and increasing in width to about 24 in. at the base of the rail. The stringers be-



Concrete Girder Track Construction of the Seattle Electric Company

tween tracks and between rails are tied together with a floor of concrete 5 in. thick. The rails are anchored to the concrete stringers with cast-iron chairs having lugs which bolt over both bottom flanges at each chair. The chairs are similar to those used in Philadelphia. Tie rods and chairs are spaced on 5-ft. centers. In placing the brick or granite pavement a cushion of sand and cement, mixed in the proportions of 1 to 3, is used. The concrete mixture for the general substructure has proportions of 1 of cement, 4 of sand and 7 of broken stone.

George P. James, chief civil engineer of the Seattle Electric Company, to whom acknowledgment is made for the accompanying information, has stated that if this type of track is found to be satisfactory for local conditions in Seattle it will be adopted as standard for future work.

THE CONNECTICUT COMPANY'S STANDARDS FOR THE OVERHEAD CONSTRUCTION OF 500-VOLT, D. C. RAILWAYS

Under direction of Vice-President E. H. McHenry, in charge of engineering and construction, there has been prepared for the Connecticut Company, which operates over 600 miles of electric railway track in Connecticut, a very interesting set of specifications, which are being applied on all of its new overhead line construction and renewals on 500 to 550-volt d.c. railways of city, interurban and electrified steam types. Primarily, these regulations have been adopted to obtain uniform construction standards, but the company has also borne in mind that the installation methods and materials chosen should be of a nature requiring the least expense for maintenance and replacement.

The work has been done under the immediate direction of the construction department of the New York, New Haven & Hartford Railroad, Edward Gagel, chief engineer, by Charles Rufus Harte, assistant engineer in charge of trolley construction, and his assistant, R. E. Wade, in conjunction with L. L. Gaillard, superintendent of power and lines of the Connecticut Company. A rather unusual feature was the submission of the first draft to various contractors, engineers and manufacturers, with the request for free criticism, consideration of which very materially strengthened and broadened the specifications.

In undertaking to prepare these specifications it was realized that, aside from catenary construction, d.c. overhead line material had attained such a ripe stage of development that it would be futile to expect the manufacturers to make radical changes in design unless the customer was willing to put up with high prices and longer deliveries. Hence it was determined to find what standard designs of the different makers were best suited to the company's needs, and then to find what variations were permissible in order that all bidders would be placed on the same footing. The investigation comprised laboratory tests in New Haven of various materials submitted, observation of such materials in service, frequent visits to line material factories to study the conditions of manufacture and numerous conferences with manufacturers relative to their ability to conform to the company's ideas. When the process of selection was completed it was found that almost every part was standard with at least one supply house. Here and there it was desirable to call for slight variations in dimensions or shape, but in every instance the practicability of the change was discussed with the manufacturers before it was specified.

As the net result of this work there has been developed a set of specifications which are believed to cover the best designs in each field, yet costing no more than before, and embodying all the advantages of interchangeability and prompt delivery. It should be added that The Connecticut Company had the cordial co-operation of all the important manufacturers in its endeavor to improve and codify line material standards.

The following paragraphs describe in detail the general rules laid down for both the line material and the general methods of installation. The first draft of the specifications covering the line material proper referred to a given item as the —— Manufacturing Company's design No. —, or equivalent. In the revision all trade names have been omitted, and instead each design is identified by an accompanying numbered drawing. As the latter also shows the permissible variations in size and shape, the bidders know just what is meant by the use of the term "equivalent." All of the drawings accompanying these specifications are bound in handy form in a book of blueprint sheets, 7½ in. x 12 in. in size.

TYPES OF SUSPENSION

Bracket construction shall be used on all single-track lines unless otherwise specified. Span construction shall be used on all double-track work, including turn-outs, and on all curves of less than 300 ft. radius; also where local conditions require such construction.

POLES, POLE FRAMING AND POLE SETTING

Poles shall be of commercially straight, round chestnut and conform to following dimensions:

Length in feet	Circum. top in inches	Circum. 5 ft. from butt in inches
30	22	36
35	22	38
40	22	44
45	22	47
50	22	50
55	22	53
60	22	56
65	22	58
70	22	58

Poles are to be delivered barked and with knots trimmed. They shall be sound and free from butt rot or hollows in butts which would impair strength above ground. They shall be free from unsound knots and shall have no more than one crook, this crook to be in one way only. Contractor shall point the tips, saw the butts off square, smooth all knots with draw knife, shave the entire pole, if so directed by the engineer, and paint the tips and gains of each pole with two coats of an approved metallic paint before installation. All poles are to be inspected and approved by the inspecting engineer when delivered along the line of work.

Poles shall be framed as shown on blueprint accompanying these specifications. Gains shall be ¾ in. deep, face of gain to be slightly hollowed to prevent rocking of cross-arm.

POLE SETTING AND KEYING

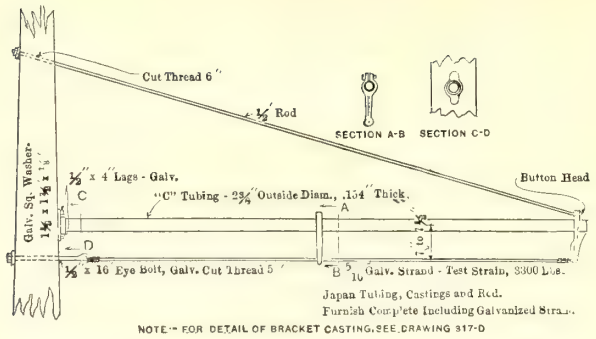
Poles shall be spaced 100 ft. apart on tangents, and shall have a rake of 6 in. away from track at a height of 24 ft. above top of track rail with bracket construction. With span construction the rake shall be 12 in. at same height above top of rail. Poles to have above rakes after taking final strain.

Holes for all poles shall be excavated to the following depths:

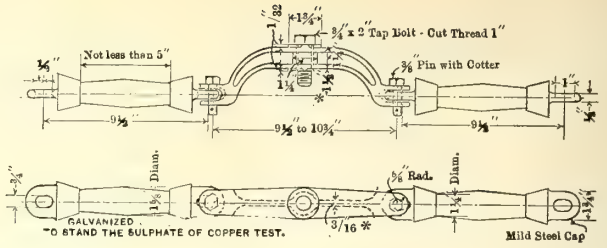
Length of pole in feet	Depth in earth in feet	Depth in rock in feet
30	6.0	5.0
35	6.0	5.5
40	6.5	5.5
45	6.5	6.0
50	7.0	6.5
55	7.5	6.5
60	8.0	7.0
65	8.5	7.0
70	9.0	7.0

For longer poles and on side banks and fills, depths will be determined by inspecting engineer. Face of pole shall be spaced at a minimum distance of 5 ft. from outside of rail head, and shall not exceed this measurement to appreciable extent unless conditions so require.

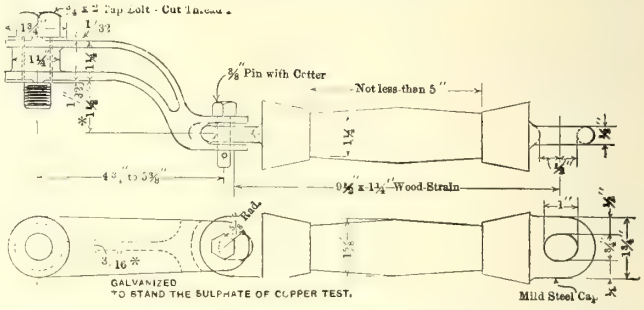
The earth around poles shall be thoroughly tamped with suitable tampers. When poles are set in concrete



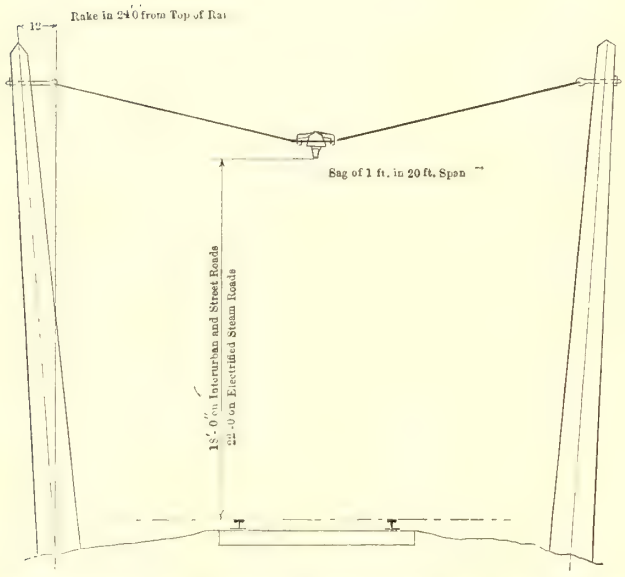
Drawing No. 317-C—Bracket for Wooden Pole



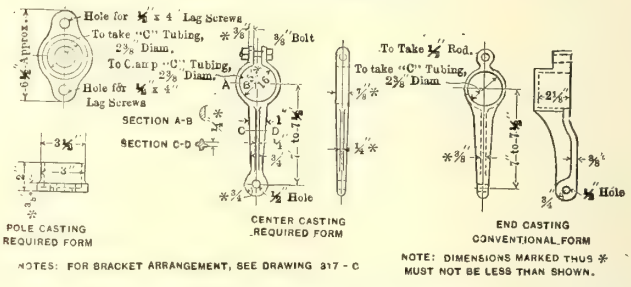
Drawing No. 315-D—Double Curve Pull-over of Galvanized Malleable Iron (Dimensions Marked Thus * Must Not Be Less than Shown)



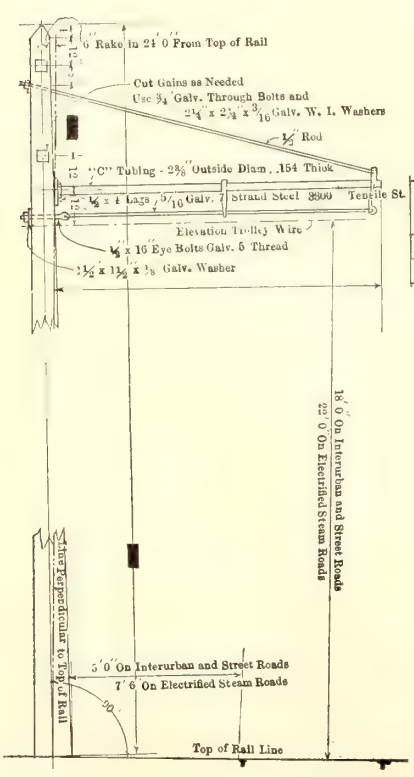
Drawing No. 315-C—Galvanized Malleable Iron, Single Curve Pull-over (Dimensions Marked * Must Not Be Less than Shown)



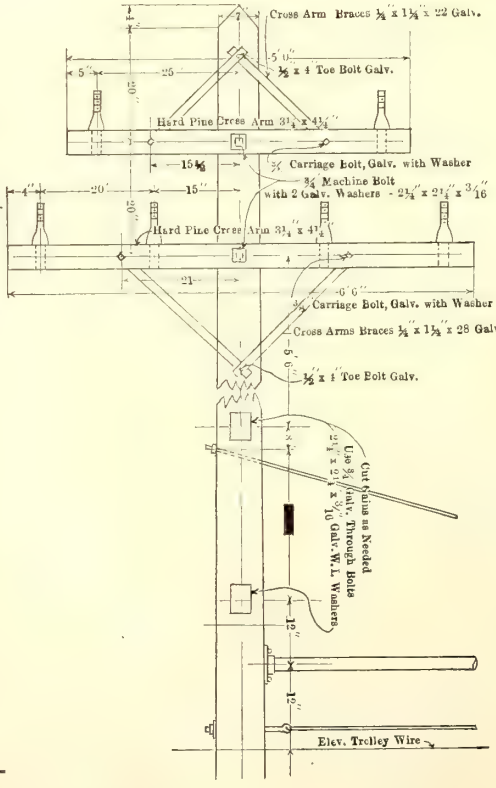
Drawing No. 318-C—Span Construction for One No. 0000 Trolley Wire



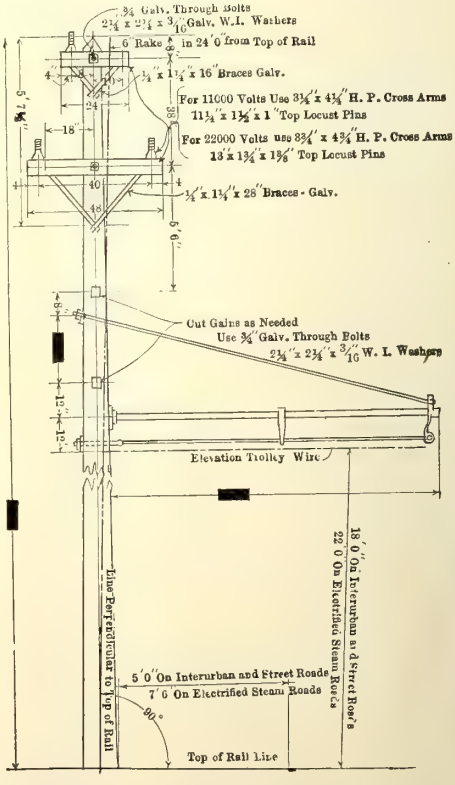
Drawing No. 317-D—Japanned Malleable Iron Bracket Casting for Wood Pole



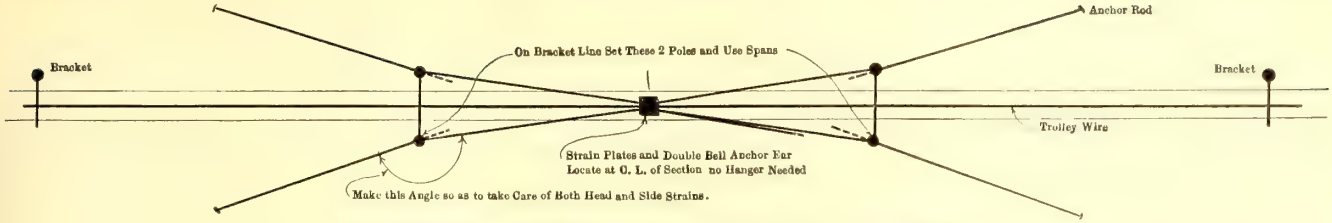
Drawing No. 318-D—Pole Top Construction for Bracket Lines



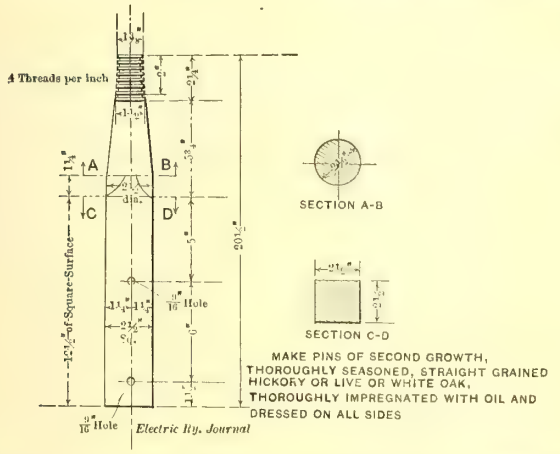
Drawing No. 319-D—Pole Construction for Two-Circuit, Three-Phase, 11,000-Volt Transmission Line



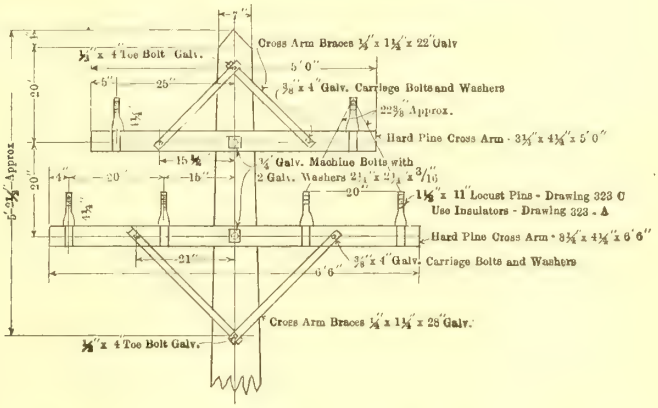
Drawing No. 319-C—Pole Construction for Combined Trolley and One-Circuit Transmission Line



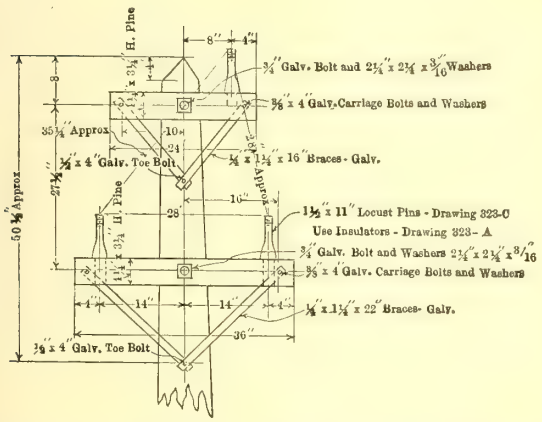
Drawing No. 319-B—Anchorage Points for Trolley Wire



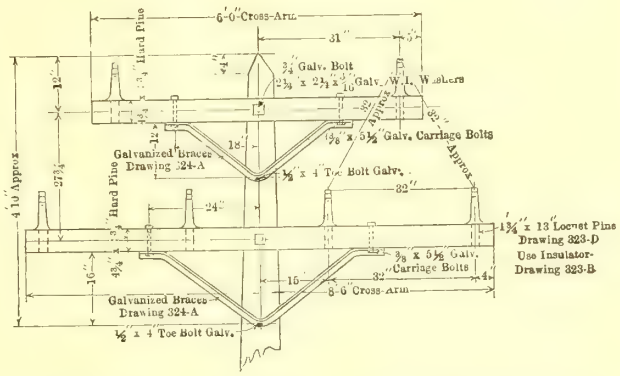
Drawing No. 324-C—Wood Pole Top Pin for 22,000-Volt Transmission Line



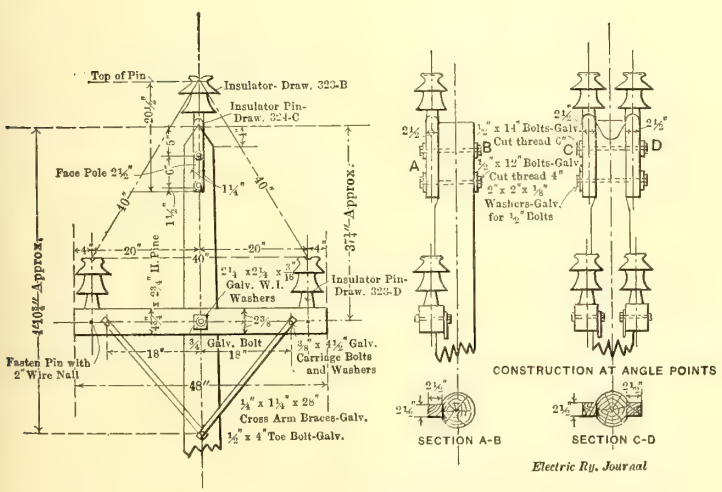
Drawing No. 321-A—Pole Top Construction for Two-Circuit, Three-Phase, 11,000-Volt Transmission Line



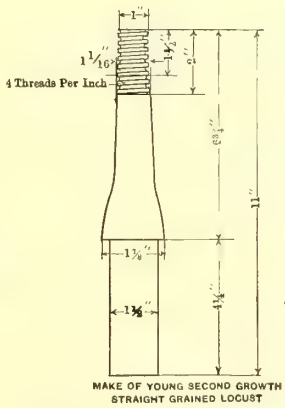
Drawing No. 321-B—Pole Top Construction for One-Circuit, Three-Phase, 11,000-Volt Transmission Line



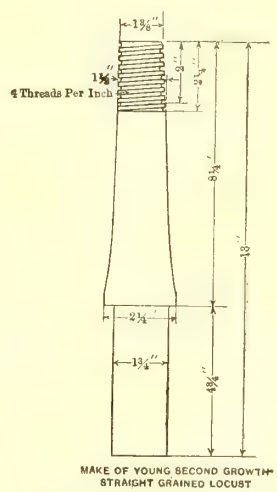
Drawing No. 321-C—Pole Top Construction for Two-Circuit, Three-Phase, 22,000-Volt Transmission Line



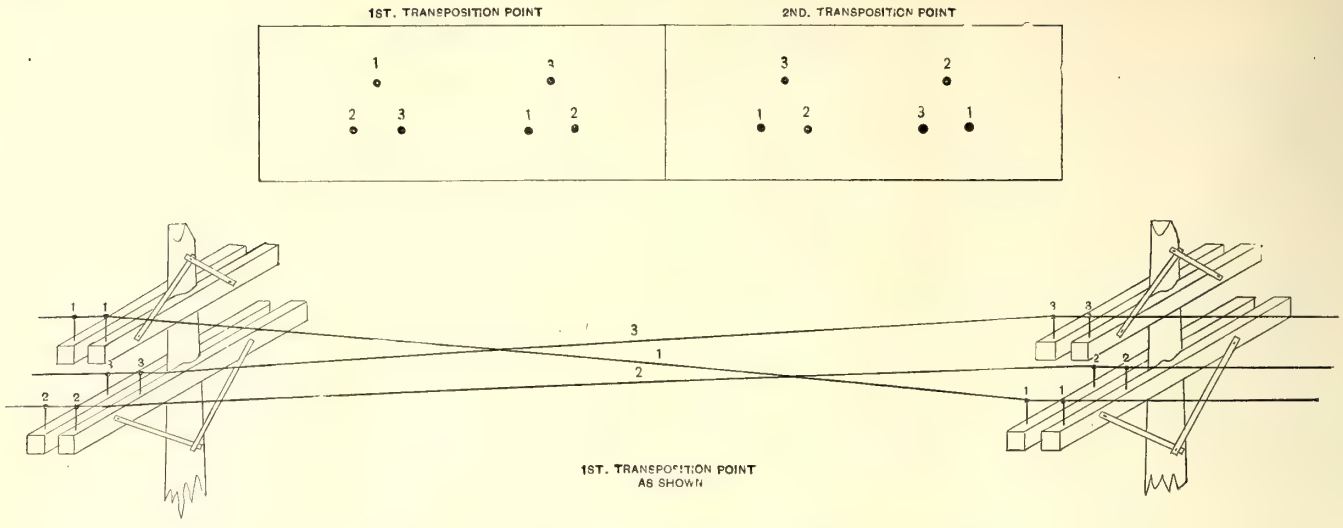
Drawing No. 321-D—Pole Top Construction for One-Circuit, Three-Phase, 22,000-Volt Transmission Line



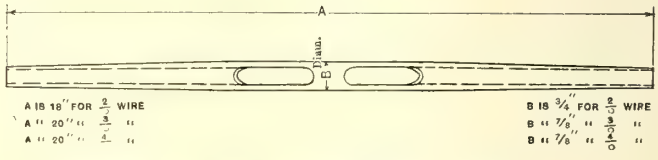
Drawing No. 323-C—Cross-Arm Pin for 11,000-Volt Insulator



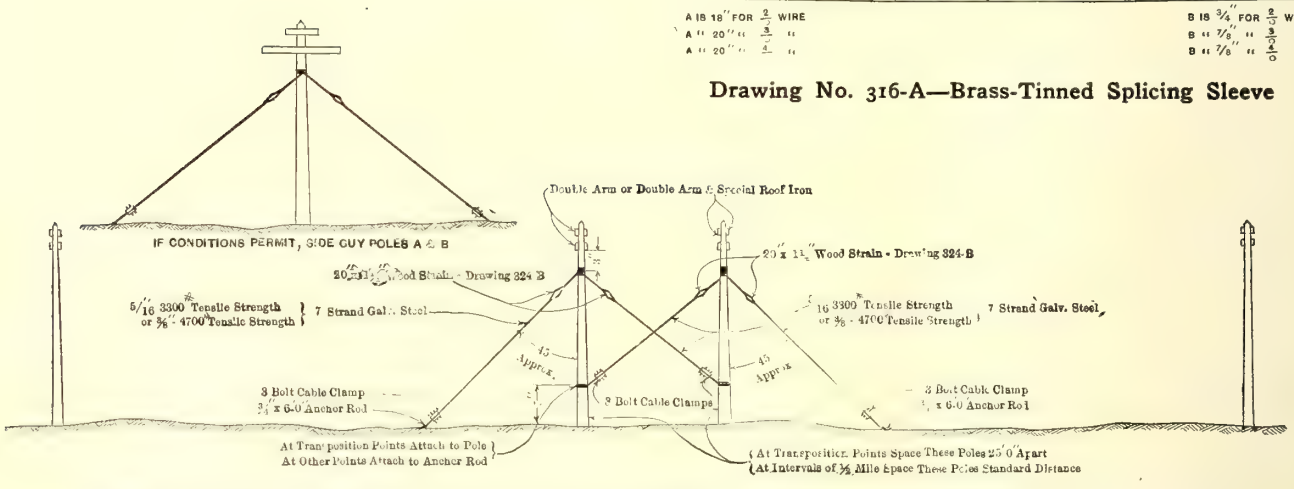
Drawing No. 323-D—Cross-Arm Pin for 22,000-Volt Insulator



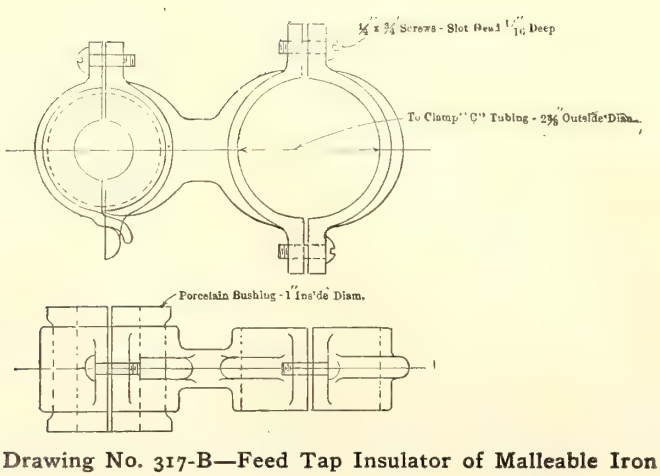
Drawing No. 322-A—Method of Transposing Power Transmission Lines



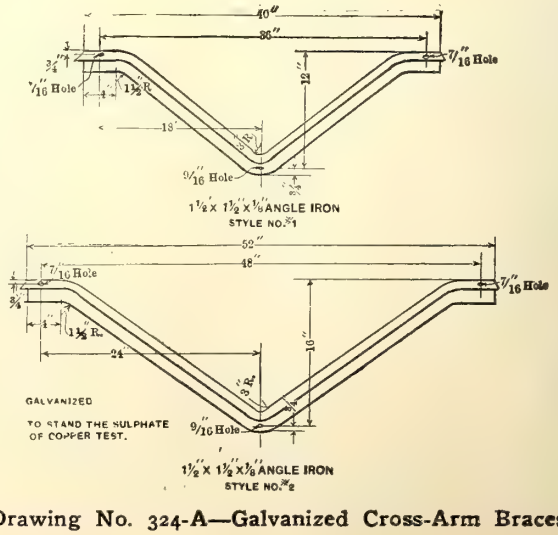
Drawing No. 316-A—Brass-Tinned Splicing Sleeve



Drawing No. 322-B—Method of Guying at Transposition Points and at Intervals of One-Half Mile



Drawing No. 317-B—Feed Tap Insulator of Malleable Iron ("C" Tubing, 2⅜ In. Outside Diameter)



Drawing No. 324-A—Galvanized Cross-Arm Braces

the concrete shall consist of one part of an approved brand of Portland cement, three parts clean sharp sand and five parts broken stone, which will go through a 2-in. ring. Amount of concrete to be determined by inspecting engineer, and concrete to be put on in layers of 6 in. and each layer thoroughly tamped. Top of concrete filling to be above ground and sloped off from pole with smooth finish so as to shed water.

All bracket poles on curves with radii between 900 and 2400 ft., and such others as may be designated by the inspecting engineer, shall be provided with suitable keys of timber or stone. One key to be located in front of pole just below surface of ground, and if of timber to be 4 ft. long and not less than 4 in. thick, with 36-in. cross-section. The other key to be located back of pole at bottom and to be not less than 2 ft. long and 4 in. thick with 36-in. cross-section.

Stone keys shall be used unless specifically provided otherwise.

CURVE CONSTRUCTION

Pull-offs on curves shall be spaced according to following table:

Radius of curve in feet	Distance between hangers in feet
40	5.0
50	5.5
60	6.0
75	6.5
85	7.0
100	7.5
200	10.0
300	15.0
400	20.0
550	25.0
680	30.0
800	35.0
900	40.0
1000	45.0
1500	60.0
1910	80.0

The distance between poles on curves is dependent on weight of feed wire, length of curve, and in towns on local conditions. In general, the minimum distance between poles shall be 50 ft. Up to 1910-ft. radius space poles from 50 to 90 ft. Above 1910-ft. radius space poles 100 ft. apart.

It is desirable to have suspension poles at P. C. and P. T. of all curves. Poles must be so located on all curves with radius of 900 ft. and under.

For bridle use ⅜-in. seven-strand galvanized steel cables, tensile strength, 4700 lb., fastened to back side of each pole with standard galvanized three-bolt cable clamp and ½-in. x 4-in. galvanized lag screw. For pull-off wire use ¼-in seven-strand galvanized steel cable. Pull-offs to be in line with radii of curves. In towns and cities pull-offs to be laced or tied together with ¼-in. galvanized strand. In dead ending bridles take three wraps around the pole instead of using eye bolt.

GUYING AND NUMBERING

Poles on curves of less than 900-ft. radius, at angles, and at any other point specified by the engineer, shall be back guyed, making use of 5/16-in. or ⅜-in. seven-strand galvanized steel cable as directed by engineer. Use shall be made of ¾-in. x 6-ft. galvanized anchor rods with 3½-in. x 3½-in. x ¼-in. washers and chestnut dead men not less than 4 ft. long and 6-in. x 8-in. cross-section. Dead men to be buried not less than 5 ft. below surface of ground, with at least 3 ft. of rock filling and the remainder of earth well tamped. (Note—Mechanical type anchors are not specified, owing to the poor condition of the soil, which is usually full of boulders.)

In making up guy, take three wraps around pole and make wrap joint. Use galvanized open thimble and three-bolt galvanized clamp at anchor rod. A 9½-in. x ¼-in. wood strain insulator to be cut in guy 5 ft. from pole. All guying to be done before installation of trolley or feed wire is begun. Anchor rods must be installed so they will point in the direction in which guy will pull.

When poles carry high-tension wires 20-in x 1¼-in. wood strains shall be used in anchors and guys. When anchor is in rock or ledge, use 1-in. x 18-in. eye bolts poured with lead or sulphur and with hole in rock inclined away from pole.

Contractor shall paint numbers on poles as directed.

BRACKETS

Brackets are to be of flexible-suspension type similar to drawing No. 317-C, with 2-in. tube arm, over support of ½-in. round iron, the flexible suspension to be of 5/16-in. seven-strand galvanized steel cable, tensile strength 3300 lb. The end casting of bracket to be provided with eye instead of eye bolt, the eye bolt passing through pole to be galvanized ½ in. x 16 in. long with thread cut 5 in.

The distance between tube and over-support at pole to be not less than 3 ft. with 9 ft. 6 in. bracket. With longer brackets this distance to be increased at the discretion of inspecting engineer. With bracket line on outside of curve, use extra long bracket to allow for pole rake and elevation of rail, so hanger shall be 1 ft. 6 in. from end of bracket when properly set with regard to track. When installed, outer end of 9 ft. 6 in. bracket to have upward rake of at least 2 in.; longer brackets in proportion. Intermediate castings to be so that hangers will be half-way between intermediate and end castings, except at feed taps, where casting must be located to suit.

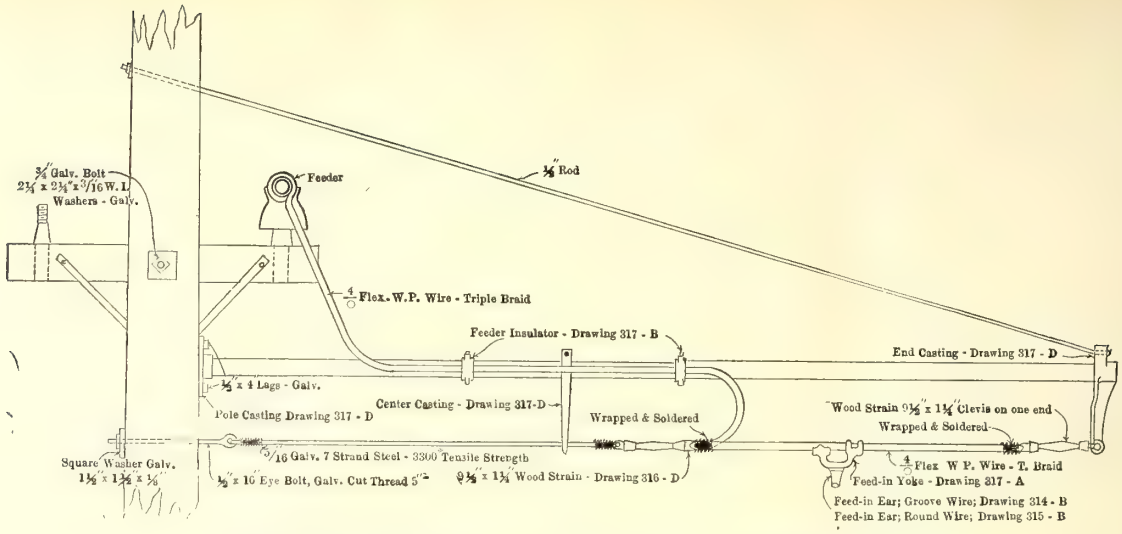
SPAN CONSTRUCTION

On single-track street railway lines use 5/16-in. seven-strand galvanized steel cable, tensile strength not less than 3300 lb.; on double-track street railway lines and on electrified steam lines use ⅜-in. seven-strand galvanized steel cable, tensile strength not less than 4700 lb., and use ¾-in. x 16-in. galvanized eye-bolts with thread cut 5 in. All spans to be installed with eye-bolts at same level and allowance made for sag of 1 ft. in 20 ft. of span, with eye-bolts at full length.

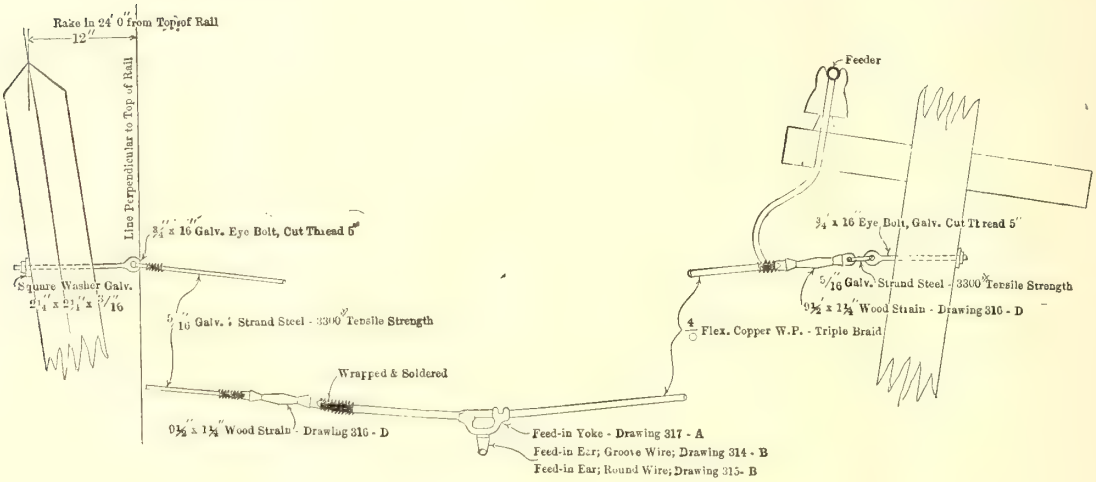
TROLLEY WIRES

One No. 0000 B. & S. grooved trolley wire shall be used. Wire to be hard drawn, and shall have 96 per cent of the conductivity of pure copper wire. Trolley wire shall be 18 ft. above top of track rail and shall be installed without kinking or cutting same. Trolley wire to be anchored at P. C. and P. T. of all curves and on an average every 1000 ft. on tangents. On bracket work where extra anchor poles cannot be set the pole supporting anchor ear is to be braced by two head guys, to be led to adjacent poles, these poles in turn to be anchored to adjacent poles, the last attachment being made about 7 ft. above ground where conditions do not permit installation of anchors in ground. The guys and anchors are to be attached to poles by three turn wraps. All head guys and anchors to have 9½-in. x 1¼-in. wood strains cut in 4 ft. from strain plates and poles respectively.

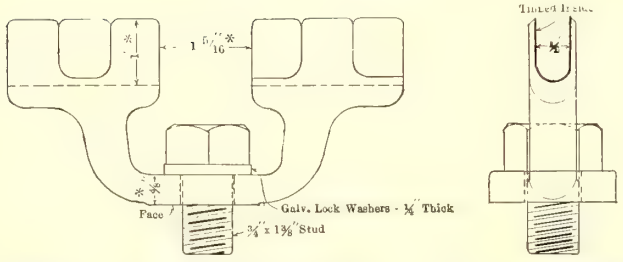
On span work, four head guys and anchors to be installed, using same method as on bracket work. Head guys and anchors to be of 5/16-in. galvanized seven-



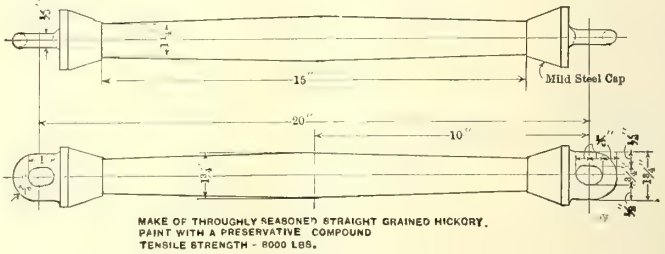
Drawing No. 318-A—Bracket Construction at Feeding-in Points



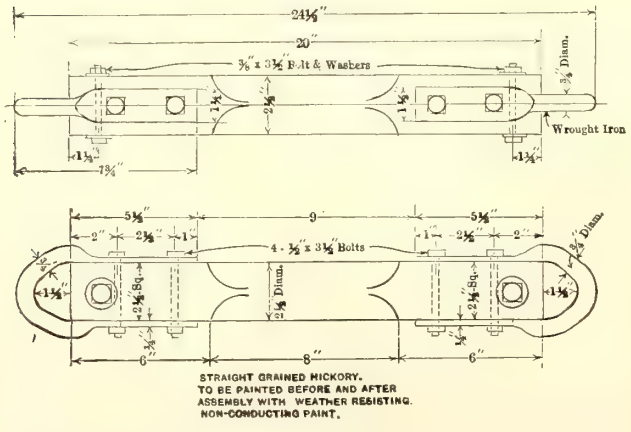
Drawing No. 318-B—Span Construction at Feeding-in Points



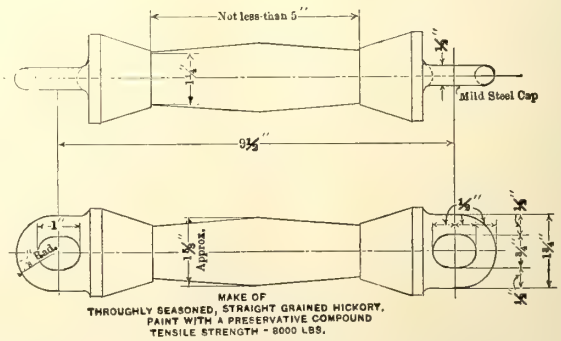
Drawing No. 317-A—Feeding-in Yoke Composition (Dimensions Marked Thus * Must Not Be Less than Shown)



Drawing No. 324-B—Wood Break Strain Insulator



Drawing No. 320-A—Strain Insulator of Heavy Wood

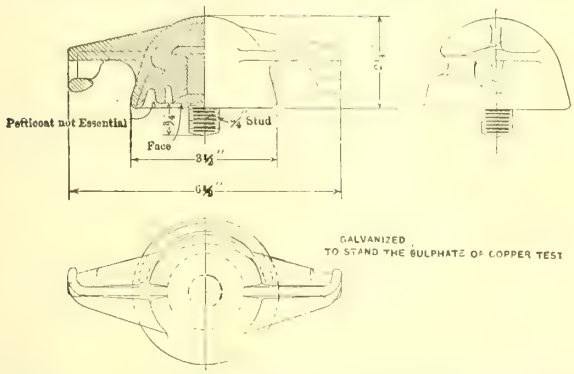


Drawing No. 316-D—Wood Break Strain Insulator for Cable up to and Including 300,000 Circ. Mil.

strand steel cable, tensile strength 3300 lb. Where overhead frogs are installed, trolley wire is to be taken straight through frog and anchored to nearest pole, cutting in a 9½-in. x 1¼-in. wood strain 4 ft. from frog and using 5/16-in galvanized strand for head guy and anchor. In pulling trolley wire, proper allowance must be made for temperature at time of installation.

SPLICING SLEEVES, FEED TAPS, HANGERS AND EARS

Splicing sleeves should be similar to those shown on drawing No. 316-A. When sleeves are installed ends of wire shall be bent back sharply, and after soldering these



Drawing No. 316-B—Malleable Galvanized Iron Straight Line Hanger

ends shall be cut off close and filed smooth with body of sleeve.

In making feed taps use No. 0000 B. & S. stranded copper for span with feed-in yoke, as shown on drawings Nos. 317-A and 318-A. (The lips of this yoke are longer than usual.)

On straight line work use round top galvanized hanger with ¾-in stud shown on drawing 316-B. On curve work use double-curve galvanized heavy pull-over with ¾-in. stud made up with two wood strains instead of giant strains, as in drawing No. 315-D, and single-curve galvanized pull-overs with ¾-in. stud, made up with one wood strain, as per drawing No. 315-C.

Use for grooved trolley wire: Straight-line clip ear, galvanized malleable iron, ¾-in. stud, 7 in. long, drawing No. 314-D; curve clip ear, galvanized malleable iron, ¾-in. stud, 14 in. long, drawing No. 314-C; anchor ears, double center, soldered, drawing No. 314-A; strain plate, galvanized, ¾-in. studs, drawing No. 316-C; feed ears, ¾-in. stud, soldered, 15 in. long, drawing No. 314-B; feed yoke, ¾-in. stud for No. 0000 feed tap, drawing No. 317-A.

Use for round trolley wire: Straight-line ear, ¾-in. tap, D. G., high center, 15 in. long, drawing 315-B; curve ears, ¾-in. tap, high center, 15 in. long, drawing 315-B; anchor ears, double center, soldered, drawing No. 315-A; strain plate, galvanized, ¾-in. studs, drawing No. 316-C; feed ears, ¾-in. stud, soldered, 15 in. long, drawing No. 315-B; feed yoke, ¾-in. stud, for No. 0000 feed tap, drawing No. 317-A.

MISCELLANEOUS DETAILS

Use heavy section insulators of design specified or approved by the engineer in charge of the work.

Use section switch as per drawing No. 320-B. (Boxes for line cut-out switches as in drawing No. 320-B are made of any well-seasoned wood and are long enough to lock with the handle open or closed.)

Cross arms shall be clear hard pine of sound live stock and close grain, properly seasoned, free from shakes, splits and other defects. There shall be no knots so located as to interfere with the strength of the arm. They shall be delivered unpainted and given two coats of good metallic paint before installation.

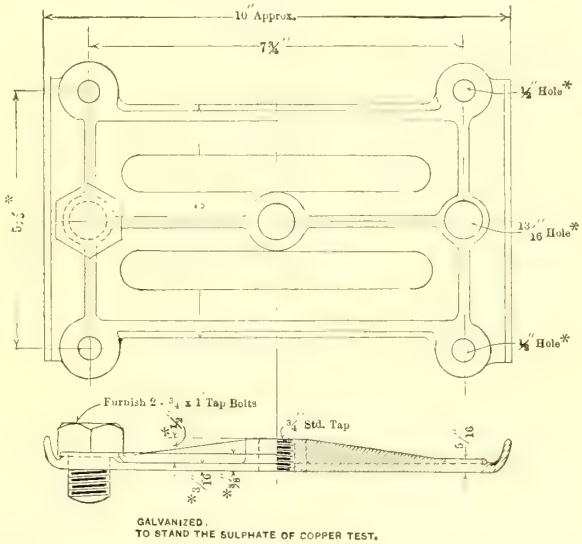
Up to 3 ft. length and with 500,000 circ. mil cable, use 3¼-in. x 4¼-in. arms. Over 3 ft. length and with 500,000 circ. mil cable and larger sizes, use 4¾-in. x 5¾-in. arms except with feeder lines of unusual weight, where special arms will be designed. Double cross-arms shall be installed at P. C. and P. T. of all curves, at angles, and on such curves and at such other points as may be designated by the inspecting engineer.

Use ¼-in. x 1¼-in. galvanized steel braces with ½-in. x 4-in. lag screws and ⅜-in. galvanized carriage bolts with washers. Use ⅝-in. galvanized spacing bolts with double nuts and washers on each end. Use ¾-in. galvanized machine through bolts with thread cut 5 in., with 2¼-in. x 2¼-in. x 3/16-in. galvanized square washers.

Use for pins 9-in. x 1½-in. x 1-in. top young second-growth locust free from imperfections and with straight grain. Shank of pins to be dipped in paint before installation in arm and pins to be fastened in arm with 2-in. wire nail. At points of heavy strain, if so directed by inspecting engineer, use shall be made of 9-in. x 1½-in. drop-forged iron pins.

Use shall be made of glass insulators with plain glass base and grooved top to suit size of cable. Where malleable iron pins are used, use molded mica insulators of proper size.

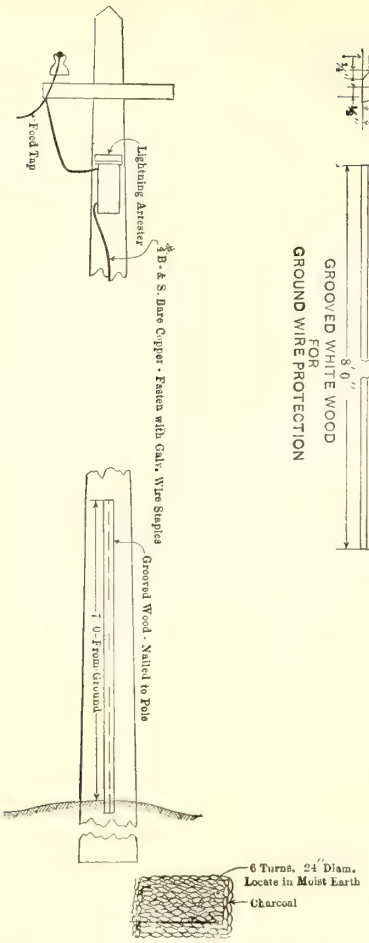
Feeders are to be installed as per feeder diagram which gives length, size, location of feed taps, section insulators and switches. Detail methods of making feed tap connections are shown on attached drawings Nos. 318-A and 318-B, and the feed tap insulator is No. 317-B. For tie wire, use



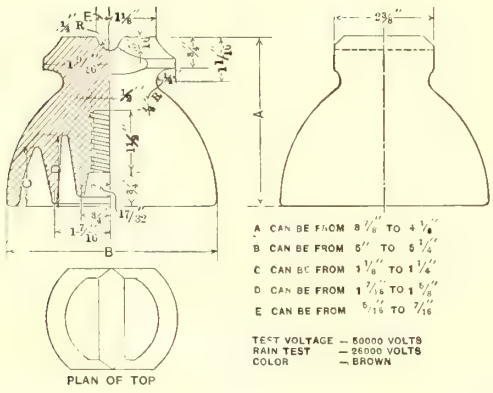
Drawing No. 316-C—Malleable Iron, Galvanized Strain Plate (Dimensions Marked Thus * Must Not Be Less than Shown)

No. 6 galvanized iron wire. For strain insulators, use 9-1½-in. x 1-1¼-in. wood strains up to and including 300,000 circ. mil cable as per drawing No. 316-D; above that size use insulator shown on drawing No. 320-A. (This is to be changed.) No ties are to be made on anchorage poles until they have taken final strain from trolley wire. Joints of feeder to be made of long wrap and with no appreciable increase above size of wire at joint.

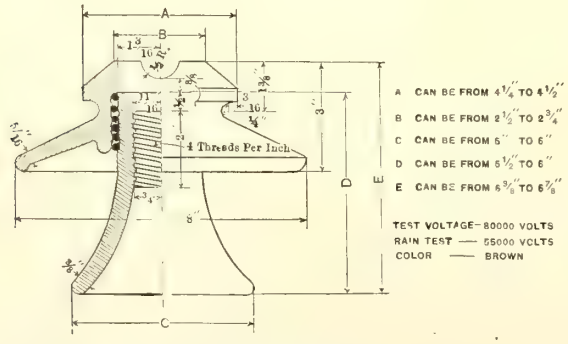
Lightning arresters are to be installed at intervals of 2000 ft. They are to be located on feed tap poles, their line connection being made to or close to feed tap. For



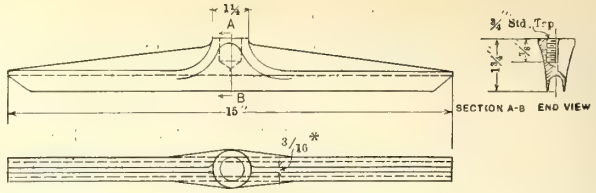
Drawing No. 319-A—Method of Installing Lightning Arrester



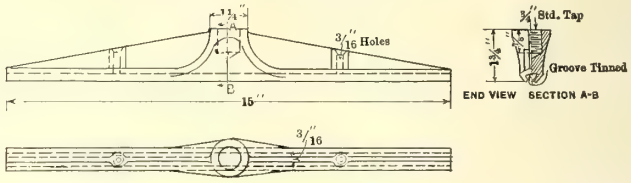
Drawing No. 323-A—Porcelain Insulator for 11,000 Volts



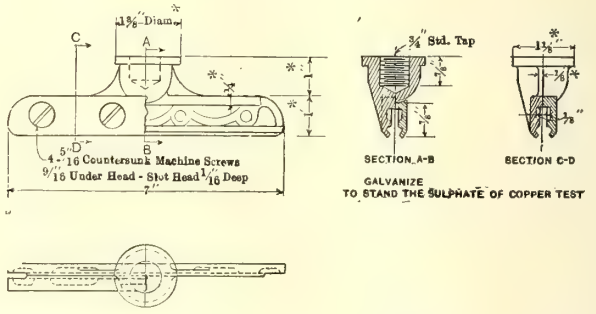
Drawing No. 323-B—Porcelain Insulator for 22,000 Volts



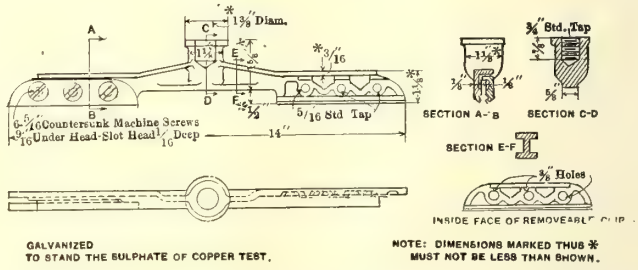
Drawing No. 315-B—Composition Feed-in Ear for Round Wire in Special Cases (Dimensions Marked Thus * Must Not Be Less than Shown)



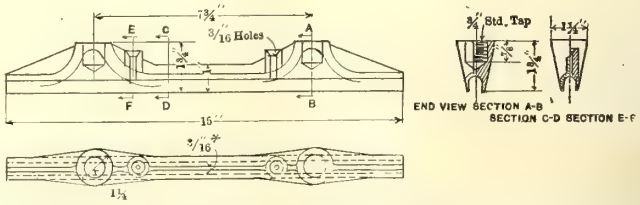
Drawing No. 314-B—Composition Feed-in Ear for Grooved Wire (Dimensions Marked Thus * Must Not Be Less than Shown)



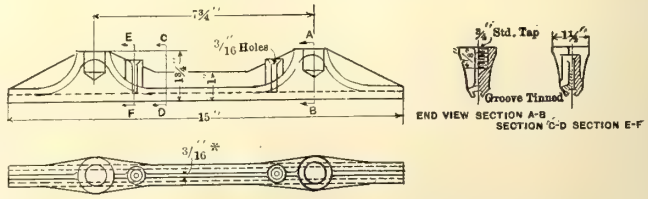
Drawing No. 314-D—Galvanized Malleable Iron Clip Ear for Grooved Wire (Dimensions Marked Thus * Must Not Be Less than Shown)



Drawing No. 314-C—Galvanized Malleable Iron Curve Clip Ear for Groove Wire



Drawing No. 315-A—Composition Strain Ear for Round Wire (Dimensions Marked Thus * Must Not Be Less than Shown)



Drawing No. 314-A—Composition Strain Ear for Groove Wire (Dimensions Marked Thus * Must Not Be Less than Shown)

ground connection use No. 4 B. & S. copper, stapled to pole with galvanized wire staples. On lower end of ground connection, make a coil of six turns, 2 ft. in diameter, and imbed this coil in moist earth, first surrounding it with charcoal, the body of charcoal to be not less than 2 ft. thick. Ground connection wire is to be protected for a distance of 7 ft. above ground by a strip of grooved wood nailed to pole. (See drawing No. 319-A.)

GENERAL

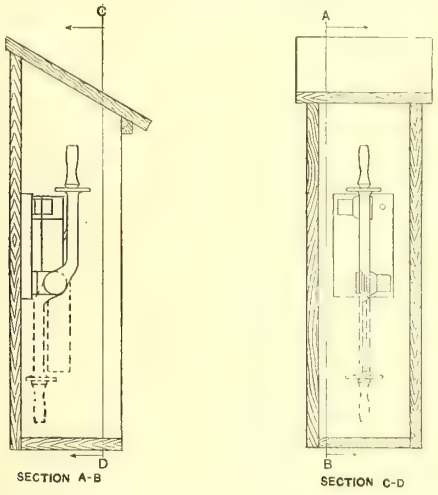
In making soldered joints no acids shall be used. Fittings specified are to be given preference and if their equivalents in kind and quality are used they must be acceptable to the engineer in charge of the work.

The use of ball or giant strains is prohibited. (Note: The company does not believe that compositions are capable of withstanding weathering for any length of time and has also found that they are easily bruised in handling and shipping. (Wood is used wherever possible.)

When wood poles are used and there are no foreign attachments to poles single insulation shall be used between trolley wire and pole.

When iron poles are used or when there are foreign attachments to wood poles, double insulation shall be used between trolley wire and pole.

All through bolts, eyebolts and anchor rods shall be



Drawing No. 320-B—Box for Line Cut-Out Switch

tested for crystallization before installation. This can be done by giving them a sharp blow on rail head or piece of metal of similar weight.

Contractor shall do all necessary tree trimming and cutting for which the company will obtain the necessary permits. When such work is done, the wood must be cut up into suitable lengths, brush disposed of and premises left in neat condition.

HIGH TENSION TRANSMISSION SPECIFICATIONS

In addition to the drawings accompanying the specifications for railway circuit work there are others relating to the installation of transmission lines carrying either 11,000 or 22,000 volts. Drawing No. 319-C shows the construction and limiting dimensions for a combination pole with one transmission circuit except that the central pin shown in drawing No. 325-A is now used instead of the short top cross-arm for a single wire. Drawing No. 319-D shows another combination pole with two transmission circuits. Drawings Nos. 321-A, 321-B, 321-C (note bent angle braces detailed in drawing 324-A) and 321-D illustrate several other high-tension designs. Drawings Nos. 322-A and 322-B illustrate respectively the method of transposing power lines and the method of guying at transposition points. The liberal specifications governing the porcelain insulators will be noted on the drawings Nos. 323-A and 323-B covering both 11,000 and 22,000 volts. The pins for these potentials are illustrated in drawings Nos. 323-C and 323-D.

ROADWAY SIGNS ON THE FOND DU LAC & OSHKOSH RAILWAY

The Eastern Wisconsin Railway & Light Company, which owns the Fond du Lac & Oshkosh interurban line, has recently installed a complete set of enameled steel signboards to facilitate the safe operation of its high-speed cars. Each railway crossing is designated by a distance sign, reading "Ry-Xing 1000 ft." and a "Stop" sign placed 50 ft. on either side of the intersecting steam track. Road crossings are designated by a sign lettered with a large letter W. These signs are also recognized as whistle posts. At a distance of 1000 ft. from curves, at which



Fond du Lac & Oshkosh—Road Crossing and Curve Warning Signs

speed must be slackened, signs reading "Curve 1000 ft." are placed. These signs have white letters on blue backgrounds.

The various signboards are mounted on oak posts of uniform dimensions, painted white, and so located with reference to the track that they are "illuminated" at night by the car headlights. The signboards are made of heavy enameled sheet steel and were furnished ready for installation by the Electric Service Supplies Company. The accompanying engravings illustrate the appearance of some of these signs along the right of way. The new signs are said to be of considerable assistance in safely maintaining schedule time during snowstorms and fogs. It is stated that the Oshkosh-Neenah division of this road will similarly be equipped in the near future. Acknowledgment is made to R. T. Gunn, general manager, Eastern Wisconsin Railway & Light Company, for these views.

C. H. Merz has estimated that if the heat wasted in the manufacture of 8,000,000 tons of coke in one district in England was utilized it would develop 150,000 hp with steam and 258,000 hp with gas engines.

MECHANICAL AND ELECTRICAL PRACTICES AT HARRISBURG, PA.

In the Sept. 3, 1905, issue of the Street Railway Journal Mason D. Pratt described the general shop and division car house designed by him for the Central Pennsylvania Traction Company at Harrisburg, Pa. This was one of the first railway installations built entirely of reinforced concrete and attracted considerable attention by reason of its novel construction and arrangement. At this time the buildings have been in service for over three years, and present many interesting features from the operating standpoint.

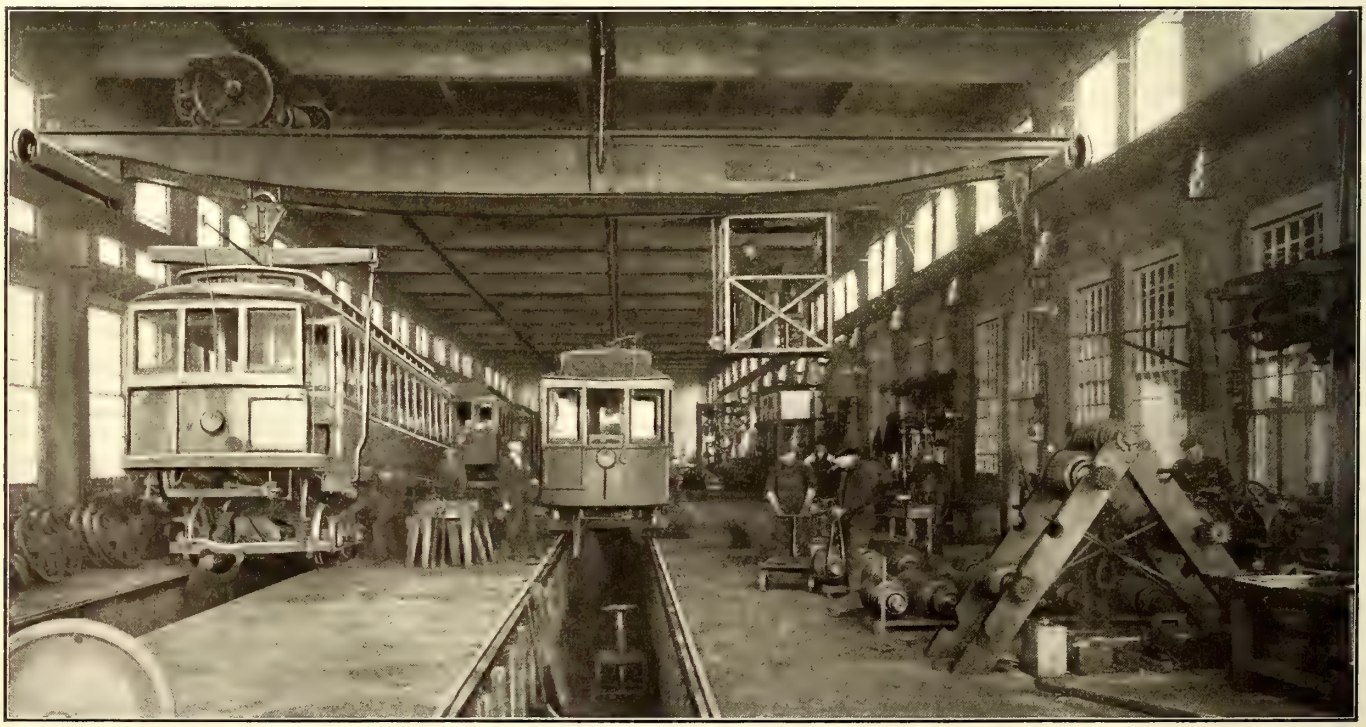


Harrisburg Shops—A General View of the Shops and Car Houses, Illustrating in Particular the Upper Side Lights of the Main Shop and the Great Window Area of the Wings or Leantos

LOCATION

The shops and car house are located on an 8-acre plot near the corner of Cameron and Foster Streets, in the outskirts of Harrisburg. Here land was cheaper, and the company was able to provide liberally for the future. The area in present use is 53,000 sq. ft., and is made up of a 75-ft. x 360-ft. car house with a 90-ft. x 75-ft. 6-in. trainmen's room and a 50-ft. x 375-ft. main shop, with wings for a blacksmith's shop, storeroom, winding room and heating plant. The main buildings are 50 ft. apart, and consequently are entirely separate fire risks. Both are supplied with through tracks and an outside loop to secure the utmost freedom in car movement for maintenance and emergency purposes. The spare grounds are neatly sodded to make an attractive background to the light cement finish of the buildings. Railway litter or other junk is not permitted to spoil the surroundings.

In view of the earlier description of the construction features, the latter may be disposed of briefly. Both buildings have concrete walls, floors, pits and roof, all suitably reinforced where necessary. Their general exterior and interior design is clearly shown in the accompanying illustrations, but special attention may well be directed to the great window and skylight area. The main shop roof has no skylights, but plenty of illumination is obtained through side sash. Arc lamps are installed for night service.



Harrisburg Shops—General View in the Machine Shop, Showing the Crane and Car Sling, Pit Arrangement, Overhead Motor-Drive of Tools, Etc.

The car house is made up of two three-track bays divided

by a concrete partition, with fire door. These tracks are 5-ft. 2½-in. gage and are spaced 11 ft. centers. The pits are of the intercommunicating type—that is, the devil strips simply are concrete floors carried on the pit posts, which support the running rails. The track entrances and exits are 3-in. wooden doors hung by steel strap hinges which are fitted around iron pipe posts resting on collars bolted to the posts.

In operating the doors as originally installed it was found that the absence of a back latch on the outer doors allowed them to swing too freely when they were opened. This annoyance has been eliminated by door stops of the type shown on page 602. The stop consists of a flat steel strip anchored at the near end and bent to the shape of a half rectangle at the other end. This free end is sprung upward several inches. When a door is opened it must be pushed over the anchorage and along the bar until it approaches the point where the depressed section springs up and acts as a stop. The door is allowed to swing back by pressing down the strip with the foot. This anchored stop thus avoids marring the concrete wall with iron-work.

A wing was built adjoining the car house for the convenience of the trainmen of this company. It is well furnished, and contains lockers, toilets and other features for the convenience of the men.

The pits and doors of the shop are similar to those in the car house. Both houses are heated through ducts by hot air supplied through a Sturtevant 120-r.p.m., 10-ft. fan driven by a Sprague 20-hp motor. Steam is supplied by a 72-in. x 18-ft. tubular boiler. The heat plant building is made of concrete of the same construction as the car house.

The shop building proper is 50 ft. wide and 375 ft. long. It contains two tracks which were offset toward the north so that a space of 20 ft. was left along the southern side for the arrangement in line of all the machine tools. In the paint shop, however, there are three tracks, the third track coming in from the rear or Twelfth Street entrance. The two shop tracks were set 15 ft. centers to give a strip 7½ ft. wide along the northern wall for storing wheels, axles, gears and other heavy parts. This arrangement of the machine repair and storage facilities has been found most advantageous for the manipulation of the crane. As the machine and truck work do not yet require the full length of the building, the woodworking and painting shops are placed directly back of them. The latter shops are isolated by temporary steel frame partitions. The electrical repair department, blacksmith shop and storeroom are placed in wings alongside and at right angles to the shop. These lean-tos are of the same general construction as the rest of the installation.

SOME NOVELTIES IN THE OVERHEAD DEPARTMENT

One of the first things to attract attention in a visit to this installation is the overhead catenary construction in front of the buildings, because elsewhere the company uses the standard d.c. suspension. P. F. Gerhart, chief electrician, reasoned that if the catenary was such a good shock absorber there was no better place to try it out than in the complicated special work in front of a car house. This home-made catenary has demonstrated itself as an unqualified success for holding curves, and might be imitated with profit at other car houses.



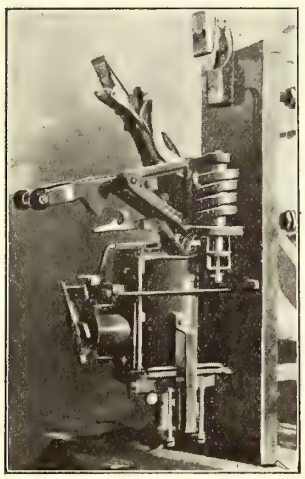
Harrisburg Shops—View of a Bay in the Nearby Car House, Showing the Type of Concrete Construction, Lighting, Pits and Other Features

Another improvement shown in the illustration of the catenary suspension on page 603 is the use of a cross-piece to prevent jumping trolley wheels from tangling up the wire junctions and smashing the frogs. Each of these stops consists of nothing more than a piece of angle iron which is bolted into an ear on each of the converging wires.

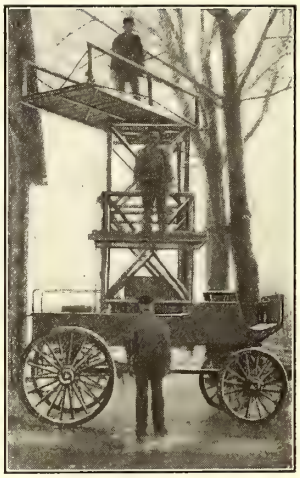
The shop employees have also rigged up from waste material a car alarm outfit, which saves time for the company as well as offering a convenience for the men. Within a short distance from the shops they have installed in

the trolley circuit brass contact makers 4 in. x 4 ft. long, bolted to wooden backs. These contact makers are in circuit with a shop gong, the ringing of which warns intending passengers that a car will pass the shop within a few seconds. A similar alarm has been made for the power house.

The company is placing on all of its feeders a modified form of I-T-E circuit-breaker, with resetting magnets.



Circuit- Breaker with Automatic Cut-In Feature



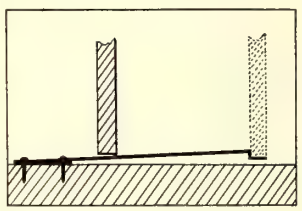
Swing Platform Tower Wagon for Pole Painting

These have been installed to reduce transmission losses by satisfactorily tying together the feeders and trolleys which supply separate sections. Before modifying the circuit-breaker in this manner, the company considered other apparatus, such as a switch and fuse, as well as the ordinary circuit-breaker. It was found, however, that while either of the customary means would separate connecting sections in time of trouble, they were troublesome to maintain.

For the sake of experiment, an I-T-E, 350-750-amp circuit-breaker of the switchboard type was equipped with a resetting solenoid and a pair of small control magnets, switches and contacts. A time-limit was also installed, but is not essential. This modified breaker, when connected across section insulators or between feeders supplying separate sections, operates as follows: Maintains a closed circuit between two sections under normal conditions; opens in case of grounds or shorts on either circuit, stays open until the trouble is removed and service resumed, after which it automatically resets; consumes no current except momentarily when resetting.

A Bristol recording voltmeter installed at a point 2 miles from the power station showed that under like schedule conditions on successive days the use of this breaker reduced voltage variations from 60 volts to 30 volts. So great a reduction necessarily must be of value in trying to get the maximum value of any railroad transmission system. After additional circuit-breakers were installed, switchboard observation showed that the feeders were tending to carry average loads instead of a peak one instant and nothing the next.

One direct advantage asserted for this breaker is that it may be set for the lowest possible limit. Where a fuse is employed, it must be of sufficient capacity to carry the maximum peak occurring between the two sections. For the same reason an ordinary breaker must be set at the maximum, as otherwise it would require constant attention to keep it set. Again, the use of heavy fuses or high-limit breakers may in cases of short-circuits injure apparatus in the power house and on certain parts of the line. This feature, which may be attached to any breaker, was invented by D. B. Moist and C. W. Young, Harrisburg, Pa., under the supervision of P. F. Gerhart.

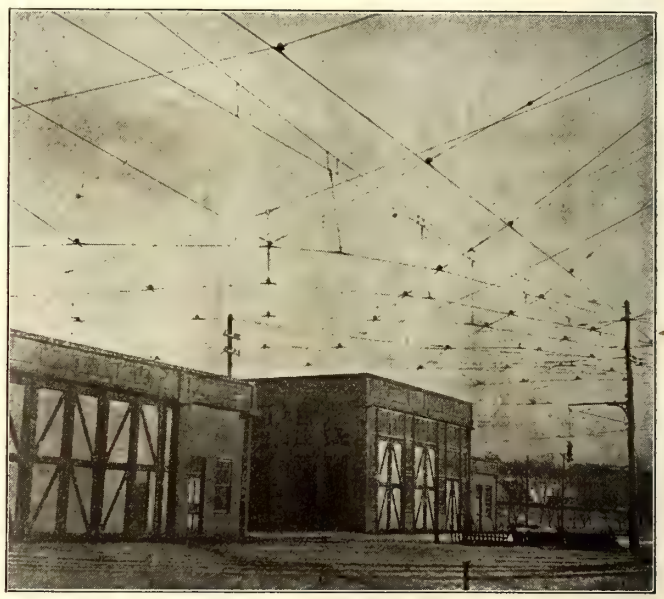


Car House Door Stop

While on the subject of the line department attention may be called to the two-platform tower wagon, which is also shown on this page. This wagon is particularly useful for painting trolley poles, as the extension platforms allow two men to work on the wagon, together with one on the sidewalk. Under these conditions three men can paint 100 poles a day.



Harrisburg Shops—A Glimpse of an Orderly, Well-Lighted and Heated Storeroom



Harrisburg Shops—Catenary Construction in Front of the Car House and Shops

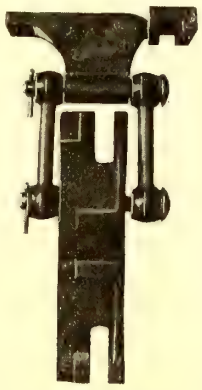
PIT LIGHTING

Railway men are so accustomed to the continuous burn-

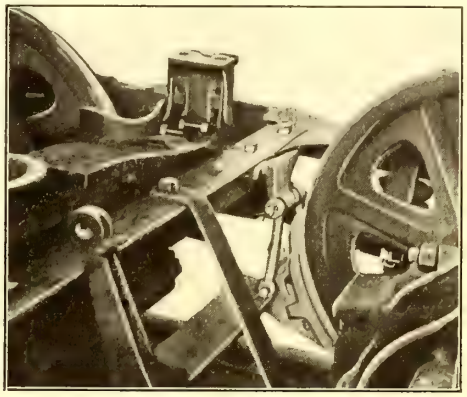
ing of pit lamps that they will find something to ponder over in the pit lighting arrangement of the Harrisburg shops and car house. It has been possible to dispense with this expensive practice largely on account of the fine natural lighting. To be sure, this lighting is not sufficient at all times and for all purposes, but it has demonstrated that the usual forms of pit lighting are needless in a shop of this kind. Instead of having a separate lamp circuit for each pit, the current for the occasional pit lighting is obtained from wires under the devil strips. Lamp sockets are placed on these circuits at short distances so that the pitman can plug in at any desired point from the pit on either side. Each man has his own extension lamp, for which he is personally responsible. For extraordinary lighting and pit tests of grounded fields, armatures, etc., three five-lamp sets, each with a 50-ft. extension, are used.



Harrisburg Shops—Overhead Cross-Bars for Protecting Frogs from Damage



Brake-Hanger Holder



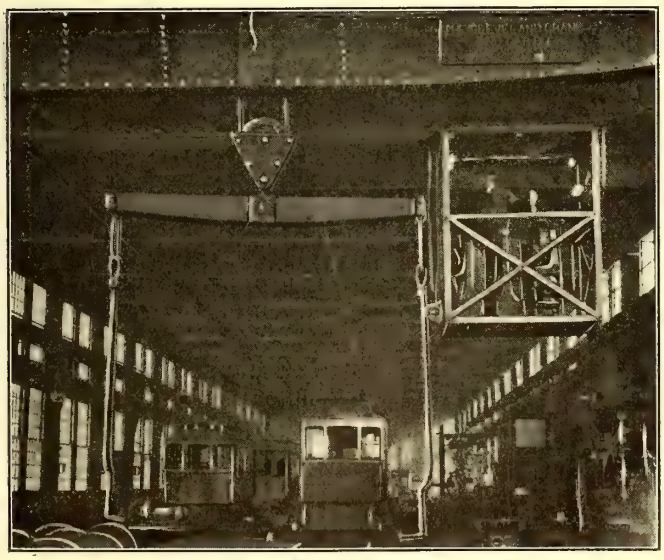
Harrisburg Shops—Brake-Hanger Holder Installed on No. 27-G Truck

TRANSPORTATION AND HOISTING

Without question, the most valuable tool in the Harrisburg shops is the 7½-ton Cleveland crane, which does every kind of work, from lifting a car off its trucks to the transfer of an armature from lathe to storage rack. By comparing the output of this shop with the older one, the company has found that the crane is worth at least five men steadily employed.

This crane has one 10-hp and two 5-hp motors, which take current from the railway power wire through a trolley wheel and pole on the forward crane girder. The crane is especially effective for rapid car hoisting in connection with detachable slings of the type shown on this page. The general view across the shop on page 600 shows how easy it is for the crane to care for inter-tool transportation, and a second view on page 605 illustrates its position in the woodworking shop.

In the pits armatures are handled with Barrett jacks and in the winding room with Franklin portable chain hoists.



Harrisburg Shops—Car Sling Used to Raise Cars with the Crane



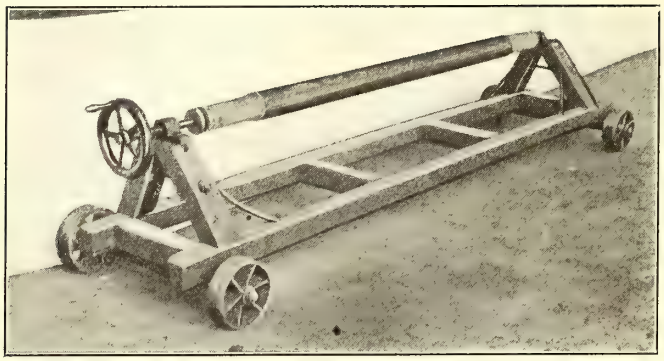
Harrisburg Shops—Every Car Marked "Special" when Destination Sign Is Removed from the Dasher Frame

MACHINERY EQUIPMENT

The machinery outfit of the Harrisburg shops is extensive enough to handle all maintenance work, and by adapting some of the heavier tools for several purposes their idle time is considerably reduced. The following machines are driven by Robbins & Myers motors, usually mounted directly overhead: Putnam boring mill, 5 hp; Schaefer-Rochester wheel press, 2 hp; Putnam lathe, 2 hp; Bement lathe, 2 hp; Reed armature lathe, 2 hp; Oliver rip saw, 5 hp; Oliver combination rip and cross-cut saw, 5 hp, and Oliver 20-in. jointer, 5 hp. The last-mentioned tool is to be fitted with a new safety cylinder cutter, which will prevent workmen from getting their fingers cut off by accident.

The other tools, which are belted to a common shaft driven by an old 10-hp Thomson-Houston exciter, com-

prise a Barnes drill press, Wilmarth & Morman drill grinder, emery wheel, Sterling hack saw, Zucker, Leavitt & Loeb buffer, and a gumming machine for the circular saw. The various small tools in the winding room are also belted to one line shaft, which is driven by a 2-hp motor. An old Christensen compressor is used for air-brake tests and to supply air for the cleaning of commutators, armatures, controllers, etc.

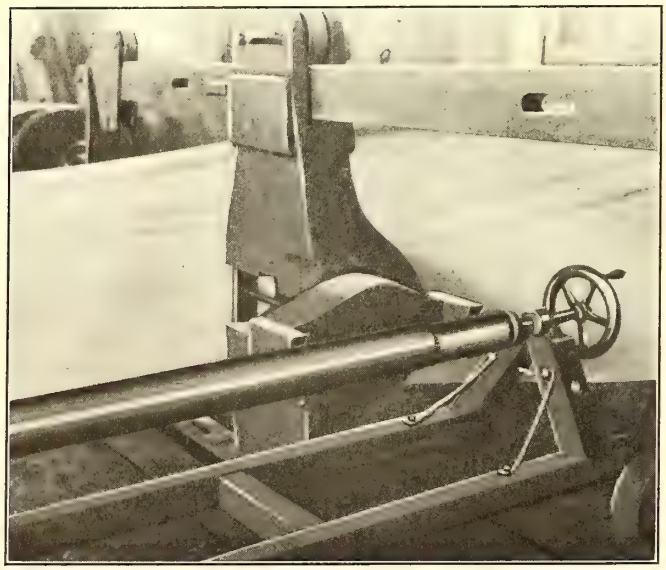


Harrisburg Shops—Truck on Which Bent Axles are Marked and Carried to the Wheel Press

The blacksmith shop contains two Buffalo forges and blowers driven by an 8-hp motor, together with one Buffalo exhaust fan.

SOME INTERESTING TOOL APPLICATIONS

The operators of this shop have devised a number of interesting auxiliary uses for the more expensive tools. Thus one of the lathes is also employed as a commutator slotter in the manner illustrated on page 605. The armature is mounted on the lathe so that the commutator is brought opposite the tool post in which a small piece of self-hardening tool steel has been inserted. This cutter is ground to the width of the mica and can be regulated to follow it with great accuracy. In this way about 45 minutes are required to slot the commutator of a GE-1000 armature.



Harrisburg Shops—Preparing to Straighten an Axle with the Aid of a Wheel Press

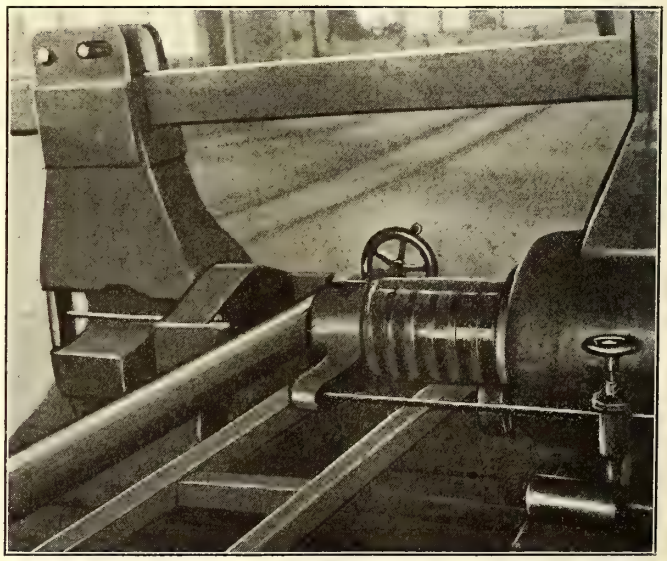
The wheel press has been cleverly adapted for straightening bent axles. A bent car axle first is mounted on a special truck which has a regulating wheel to hold the axle firmly in position. The distorted section is then chalked off and the truck and axle placed at right angles to the wheel press, as shown on this page. The head of the wheel press is furnished with a heavy block, which is recessed to hold the axle in line when the piston operates. The pressure is not exerted directly by the piston face, as might be supposed from the illustration, but through an inserted forging shaped like the frustum of a pyramid. These bearing blocks are made in several sizes, according to the area of distortion. The axle alignment is finally tested by the ease of spinning it around the truck.

A valuable accessory of the boring mill is an expanded borer furnished by the Davis Expanding Borer Tool Company, of Chicago. This device bores holes from 3¼ in. to any size desired. It has been in service on gears and car wheels for five years without any maintenance cost whatever.

BRAKE SHOE HANGERS AND BRAKE SHOE PRACTICE

About two years ago the company substituted for the ordinary U-bolt brake-head hanger of the Brill No. 27-G truck an anti-chattering steel hanger made of a forging bolted to the truck transom links carried on two ⅞-in. x 7-in. key bolts with cotter pins ¼ in. x 2 in. The life of this new bracket and hanger is about two years. The company has not experienced any trouble in keeping all parts tight, as they are easily inspected.

The company has followed the unification of brake-shoe practice with much interest, having accepted the recommendations of the standardization committee of the American Street & Interurban Railway Association for wheels of 2¾-in. tread. As fast as the half-dozen old designs wear out they are replaced by the gray iron, steel-back shoe pattern M-541 made by the American Brake Shoe & Foundry Company. The matter of shoes for pony wheels is not of much importance, as very few maximum traction trucks are operated in Harrisburg. About seven months ago brake-shoe life began to be recorded on a mileage basis.



Harrisburg Shops—Straightening a Car Axle in the Wheel Press

GEAR PRACTICE

Solid gears of Bliss, Catskill and Nuttall manufacture are the Harrisburg standards. They are pressed on at 30 to 40 tons pressure without any keyseat to weaken the axle. The end of the axle is slightly tapered, say 1/64 in. in 8 in. length as for the GE-80 motor, to give the gear a good start while using less power. Gears can be pressed on and replaced in one-half the time it would take to in-

stall a split gear. The gears are not permitted to wear out entirely, but when the teeth are within ⅛ in. of becoming sharp they are scrapped on the assumption that they would be in bad condition before the next set of cast-iron wheels wore out.

Gears are lubricated with Dixon's wood graphite. They are housed either in Columbia or Lyon sheet steel cases. Pinions are removed with Columbia pinion pullers.

BEARINGS AND LUBRICATION

The armature babbitt used in Harrisburg for the last three or four years is a composition containing 83 per cent tin and costs 23½ cents per pound. In GE-80 motors it has given an average life of 40,000 miles.

The lubricant for bearings of grease cup motors is a non-fluid, vaseline-like material made by the New York & New Jersey Lubricator Company and costs 5½ to 6 cents per pound. It is successfully used on the Westinghouse No. 3 and GE-800 motors, both in hot and cold weather.

IN THE PAINT SHOP

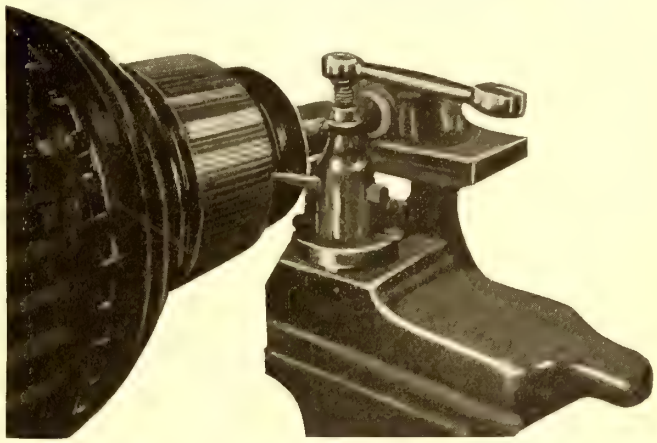
Among the interesting things in the paint shop is an adjustable sawhorse for conveniently painting the sides of cars from roof to panels. The simplicity of this scheme for using but one set of sawhorses for the different heights is apparent from the cut on page 606. The view on page 603 of the car marked "Special" brings up another oddity. Although the Harrisburg cars carry destination posters in a frame on the dasher, people had the disastrous habit of trying to board special cars which had just left the shop without any intention of picking up passengers. It occurred to A. F. Rexroth, master mechanic, that if the word "Special" were painted in conspicuous red letters on the yellow dasher the car could be plainly indicated as a non-passenger vehicle just by removing the destination sign over it. The adoption of this simple idea really has eliminated a lot of trouble in this respect.

Brasswork is easily cleaned by first dipping it in lye to remove old varnish, dirt and grease, then dipping it in a solution of nitric acid and finally applying a coat of lacquer.

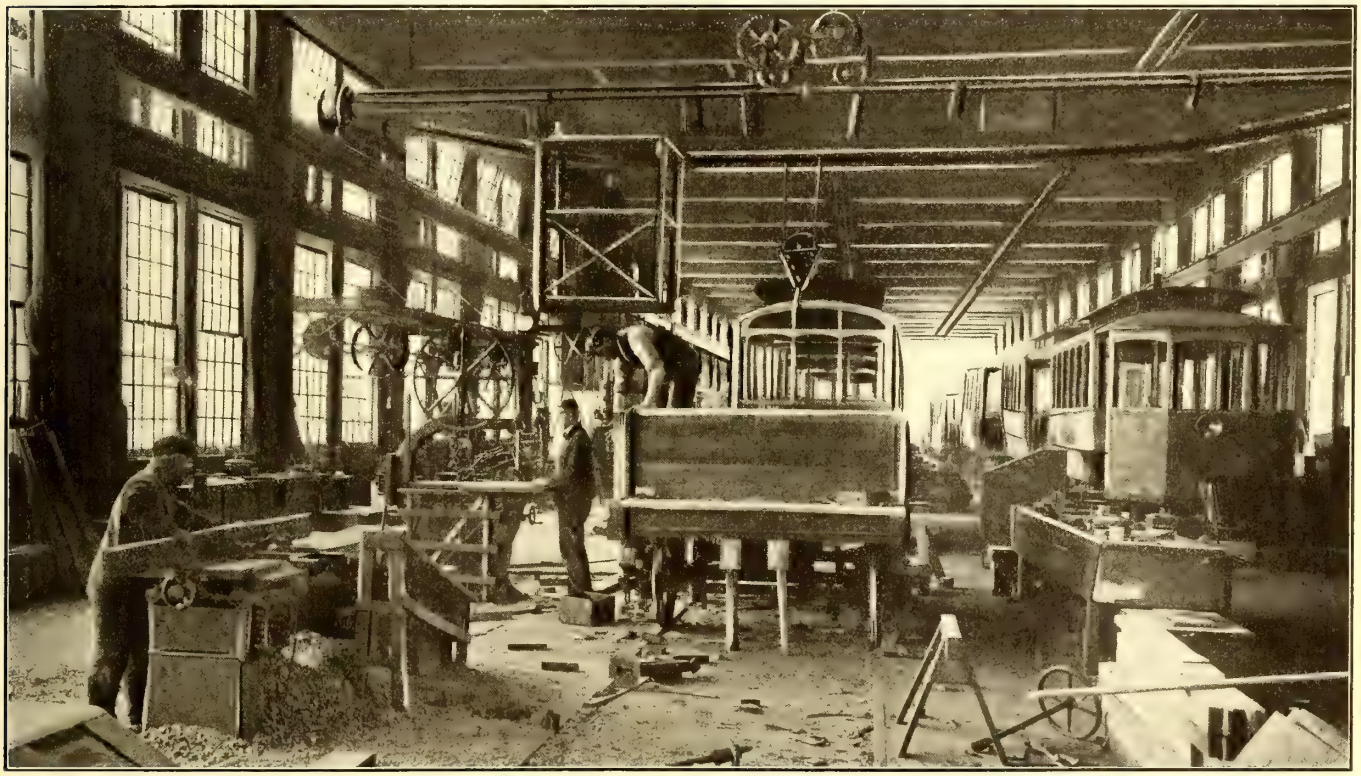
CAR PAINTING

The system used by this company for car painting is as follows: When found necessary to repaint a car it is first burned off outside. After being sandpapered, a coat of white lead is applied as a primer. It is then given one coat of surfacer or rough stuff, puttied and glazed. Next it is sandpapered again to get an even surface, and three or four coats of color are applied, according to the requirements. It is then striped, lettered and finished with three coats of body varnish of a standard make. The inside of the car is cleaned with varnish remover and washed with benzine to insure a clean surface. It is then sanded and filled with wood filler or shellac until a good foundation is obtained, sanding between the coats. It is then given two or three coats of body varnish. Except on emergency jobs, the first coats used are rubbing varnish. All cars are given one coat of body varnish once each year.

The painting force consists of three painters and two helpers. These men are able to take care of 114 cars in ad-



Harrisburg Shops—Slotting a Commutator on a Lathe



Harrisburg Shops—View in the Woodworking Department Back of the Truck Overhauling Department

dition to doing all park and other outside company painting.

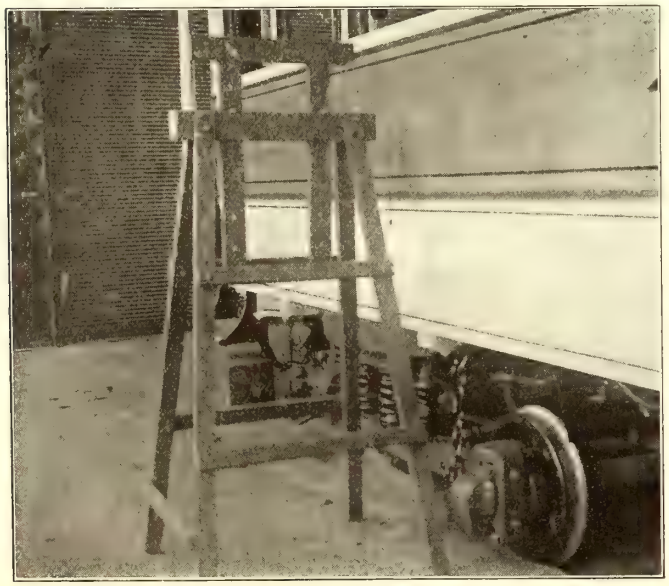
WINDING PRACTICE AND ELECTRICAL KINKS

In the winding room a countershaft run by a 2-hp Robbins & Myers motor operates a banding lathe, armature coil taper and field winder. The latter was made from an old belt tightener and worm gears, which arrangement has been found satisfactory because when the machine is stopped the tension is kept tight on the wire. The standard field coils for motors are made of asbestos-covered wire, and while



Harrisburg Shops—The Winding Room

being wound are treated on each layer with a brush-applied composition made of equal parts of powdered asbestos and oxide of iron mixed to a soft paste with armalac. After fields are taken from the form they are put in a roaster for about 24 hours. On being taken out, they are thoroughly coated outside with the same composition and taped with asbestos tape. After all outside insulation and terminal plates are put on they are again roasted for about 12



Harrisburg Shops—Adjustable Horse for Painting Cars

hours. Fields treated in this manner have been in constant service for about four years and are still in good condition.

The winding room contains a set of electric heaters, the coils of which are made available in different voltage combinations for various purposes. In one instance, a shunt off the heater circuit lights some tiny incandescent lamps on the inner side of a tool-box cover whenever the lid is raised to look for something. Another heater shunt connected to bells is used for coil testing in place of batteries. This method is more reliable than a battery, since the latter is liable to have an open circuit.

SHOP PERSONNEL

It would be difficult to point out the actual originators of many of the shop practices at Harrisburg, as the maintenance men have the pleasant custom of working out their new ideas in co-operation. The responsible heads of the maintenance departments, however, are A. F. Rexroth, master mechanic, and P. F. Gerhart, chief electrician in charge of the overhead work, to both of whom acknowledgment is due in helping to gather data for this article.

CAR CIRCUIT BREAKERS

BY A CAR INSPECTOR

The rate of depreciation of the motors, controller, wiring and other parts of a car equipment depends more closely upon the proper adjustment of the car circuit breakers than upon any other one part of the apparatus on the car. It is the safety-valve upon which the integrity of the other portions of the equipment depends.

The adjustment of the circuit breaker should be checked by the use of a suitable rheostat and ammeter at least once a month, and in doing so the current should be raised gradually when approaching the tripping point, otherwise the true reading will not be obtained. It is the practice in some shops to set the breaker by the use of a calibrated scale or dial. Such a scale is not necessarily correct, and, if it were, the method is not one to be relied upon, as the friction of the tripping mechanism changes on account of rust. Again, the circuit breakers are not always put on a car in the position which the manufacturer intended, and any changes in position alter the force of gravity, hence the calibration of the breaker. To determine the correct setting for a circuit breaker, a car should be put in regular service over the line on which it is intended to run, and, with an ammeter and proper acceleration, the correct current value at which to set the breaker can be determined.

Improperly set circuit breakers are of two classes, namely:

(1) Those set to blow at too low a current value.

(2) Those set to blow at too high a current value.

Those in Class 1 make it necessary for the motorman to feed his controller more slowly than if the circuit breaker were set properly. It is also evident that on this car the rheostatic losses will be greater, and there will be less opportunity to coast, and as the current is on for a longer period, braking must be commenced at a higher speed to make the same schedule.

With the platform controller in the hands of an indifferent motorman, the circuit breaker inoperative, the voltage high and the load heavy, the acceleration is apt to be disagreeably quick, and the life of the equipment in general will be decreased. The parts on the car most affected are the commutator, coils, pinion and gear, but on interurban roads a sudden overload at the substation might result in burning the station breakers, flashing and throwing the rotaries out of synchronism. With a slippery rail an automatic safeguard is provided through the spinning of the wheels, through which the counter e. m. f. of the motors is increased, but the current in the motors may be suddenly raised above the normal tripping point of the breaker should the motorman sand the rails. The location of circuit breakers under the car is advantageous in one respect. It reduces the tendency to fast feeding of controllers because the motorman has to stop the car in order to reset the breakers.

REINFORCING METAL POLES

When iron poles were originally used for electric railway work it was thought by many that if properly maintained they would last a lifetime. Experience has shown, however, that after about ten years serious corrosion begins to take place, usually at the base of the pole, just above the ground line and extending below the ground for several inches. The extent of this corrosion seems to be largely independent of the manner in which the poles are installed. Usually, the location makes little difference.

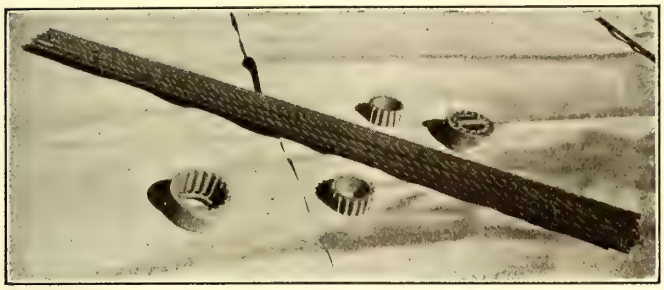


Fig. 1—Twisted Rods and Castings Used in Reinforcing Poles

Poles set in a cosmocrete sidewalk or in country side paths are attacked impartially, but pure wrought-iron poles seem to be much less susceptible to attack than steel. Thus, in Brooklyn a lot of about 50 wrought-iron poles which had been set just 10 years were removed recently, and were found to show no signs of corrosion, although parts of the poles were not covered by concrete near the surface of the ground.

The question of the maintenance of poles which were corroded near the base had to be faced some time ago by the engineering department of the Brooklyn Rapid Transit Company. Several courses were available: (1) To replace the pole with a new one. (2) To reinforce the pole by removing and shrinking on an iron jacket over the weakened portion. (3) To slip a sleeve, larger than the lower section, over the pole, sink it below the ground the desired distance and fill in the intervening space with sulphur, cement or other material. (4) To insert a reinforcing system of rods in the trolley pole from the top and filling the pole to the desired height with concrete or cement mortar. In the opinion of the Brooklyn engineers there were serious objections to the first three plans. The cost of the first was large, as it involved not only a new pole, but disturbance to the overhead construction supported by the pole and to the sidewalk. The second plan presented the same objections as the first. In the third plan all wires as well as the arms and ornamental collars must be stripped from the pole to permit slipping the sleeve over the top. Again, the sidewalk must be destroyed and replaced, and this was considered objectionable because malicious persons frequently destroy the patches and prop-

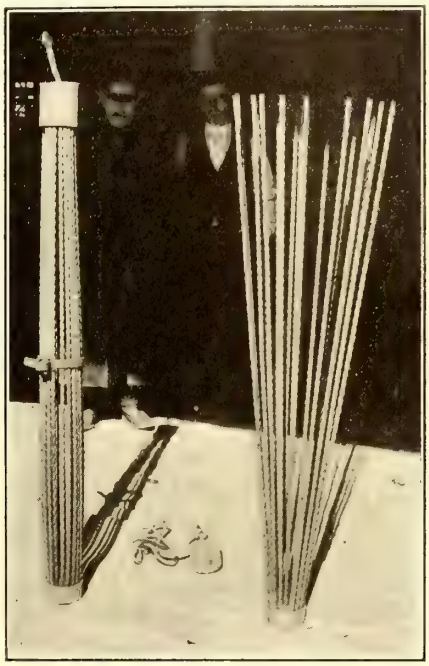


Fig. 2—Rods Used for Reinforcement



Fig. 3—Slipping the Wires Inside the Pole

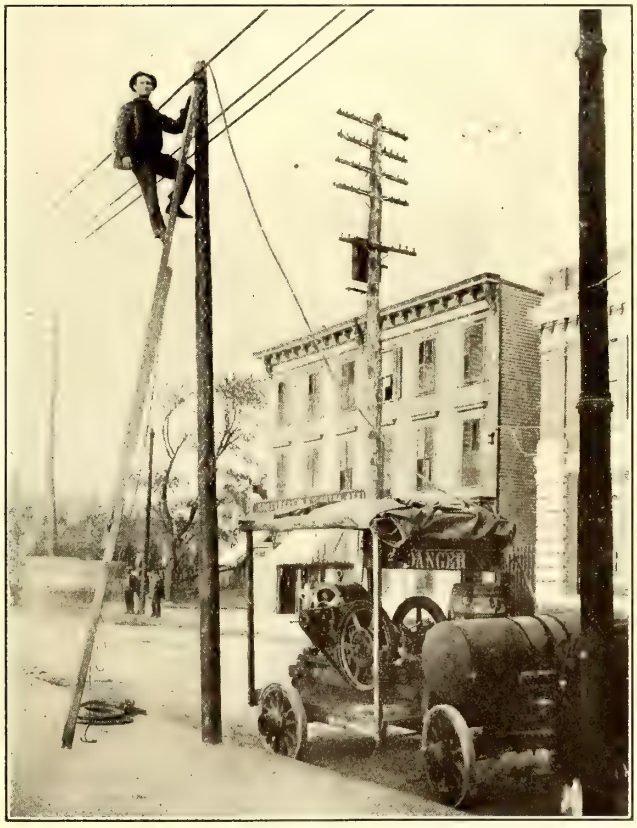
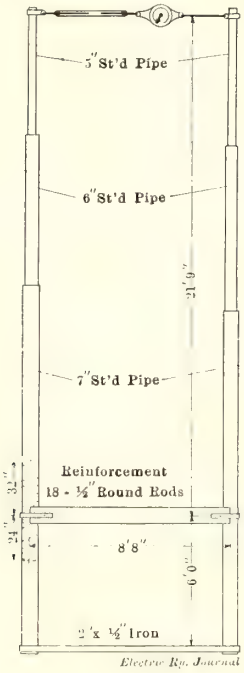
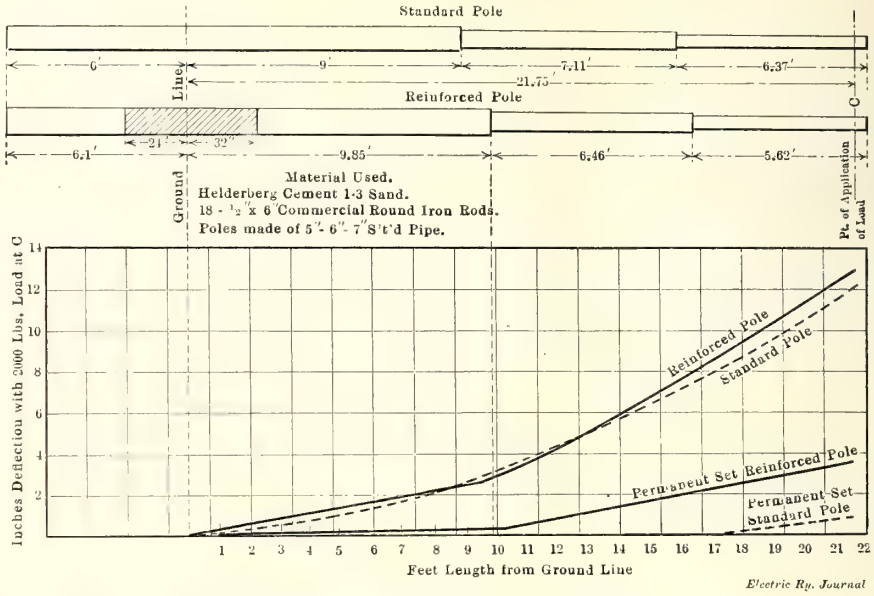


Fig. 4—Pumping Liquid Cement into Pole

erty owners are apt to be unreasonable. The method is also costly, since when sidewalks are opened a city inspector has to be engaged at $4 per day to oversee the work.

The fourth method was adopted in Brooklyn and has been found simple, cheap and effective. A short description of this method was published in the Electric Railway Journal for Oct. 10, 1908, page 929, but further particulars will be of interest. Nothing but the pole cap need be disturbed, and this can be done easily by lifting the cap off. Twisted steel rods of any desired number within limits are formed into a "cage," as it is called, by means of the pair of castings between which the rods are held. These are shown in Figs. 1 and 2. These rods are held in such a manner that some pressure is required to restrain them while they are being inserted in the top of the pole (see Fig. 3). The rods are usually about 5 ft. long and to insure their proper position with respect to the point of weakness, the bottom of the pole is filled with sand so that the cage will rest at the desired point. The rods when inserted in the top of the pole require a little pressure to force them through the upper section, but after passing into the middle section, fall easily to the bottom. In this position the rods will expand very close to the inner wall of the pole, thus providing the most economical distribution of the metal and still leaving sufficient space between the rod and the inner wall for a coating of cement mortar. A piece of tar paper is then placed around the bottom of the pole, if there is a hole in it, to close the hole. A cement mortar is then forced into the pole so as to cover the rods by a foot or more, and then the replacement of the cap is all that is required to complete the job. The method is shown in Figs. 4 and 5. No wires, arms or other fixtures need be removed. No difficulty has been experienced with vibration and poles reinforced under severe conditions have withstood tests indicating that a pole with less than 1/16 in. of metal at the ground line will fail at other points before showing any signs of bending at the reinforcing. In fact, even if all the metal were removed the pole will be still as strong as the new pole and have the additional advantage that at destruction it will only bend and not break and fall into the street.





Figs. 5 and 6—Tests of Plain and Reinforced Iron Poles



Figs. 8, 9 and 10—Bases of Corroded Poles

Fig. 11—Repaired Pole

The amount of reinforcement can be varied by increasing the number and size of the rods and their disposition in the pole. For example, rods may be larger at the "back" of the pole, depending on the concrete to take the compression, but as poles are frequently reset and removed, it is considered in Brooklyn better to reinforce the pole equally and thus enable it to resist stress in any direction.

Fig. 6 gives the results of some tests of poles, new and reinforced at the ground line. The poles were framed up

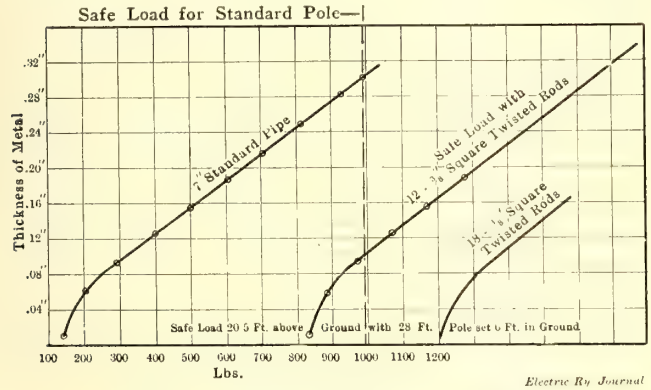


Fig. 7—Tests of Reinforced Iron Poles

as shown in Fig. 5. At their bases the poles were held with an iron link of suitable strength; at the ground line a strut of heavy timber was inserted and fastened loosely to the poles for convenience. At the top a turnbuckle and dynamometer were inserted to supply the load to the poles. This arrangement insured the same stress on both poles and eliminates any inaccuracies in measuring instruments so far as relative results are concerned. It should be noted that the conditions of the test do not reproduce exactly the conditions of the poles in the ground which are generally assumed as cantilevers, but poles as usually set are not fixed rigidly in the earth, as the concrete jacket is not thick enough to be of much value in preventing bending below the ground line.

The load was applied in regular increments up to 2000 lb. (safe load being about 1000 lb.) and deflections noted at 1-ft. intervals above the ground line. It was found that the new pole had a uniform flexure, but that the reinforced pole was very rigid throughout the reinforced section and most bending took place at other points. This test was completed when the reinforced pole failed above the first joint—that is, at the 6-in. and 7-in. sections. When repeated under same conditions the reinforced pole failed in the same point. The permanent set was found to be small in the new pole and to be hardly perceptible in the reinforced portion of the old pole. (See Fig. 6.)

In the study of reinforced steel poles given by C. E. Roehl and H. H. Hilborn, of the engineering department of the Brooklyn Rapid Transit Company, patentees of the system of reinforcement described, tests were also conducted to determine the deflection of beams made up to represent the condition of reinforced poles in which all the metal had disappeared, leaving the concrete and reinforcement only to carry the load. Two sections of 7-in. square Ransome rods and a grout of two parts sand and one part cement, the other with 12⅜-in. square Ransome rods. After the concrete had set for 30 days the specimens were weakened by cutting away a ring of metal ½ in. wide entirely around the pipe at the center. The beams were then tested by placing them on two saddles, 6 ft. apart, and applying the load in the center with regular increments by a testing machine, and the beams were found able safely to withstand a load of 675 lb. and 1071 lb., respectively. Another series of tests was conducted to determine the safe load which may be applied at 20½ ft. from the ground for various thicknesses of metal available in addition to the reinforcing rods. These results are given in Fig. 7 with the corresponding data for 28-ft. poles composed of 5-in., 6-in. and 7-in. pipe. Figs. 8, 9 and 10 show poles which were corroded at their bases and Fig. 11 a pole reinforced in the manner described by the Brooklyn Rapid Transit Company.

These patents are now controlled by the New York Pole Company.

ELECTRIC EXPRESS CAR FOR THE NORTH-EASTERN RAILWAY, ENGLAND

Last January the North-Eastern Railway, of England, introduced on its electrified Newcastle division the combined parcel and freight motor car shown in the accompanying illustration. This car has four compartments, consisting of a motorman's cab at each end with separate divisions between for packages and fish, which constitute a large part of the freight.

The car is 55 ft. over all, and is mounted on pressed steel trucks having 36-in. diameter wheels. The wheel base of each truck is 7 ft. and the distance between centers 40 ft. The center and side couplers are located on the end sills to enable the car to be coupled up to either an electrical or a steam-driven train without delay. The buffers are also arranged to conform to the two systems. The braking equipments comprise standard air brakes and hand brakes. Compressed air from the brake system is used for operating a whistle over each motorman's cab.

The electrical equipment consists of four 125-hp British Thomson-Houston railway motors of the GE-66 type as used on all other North-Eastern electric trains but with the latest form of Sprague-Thomson-Houston multiple-unit control. All cables are asbestos covered and are run in solid drawn steel conduits screwed into cast-iron connection boxes wherever junctions are required. A bell mouth is provided where the cables leave the piping and a rubber washer, making a perfectly tight joint, insures the complete sealing of the conduit.



Fish Express Car for Service on Electrified Lines of North-Eastern Railway of England

The car is lighted by six lamps in series. Duplicate signal and route lamps are also installed, arranged on a sliding base, so that in the event of one circuit failing the duplicate set can be immediately brought into use. The weight of the car in complete running order, but exclusive of its load, is almost 38 tons. The car was built by the North-Eastern Railway Company at its carriage works at York and all of the electrical equipment was supplied by the British Thomson-Houston Company, Ltd., of Rugby, England.

METHODS AND COSTS OF INSPECTION AND REPAIR WORK ON THE SOUTH SIDE ELEVATED RAILROAD

The South Side Elevated Railroad, of Chicago, in March, 1908, began a careful inquiry into the cause of electrical and mechanical defects on its cars. As a result of co-operation by all departments interested the mileage per case of trouble has been nearly doubled in 11 months. This article describes the scheme of inspection records used and the methods followed in locating and eliminating mechanical and electrical troubles.

The good results of the past 11 months may largely be credited to the thorough inspection practice and plan of specialized inspectors and repair men in particular classes of work. This plan is based on the theory that when one man centers his attention on one class of inspection work

COMPARISON OF ELECTRICAL DEFECTS ON CARS, BY MONTHS.

	Total number of elec. defects			Mileage per case of trouble			
	G.E. 57	G.E. 73	West. 121	G.E. 57	G.E. 73	West. 121	Ave. for all classes
April, '08	648	149	127	673	1200	3910	1202
May, "	731	167	184	629	1118	2745	1064
June "	386	128	77	1168	1427	6525	1921
July, "	388	126	80	1130	1433	6082	1877
Aug., "	525	133	79	815	1365	6250	1497
Sept., "	520	151	57	826	1220	8450	1504
Oct., "	441	121	88	1025	1640	5700	1774
Nov., "	401	91	100	1070	2154	4948	1893
Dec., "	329	96	117	1495	2200	4460	2278
Jan., '09	293	80	117	1545	2461	4411	2378
Feb., "	310	99	105	1321	1672	4485	2035

the faults which escape him will be a minimum. If this plan were followed to the extreme the shopmen, of course, would lose interest in their daily tasks, and the work might be neglected; so at opportune times deserving men are shifted from one kind of work to another. This maintains interest in the work and offers a convenient means for promotion.

The accompanying table shows a comparison by months from April, 1908, to February, 1909, of the electrical defects on cars and the car-mileage per case of trouble. The statistics are subdivided according to the kinds of motors used. In this connection it should be stated that the GE-57 equipments have been in service about 11 years, the GE-73 equipments for about seven years, and the Westinghouse 121 motors only about two years. The older motors are of smaller capacity than those purchased more recently, and all three types of motors of various horse-power capacities are operated with each other in multiple-unit trains.

The South Side Elevated Railroad was the first road to use multiple-unit control for train operation, and the number of cars equipped with the various kinds of motors, each with two motors per car, are: GE-57, 150 cars; GE-73, 70 cars, and Westinghouse 121, 150 cars. The cars with the GE-57 motors are equipped with the Sprague multiple-unit control as first designed and put in service on the road. The controller is a K-type, actuated by a small pilot motor wound with No. 32 silk-covered wire. Very few changes have been made in control or motors during the 11 years in which they have been in use. The 70 cars equipped with GE-73 motors were purchased about seven years ago, and have the same control system, but improved in some particulars. The 150 cars with Westinghouse 121 motors are comparatively new, and have the Westinghouse electro-pneumatic multiple-unit control. It is planned to use the latter as much as possible, so that the older equipments will be relieved. As the three kinds of motors with two kinds of control are combined in trains, the gearing on all motors is arranged for a uniform speed of 28 m.p.h.

RECORD SYSTEM

Up to a year ago repairmen were stationed at the ends of the lines so that they might ride defective cars and make light repairs en route. Now the mileage per case of trouble has been so reduced that the repairmen can be used more efficiently by making their headquarters at the shop at Sixty-first Street. Whenever a motorman notifies a dispatcher of trouble on his train the dispatcher enters the report on his train sheet and notifies the shop to send out a repairman to meet this train at the most convenient point. With this report begins a series of car records that is extremely simple, and yet gives all the data required either for studying the performance of any car or in investigating a reported accident.

The permanent records of all work done on cars and their equipment are made on four cards, all of the same size, 4 in. x 8½ in., but of different colors—white, blue, yellow and salmon. These cards are known as motorman's report of defects, repairman's report of defects, inspection report, and report of repairs made at car shops. After the cards have served their immediate purpose they are permanently filed in a large case in the office of the superintendent of the car department. This case has 400 compartments, each of a size to hold the cards when lying flat. The compartments are numbered correspondingly with the car numbers, and each day when the cards have been filled out and viséd by the foreman and the superintendent of the department, a clerk distributes them by number into their proper compartments in this large case. Thus the system is followed out from day to day without any bookkeeping, and in the compartment for each car may be found at any time the signed reports, describing definitely all the work of inspection and repairing done on that car since this system of records was established.


SOUTH SIDE ELEVATED RAILROAD

Motorman's Report of Defect on Car No._____

Date _____ 190_ Time _____ A. M. ____ P. M. ____

_____ Branch _____ Motorman

Delay: Place _____ Minutes _____

CAR BODY
DOORS
GLASS
CURTAINS
SEATS
VENTILATORS
DECK SASH
BELL
BELL CORD
LIGHT OR LIGHT SWITCHES
PLATFORM GATES
SAFETY SPRINGS
DRAW BAR
MATS
HEATERS

MOTORS
ARMATURE
MOTOR FLASHED
FIELDS
MOTOR BEARINGS
FUSE BLOWN
BRUSH HOLDERS
GEARING

TRUCKS
MOTOR TRUCK
TRAILER TRUCK
FLAT WHEELS
HOT BOX
BRAKES NOISY

CONTACT SHOES

CONTROL SYSTEM
CIRCUIT BREAKER
PLATFORM SWITCH
PILOT MOTOR
REVERSER
RELAYS
LINE FUSE
SWITCH GROUP
CONTROLLER
LIMIT SWITCH
RESISTANCE
TRAIN LINE CABLE
OVERHEAD TROLLEY
STORAGE BATTERY

AIR BRAKE
MOTORMAN'S VALVE
GOVERNOR
COMPRESSOR
PUMP FUSE BLOWN
TRAIN LINE PIPE
RESERVOIR HOSE
TRAIN LINE HOSE
RESERVOIR PIPE
AIR GAUGE
TRIPLE VALVE
WHISTLE

Track Defects _____
Signal Failure _____
Remarks _____

South Side Elevated—Motorman's Report of Defect Card

The various cards are reproduced as actually filled out in regular work during the past month. The method of using them may be of interest.

Each case of trouble found by a motorman is reported on one of these standard size cards as reproduced. The heading of the card used for this purpose is "Motorman's report of defects of car No. ****." In using this report blank the motorman fills in the date and time and branch of the road on which he is operating, signs his name, makes a note of the delay caused and checks from the list of car and equipment parts that part of the car which is out of order. At the bottom of the report he notes the condition of the defect.

Whenever a repairman is called upon to inspect or repair any part of a car he fills out a standard repair report of the account of the blowing of a main fuse, he found that the armature of the No. 1 motor was grounded.

When a car is turned in for inspection, the inspection report used at the shops is fastened to a small board, and is left in the car, so that each man who does any work on the car may sign his name in the space opposite the list of car and equipment parts. After all the blank lines left for the signatures have been filled, indicating that all the parts of the car have been inspected and taken care of, the card is handed to the shop foreman, who marks up the car "O.K." the car may sign his name in the space opposite the list of superintendent's office, where, after it has been viséd, it is

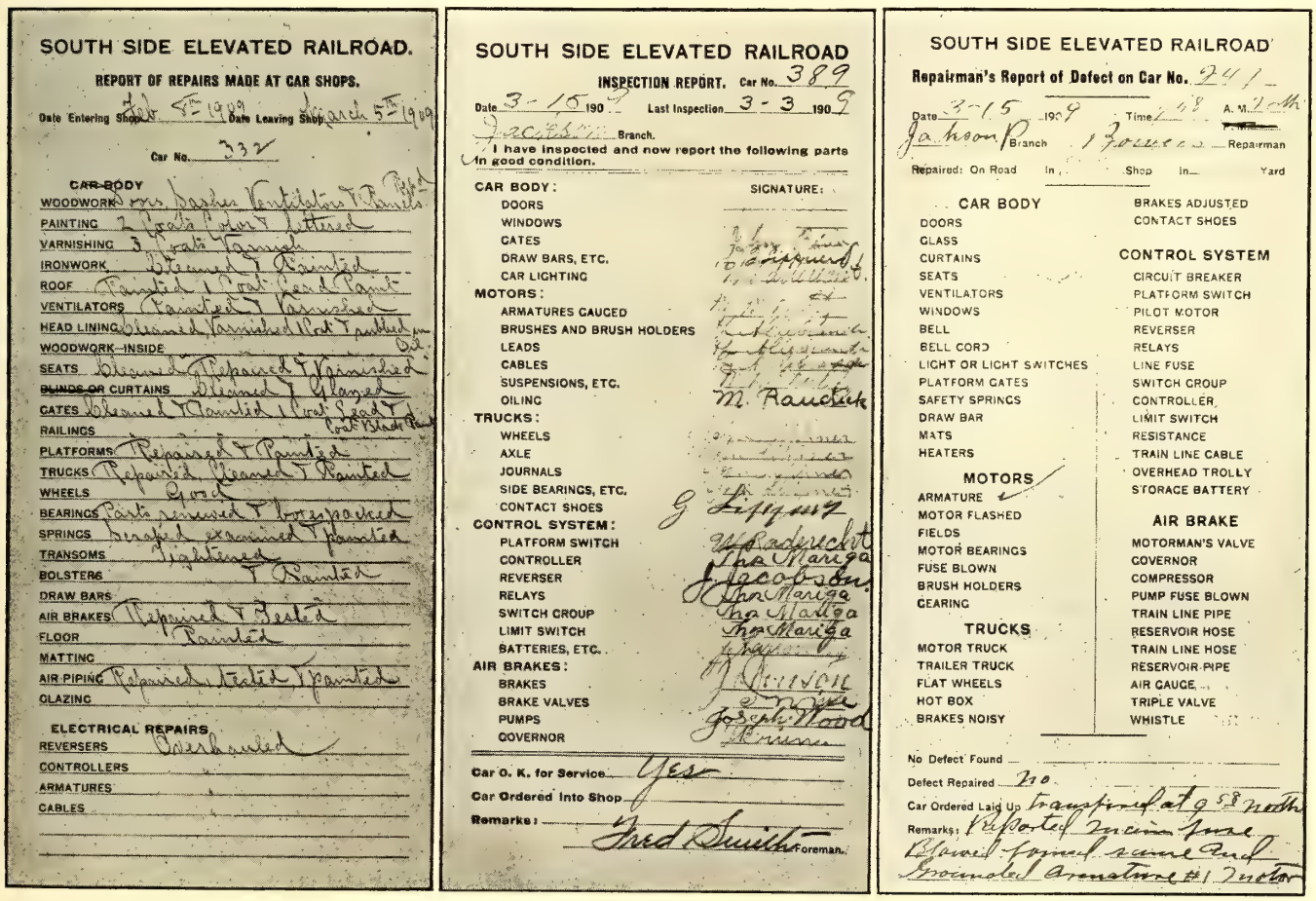
SOUTH SIDE ELEVATED RAILROAD

DAILY CAR DEFECT REPORT

Date, March 11, 1909. 7.00 a. m. to 7.00 a. m. Weather, Clear.

Car No.	Trouble Found	Repaired by	Time	Place Repaired	Previous Regular Inspection by	REMARKS	Cars in for Regular Inspection	
							O. K.	For Shop
69	In Master Switch	Bowers	A.M. 11:06	On road	Mariga	Changed Master Switch Spring.	O. K.	
65	In Pilot Motor	"	11:42	" "	"	Open circuited Pilot Motor.	"	
75	In Train Line Cable	"	P.M. 5:59	" "	Wood	Cross in jumper between coast and series.	"	

South Side Elevated—General Manager's Daily Report of Car Defects



South Side Elevated—Car Inspection and Repair Report Cards

form illustrated and explains his part of the repair work in the suitable space left at the bottom of the card. On the particular blank used for the illustration of the repairman's report it will be noted that car 247, running north on the Jackson Park branch, was turned over at 9:58 a. m. to the shops at Sixty-first Street, because, when the repairman inspected the equipment reported to be defective on placed in a compartment of the large case with all the other report cards referring to the same car.

The work done in repairing cars at the shop is similarly recorded on a repair report card of the standard size, one of which is reproduced. When filled out this card presents a record of the work done on all parts of the car body, the electrical and the other equipment. On the reverse side of

this card is a tabulation space for the material and labor costs of this repair work. The repair report is signed by the superintendent of the car department and then placed in the large card case with the other cards referring to that particular car. It is said that only about five minutes' work is required each day in sorting all the cards in the case. This process, of course, is purely mechanical, and therefore no errors of transcribing occur.

Each morning a clerk in the office of the superintendent of the car department fills out a daily car defect report, which is forwarded to the general manager. The report for March 11 is reproduced. Even the most trivial defects are reported. A blown fuse is classed as a defect. In the general manager's office a record for comparative purposes is made for classifying by cars and months the different defects to all equipments. It is found that most of the trouble is with the older cars, and so a record also is made of the number of each car on which there occur five or more cases of trouble per month. An inspection of this record shows at a glance which cars need the most attention, and an analysis of the daily car defects when tabu-

SOUTH SIDE ELEVATED RAILROAD

DAILY REPORT OF CARS OUT OF SERVICE

Date, March 12, 1909.

CAUSE	CARS	Number
General Repairs	20-61-147-157-179-223-334-335 & 336.	9
Light Repairs	186.	1
Wheels	71 & 190.	2
Trucks	52.	1
Motor Trouble	48-350 & 386.	3
Control System		
Air Brakes		
Heaters		
Other Causes		
	Total	16

George H. Hopkins,
Superintendent of Car Department and Shops

South Side Elevated—General Manager's Report of Cars Out of Service

lated is valuable as a month-to-month comparison of the efficiency of the shop forces and the reliability of the car equipment. The general manager's office also is furnished with a daily report of the cars out of service, which is reproduced.

INSPECTION AND REPAIRS

The reduction in defects made during the past year can be accredited largely to thorough inspection and repair work. The shop and inspection facilities of the South Side elevated road are not of the latest design. The buildings now used are the same structures which were built for the maintenance of the small number of cars operated 15 years ago. The motor and truck repair shop has three tracks about 60 ft. long, served by air hoists. The paint shop has sufficient trackage to hold but 12 cars, and that space which could be occupied by two cars must be used for varnishing and other light work. The inspection shed has two tracks, each of which holds eight cars. As an illustration of the crowded condition of these shops, it is stated that estimates showed that if the striping and ornamentation were left off the car bodies it would increase the capacity of the paint shop by two cars per month, and for this reason the cars as now painted are without decorations. Including the shop and inspection department, the superintendent of the car department has on his payroll an average of 200 men at a total cost of $386 per day.

Regular inspection is made on the basis of 1500 miles. The cars are lubricated and cleaned throughout at every inspection. It is necessary to put about 25 cars a day through the inspection shed, which has track accommodations for but 16 cars at one time. The work of inspection is subdivided as follows: When cars are received into the shed in trains one man immediately goes through the entire train and cuts all electrical connections, so that there may be no accidental starting or shocks. All of the controller inspection is done by two men, who clean, renew and oil the pilot motors and controllers. Another man devotes his time to inspection and repairing of reversers. So, also, one man devotes his time to the relays and to general electrical trouble work and there is one repair man each for air governors, air compressors, motor brushes and brush holders, contact shoes and trolley connections, master controllers and light circuits. An oiler with a helper is responsible for the lubrication of all car journals and motor bearings. One man also is responsible for the safe tightening of the bolts and all suspended parts under the cars and for gaging all clearances.

The costs for inspecting the more important parts of the equipment follow:

Name of part	Cost	Cost per 1000 miles
Controller	$0.20	$0.1228
Reverser	.0945	.0580
Governor	.0945	.0580
Master switch	.0472	.0289
Compressor	.1010	.0620
Brakes	.2165	.1330

The regular inspection work is supplemented with yard inspection by a man who particularly looks for loose or defective parts underneath the car bodies. The foreman of the shop or his assistant also gives every car a thorough inspection after it has been passed upon by their subordinates.

CAR CLEANING

All cars put through the regular inspection are cleaned while they are in the inspection shed. The body paint on five cars per day is gone over with an emulsion cleaner manufactured by the company, the formula for which was obtained from the Philadelphia Rapid Transit Company. It is applied with scrubbing brushes and then wiped off with waste. All the windows of all cars are cleaned with whiting and water at each inspection. The floors are also scrubbed and the interior finish rubbed clean. The cleaning process also includes disinfecting with suitable disinfectants. Compressed air for use in cleaning motors and control apparatus is led into the car body through a long hose provided with a standard coupling so that it may be connected with any nearby car equipped with an operative motor compressor. The unit costs for cleaning cars are as follows: Windows, 40.75 cents; sweeping, 6.01 cents; scrubbing, 20.41 cents; outside cleaning with emulsion, $2.34 per car.

An average of 25 cars per day are oiled, four of which have their journals repacked. One man looks after all of the oiling and draws each day 23 gal. of oil for use on car journals and the GE-73 and Westinghouse 121 motors. He also draws on an average 5 gal. of light oil per day for oiling GE-57 motors which have wick feed.

REMEDYING TROUBLE

About a year ago there was found to be an excessive number of fuses blown out on cars equipped with old GE-57 motors. A study of the equipments indicated that the probable seat of the trouble was at the brushes. As a result

the dimensions of the brushes used have been changed and the troubles largely reduced. Until this change was made the GE-57 motors were equipped with carbon brushes ⅝ in. thick, which just covered two commutator bars from mica to mica. If the brush holder became warped or was set a little out of line the brushes would be in contact with three bars all of the time and flashing would result. The electrical defects from this cause have been prevented very largely by the use of a ½-in. Le Carbone type E brush, which is ½ in. thick and therefore will allow ⅛ in. variation from perfect alignment without short-circuiting three commutator bars all the time. The brush tension is about 5 lb. and all main motor commutators are grooved 1/32 in. Work has been started also on grooving all of the commutators in the compressor motors.

Sparking at the commutator has been remedied by paying close attention to lining up the commutator bars with the armature slots so that when the brushes are on any particular bar the coil connected with that bar will be at its proper position in the neutral point of the field.

The third-rail collector shoes, of which there are four per car, have a life of about 20,000 miles and require very little attention other than renewal.

Master Car Builders' standards are closely followed with regard to wheels. All motor cars have 34-in. Standard steel-tired wheels with spoke centers. Similar wheels, 31 in. in diameter, are used under the trailers. The motor-car wheels have an average life of about 40,000 miles between turnings and the total life of the wheels averages about 200,000 miles. Wheels are inspected according to the M. C. B. rules and are turned whenever they are hollowed out ⅛ in. The tread and flange of the wheel is M. C. B. standard. A composition brake shoe is used, which has a filling made up of 85 per cent cast-iron borings and 15 per cent asphaltum.

HUNGARIAN ELECTRIC RAILWAYS AT THE END OF 1907

The department of commerce of Hungary has issued the accompanying statistics on the electric railways of that country for 1907. The only change from the preceding year was a decrease of 5 km (3.1 miles) over 1906, due to the purchase of an electric railway which is now used as a portion of the Hungarian State Railways. Freight lines are owned by municipalities:

Railway.	Length of all track—Single track. Km.	Double track. Km.	Length of Route. Km.
Vizinal System Divisions			
Budapest-Budafok	7.835	.....	8.675
Budapest-Szentlörincz	11.868	7.915	11.506
Miskolcz-Diosgyör	8.277	.....	6.943
Total	27.980	7.915	27.124
Other City Railways.			
Budapest street railway lines	71.850	67.845	71.850
Budapest municipal line	44.856	44.032	44.785
Franz Joseph electric subway (in Budapest)	3.700	3.700	3.700
Budapest-Ujpest-Rákospalota railway	16.488	11.267	17.208
Budapest and suburban railway	6.841	3.725	6.770
Fiuman railway	4.413	.....	3.982
Miskolcz municipal railway	7.300	.....	6.578
Nagyszeben municipal railway	2.395	.....	2.395
Nagyvarad municipal railway	15.327	1.799	12.497
Pozsony municipal railway	8.002	2.516	7.800
Sopron municipal railway	4.575	.....	3.830
Szabadka railway	10.000	.....	10.000
Szombathely municipal railway	3.026	.....	2.810
Temesvar municipal railway	10.415	4.865	10.415
Total	209.188	139.749	204.620
Grand total	237.168	147.664	231.744

Application has been made to the Ministry of Public Works of Austria-Hungary for a concession for the construction and operation of a standard-gage electric railway from Tirano to Bormio. The line will be about 25 miles long.

PAINTING AND VARNISHING PRACTICE OF THE BOSTON ELEVATED RAILWAY

All painting and varnishing work done on the Boston Elevated Railway Company's system is conducted at the Bartlett Street shops, Roxbury. These shops are connected with the elevated railway structure and with the surface lines passing through the district and all work done there is more or less closely associated with car body repairs. In a general way the machine shop work of the company is carried on at the Albany Street plant, while the woodworking is performed at Bartlett Street. A large forge shop is also located at the latter point.

ORGANIZATION

The painting department is one branch of the Bartlett Street organization, and as such is under the general supervision of the superintendent of rolling stock and shops. The superintendent of shops is in immediate charge of the work at Bartlett Street and makes his headquarters at this point. Under him are an assistant superintendent and various department heads, among whom is the general foreman painter. At present the latter has jurisdiction over four groups of painters, each section or gang being under a sub-foreman. The working force in each section consists of painters and helpers. One of these gangs is constantly at work painting the company's buildings, such as car houses and power stations, while the others are specialized on rolling stock and in general are located in the painting department of the shops.

ARRANGEMENT OF WORK

The rolling stock which is owned by the company includes 219 elevated cars, 91 service cars, 12 mail cars, 1504 open cars of from 7 to 12 benches, 1565 closed cars of from 20 ft. to 26½ ft. body length and 191 semi-convertible "easy access" cars of about 33 ft. body length. There is also a large number of snow plows, snow sleds, wagons, automobiles and other miscellaneous vehicles. All rolling stock is brought to Bartlett Street for painting and varnishing when such work is necessary. Closed cars usually go to the shop under their own power, but are occasionally hauled, one at a time, by a service car. Open cars are usually stripped of their motors before being taken to the shop and are hauled there two cars at a time by the service car. One motorman and two trolley men are required on such a train. Two service cars are constantly at work transporting open or closed cars to and from Bartlett Street shops.

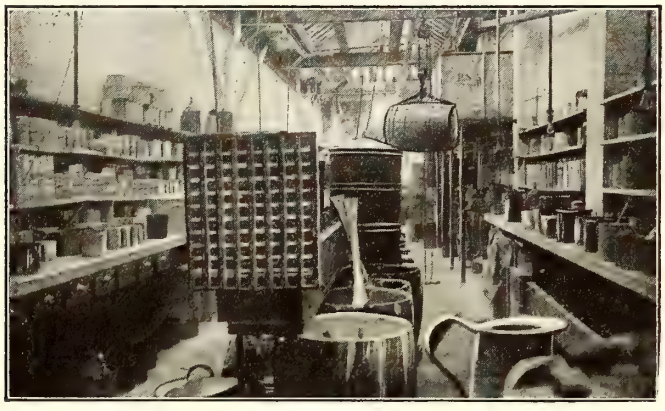
The work on the open cars begins in the painting department about Oct. 1 and continues until early in May. During this time about 150 closed cars are usually put through the shops in addition to the open cars. In May the force takes hold of the closed cars and works steadily on this type of rolling stock throughout the summer months and early fall. The company endeavors to touch up, varnish or paint all of its open cars each year. At present there are about 35 painters at work on open cars, turning out on an average 12 cars per day. The working hours are 56 per week. About 90 per cent of the work of the department is on piece work. The shop is handled on the basis of putting through a certain amount of work in a given time, fixed periods being allowed for each kind of a painting job. The capacity of the shop at any one time is six elevated and 59 surface cars.

The work of the painting department divides itself in general into three classes: Touching up jobs; cutting in

with color, and burning off and painting jobs. The touching up includes cleaning, touching up and revarnishing. Cutting in includes the application of the proper color when a car is transferred to another division of the system. Burning off includes all the steps necessary to practically repaint the whole car. The time schedule for the different classes of work is as follows:

BURNING OFF

The car is first entirely dismantled of sashes, doors, ventilators, bells, registers and miscellaneous transportation fittings. Burning off is done on the first day with a gas flame and the first coat of priming lead paint is applied. The car is allowed to dry the second day. On the third day the car is puttied smoothly and on the fourth day it is given a knifing coat. This coat is a specially prepared lead and is put on and set partially dry. The surface is then gone over with a broad putty knife and smoothed down to eliminate all brush marks and irregularities. On the sixth day this coat is gone over with fine sandpaper. The workmen then apply a ground coat or a coat of color tint preparatory to the application of a body color. On the seventh day the ground coat is sandpapered and the car is given its first coat of color. On the eighth day a second coat of color is applied and in this coat a sufficient amount of varnish is added to give a very thin gloss. The ninth day is devoted to such ornamentation as the car requires. The first coat of body varnish is applied on the tenth day and the second coat on the eleventh, using no rubbing varnish except on doors and sashes. At this time the inside doors and sashes are taken care of, the company's practice being to use no paint on these parts, as they are generally finished in hardwood. The work is mainly varnishing. On the thirteenth and fourteenth days the cars are trimmed and the fittings are installed. On the thirteenth day also the trucks are painted one coat of oil color of a tint approximating that of yellowish mud. On the fifteenth day the car floor is painted and the fenders are blocked off, and as soon as possible within the next few hours the car is taken out of the shops.



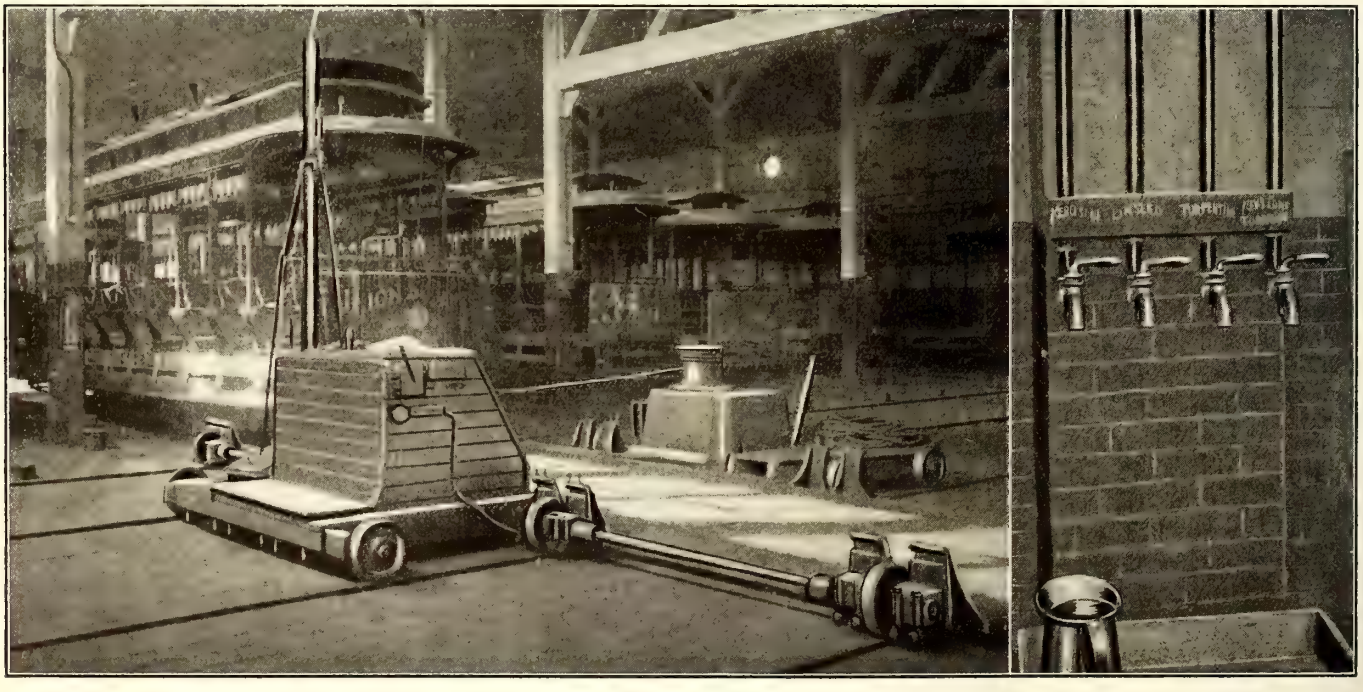
Boston Elevated Paint Shop—Stock Room

TOUCHING UP

In the process called "touching up" the car is first stripped and then thoroughly rubbed with pumice stone and water and a mild solution of soap. When it is clean its body color is matched and the colors are touched up. One man in the painting department spends practically all his time in matching colors. After touching up, one or two coats of body varnish are applied and usually a coat of white paint around the car windows. The average time for this kind of a job is approximately from a week to 10 days.

CUTTING IN

This is done only when a change in color is made, as in transferring a car from one part of the road to another. The car is sandpapered with fine-grained paper and the color cut in as designated on the instructions. All cars are provided with tags (see p. 616) which state the proposed changes in color for the belts, panels, dashers and other portions of the bodies, with the car number, division number, colors and sign designations when the car comes into the shop. The dates of arrival and completion of the work are also stated on this tag, which remains with the car as long as it is in the shop. After the color is cut in, two coats of body varnish are applied. A cutting-in job usually takes five or six days.



Boston Elevated Paint Shop—Transfer Table

Faucets for Oils

PAINTING ELEVATED CARS

Elevated cars are sandpapered off and two coats of color applied, after which two coats of varnish are put on. The

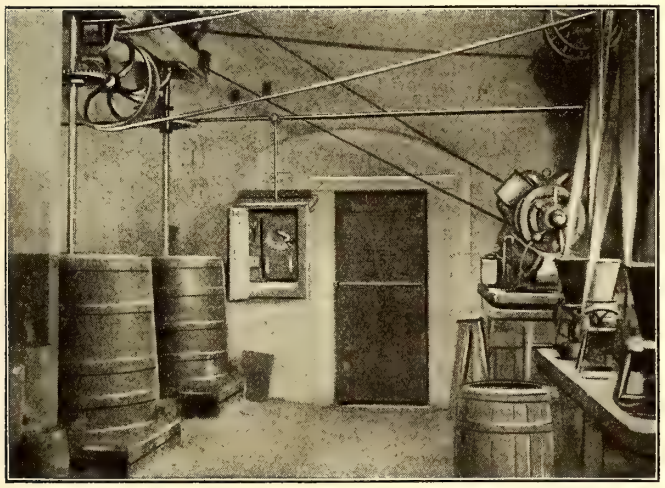
time for this work averages from a week to 10 days. This treatment of the elevated cars is the result of the severe service conditions to which they are exposed. The brake-shoe dust created by the operation of these heavy cars at speeds of from 30 to 40 m.p.h. settles into the surface of the car bodies to an extent that its removal would be very slow and expensive; hence the company does not attempt to remove it before repainting.

MIXING COLORS

The company uses stock body colors, among them green, aurora red, blue, vermilion, buff, yellow and brown. With the exception of one or two special colors all those used are put up in Japan. The company mixes its own colors for undercoats, floors, roofs, touching up, etc. Night work is seldom done in this department. As far as possible the work is specialized, each man doing the same class of detail painting repeatedly when a considerable number of cars requiring the same treatment is at hand.

STOCK ROOM

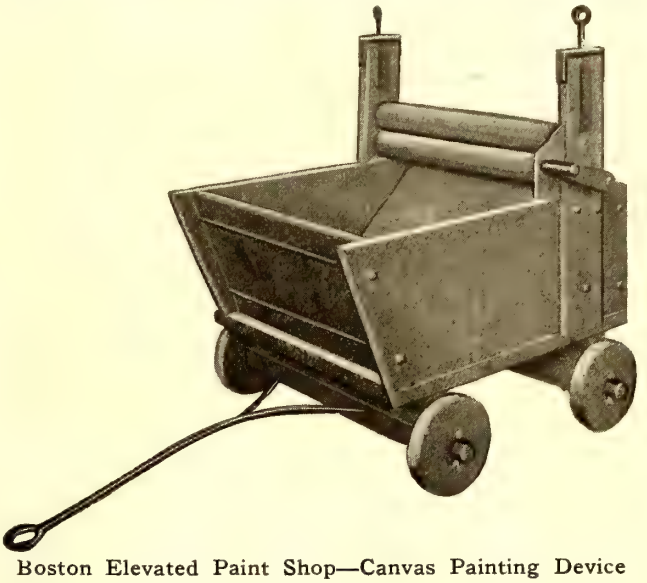
The stock room of the painting department is located on the second floor of the shops, at one side of the quarters devoted to the cars and at the end of a transfer table track which traverses the entire surface car painting division. All cars treated in this division are brought up from the street floor by a motor-driven elevator which has a capacity of four cars per hour, including shifting between the elevator and the transverse berth tracks in the painting division. The transfer table and the general arrangement of the painting berths are shown in an accompanying engraving. A short description of the transfer table might be given in this connection. It is a flush table and is fitted with two motors, one for driving the table and one for operating a 15-in. winch, which is used to move cars on and off the table when they are brought into the department without their own power. The wiring of the table is carried in iron conduit and each motor is fused. The table is of steel frame construction with idler and geared wheels on the carriage and is supplied with power from



Boston Elevated Paint Shop—Paint Mixing Room

an overhead trolley line running across the shop. The table is about 24 ft. long, has a speed of about 2 m.p.h. and can be operated by one man.

The stock room is about 80 ft. x 16 ft. Paint in cans is stored on shelves on each side of the room, which has a skylight giving excellent natural illumination. Brush racks and tanks are located under the shelves and in the central portion of the room and the whole length of the room is served by an overhead traveling hoist installation equipped with a one-ton and a half-ton hoist of the hand-operated type. By this hoisting apparatus a barrel of kerosene, linseed oil, turpentine or Keystone turpentine can be elevated to a height above the floor of the stock room and the contents can be discharged into one of four tanks carried on a steel framing at the side of the center aisle. Each of these tanks has a capacity of 10 barrels and is connected by a pipe line with a corresponding faucet below. As the faucets are properly labeled, the necessary liquids can be drawn off with the minimum loss of time. The faucets



Boston Elevated Paint Shop—Canvas Painting Device

are arranged in groups as shown in one of the views. The brush racks and tanks are provided with steel wires on which brushes can be hung and drained.

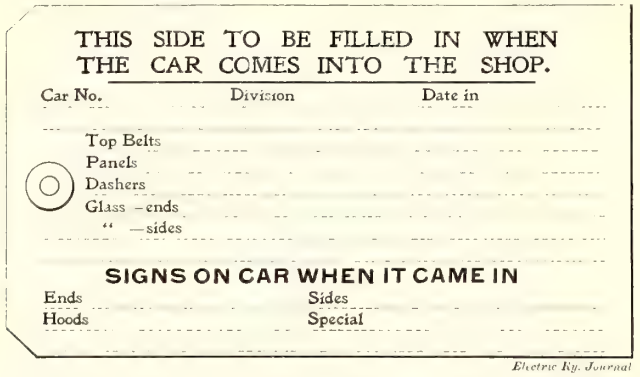
In one corner of the stock room is a steam bath where all skin paint is boiled off and redeemed as a brown color for subsequent use by the company. In the center of the stock room near the delivery window is a check rack, shown in the general view. This rack has about 80 pockets of inclined form for the reception of different colored tabs, numbered to show what painters are using the different tools and brushes. An additional rack of this type is also located on the inside wall of the room and on the outside of the room is a duplicate rack where the men keep their tabs when they are not in exchange for tools or brushes. Each pocket has a number corresponding to that assigned to the painter who uses it. Among the supplies and tools for which separate checks are given are color, red paint and flat wall brushes, sash tools, oval varnishers, slickers, chamois, water brushes, scrapers, scraping knives and dusters. At one end of the stock room is an installation of small grinders, group driven by a motor in the next room. These adjoin the reclaiming kettle, which has a capacity of 15 gal.

PLANT FOR MIXING PAINT

An interesting installation in the painting department is a plant designed by the company for mixing up very large quantities of paint in connection with the painting of the elevated structures. A batch of 190 gal. of paint can be produced at one time in this plant, which is shown in one of the accompanying views. The plant consists of two mixing tanks 4 ft. in diameter and 4 ft. high, with paddles provided for each tank. The paddles are made out of 2-in. iron pipes and are driven by bevel gearing and countershafting from a motor mounted on a platform at one side. The tanks are served by a 1000-lb. hoist, which elevates the materials required in the tanks to a platform shown in

the illustration. Each tank is equipped with outlets for convenient discharge. One tank is used for mixing zinc.

A batch of 150 gal. of paint for the elevated structure is made up according to the following proportions: 1200 lb. lead; 600 lb. zinc mixed with oil in the first tank; 300 lb. stone yellow; 75 lb. lampblack and oil; 6 gal. Japan and 110 gal. of oil. The mixture can be effected properly in an hour after the materials are poured in. At one side of this installation is a group of smaller paint grinders driven


THIS SIDE TO BE FILLED IN WHEN THE CAR COMES INTO THE SHOP.

Car No. Division Date in

Top Belts
Panels
Dashers
Glass —ends
" —sides

SIGNS ON CAR WHEN IT CAME IN

Ends Sides
Hoods Special

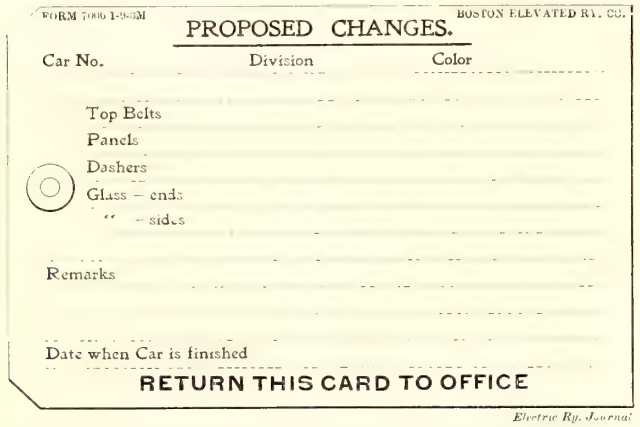
Electric Ry. Journal

Boston Elevated Paint Shop—Front of Shop Order Tag

by the same motor which operates the mixer. Two men in the stock room are constantly engaged in mixing paint.

METHOD OF PAINTING CANVAS

One of the most convenient devices in the painting department is a device for painting the canvas used for motor protection under the car. This device is illustrated in one of the accompanying photographs. It consists of a pine box, 44 in. long, 36 in. wide and 18 in. deep, mounted on wheels, 14 in. in diameter. One end of the box is equipped with two ash rollers 4 in. in diameter and a similar single roller is in the bottom of the box. The box has an iron handle by which it can be transported easily around the shop. In operation the canvas is slipped under the roller in the bottom of the box and is fed through the two upper rollers. Two men then sieze the end of the canvas and walk away with it at an easy speed. Another man keeps the box about two-thirds full of paint and a fourth feeds the canvas from a reel into the box. By this


FORM 7006 1-05M BOSTON ELEVATED RY. CO.

PROPOSED CHANGES.

Car No. Division Color

Top Belts
Panels
Dashers
Glass — ends
" — sides

Remarks

Date when Car is finished

RETURN THIS CARD TO OFFICE

Electric Ry. Journal

Boston Elevated Paint Shop—Reverse of Shop Order Tag

means four men can paint 300 yd. of canvas in half an hour, which is an enormous improvement over the old methods of hand painting by the brush. The tension of the canvas can be regulated and hence the thickness of the paint application by the use of an adjusting set screw feeding the upper roll upon the lower one.

BLANKS

The company has put in force a complete system of blanks and cards for recording the work done in the painting department on both the piece and flat rate basis. All cards are 3¼ in. x 5½ in. and all time is kept by an International clock installed near the general foreman painter's desk. The workmen on piece-work jobs use a separate card for each job. It shows on one side the painter's shop number. The order number, date issued, number of the piece-work job, a brief description of the work and the time of starting and stopping each job as stamped at the clock are recorded for each day by the painter. On the back of the card the foreman writes the numbers of the cars which the painter is to work upon and keeps a similar list of men's numbers on his desk, corresponding to the car numbers which are undergoing the work in regular tabulated stages. At the end of the week each card is totalled and figured and signed by the foreman for sending to the shop office. The time card inserted by each man in the clock whenever he enters or leaves the shop is arranged to show flat time on one side and piece work on the other. Another card, also of uniform size, is used by men engaged entirely on flat time and another records overtime. Each form of card is of a different color. The main office also has a series of cards to record work done in the shops.

ANNUAL MEETING OF THE NEW ENGLAND STREET RAILWAY CLUB

The annual meeting and banquet of the New England Street Railway Club was held at the Hotel Somerset, Boston, March 26. Officers for the ensuing year were elected at the annual meeting which was held in the afternoon. Only one ticket was in the field and the following officers were elected unanimously:

President—W. D. Wright, Providence.

Vice-presidents—C. H. Hile, Boston; Calvert Townley, New Haven; J. Brodie Smith, Manchester, N. H.; F. H. Foote, St. Albans, Vt.; E. A. Newman, Portland, Me.; M. H. Bronsdon, Providence.

Secretary—John J. Lane, Boston.

Treasurer—N. L. Wood, Boston.

Executive committee—Matthew C. Brush, Newtonville; Franklin Woodman, Haverhill; E. P. Shaw, Jr., South Framingham; E. W. Holst, Boston; Lee H. Parker, Boston; Charles N. Wood, Boston; Lewis R. Speare, Boston.

Finance committee—W. D. Wright, Providence; John W. Corning, Boston; George W. Knowlton, Boston.

A portrait and biographical sketch of Mr. Wright, the new president, appear elsewhere in this issue.

The banquet, held in the large dining room of the Somerset in the evening, was attended by more than 400 members and guests of the club and was a very successful affair. D. L. Prendergast, secretary, Boston Elevated Railway Company, acted as toastmaster, and the Fifth Regiment Band supplied music.

Mr. Wright made the opening address and announced that the past year had been one of marked success for the club, which had added 28 to the membership, making a total of 727 members. The account of the treasurer showed the sum of $3,041.87 in the treasury.

The other speakers at the meeting were Hon. James F. Shaw, president of the American Street & Interurban Railway Association; Hon. James F. Jackson, formerly chairman of the Board of Railroad Commissioners of Massachusetts, and P. F. Sullivan, president, Massachusetts Electric Company.

The topic selected by Mr. Shaw was the "Scope and Purpose of the American Street & Interurban Railway Association." He referred to the important work of a technical character being conducted by the different affiliated

associations and by the committee on municipal ownership and public relations, of which Gen. W. A. Bancroft, president, Boston Elevated Railway, is chairman, in bringing the electric railway companies and the public closer together. On the latter subject he said, in part:

In my judgment a most important plan of creating the proper public opinion is the plan of increasing the membership, both active and associate, and thereby bringing the association and its work more prominently to the attention of the people. The greater our membership and the more enthusiastic our members, the greater good will be accomplished for the electric railways in general. Since Oct. 1 the active membership has increased 35 companies and the associate membership 375, and at the end of this fiscal year we hope to have an increase of 100 active and 1000 associate members. Every member of your club is entitled to associate membership, and I ask each and every one of you to become one of our members.

It is my opinion that no better medium of attracting attention to our work could be had than the associate-membership pin recently adopted by the association, and it is gratifying that so large a number of associate members have already secured and are wearing the emblem of their alliance with, and interest in, the electric traction field. It is felt, however, that if the greatest good is to be accomplished this pin should be worn by every one of our associate members in order that the least possible time be lost in the spreading of a doctrine of fair play to the electric railway interests.

The future of the electric railway business depends in a large measure upon the attitude of the public toward it, and it should be the effort of us all to attempt, each in our own way, to sway that feeling from antagonism to goodwill. We not only want you to become associate members of our association and to wear the pin, but we want you to read the proceedings of our conventions, to familiarize yourselves with our work and to join hands with us in a personal effort to bring about an honest conception of the difficulties under which the electric railway companies operate.

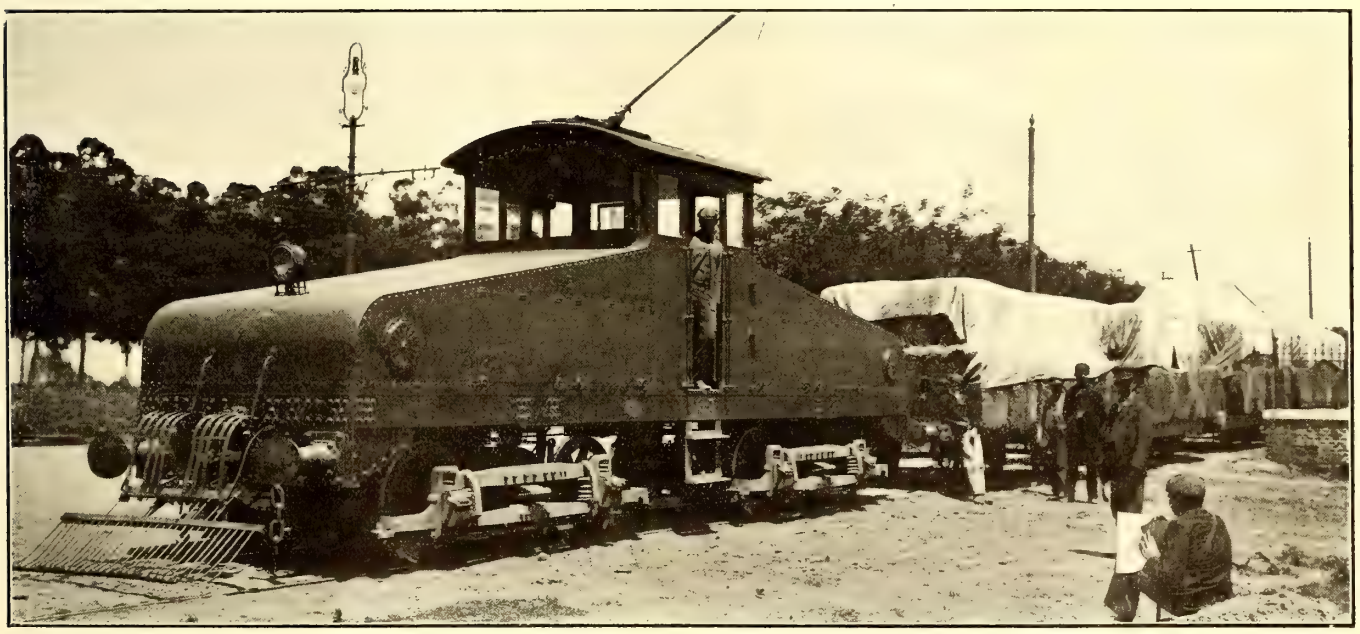
From my experience in the street railway business for the past 17 years and my experience in the Massachusetts Senate for the past three years, perhaps I am in a better position to judge of the temper of the public than some of you who have had only one side of it. Many times we hear the members of the Legislature criticized for the votes on certain questions which appear to be antagonistic to the public-service corporations, but I can recall many instances when such votes were taken where I knew the member was voting against his own convictions, but had been besieged by his constituents to vote as he did. I have no hesitancy in saying that the members of the Massachusetts Legislature are as fair a body of men as can be found, but the trouble is that the people have been educated to believe that the public-service corporations were dishonest and should be encumbered with drastic restrictions and regulations.

I am of the firm belief that if the work we have in hand has the support of all the people who earn their livelihood through the street railway business, either directly or indirectly, and if they will join with us in our undertaking the public will meet us half-way and let us have a just return on our properties.

ELECTRIC LOCOMOTIVES FOR SOUTH AMERICA

The accompanying illustration shows one of six standard-gage electric locomotives recently supplied to the Rural Tramways, La Croze, South America, by Dick, Kerr & Company. The locomotives are of the central cab type and are mounted upon Brill No. 27 E-1 trucks. Each locomotive is equipped with four D.K. 7-B., 500-volt, d.c. motors rated at 50 hp each on the one-hour basis. The total tractive effort of the locomotive at full load is 5720 lb. at the car wheels at a speed of 13.2 m.p.h. and a total current intake of 360 amp. The maximum speed is a little over 20 m.p.h. The diameter of the truck wheels is 34 in. and the gear ratio of the motors is 71:15.

The motors are operated with a type Q-2, Form A controller having five series and three parallel notches. Current is collected by a single trolley. There is no electric brake, but each locomotive is fitted with a Christensen type C-3 straight air brake equipment. The locomotive measures 30 ft. over the end sills and 7 ft. over the side sills. The bodies were built at Dick, Kerr & Company's general engineering works at Kilmarnock, the power equipments at their electrical works at Preston. The principal contractors for the Rural Tramways were J. G. White & Company.



Electric Locomotive of the Rural Tramways, La Croze

The Government Tramways Department of New South Wales reports that over 47,000,000 passengers were carried for the last quarter of 1908 ended Dec. 31. There were 135 miles of line operated, mainly by electric traction.

QUARTERLY MEETING OF THE NEW YORK STATE STREET RAILWAY ASSOCIATION

The ninth quarterly meeting of the Street Railway Association of the State of New York was held in the assembly hall of the Schenectady Railway Benefit Association, Schenectady, N. Y., on March 24. About 60 were in attendance, and the meeting was presided over by the president of the association, E. S. Fassett, general manager, United Traction Company, Albany, N. Y. The morning session began at 11:30 with the reading of the report of the Committee on Use of Curtains in Car Vestibules, of which W. R. W. Griffin, general superintendent, Rochester Railway Company, was chairman. At the annual meeting at Niagara Falls, last July, Charles R. Barnes, inspector for the Public Service Commission of New York, Second District, brought before the association for discussion three subjects which had been made the basis of complaints to the Public Service Commission. These subjects were "Use of Curtains in Car Vestibules," "Carrying Musical Instruments on Cars," and "Signaling Interurban Cars at Way Stations." They were discussed informally at the Niagara Falls meeting, and committees were appointed by the president of the association to investigate the practice of the railway companies in New York State and to present reports.

USE OF CURTAINS IN CAR VESTIBULES

The committee sent out a circular of inquiry to all of the member companies. Replies were received from 26 companies, including 5 suburban lines, 13 interurban lines, 5 lines which operated both suburban and interurban routes, and 3 electrified steam railways. The questions included in the circular of inquiry concerned location of tracks, whether on streets, highways or private right of way, schedule speed, use of curtains in the daytime and kind of motormen's cabs. All of the suburban lines replying keep the car curtains open in the daytime, as do also all of the combined suburban and interurban lines which replied. Of the interurban lines, one keeps the curtains closed, 10 keep them open and two which formerly kept them closed have recently opened them. Of the electrified steam roads, one keeps the curtains closed and two keep them open. Various reasons were given for and against keeping the curtains closed. One company believed that the curtains should be drawn day and night, thereby isolating the motorman from all occurrences in the car, so that he will give his whole attention to his work. Another states that it operates with closed curtains on account of the possibility of a panic among the passengers if they can see what to them looks like impending danger. Several of the companies stated that they did not consider closed curtains necessary, and some of the replies added that the ability of the passengers to see ahead was an attraction which stimulated traffic on the electric roads. Another reason given for keeping the curtains open was that passengers in the car often made valuable witnesses in case of accidents, provided they had a clear view ahead and could see all of the occurrences immediately preceding the accident.

The committee, after carefully considering all sides of the question, did not feel that it could make any recommendation for the adoption of a rule covering this point which could be adopted by all companies. Inasmuch as local conditions enter largely into the advisability of operating with open or closed curtains, the committee believed that it was a question to be settled by the management of each company. The report was accepted and the committee discharged.

CARRYING MUSICAL INSTRUMENTS ON PASSENGER CARS

The committee appointed to consider this subject, of which Albert Eastman (Utica & Mohawk Valley) was chairman, sent out a circular of inquiry, to which 32 replies were received. The replies to the first question in this circular indicated that few companies had so far had occasion to put into effect special rules covering this point. Two companies did not permit passengers to carry musical instruments on their cars, five companies required a release and special permit, while the remainder of the companies which replied carried musical instruments without any special rules, regulations or form of release. The place on the car where large instruments, such as bass drums and bass viols, are permitted to be carried, is shown by the following table, which is a summary of the practice of the companies who replied:

Rear platform	8
Smoking compartment	2
Body of car	8
Front vestibule or front platform	9
Baggage compartment	4

The form of permit and release used by the Brooklyn Rapid Transit Company; the Fonda, Johnstown & Gloversville Railway; the Schenectady Railway Company, and the United Traction Company, of Albany, were included as appendices to the report of the committee. The report concluded:

So far as general rules and regulations are concerned, the replies indicate that most street railway companies will not permit passengers to board a car with any large musical instrument or other package which will block the aisle or occupy a space required by other passengers. The majority of the companies replying seem to favor a rule prohibiting carrying of large instruments on passenger cars, but believe it would work a hardship in many cases unless some other facilities are provided. Owing to the difference of opinion expressed as to the practicability of enforcing such a rule, the committee does not feel able to recommend any regulation which could be adopted by all companies. This is a matter in which style of car, volume of traffic and other local conditions will have to be taken largely into consideration.

The report was adopted without discussion and the committee discharged.

SIGNALING INTERURBAN CARS AT WAY STATIONS

The committee sent out inquiries relative to this question to various members of the association, and answers were received from 15 companies.

In answer to the question, "What method, if any, have you adopted to assist passengers on your line in stopping cars at interurban stations after dark?" seven companies replied that they had adopted no method. Four companies answered that they had adopted a mechanical signal to be operated by the passenger. Four companies reported the adoption of bank lights, or clusters, which are kept continually burning at each station. All eight companies stated that their method was satisfactory.

In answer to the question, "Have you experienced any difficulty in maintaining your signals on account of interference or destruction by outside parties?" six companies reported that they had no material trouble or difficulty. One company reported that they had a slight amount of trouble, but not serious. One company said that they had no success with the signals operated by passengers, but that the bank lights were quite satisfactory.

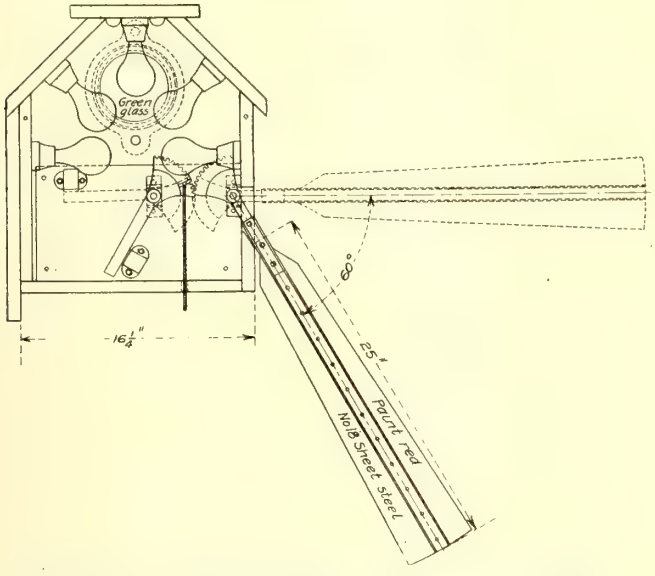
In reply to the question, "What is the approximate cost of installation per station?" the costs named ranged from $3 to $7.50 per station for mechanical signals and from $3.50 to $15 per station for bank lights.

In reply to the question, "What is the approximate cost of maintenance per station?" one company reported the maintenance of the mechanical signals as $1.25 per year. On the maintenance of bank lights, one company reports $1.80 per year, and another company $18 per year, the

latter taking into consideration the cost of current consumed by the bank light.

In answer to the question, "Do you consider these expenditures a good investment for the railroad?" eight companies who have adopted such signals agreed that it is a good investment. The companies which have not installed a system of signaling believe that such a signal is a good thing, provided the cost of installation and maintenance is not too high. One company reports that it does not need such a signal, as all cars stop at all stations, regardless of whether passengers desire to board or leave car at that point.

The bank lights used by several companies consist of a cluster of five lamps, covered by a disk or box to protect



Stop Signal, with Semaphore Arm, Used by Rochester Railway Company

them from the weather. This cluster is hung over the station platform and connected with the trolley wire, a snap switch being placed on a pole or in the shelter house in such a position as to be convenient for turning on or off the lights. These lights are turned on when it becomes dark and continue to burn until they are turned off by the last car going over the line. With the aid of the light produced by this method the motorman is able to see the passenger signal his car for some distance before he arrives at the station, and in sufficient time to bring his car to a stop at the required point. Since this system has been in operation on the lines of the Schenectady Railway very few complaints have been received on account of cars running by passengers. In using this system it is necessary to depend largely on the patrons of the line for turning on and off the lights, and the principal objection to this system is the cost of current consumed, which makes its cost of operation very high.

Another signal to be used for this purpose consists of a box enclosing five incandescent lamps with a glass disk or lens in each side of the box. This box is attached to a pole at the station so that the light, when the connection is made, shines through the disks in such a way that it is visible to the motorman approaching the station. The signal is lighted by means of a rope extending down the pole to within reach of the platform, this rope being pulled by the passenger when he desires to stop the car. The switch by which these lights are turned on is weighted so that it shuts off automatically. The moment the passenger lets go of the rope, the circuit is disconnected, and very little current is consumed in the operation of this signal. Another signal, used by the Rochester Railway, is very similar to the last mentioned, except that it is equipped with a semaphore arm, and is designed for use both day and night. A drawing of this signal is reproduced in the accompanying engraving.

The committee believes that if any special signal is recommended as standard, the recommendation should be made by the association rather than by a committee.

The report, which was read by George L. Radcliffe (Schenectady Railway), chairman of the committee, was accepted after a brief discussion.

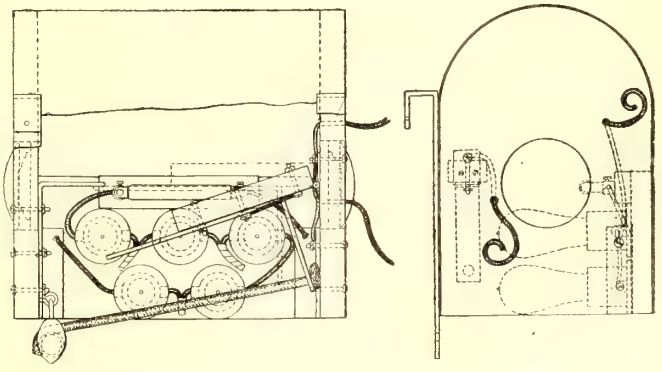
E. F. Peck, Schenectady Railway, said that the use of high power arc headlights was not to be depended upon entirely for distinguishing waiting passengers.

TRANSFERS, USE AND ABUSE

Following the reports of the committees, C. Loomis Allen, vice-president, Syracuse Rapid Transit Company, opened the discussion on this question. He prefaced his remarks by reading a letter received from J. H. Stedman, the originator of the present-day form of transfer slip. Mr. Stedman described the origin and evolution of transfers, and pointed out that the safest way to prevent abuse of the transfer privilege was to enforce the rules regarding time limit. It had not always been the case that the courts had supported the railway companies in refusing to honor transfers on which the time limit had expired, but he believed that the mere punching of a time limit on a transfer acted in a large measure to prevent any excessive abuse of the privilege. He thought that 95 per cent of the passengers who ride on transfers use them honestly. He was strongly in favor of registering transfers collected as well as cash fares and all forms of tickets. In no other way could inspectors check up the work of conductors. In his opinion many companies had lost money by attempting to simplify the form of transfer used and by failing to properly punch the line, date, time, etc. Conductors have time to make change, and in the ordinary course of their work they should have time to carefully punch transfers and to carefully examine all transfers which they take up.

Mr. Allen opened his discussion by quoting from Sections 101 and 104 of the Railroad Law, in which the word "continuous" is used in qualifying the ride to which a passenger is entitled for one fare. In his opinion, the intent of the law was that the trip or ride made by the passenger for one fare should be a continuous ride, and that in no sense was the privilege of a stop-over conceded. Referring to the abuse of transfers, he said in part:

Transfers have been in use since 1884, and pretty generally since 1896. During the operation of the various transfer systems that have been used, passengers who have felt themselves aggrieved, either by being refused transfers, or because the transfers issued to them were not accepted for fare by reason of violation of some regulation which the companies had made, have brought their grievances before the courts. There have been many decisions as to the validity of transfers, and as to the reasonableness of the regulations under which the transfers were issued and accepted in



Stop Signal Used by Hudson Valley Railway

payment of fare. It is fair to say that some of the cases that have been most vital have not involved transfers alone, but evidence other than the regulations in regard to the use of transfers was brought into the case. To-day it is

practically impossible to design a transfer system and make regulations for its enforcement that can be borne out by the court decisions of the past.

The most serious and difficult phase of the transfer problem that we have to contend with to-day is the growing tendency on the part of passengers of a certain class to obtain their passage or pay their fare by offering the conductor, particularly during the rush hours, transfers that are not used in accordance with the statute, viz.: "as a continuous ride." I have seen in various communities prominent persons take from their pockets a half-dozen transfers, examine them carefully, and offer the conductor one of them in payment of fare, and then return the unused transfers to their pockets for future use. Another serious phase of the transfer question is the trading of transfers in public buildings, stores, at newsrooms, cigar stands, bootblack stands, and saloons.

I believe that for any railway company operating in any city outside of New York and Brooklyn (and these two cities are exempted for the reason that there is a lack of information as to the distances passengers are carried on transfers in these two places) the inauguration of the transfer has been a good thing for the railway company, in that it stimulates travel. The increase in the abuse of the transfer privilege by passengers using transfers not within the meaning of the statute, and the trading of them, however, has caused railway men in general to view with alarm the transfer question. I am still of the opinion that a transfer system with reasonable regulations as to the issuance and acceptance is a good thing for the railway company, and the enforcement of reasonable regulations will, to a very large extent, prevent the abuses which are so common and growing to-day. The statute is sufficient in specifying that the transfer is issued for a continuous passage, and it would seem as if it were the duty of the railway companies to educate the public to the fact that transfers are good for a continuous passage, and not good for a "stop over." The abuses in the trading of transfers can be reduced to a minimum by the employment of detectives to secure proper information for the successful prosecution of offenders. It will not be necessary for railway companies to do this in more than one or two instances to break up this trading practice which is so prevalent to-day.

To aid in the discussion of the subject, Mr. Allen propounded the following list of eight questions:

1. Is it reasonable and practical to issue transfers only at time of payment of fare?
2. Is a railway company entitled to say at which transfer point a passenger shall use his transfer, where two lines intersect at more than one point?
3. Is it reasonable and enforceable that transfers must be used by passengers at a stated transfer point, and, if offered at any other place, they can be refused and passenger made to pay his fare?
4. Do you believe in a "specific line transfer"? If so, why?
5. Do you believe in "direction transfer"? If so, why?
6. Do you believe in a combination of the "specific line transfer" and "direction transfer"? If so, why?
7. Do you believe in the "transfer by transfer point," leaving it optional with the passenger to take any line passing that transfer point, excepting, of course, that line from which the transfer was issued?
8. Do you believe in punching the time at which car should arrive at the transfer point, or do you believe in punching the time in which the transfer will be accepted for passage?

The questions were taken up one by one and quite fully discussed by the members present.

DISCUSSION OF TRANSFERS

"Is it reasonable and practical to issue transfers only at the time of payment of fare?"

W. J. Cook, Rochester Railway Company, thought that such a rule should be enforced, but he was not sure whether it was practicable under all conditions of operation.

E. F. Peck, Schenectady Railway Company, believed that such a rule worked hardship to passengers who might neglect to ask for a transfer at the time they paid their fare or who changed their minds as to their destination after paying their fare. He believed that a restriction of this kind would discourage traffic. No such rule is in force in Schenectady.

W. H. Collins, Fonda, Johnstown & Gloversville, also thought such a rule would work a hardship. The privilege of asking for transfers after fare had been paid was perhaps abused to some extent, but the greatest abuse of the transfer privilege was the practice of trading transfers.

C. Loomis Allen thought the question of reasonableness depended entirely on local conditions. It is unreasonable for a passenger to ask for a transfer just as the car reaches the junction point and a large number of the passengers are hurrying to get off. On the Utica & Mohawk Valley road no penalty is attached either in issuing transfers or in collecting fares when a passenger changes his mind as to his destination. If a passenger bought a ticket for 30 cents and decided to get off when he had traveled a distance for which the fare was only 15 cents, the passenger was given a rebate receipt, redeemable for the difference. He could see little or no advantage in requiring a passenger to ask for a transfer at the time of paying the fare, so long as the company got the cash fare.

C. Gordon Reel, Kingston Consolidated Railroad, referred to the court decisions as to the reasonableness of the rule put in force in New York City requiring passengers to ask for transfers at the time of paying the fare. He believed the rule was reasonable in New York, where the old plan of peddling transfers through the car at frequent intervals permitted unscrupulous passengers to receive as many as six or eight transfers on a single trip. On his line there was very little transfer traffic, and the rule was to issue transfers at any time on request.

J. W. Hinkley, Jr., Poughkeepsie, said that he had found it necessary to issue transfers only at the time of paying the fare, as two belt lines were operated in Poughkeepsie, and it was easily possible for passengers to get several transfers on one trip. He believed that passengers would not forget to ask for a transfer a second time after it had once been refused them because of neglecting to make the request at the time of paying the fare. On short runs it was necessary, of course, to get the nickels first, but he believed that, under most circumstances, no trouble would be experienced in giving the transfer only at the time of paying the fare.

J. E. Duffy, Syracuse Rapid Transit Railway, pointed out that it was the first duty of the conductor to get all of the cash fares. Where the traffic was very heavy, it might not be practical to require the conductors to issue transfers while they were making the round through a crowded car. The introduction of pay-as-you-enter cars had made such a rule imperative.

F. J. Gerdon, Utica & Mohawk Valley, said that his company made it a rule never to eject a passenger who presented a transfer which for any reason was void. This, perhaps, encouraged abuse of the privilege. He believed that most transfer systems were too complicated and required too much time for the conductors to accurately punch them and carefully examine them.

E. S. Fassett, United Traction Company, of Albany, explained that Albany was one of the last cities in the State to grant transfers. The company had fought the practice, and the transfer system was not inaugurated until after the passage of the so-called Barnes Act in 1905. Before putting a transfer system into effect his company had made

a very careful study of the transfer systems used in nearly all of the important cities in the United States, and the system which was adopted was intended to correct some of the evils encountered in some of the other cities. The public was educated from the beginning to ask for transfers when paying fare. It was not always necessary that the conductor stop and issue the transfer immediately on receiving the cash fare, but it was reasonable to demand that the passenger indicate to the conductor at the time of paying his fare that he desired a transfer. Very little trouble had been experienced in Albany due to the operation of this rule.

"Is a railway company entitled to say at which transfer point a passenger shall use his transfer, where two lines intersect at more than one point?"

Hubbell Robinson, claim attorney, Schenectady Railway Company, expressed the opinion that the railway company has the right to limit the use of a transfer to the line which will take the passenger to his destination by the most direct route. The practice in Schenectady was to designate the particular point at which the transfer would be honored.

E. J. Cook, Rochester, stated that his company did not enforce such a rule, although he believed it was entitled to do so.

J. E. Duffy, Syracuse, said that his company insisted upon passengers transferring at the first intersection. In one case the company had designated a transfer point where it required passengers to walk 500 ft. from one line to the point where cars of another line could be boarded. This rule had been contested, and the case was now in the Court of Appeals. The lower courts had sustained the company.

"Is it reasonable and enforceable that transfers must be used by passengers at a stated transfer point, and, if used at any other place, they can be refused and the passenger made to pay his fare?"

Hubbell Robinson, Schenectady, thought that the court decisions upheld the companies in making such a rule. Several members raised the question whether it was possible to enforce such a rule during the rush hours.

Mr. Fassett suggested that if such a rule be rigidly enforced outside of rush hours, and whenever possible during times of heavy traffic, the public would soon learn to respect the rule.

C. Loomis Allen, Utica, did not believe that such a rule was enforceable in a city of any size. In Syracuse there is a central district in which no fares are collected, and it would be practically impossible to enforce such a rule in that city.

W. R. W. Griffin, Rochester, thought that as long as the transfer was presented within the time limit it made no difference where the passenger boarded the car.

In closing the discussion on this point, Mr. Fassett pointed out that if a passenger boards a car beyond the transfer point it is pretty good evidence of abuse of the transfer privilege. In Albany conductors are upheld in enforcing this rule strictly.

Questions 4 to 7, inclusive, were considered together.

Mr. Callahan, Rochester Railway, favored punching only the junction point at which the transfer would be honored, and permitting the passenger to take any cars of any other line which passed this junction. He thought it made no difference on what line a transfer was collected. It would be necessary, of course, to have the name of the issuing line plainly printed on the transfer so as to prevent return riding.

F. J. Gerdon, Utica, favored a direction transfer.

"Do you believe in punching the time at which the car should arrive at the transfer point, or do you believe in punching the time beyond which the transfer will not be accepted for passage?"

Charles H. Smith, United Traction Company, Albany, favored punching the time of arrival at the junction and placing a time limit of ½ hr. upon the use of the transfer.

J. E. Duffy, Syracuse, believed that the accuracy of the time limit placed on a transfer hinged primarily on the issuing conductor. He believed that the liability of mistake was equally great in punching the expiring time as in punching the time of arrival at the junction. Some lines run at much longer intervals than others, and if the expiring time is punched conductors must punch the maximum headway on all transfers. They cannot be expected to punch hourly intervals on transfers to one line and five-minute intervals on transfers to another line of heavy traffic. He believed that punching the expiring time opened the door to abuse.

E. S. Fassett pointed out that it was a safer rule to punch the time of arrival, as conductors know almost by instinct the time at which their cars are due to arrive on each trip at the transfer point.

At this stage of the discussion the meeting adjourned to partake of a buffet luncheon served by the Schenectady Railway Company in an adjoining room of the Benefit Association.

AFTERNOON SESSION

The discussion of transfers was continued when the meeting reconvened in the afternoon. E. S. Fassett suggested that the most important question relating to the use and abuse of transfers was the strict enforcement of the rules laid down by the companies.

George L. Radcliffe, Schenectady Railway Company, said that inspectors frequently checked the issuing of transfers by conductors while riding on the cars. This was the only method of checking employed in Schenectady.

J. E. Duffy, Syracuse, described the method of checking transfers used by his company. Conductors deposited all transfers collected in an envelope and dropped these envelopes in boxes at the car houses at the end of every round trip. The envelopes are collected from these boxes five or six times a day and are immediately taken to the office, where the number of transfers in the envelopes is checked against the trip sheets. No attempt is made to check the time of collection or the sequence of the serial numbers; he thought the expense of such elaborate checking was more than it was worth.

Mr. Callahan, Rochester, said that his company made a complete check of all transfers issued and collected on a different line each day. Conductors were required to pay for shortages and for transfers collected which were punched for the wrong date. Once each month transfers from all lines in the city are carefully checked to discover any serious abuse.

C. Gordon Reel, Kingston, said that his company issued only a few hundred transfers each day, and these were all carefully checked against each other.

E. S. Fassett, United Traction Company, Albany, explained the very complete method of checking transfers which is used by his company. A duplex form of transfer is used, and the conductors punch both the passenger's check and the duplex check at the same time. At the end of each half-trip conductors enclose the duplex stubs of all transfers issued on that trip in an envelope printed in red, on which are entered the beginning and ending serial

numbers. All transfers and passes collected are enclosed in an envelope printed in black, on which is marked the number of tickets enclosed. The serial numbers of the transfer pads issued to each conductor at the car houses are transmitted to the office every night. In the auditor's office two sets of girls check all transfers issued and all transfers received. The transfers are put back in their proper order, and the time, date and line are all checked. Mistakes of any kind are charged against conductors at the rate of 5 cents for each defective transfer accepted. The cost of this system to the company is about $5,000 a year; the duplex transfers used cost 8 cents per thousand more than plain transfers. The amount collected in penalties from conductors averages between $50 and $60 a month. Between 7,000,000 and 8,000,000 transfers per year are audited in this manner, and the transfer traffic amounts to between 8 per cent and 18 per cent of the total number of passengers carried, depending on the time of the year. It is necessary to occasionally check the girls in the auditor's office, to make sure that they are doing their work carefully and honestly. This is done by having inspectors put out decoy transfers and having these pass through the office in the usual way. A recent test showed the efficiency of the checking system. Fourteen decoy transfers were put out in one day, and all were detected in the auditor's office, with the exception of one, which was punched with the wrong year, but with the correct day and time. He believed that the cost of the system was not excessive, considering the benefits derived. It reduced the abuse by employees to a minimum, and enabled the company to enforce strictly the rules relating to transfers, and thereby reduced to a very large extent the abuse of the transfer privilege.

CLAIMS—CO-OPERATION OF OPERATING AND LEGAL DEPARTMENTS

Hubbell Robinson, attorney, Schenectady Railway Company, read a short paper on this subject, which was followed by a general discussion.

F. J. Gerdon, Utica, believed that it was not within the province of the claim department to lecture trainmen or to attempt in any way to interfere in the matter of discipline. The superintendent only should deal with the men, as he is the officer who hires the men and should be the one to administer any discipline. He believed that the interference of men from the claim department who were constantly making suggestions and lecturing an unfortunate trainman who had been in an accident tended to discourage the other men.

Mr. Joyce, claim agent, Rochester Railway, believed that it would be a good thing if the claim department could occasionally instruct the superintendents and thoroughly impress upon them the necessity of teaching the trainmen to avoid accidents and the importance of obtaining names of witnesses when an accident did occur.

J. H. Pardee, J. G. White & Company, spoke of the alarming growth of accident damages paid by street railway companies, which was attracting the attention of all managers to the importance of the prevention of accidents and the work of the claim department. He believed that most trainmen had no realization of the amount paid out for damages or the difficulties under which the claim department works when witnesses to accidents have not been secured by the train crew. He believed that it would be a good plan to take a few men from among the best-known and best-liked of the trainmen and put them to work in the claim department for a long enough time to have them became fully acquainted with all of its routine. These men could then go among the trainmen and impart to them some idea of the importance of preventing accidents. Coming from the ranks, the counsel and advice of these men would be respected far more than lectures delivered by representatives of the claim department, about whom the trainmen knew nothing and cared nothing.

J. E. Duffy, Syracuse, described the work of instruction carried on by Dr. Ryan, of the claim department, of his company. Two years ago the company inaugurated the practice of holding instruction classes which were in charge of Dr. Ryan. The first classes were not successful. The men evinced little interest, and felt that they were being imposed upon by being compelled to attend the classes without pay. A few months ago his company inaugurated the plan of paying employees at their regular rate of wages for attending these instruction classes. The results have been much more satisfactory, as the men seem to take more interest in the talks and to evince some desire to put the suggestions made at these meetings into effect in the course of their daily work. The speaker did not believe that it made any difference who instructed the men or who disciplined them, so long as accidents were reduced.

J. P. Maloney, Albany & Hudson Railroad, described a novel scheme which has been tried on his line for the past 18 months. The company pays its employees by check, and in the envelope each week is enclosed a brief talk on the subject of accidents and their prevention. The men at first complained that they were being insulted by the self-evident truths pointed out in these bulletins, but the plan was kept in force, and as a result the past year has been remarkably free from accidents of any kind.

George L. Radcliffe, Schenectady Railway Company, said that he believed most companies crowded the new men too hard in educating them during their period of apprenticeship. The new man cannot absorb all of the words of counsel and advice which are thrown at him by the claim agent, the superintendent, the shop instructor, and the car instructor on the same day. He believed that the place to educate the men was on the cars by means of competent, instructing trainmen; five minutes instruction on a car, in his opinion, was better than an hour of lecturing.

In closing the discussion, President Fassett suggested that it would be an excellent idea to have the superintendent and the claim agent go over every accident report each day and discuss fully the causes and possible remedies. He emphasized the need of the closest co-operation between the claim department and the operating department in every detail of their work.

Charles R. Barnes, inspector for the Public Service Commission, Second District, who was unable to be present at the morning session, when the committee reports on subjects suggested by him at the Niagara Falls meeting last July were discussed, made a few remarks before the meeting adjourned. He expressed his regret that none of the committees felt it advisable to formulate definite recommendations on the subjects which they considered. He said that the object in presenting these questions to the association for discussion was to get some views from the members which would assist the commission in deciding on recommendations concerning these matters which the commission might make as the result of formal complaints.

After a vote of thanks was passed to the Schenectady Railway Company for its hospitality in entertaining the members of the association at luncheon and in providing a meeting place, the meeting adjourned.

NEW LEAVITT STREET CAR HOUSE OF CHICAGO RAILWAYS COMPANY

Plans were presented in the Electric Railway Journal for Aug. 29, 1908, of the new car house of the Chicago Railways Company at Twenty-fifth and Leavitt Streets. At the time of publication the car house was in the early stage of construction. Since then it has been put into service, and more complete data and illustrative matter are now available. The new building is of especial interest on account of its thorough construction and because of its arrangements for careful car maintenance.

The plan published in the issue of Aug. 29 showed the car house to contain six storage bays, with an aggregate capacity for housing 137 large double-truck cars; a repair bay with track room for five cars on one side, and a row of utility rooms facing this track. Each of the six bays extends from street to street through the block bounded by Irving Avenue, Twenty-fourth Street, Leavitt Street and Twenty-fifth Street. The over-all ground dimensions of the new car house are 303 ft. x 344 ft. 5½ in.

CONSTRUCTIONAL FEATURES

Each of the storage bays has four through tracks 198 ft. long, with pits under each track. The 25 through tracks connect at the north and south ends by curves of 37 ft. 6 in. center radius, with parallel ladder tracks leading to the main north and south street tracks on Leavitt Street. A loop track connects the west ends of the ladders so that cars may be passed entirely around the outside of the building. Each bay is 48 ft. 7½ in. wide between wall centers, and is covered by a concrete roof with reinforced concrete girders spaced 17 ft. 9 in., resting on pilasters 2 ft. 5 in. x 1 ft. 9 in. in horizontal section. The concrete roof is reinforced according to the Kahn system. All exterior walls are faced with vitrified paving brick laid in colored mortar. The walls between bays and the partition walls which sectionalize the utility bay are laid with Chicago brick. All foundations and footings below grade are of concrete, composed of one part Portland cement, three parts coarse sand and six parts broken stone to pass a ring from ½ in. to 1½ in. in size. A moderately wet mixture was used.

In each bay the sub-floor at the bottom of the pits is continuous under the four tracks, and the space between tracks. This sub-floor is 8 in. thick, not reinforced. The track rails and the floor between pits are supported on concrete piers and cast-iron posts spaced 6 ft. on centers. The T-section track rails are tied to the concrete piers with ¾-in. anchor bolts and to the intervening cast-iron columns with special clamps. The narrowest pits are 3 ft. 11 in. wide in the clear at posts and 5 ft. deep.

The floor between the track rails is made up of a 1:2:4 mixture of concrete, using Portland cement, coarse sand and broken stone to pass a ¾-in. ring. This floor is 6 in. thick, reinforced with ¼-in. twisted steel bars, laid 12 in. on centers both ways. The ends of the transverse bars rest on the bottom flanges of the track rails and the longitudinal bars rest on two 4-in. x 3-in. x 5/16-in. angles connecting the tops of the rail-supporting posts. The stairways at the ends of the pits are of cast iron with 9-in. treads and 9-in. risers. Each track opening at the ends of the car house is fitted with a hand-operated Kinnear rolling steel door, and all openings from bay to bay through the curtain walls are fitted with two automatic sliding fire doors controlled by fusible links.

The roofs of all the bays are of similar design, with concrete girders supporting solid reinforced slabs carrying rows of closely spaced skylights. The top finish of the roof slab is ½ in. thick of 1:3 cement and sand, broom-finished. The following specifications were issued by the Board of Supervising Engineers for the roofing to cover the concrete slabs over the entire structure:

Work Included: The entire roof of the building is to be covered with roofing as hereinafter specified.

The "General Conditions," on pages 1, 2, 3, 4 and 41, apply to this work, with the exception of "Guarantee" clause. See special guarantee for this work herein contained.

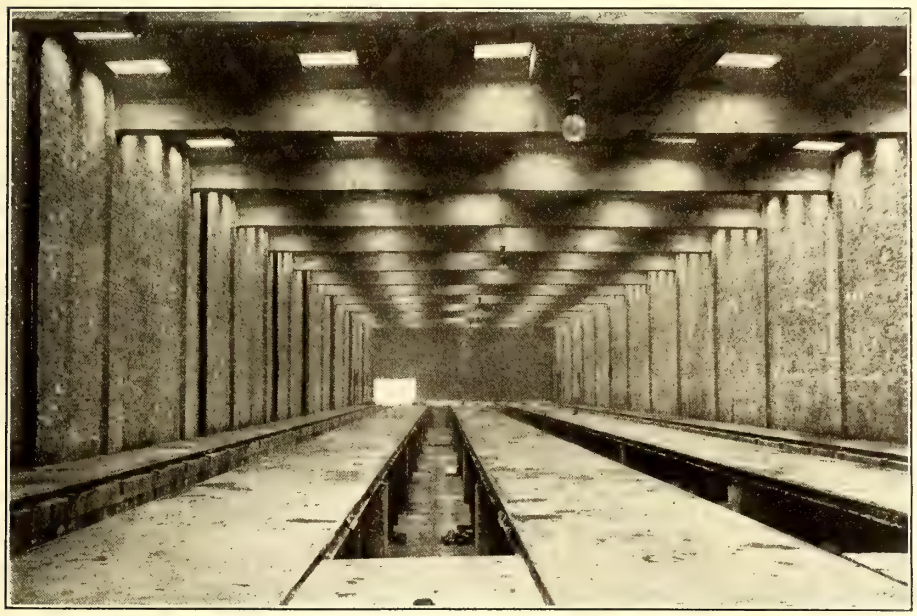
Cover concrete roof slab with a five (5) ply, coal tar pitch, felt and gravel roof. The tarred felt shall be No. 1 wool felt weighing not less than fourteen (14) lb. per 100 sq. ft., single thickness.

The pitch shall be coal tar pitch, brand to be approved by the engineer in charge and there shall be used not less than two hundred (200) lb. per 100 sq. ft. of completed roof.

The gravel shall be of such a grade that no particles shall exceed five-eighths (⅝) of an inch or be less than one quarter (¼) of an inch in size. It shall be dry and free from dust. In cold weather it must be heated immediately before using. Not less than four hundred (400) lb. of gravel shall be used per 100 sq. ft.

First coat the concrete with hot pitch mopped on uniformly. Over this coating of pitch lay two thicknesses of tarred felt, lapping each sheet seventeen (17) inches over the preceding one and mopping back with pitch, the full width of each lap.

Over felt so laid spread a uniform coating of pitch mopped on. Then



Leavitt Street Car House—Interior of One Storage Bay, Showing Roof Lighting



Automatic Sliding Fire Door in Partition Wall Between Bays

lay three (3) full thicknesses of tarred felt, lapping each sheet twenty-two (22) inches over the preceding one.

When the felt is thus laid, mop back with pitch the full width of twenty-two (22) inches under each lap. Then spread over the entire surface of a roof a uniform coating of pitch into which, while hot, embed slag or gravel. All joinings along wall to be carefully made and connected to 1¼-in. x 1¾-in. wood strips built in walls.

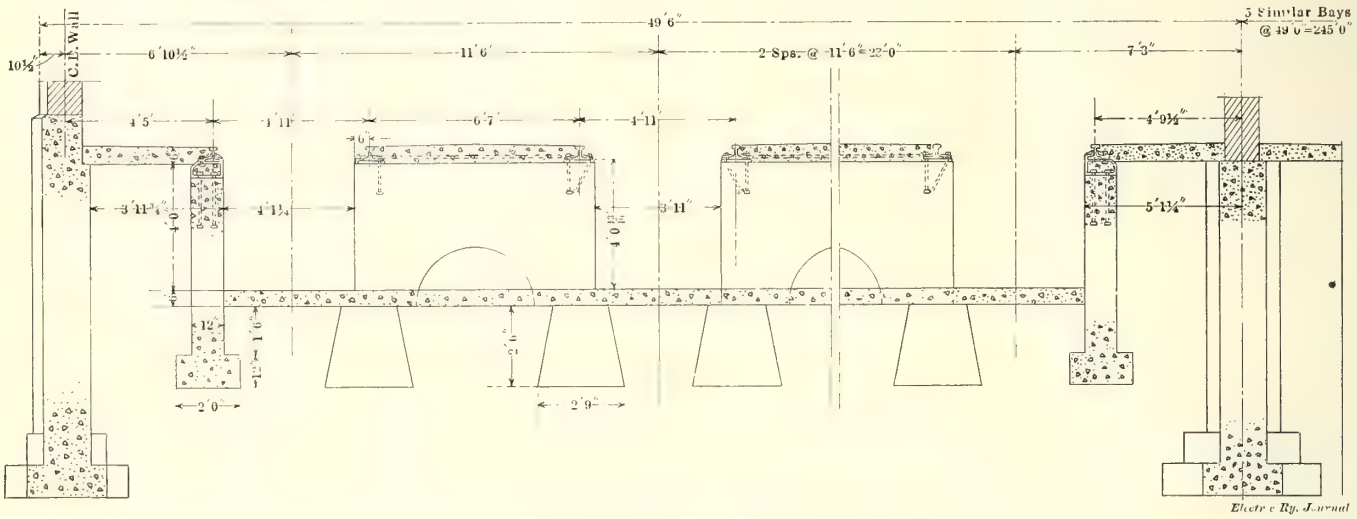
After three months the contractor shall recoat the entire roof as follows: Sweep up all loose gravel into piles. Coat entire surface of roof with a heavy coat of pitch and gravel of kinds specified above. This recoating shall not be done until the engineer in charge for the Chicago Railways Company has been notified. The inside surface of all parapet fire walls above roof line shall be mopped with one heavy coating of coal tar pitch, using not less than 40 lbs. per 100 sq. ft.

Guarantee—Give written guarantee for ten (10) years.

An illustration presents a view of a portion of the roof of the car house, showing the large number of small skylights which are used. Each skylight is built of No. 24-gage galvanized iron and ⅛-in. factory ribbed glass. The skylights are arranged in rows over the aisles between car tracks. Beneath these skylights at the level of the underside of the roof is a metal guard built of No. 15 gage galvanized wire of ¾-in. mesh securely fastened to the concrete roof slab. Another illustration shows the appearance of the under side of the skylights with the wire guards in place. As first designed, the car house was to be lighted by flat skylights of wire glass, but objection to this construction was made by the fire underwriters and the present construction developed. As first designed, the skylights would have formed a barrier through which, it was thought, the firemen could not have worked properly in case of fire. As now built, the ribbed glass may easily be broken for the insertion of a fire nozzle. The wire net beneath each skylight serves to protect workmen from falling glass in case of accidental breakage.

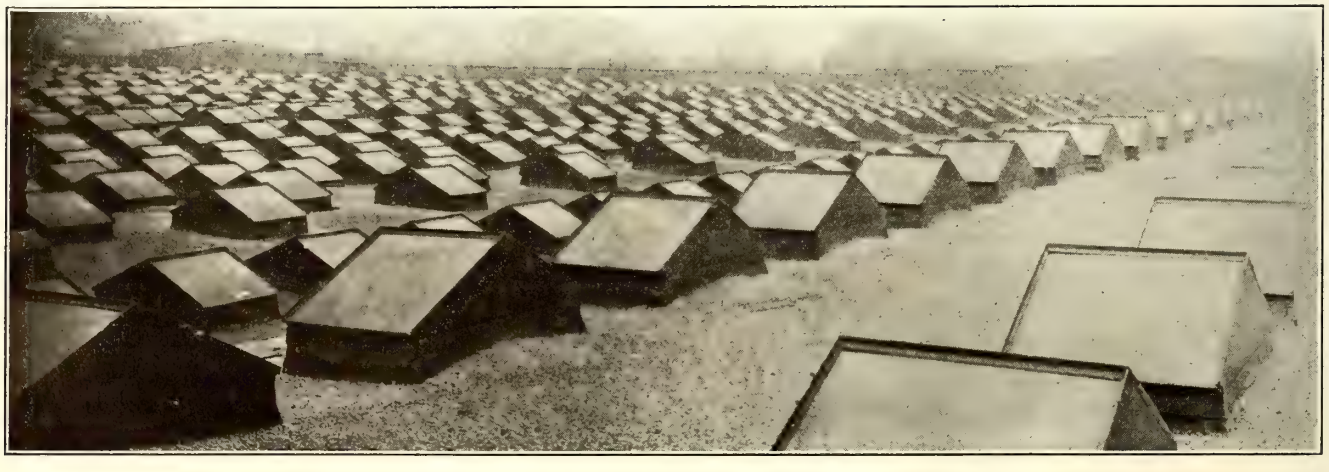
UTILITY SECTION

The eastern bay of the new car house is subdivided by a longitudinal end-to-end brick wall into a repair bay and a row of utility rooms and offices. A 10-ton electric crane serves the two tracks in the repair bay. One of the tracks, that which extends through the building, is built over a repair pit 192 ft. long. The second track has neither outside connection nor pit, and is designed for use in making truck repairs. The car body crane to be used here was built by the Cleveland Crane Company, and is provided with a full motor equipment.



Leavitt Street Car House—Cross-Section Through Tracks in Storage Bay

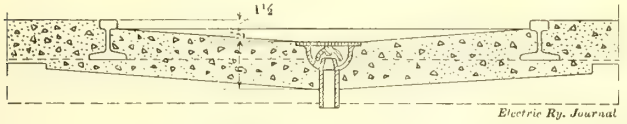
Beginning at the north end of the car house, the utility section, which is 25 ft. wide, is subdivided as follows: Receivers' and foremen's offices, trainmen's rooms, toilet room, storeroom, repair shop, in which will be placed an equipment of small tools for making light repairs, oil room and heating plant. The heating plant occupies two rooms set off from the rest of the building by full-height brick walls. Hot air for heating is distributed throughout the building by a Sturtevant fan equipment discharging into large concrete ducts under the floors. There are two fire-tube boilers for making steam, so arranged with reference to the nearby track that coal may be unloaded close to the firing doors. The steam at a low pressure is fed through heating coils arranged as baffles in the intakes of two large blower fans. Fresh air is received through two large windows in the outside wall of the building, and fans, steam coils and other blowing equipment are all provided in duplicate with the two sets separated by a sheet-steel



Leavitt Street Car House—View on Roof, Showing Skylights

partition. Thus it is possible to regulate the equipments used in heating the car house and also to keep the building warm in event of trouble with one of the heating sets. The fans are belt-connected to 20-hp, 500-volt motors.

The main conduit or tunnel which carries the hot air away from the fans for distribution to the laterals under the pits extends under the repair bay floor, and is 4 ft. x 8 ft. in section. Two cross tunnels, one at either end of the pits, feed galvanized-iron distributing pipes supported under the car house floors. These cross tunnels are 8 ft. x 4 ft. in size where they connect with the main distributing tunnel under the repair bay, and taper to 2½ ft. x 4 ft. in size under the most distant tracks. At each partition wall through which these hot-air ducts pass two balanced sheet-steel fire doors are provided, arranged to be held normally above the level of the car house floor, but so adjusted that in time of fire they may be lowered easily so as positively to close the hot-air duct between the bays on the opposite sides of the door.



Leavitt Street Car House—Section Through Wash Track

The several offices for the transportation and mechanical departments are attractively trimmed in hardwood and have wooden floors. The following specifications were issued by the Board of Supervising Engineers to cover the materials used in painting:

In General—Although these specifications are intended to be explicit, and cover all parts to be painted, and varnished, the constructor is directed to refer to detail drawings, also to specifications for carpentry, structural iron, iron stairs and sheet metal, and inform himself fully of the character and extent of work.

Wherever wood work is not perfectly dry or smooth enough notify the engineer in charge before proceeding.

All work must be of the highest grade of its kind and to the complete satisfaction of the engineer in charge.

All iron to be cleaned free from rust before painting. Use wire brushes.

The "General Conditions" on pages 1, 2, 3, 4 and 41, hereinbefore mentioned, apply to this work.

Material—All paint to be strictly pure white lead, pure linseed oil, pure colors ground in oil and turpentine unless otherwise specified.

Where "Standard Green" is specified, same is to be a special green paint to be approved by the engineer in charge.

Where graphite paint is called for it is to be Dixon's graphite or equal.

Asphalt paint to be Western Roofing & Supply Company's black asphaltum or equal.

All colors in oil to be Sherwin-Williams Company's best colors ground in oil or equal.

Use Wheeler's wood filler or equal for all oak finish.

Varnish to be Murphy Varnish Company's best quality or equal.

Whitewash material to be Geo. Fletcher & Company's "Monarch" or other cold wash paint as approved by Board of Underwriters.

All material to be delivered at building in original sealed packages and approved by the engineer in charge, before using.

During the cold weather in London recently trains on the Wimbledon and Putney bridge section of the Metropolitan District Electric Railway were delayed in the early morning owing to the layer of ice which had accumulated on the rails. Curiously enough, none of the other exposed sections of this railway suffered in the same way. If an occurrence of this sort is anticipated it is usual to clear the rails by periodically running a steam locomotive over them fitted with special steel brushes.

On the London "tube" railways, at Dover Street and Earl's Court stations, an elevator-signaling system, electrically connected with the automatic-signaling system, has been adopted experimentally. A bell in the elevator rings on the approach of a train, and the interval before its arrival is just sufficient to enable the elevator to descend and the passengers to reach the platform. Illuminated indicators over the elevators, which are lit up five seconds before they reach the top, have also been fitted in several stations.

LITTLE THINGS IN CONNECTION WITH OPERATION*

BY W. A. CARSON, GENERAL MANAGER, EVANSVILLE RAILWAYS COMPANY, EVANSVILLE, IND.

The aim of every practical railway operator is to increase earnings and decrease operating expenses, and with this end in view, he should bear in mind that, saving the dimes, the dollars will take care of themselves. The subject of this paper was given me with the idea of bringing out a few of the "little things" in connection with operation, which are liable to be passed over as unimportant.

PURCHASES

Almost any railway operator can keep his cars running and carry passengers, but to get economical results all maintenance must be carried on in a systematic manner and the dimes spent must be given as much attention as the dimes collected. Employees are apt to become imbued with the general public opinion that railway companies have unlimited means, and when anything becomes broken or inoperative for any reason, it is much easier to substitute new material than it is to make the necessary repairs even though such repairs could be made at small expense compared with the original cost. Old material should never be scrapped or new material issued without the approval of some competent department head. New material and supplies should be kept in a properly equipped and orderly storeroom and the responsibility of maintaining such storeroom centered in one employee. It should be his duty to carry in stock such materials and supplies as may be specified by the different department heads and such materials and supplies should only be issued on the approval of such department heads. Accurate records should be kept of all materials and supplies taken into the storeroom and nothing should be issued without a properly approved requisition which states to whom and for what purpose the material is issued.

Heavy materials such as rails, ties, etc., stored along the line should also be looked after and checked and record kept by the storekeeper. In this way accurate distribution of maintenance accounts is made possible. When materials are ordered in quantities such as nails, bolts, spikes, etc., for the different departments and delivered to them direct, the whole consignment is generally shipped to the point at which it is needed for immediate use. The quantity left over is usually not taken care of, but permitted to remain at that point in easy access, and it can be expected that such material will be carried away for personal use, which is a direct loss to the company. When another department is in need of the same kind of material, the stock on hand is likely to be overlooked and another order placed.

It has often been said that the maintenance of a car is no better than the shop in which the work is performed. When materials and supplies are piled promiscuously about the shops and car barns and everything is dirty and disorderly, some materials soon become buried, and it is impossible to tell just what there is on hand. When something is needed, it cannot be found, and on the assumption that the stock is exhausted another order is placed. I know of a case where a quantity of several hundred angle bars was stored in a car barn, and to get them out of the way the barn foreman moved them to an obscure part of the barn. As no one had a record of this stock, the next time the track department was in need of angle bars it was not thought of and another order placed. When the bars on this order were received and checked in the stock on hand was discovered and found to be considerably in excess of the amount needed for immediate use. I have also known of cases where material was left at stations and depots on the line and out along the track, which was discovered several months after, and orders for the same kind of material had been placed in the meantime.

Some roads think a card index of all purchases is not necessary and is too much red tape, but with a few minutes' work each day in the office a detailed record can be

*Paper presented at Cleveland meeting of Central Electric Railway Association, March 25, 1909.

kept of the different materials and supplies purchased, showing the order number, the date the order was placed, the quantity ordered and the price and discount given. In this way differences in prices can be easily found, and a letter can be written asking for an explanation of such differences. In nine cases out of ten a credit meorandum will be forthcoming.

Local wholesale hardware companies and steam fitting supply houses from which the railway companies purchase large quantities of material have quite a schedule of discounts for the different customers, according to the quantity of material ordered. The bill clerk does not always give the best discount to which the customers are entitled, and unless the bills are closely checked, there will be a variety of prices on the same material. From personal experience with a large wholesale hardware company I have received from two to half a dozen credits a month on overcharges of this kind. I have also found this to be the case with a large number of electrical and railway supply houses. A card index record is also a good check on the consumption of the different materials. If requisitions come in more frequently than has been customary, an explanation can be requested, and perhaps some irregularity brought to light.

Employees who check material received should be required to check all shipments carefully and accurately as to weight, quantity, etc. All material and supplies, such as brake shoes, waste, bar iron, etc., which are sold on weight should be checked by weight in addition to quantity. Orders are frequently filled with greater or less quantity than is called for on order, and unless employees are required to check shipments carefully, they will mechanically report the quantity called for on the order or requisition without ever checking the shipment. Shipping clerks of the railway supply houses, under pressure of heavy business, make frequent errors which will be brought to light by a careful check of the railway company.

ATTENTION TO DETAILS

Department heads and principal employees should be impressed with the idea that all matters coming under their jurisdiction should have the most prompt attention. An aid to prompt execution is a loose-leaf memorandum book carried in the pocket. Notations can then be made of matters requiring attention, which will serve as reminders until such matters are finally disposed of. Employees are apt to depend too much upon their memories, and every day or so they are confronted with an inquiry as to why certain work has not been done, and the only excuse is that it was forgotten. The head of a large concern once said, "I carry the big things in my head and the details in my pocket." A man burdened with details is not as efficient as he should be, and a pocket supplement to the memory will remedy the difficulty.

REPORTS AND COMPLAINTS

Written daily reports should be sent to the general manager by all department heads, giving in detail all the work done by their department during the day and the number of employees engaged on such work. In this way the manager can keep in close touch with the progress of all the work and will know when the work he has requested done has been finished. These reports will also tend to encourage progress of the work that a good showing may be made.

Written and personal requests and complaints of farmers and patrons along the line should be disposed of promptly, and not be allowed to drag along until the patience of the party is worn out and he assumes an unfriendly feeling toward the company.

VISITS TO OTHER PROPERTIES

Managers and department heads should make frequent visits to other roads and see how the other fellow handles the various propositions. In this way they can profit by the experience of their neighbors and take advantage of all the good points in their system and apply them to their own. Almost any one can figure out a system of some kind, but to get the most up-to-date methods, experience of the man who has been up against actual conditions is the best.

RELATIONS WITH EMPLOYEES

The manager should leave details to assistants and clerks, thereby giving him an opportunity to be out on the line and get acquainted with the employees at work in the various departments and come in close touch with the activities of the company, talking over with the men the various phases of their duties and making them feel that he has a personal interest in them and their work. As long as an employee thinks his efforts are appreciated he will take greater interest, and it will soon become a pleasure for him to come in contact with the manager instead of having that uneasy feeling when the "old man" is around.

The desk should be kept as clear as possible from all papers, one corner of it being reserved for papers covering matters under consideration. Such papers, however, should be gone over every day, so that nothing will be buried and overlooked. All other papers should be filed. The criticism on a disorderly shop, mentioned above, might fittingly apply to a disorderly desk—that the efficiency of business transacted is no better than the condition of the desk it goes over. The latest and most modern office furniture, filing devices and office equipment should be used, so as to get the best results from the efforts put forth.

To maintain discipline among employees, violation of minor rules should never be overlooked as of no importance, as by calling attention to these minor cases infraction of more important rules and regulations will be prevented. Employees should be lectured and warned for violation of minor rules, but for more important violations they should be suspended. The plan of one of the large steam roads to post on the bulletin boards notices of suspension, giving the name of employee suspended, the length of suspension and full details as to the specific cause is an excellent one. Suspensions are not made particularly for punishment to the employees who receive them, but as a lesson and example to all the other employees, and the more publicity given the better effect it will have on the entire organization. It will also soon become a matter of pride for employees to keep their names off the bulletin. The posting of a monthly over and short list of conductors, showing the percentage of correct days, will create enthusiasm and rivalry, and greater care will be exercised in the registering of fares so as to make a good showing.

Men should not be discharged too hastily, as new men taking their places might make more serious mistakes. A man making a mistake and receiving severe discipline will not likely repeat the offense, but his efficiency to the company will be increased.

REPORTS ON IRREGULARITIES IN THE SERVICE

It is frequently the case that reports of irregularities of service are made by officials and others interested in the company several days after the occurrence, and it is hard to get enough definite information to place the responsibility. To encourage prompt and accurate reports of irregularities of service, violation of rules, etc., A. A. Anderson, president of our association and general manager, Indianapolis, Columbus & Southern Traction Company, has inaugurated an excellent system of small printed report blanks. These reports have blank spaces for the date, car number, train number, conductor, motorman, time of day, place and remarks, and the signature of the party making the report, and the following printed request: "Please fill out this form, reporting any irregularities of service, violation of rules, misconduct of employees or other matters requiring attention. For the good of the service. After signing, seal and hand to conductor or motorman." Each report is gummed on one end and printed in such a way that when it is folded and sealed it forms a small R.R.B. envelope addressed to Mr. Anderson's office. A supply of these reports was sent out with 1909 annual card passes. (A reproduction is shown.)

DUTIES OF EMPLOYEES

Before being turned in new men should receive full instructions about making out accident reports from the men subbing them. They should also be examined and approved by the head of the claim department before be-

ing allowed to begin work. The claim department should be allowed to order suspensions of employees for violation of rules pertaining to that department. Special instructions, covering accident reports, calling physicians, etc., should be printed on the employees' timetable for ready reference, together with the names, addresses and telephone numbers of all company surgeons.

All trainmen and employees whose duties bring them in touch with the public should be required to wear suitable uniforms and be neat in appearance. A few things that add greatly to the appearance of employees in uniform are gold and silver collar ornaments of the company initials, gold and silver braid around the caps and service stripes on the left coat sleeve and a special design of uniform buttons instead of the regular stereotyped motorman and conductor's buttons furnished with uniforms.

At intervals written examinations on the operating rule book should be given all employees whose duties have anything to do with the operation of trains, and all employees making grades of less than 85 per cent should be required to take another examination. Three failures to grade better than 85 per cent should be sufficient cause for dismissal. These examinations should also cover special orders which have been posted from time to time.

Conductors should stand on the ground when loading or unloading at stations, to assist ladies and children and take care of hand baggage, bundles, etc. Conductors should be required to hat-check destination of all passengers, so that people will not be overlooked who endeavor to ride beyond the point to which fare was paid. Conductors should be familiar with the special tickets and rates so as to be able to explain the features to patrons making inquiry. Both conductors and agents should be familiar with the timetables of all connecting steam roads and interurban lines, so as to be able to answer any inquiries regarding such connections.

The use of this envelope to avoid payment of postage on private matter of any kind is punishable under the U. S. postal laws by a fine of $100.

R. R. B.

A. A. ANDERSON, Gen. Mgr.,
Columbus,
Indiana.

Please fill out this form, reporting any irregularities of service, violations of rules, misconduct of employes, dirty cars or other matters requiring attention.
FOR THE GOOD OF THE SERVICE.
A. A. ANDERSON, Gen. Mgr.

190....

Car No..... Train No.....
Conductor .....
Motorman .....
Time of day ..... A. M. P. M.
Place .....
.....
REMARKS
.....
.....
.....
.....
.....
Name .....
Address .....

AFTER SIGNING, SEAL AND HAND TO CONDUCTOR OR MOTORMAN

Envelope Used for Transmitting Reports on Irregularities of Service

The leaving time of all trains should be posted on a bulletin in a conspicuous place in all stations. When a car is delayed any considerable length of time for any reason the dispatcher, or some other employee closely connected with him, should notify all agents by telephone about such delays and advise them of the time that car will pass their station.

Good landing platforms should be installed and maintained at all country stops and stations to facilitate the movement of passengers in getting on and off the cars. These platforms should be arranged as near as possible on one side of the track and conductors required to keep only one rear vestibule door open, so that they can give personal attention to discharging and taking on passengers, to avoid accidents.

To enable the motorman to make accurate stops, marker posts should be installed or the ends of ties painted on the right side of track the exact distance each side of the stop, so that when the front of the car is even with the marker the rear vestibule door will be in the middle of the landing platform.

"S" and "X" whistle signs should be painted on poles at least 1000 ft. each side of stations, crossings and curves, insuring the blowing of the whistle by the motorman at the proper time and place, and also acting as a guide for old men on dark nights, heavy rains and dense fogs, as well as assisting new men in learning the road, helping their sense of location, etc.

Conductors, when flagging railroad crossings, should look back to the rear of the car to see that no passengers are getting on or off before giving the motorman the signal to proceed. The motorman, after receiving a signal from the conductor and before starting up, should look back through the car to see that no one is getting off.

When extra trains back into sidings to clear regular trains, or when regular trains back in for any reason to clear opposing trains, after heading out of the siding and the switch thrown for the main line, the car should be backed over the switch points far enough for the motorman to see that the switch is properly set.

CONDITION OF CARS

Car men are always very ready to criticise the shop for not making car repairs promptly, but if the truth were known the reason would probably be because the attention of the shop had never been called to such defects. To bring these small defects to the attention of the shop promptly, all car men should turn in a car defect report every day, covering each car they have handled during the day, reporting the defects coming to their notice, and in case there were no defects, to mark the report O.K. These reports should be signed and dated by the shop foreman when the work is completed and forwarded to the superintendent for inspection.

All cars should be kept as clean as possible, and if car barns are maintained at one of the terminals, a clean car should be put out every trip. One hour's time is sufficient under ordinary conditions to inspect the equipment of a car, clean the windows and do such other work as may be necessary. Conductors should keep all loose papers and rubbish picked up off the floor of the car when on the road.

ORGANIZATION

To facilitate the systematic transaction of the business of the company and to avoid misunderstandings as to the duty of employees in connection with any particular matter, a written detailed organization plan defining the position and duties of the various department heads and principal employees should be issued and placed in the hands of the men and posted in a conspicuous place. It should specify what employees come under the jurisdiction of the respective departments, and the authority of the various department heads with reference to employees whose duties lap over in two or more departments. Particular mention should be made emphasizing the importance of team work and discouraging personal feeling, disputes and the disposition to shift responsibility.

There are very few roads that do not have friction between the shop and transportation departments, and unless the heads of these two departments work in harmony and keep down the criticising spirit in the men under them, a feeling will soon exist that will be detrimental to the company's interest. When one employee does something to "get back" at another, the company, but neither of the men, is the loser.

To promote a kindly feeling in the organization, it is a good idea to have periodical meetings of executive heads to discuss freely all of the work in the various departments, especially that which laps over from one department to another. Meetings of all employees in every department should be held at intervals and talks given by the management and the various department heads, and an endeavor made to have them bring up for discussion new conditions which come up from time to time; the policy of the company with reference to such matters should then be decided upon and explained. The purpose of these meetings should be the raising of efficiency and removal of complaints by infusing personality, enthusiasm, tact and a knowledge of the company's policies in the whole organization.

Violations of minor rules should be brought up and various cases cited in detail, without mentioning names, with the idea of impressing upon each employee the importance of strict observance of all rules whatsoever. Mention should also be made, without giving names, of the commendable things done by employees. This will not only encourage the particular man, but will stimulate the other employees to do praiseworthy things.

All employees should be inspired with the idea that every one connected with the company, from the general

manager down to the sectionman, should be loyal and work for the common cause, the good of the company, and that those who are constantly finding fault with their duties and superiors are out of place in the organization, and will soon fall overboard. Along this line and to bring out this point more forcibly, the manager of a large interurban line had the following, a clipping from the *Philistine* printed and framed and posted in all of the offices, car barns, power houses and trainmen's rooms:

"A big business is a steamship bound for a port called Success. It takes a large force of men to operate this boat. Eternal vigilance is not only the price of liberty, but it is the price of every other good thing, including steamboating.

"To keep this steamboat moving, the captain requires the assistance of hundreds of people who have a singleness of aim—one purpose—a desire to do the right thing and the best thing in order that the ship shall move steadily, surely and safely on her course.

"Curiously enough, there are men constantly falling overboard. Those folks who fall overboard are always cautioned to keep away from dangerous places, still there are those who delight in taking risks. Those individuals who fall off and cling to floating spars, or are picked up by passing craft, usually declare that they were 'discharged.' They say the captain or the mate or their comrades had it in for them. I am inclined to think that no man was ever 'discharged' from a successful concern—he discharged himself. When a man is told to do a certain thing, and there leaps to his lips, or even his heart, the formula, 'I wasn't hired to do that,' he is standing on a greased plank that inclines toward the sea. When the plank is tilted to a proper angle, he goes to Davy Jones' locker, and nobody tilts the fatal plank but the man himself. And the way this plank is tilted is this: The man takes more interest in passing craft and what is going on on land than in doing his work on board ship. If you are on a greased plank you had better off from it, and quickly, too."

LOYALTY

Loyalty is the thing. A large piano manufacturing company, to impress "Loyalty" on its employees, requires every new recruit to commit to memory this preachment of Elbert Hubbard on "Loyalty":

"If you work for a man, in heaven's name work for him. If he pays you wages that supply your bread and butter, work for him, speak well of him, stand by him and stand by the institution he represents. If put to a pinch, an ounce of loyalty is worth a pound of cleverness. If you must vilify, condemn and eternally disparage, why resign your position, and when you are on the outside, damn to your heart's content. But as long as you are a part of the institution do not condemn it. If you do, you are loosening the tendrils that hold you in the institution, and the first high wind that comes along you will be uprooted and blown away, and probably you will never know why."

POSTERS AT THE MANILA CARNIVAL

The Manila Electric Railway Company has always taken a prominent part in the annual Manila carnival, which this year was held on Feb. 2. The carnival is an event of interest throughout the island, and many strangers visit Manila to attend the entertainments and witness the other events which take place. One of the contributions by the railway company this year was the distribution and posting of posters throughout the island, advertising the carnival. One of these is reproduced as an addition to the series of advertising posters of other electric railway companies which have been published in recent issues of this journal.



THE PRESERVATIVE TREATMENT OF TIMBERS USED BY ELECTRIC TRACTION COMPANIES*

BY J. M. NELSON, FOREST SERVICE.

The preservation of structural timber from decay has been made the subject of careful study by the Forest Service for many years. It has been recognized all along that the preservative treatment of wood is distinctly a matter of dollars and cents. If it brings about a saving, it will be adopted; if it costs more than it saves, no recommendations from the Forest Service or from any other source will put it into actual practice. The questions with which we are concerned have to do with the supply of cross-ties, poles, and other timbers used by electric traction companies throughout the Middle West; with methods of prolonging their life so as to secure the greatest possible service from a given amount of timber at the least cost, and, finally, with the chance to substitute other and more abundant kinds of wood for the comparatively few species used at present for ties and poles.

It is each year becoming more difficult to secure an adequate supply of tie and pole timbers at reasonable prices, and the replacement of ties and poles, when in a few years they must be removed because of decay, is becoming ever a more and more serious problem. During the past year the supply of ties and poles may have exceeded the demand, but such a condition was purely temporary and due to the enormous curtailment of structural work brought about by the financial stringency throughout the entire country. The Forest Service reports show that in 1907 over 9,500,000 cross-ties were purchased by electric railroads operating in the United States. Nearly 4,500,000 were of white oak, cedar and chestnut, species comparatively expensive and scarce. In this same year the electric companies of the United States purchased over 900,000 poles, nearly 75 per cent of which were cedar and chestnut, both high-priced species of limited supply. Frequently these ties and poles must be transported from distant points at high freight rates.

Within a few years it will be difficult to procure sufficient quantities of these more durable and less plentiful species at any price. It is true that nearby, perhaps adjacent to your property, there may be large quantities of inferior species of timber, such as red and black oak, sycamore, hickory, beech, birch and maple. You can purchase from the pine country of the South shortleaf sap-pine ties at a price delivered less than that which you pay for white oak and chestnut. However, these woods are often classed as inferior species of timber not worth the cutting, and are usually rejected because, in their natural condition, they are neither sufficiently durable to resist decay nor hard enough to resist mechanical wear. One of these defects can be overcome entirely, and the other in part, by a chemical treatment with a wood preservative. If preserved by a suitable treatment, a red-oak tie will outlast a white-oak tie untreated, or a sap-pine pole will prove more durable than a cedar or chestnut pole untreated. Of course, in the case of ties, the element of mechanical wear must be seriously considered. However, this element of destruction is confined for the most part to railroads over which the traffic is heavy. Moreover, it is certain that a large number of ties which are abraded by the rails are previously softened by the decay of wood beneath the railbase and in the vicinity of the spikes.

To grow a white-oak tree large enough to furnish a tie requires from 40 to 50 years, while an equivalent period is necessary to furnish a chestnut pole. The life of a tie or pole as used by electric railway companies is estimated at from 8 to 12 years. In exceptional cases this life is exceeded. At least three times as many ties and poles are being consumed as are annually produced by the forest growth.

Some years ago the Forest Service realized that the decay of timber was a severe drain on the forest resources of this country, and steps were taken to combat this form of timber destruction. Studies in methods of preserving wood from decay by the application of a chemical treatment were inaugurated. Throughout this investigative work the

*Paper read at the meeting of the Central Electric Railway Association, Cleveland, Ohio, March 25.

financial saving to the consumer has been constantly considered. Efforts have been made to devise treatments at a cost reasonable in proportion to the initial cost of timber, for it is realized that if the added initial expenditure is too great, the timber consumer will not add a new feature to the usual methods of handling timber, regardless of the ultimate final saving. Moreover, it is realized that for an innovation of this character to be a commercial success, it must yield a financial return within a reasonable period; that is, within the term of administration covered by the officials of the timber-consuming company.

At present there are operating in the United States about 60 wood-preserving plants, which furnish an output amounting to 1,250,000,000 ft. (board measure) of timber per year. Four years ago this output was but 500,000,000 ft. This increase of 300 per cent in this short period argues well for the development of this industry and for its necessity as a money-saver to the commercial world. Throughout the United States, if all the timber were treated which is subject to destruction by decay, at least $72,000,000 would be saved annually.

	Cedar poles		Sap pine poles	
	Cost.	Life.	Cost.	Life.
Untreated	$4.00	15 years	$2.50	5 years
Treated	5.50	25 years	4.00	20 years

	White oak ties		Red and black oak ties.	
	Cost.	Life.	Cost.	Life.
Untreated	$0.75	8 years	$0.45	5 years
Treated	1.05	20 years	0.75	15 years

It may be well to describe briefly the causes of decay and the principles of its prevention. Decay is due to the activities of low forms of plant life called fungi, which permeate through the wood structure, abstracting their food from the wood cells, and leaving the wood disintegrated and discolored. Spores, which may be described as very primitive substitutes for seed, are borne by the fungi in countless numbers. They can be seen only by the aid of a microscope, and, being carried freely by the wind, are everywhere present, ready to attack any favorable surface of wood on which they happen to alight. Some of the spores of these wood-destroying fungi find a lodging place on cut timber, which is in a receptive condition for their germination and growth. These organisms are the real agents of decay, and the success of a wood preservative is directly proportionate to its ability to render and to keep wood unfit for their germination and growth.

There are four essential conditions for the growth of a fungus: It must have the requisite amounts of food, air, moisture and heat. If any of these is lacking, or is insufficient in amount, the fungus cannot develop, and the wood will be preserved indefinitely from decay. The necessary heat is supplied by all temperate climates, and it is only in rare cases, as under water, or deep under the surface of the ground, that air can be excluded. When freshly cut wood is exposed to the elements in its natural state, the sap contains sufficient quantities of food and air for the development of the fungi. Clearly, the supply of heat and air are beyond control, but the moisture content of the wood may be reduced so low as to prevent the germination or growth of fungi, and the food supply may be poisoned.

All of the efforts to promote wood preservation are based on one or both of these lines of action. Seasoning timber, or reducing its moisture content, is the simplest method of prolonging its life, and it is efficient so long as the amount of moisture in the wood is kept below the requirements of the fungi; but moisture will eventually be reabsorbed from the atmosphere or from the soil, and the old conditions partially or completely restored. A thorough seasoning of the timber is of the first importance for several reasons. It increases its durability, adds greatly to its strength, decreases its weight, and hence the freight charges for transportation. Most important of all, seasoning renders the wood more porous and in better condition for the reception of a preservative fluid such as will be described. Considered by itself, the seasoning of a railroad tie or a pole would more than pay for its cost, which, in most cases, merely represents the interest on the money invested in the timber for the time required by the seasoning process. Sometimes an extra handling is necessitated, but in almost every case the saving in freight will more than pay for the cost of seasoning, irrespective of all other advantages; but, as has been said, if timber be merely seasoned, moisture will be excluded only temporarily. It will be reabsorbed when the timber is brought in contact with damp soil or air. The only permanent way to prevent the development of wood-destroying fungi is to poison their food supply. This is done by injecting antiseptic substances into the wood and so changing the organic matter from food suitable for fungi into powerful fungicides.

Of the many antiseptics which at one time or another have been proposed for the preservation of timber, two general classes may be made: (1) Antiseptic salts of various substances, such as zinc chloride, corrosive sublimate and copper sulphate; and (2) antiseptic oils, of which creosote, or dead oil of coal tar, is most generally used.

Copper sulphate has fallen into almost total disuse for preservative purposes in this country, and corrosive sublimate is used only to a very slight extent. The most common preservatives in general use are zinc chloride and creosote. Each has its advantages and disadvantages. Both are excellent antiseptics. It may be said, however, that the principal value of zinc chloride may be found in its cheapness and its ease of transportation, for it can be hauled in the form of a solid and dissolved at the treating plant. The principal defect of zinc chloride is its liability to leach out of the timber when exposed to moisture, either in the soil or in the atmosphere. It readily dissolves in water, indeed, it is injected into the timber in the form of an aqueous solution, and so its subsequent leaching out is merely a question of time, and the wood is left once more subject to attack. Its use, therefore, is limited to the more arid regions of the United States. Creosote, on the other hand, is practically insoluble in water, and so, when a high grade of oil is used and injected into the timber, decay will be postponed almost indefinitely. Its principal disadvantages are its higher first cost, as compared with zinc chloride, and its limited supply. But, for the treatment of timber for many structural purposes, there is no other preservative which gives good promise of replacing it. The thing to do, therefore, is so to use it as to insure the greatest returns from the expenditure of a given amount of money. It is along these lines that the principal activities of the Forest Service have been exerted.

Methods of applying a chemical treatment in this country might be divided into two classes, those in which the preservative is injected by artificial pressure, and those in which the atmospheric pressure is made to force the preservative into the timber. The non-pressure or open-tank process, as it is sometimes called, is much the simpler and less expensive, but not so well suited for the treatment of a variety of species and forms of timber. When timber is to be creosoted under the usual pressure method, or Bethell process, as it is called, it is placed on iron trucks and hauled by cables into large steel cylinders capable of withstanding high pressure. The doors are closed, and the timber is subjected to a bath of live steam for several hours. This is followed by a vacuum, and finally the cylinder is filled with creosote, the force pumps are started, and continued until the desired amount of oil has been forced into the

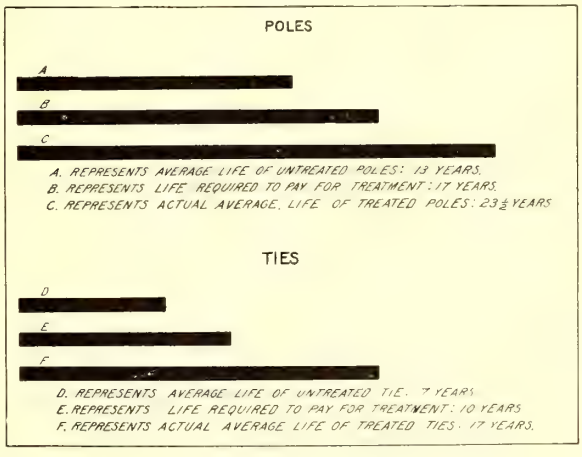
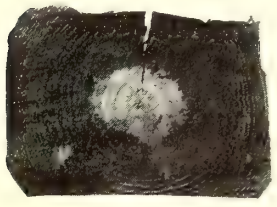


Diagram of Life of Treated and Untreated Poles and Ties

timber. The surplus oil is then run out, the doors opened, and the treatment is complete. Thus the treatment is divided into three subsidiary processes: First, the steam bath; second, the vacuum, and third, the injection of the preservative under pressure. It remained to be found whether all of these processes were essential to a proper treatment, or whether they could be replaced by simple and cheaper methods. I have not time to trace the steps, or to recount the experiments which were made in this effort. The results were that air-seasoning was found to be more satisfactory in most cases than the bath of live steam, and that the vacuum could often be dispensed with altogether. There remained merely the question of pressure. Allowing the



Section of Loblolly Pine Tie Creosoted by Non-Pressure Process

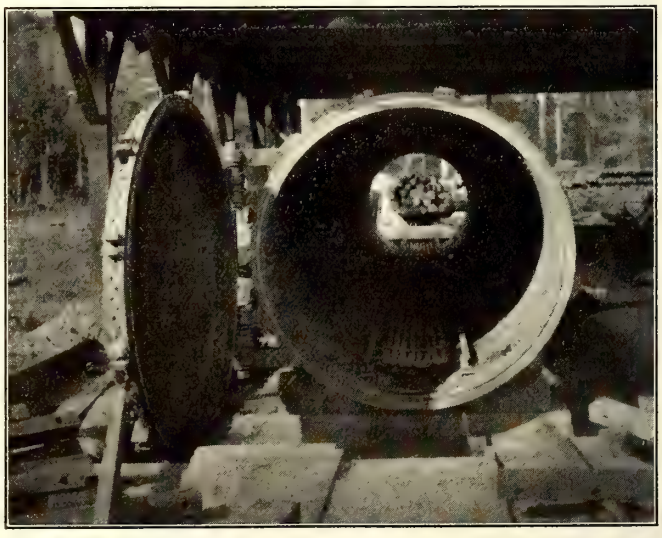


Section of Loblolly Pine Telephone Pole Creosoted by Non-Pressure Process

oil to seep into the wood without pressure of any kind was slow and unsatisfactory; and yet the old artificial pressure required expensive plants and machinery. A happy solution was found by making atmospheric pressure take the place of force pumps. To Dr. Charles A. Seely, of New York, is due the credit for having introduced this principle of treatment into America in 1867. His application of the method has been improved by the Forest Service and adapted to wide conditions. During the process of air-seasoning much of the moisture in the wood cells is evaporated and its place is taken by air. The wood structure becomes more porous and more easily penetrated. Having reached, or closely approached, an air-dry condition, the wood is placed in a bath of hot oil or other preservative. This application of heat causes the air in the wood structure to expand, and much of it is expelled. Some of the moisture remaining in the wood is also evaporated and escapes. After a time the hot liquid is run out of the treating tank and cooler oil admitted; or else the timber is removed from the hot bath and quickly plunged into one of lower temperature; or, by a third method, the heat may be shut off and the timber allowed to remain in the oil as it cools. This quickly causes a contraction of air and a condensation of moisture to take place within the timber; a partial vacuum is consequently created, and the preservative is forced into the timber under atmospheric pressure.

The preservative process best suited for the treatment of poles and ties by electric traction companies depends upon the form and species of timber handled and the proportion of sapwood it contains. A porous wood, such as sap pine or red oak, is more easily impregnated with a preservative than is a dense species, such as white oak or chestnut. A less expensive non-pressure treatment, therefore, is more suitable for the treatment of these porous woods. Moreover, sapwood is more easily treated than heartwood. When the timber to be treated is round, in the form of a pole or post, there is always a well-defined band of porous sapwood encircling and enclosing the interior dense heartwood. The presence of the surrounding sapwood insures a satisfactory and an even penetration of the preservative fluid applied by either method of treatment, inasmuch as the sapwood of almost any species of timber may be penetrated without the application of artificial pressure. However, when the timber to be treated is partly square or rectangular, as a railroad tie, both sapwood and heartwood surfaces may be exposed. As a rule, this dense heartwood can be treated more thoroughly by the application of artificial pressure. When treated, the sapwood surfaces of the tie may be thoroughly impregnated, while the heartwood surfaces are barely penetrated with the preservative liquid. The side of the tie on which the rails rest and into which the spikes are driven is usually heartwood, and it is here that a preservative treatment is most desired. Moisture collects beneath the base of the rail and around the spikes, forming an excellent opportunity for the development of decay. If such a tie is not treated uniformly on all sides, the money invested in the treatment of the sap portions may be a partial loss. Some species of wood contain a much larger proportion of sapwood than do others. For instance, loblolly pine and cottonwood contain a great deal of sapwood, while white oak and chestnut contain a very small proportion. In consequence, a non-pressure method of application may be suitable for the treatment of the former species and not desirable for the treatment of the latter. Numerous variations in the kind and form of timber should influence the consumer in selecting a method of treatment. It is important to study the specific timber problem before any definite form of treatment is selected and a specific type of plant is constructed.

For the treatment of poles in this locality, a non-pressure form of treatment is usually the best. The poles are usually a durable species, chestnut or cedar, which decay for the most part at the ground line, where air and moisture conditions favor the development of fungi and subsequent decay. It is not economical, of course, to apply a preservative to the top of a pole which, without treatment, is sufficiently durable to give satisfactory service. The butt of the pole, or that part of its length extending from its butt end to about 1 ft. above the ground line, it is of primary importance to protect. For a partial treatment such as this, the necessary apparatus is an open iron tank about 8 ft. deep, fitted with steam coils arranged along the bottom or sides, together with a tank for the storage of the preservative, and a boiler for generating steam. If the amount of timber warrants the additional expense, the treatment can be hastened and cheapened by adding an underground receiving tank for holding the heated oil used in the first bath, a pump to convey the liquid from the receiving to the storage tank, and a steam hoist for convenient loading and unloading. By the pressure-cylinder method it is necessary to treat the entire pole instead of 5 ft. or 6 ft. at the butt, and to inject just as much preservative in the naturally durable top as in the danger zone near the ground line. The saving in the preservative brought about by the treatment of 5 ft. or 6 ft. of the whole length, instead of 30 ft., is readily apparent.



Treating Cylinder of Non-Pressure Plant at Winnfield, La.

An open-tank plant for the butt treatment of 150 poles daily can be constructed for about $2,000, while a non-pressure plant equipped with a closed cylindrical treating tank for the treatment of the entire length of these poles would cost about $10,000.

For the treatment of ties, a closed cylindrical treating tank is preferable, although a non-pressure method of application may be adopted. A non-pressure plant for the treatment of 350 seasoned ties per day of 12 hr. can be completely installed for about $5,000 to $7,000.

During the past year the Forest Service supervised the

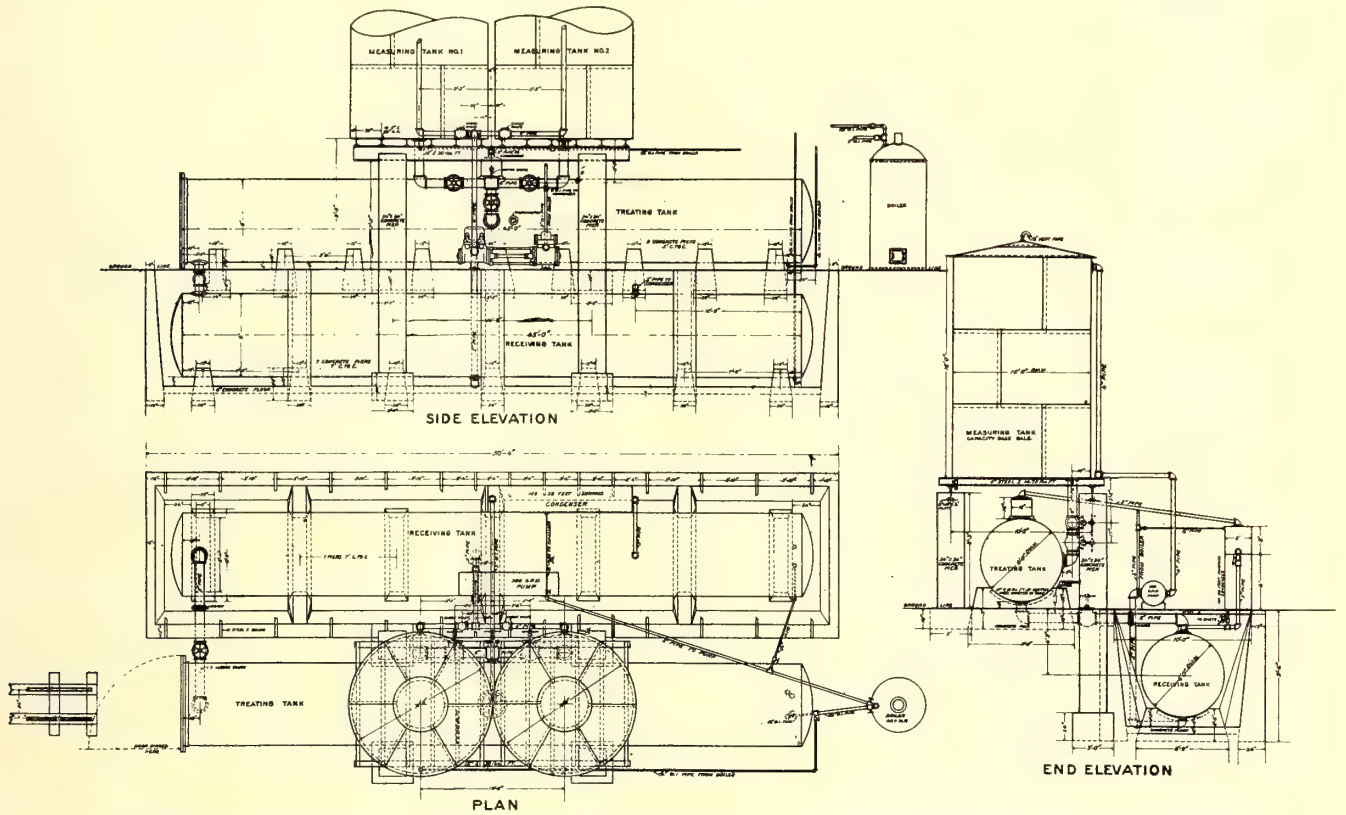
design and installation of three non-pressure plants for the treatment of seasoned loblolly pine. Both ties and poles of this species have been successfully treated at a minimum expense. In addition, round timbers of long-leaf pine, pitch pine and red oak have been satisfactorily impregnated. The above timbers are either species most easily treated or in a form most suitable for treatment, factors which decidedly favor the employment of a non-pressure process.

There is perhaps a field for a type of plant combining the better features of both the pressure and non-pressure designs. That is a plant of relatively light and inexpensive construction, but of sufficient strength to stand a low pressure. In operating such a plant a limited amount of artificial pressure, about 70 lb., can be applied to assist the atmospheric pressure in forcing the preservative into the wood. Under such conditions the fundamentals of a distinct non-pressure treatment, namely, the successive hot and cold baths, would be practised, but the absorption obtained by a sudden change in temperature would be assisted by artificial pressure.

Of course, if an electric traction company wished to treat large numbers of railroad ties of hard, dense species, is, for 25 cents or 30 cents, a preservative treatment may be applied, which will render the red-oak or sap-pine tie twice as durable as the white-oak or longleaf-pine tie untreated. Although the white oak and longleaf pine can be treated with profit, larger returns can be realized from the use of a plentiful and cheap species, made serviceable by protection from decay. The labor cost for placing and replacing ties should be considered in connection with the value of the timber; perhaps 8 cents to place a tie in the track and 15 cents to replace it with a new tie.

The life of a red-oak tie untreated is not more than five years, and in the track it is worth at least 55 cents or 60 cents. At an added cost of 50 per cent for treatment, its life will be increased 200 per cent, and the maintenance charges for renewing ties will be correspondingly reduced. In some instances, where softwood ties are used, it may be necessary to protect them from mechanical wear by the use of tie-plates. However, where the traffic is relatively light, in comparison with steam railroads, as is the case with many electric traction systems, the use of tie-plates need not be seriously considered in connection with the treated tie.

Satisfactory tie-plates cost 25 cents per tie; however, if



Wood-Preserving Plant Designed by the Forest Service for the Indianapolis, Columbus & Southern

a plant of the pressure type is most suitable. A pressure plant of sufficient capacity to treat 500,000 ties annually would probably cost about $75,000.

The Forest Service does not favor any particular preservative process, nor any specific type of plant, but recommends to the timber consumer the most economic method for preserving the particular timbers which he handles. Recently the impression has been created that the non-pressure processes are designed to replace the older and more firmly established pressure processes for all timbers and for all conditions. Nothing could be less correct. The open-tank or non-pressure process is distinctly a process for the consumer of certain species and special forms of timber, and is nothing more than a natural development of the old pressure system, made necessary by the need for a simple and less expensive method for the small user or for the cheaper classes of timber.

The financial saving to be derived from the treatment of ties and poles will now be considered briefly. A red-oak tie or a sap-pine tie can probably be purchased for 50 cents, while a white oak, chestnut or heart longleaf-pine tie may cost 75 cents or 80 cents. For this difference in price, that a softwood tie is both treated and plated, its cost is not increased more than 100 per cent, and its life will be increased at least 200 per cent. Such a tie will cost probably $1 in the track. In the near future the certain rise in price of high-class timbers will make the price of a white oak tie hardly less than this amount. Moreover, within a few years the supply of white oak will be almost exhausted, regardless of price. The railroads must then concern themselves with species of timber which they can obtain in sufficient quantities at reasonable prices. The available tie timbers will certainly be those possessing less durable qualities. If used with economy they must be preserved from decay, and possibly from mechanical wear. A sudden transition from the use of hard, durable woods to those which decay rapidly will be impractical. A gradual substitution of the inferior grades of timber preserved from decay by a chemical treatment is entirely feasible and economical.

The future supply of poles is also of concern to electric railway companies. Assuming that a standard 30-ft. pole of cedar or chestnut costs $4 or $5, with the added cost of labor it may be worth $7 in position. Its average life,

untreated, is but 10 to 12 years. It may be treated with creosote at the butt (where decay is more prevalent) for $1. Treated, it will last 20 or 25 years—that is, at an added initial expenditure of 15 per cent the pole may be increased in life 100 per cent, with a corresponding saving in expense for timber and labor.

For railroads favorably situated in respect to the Southern pine regions, and where freight rates are consistent with economy, the use of shortleaf (sap) pine for ties and poles is urgently recommended. This species of timber is comparatively cheap and plentiful. It seasons rapidly, and by drying it before shipment a saving in freight of 30 per cent may be effected. It can be easily and thoroughly impregnated with a wood preservative, and when so treated will render far more efficient service than a chestnut or cedar pole or tie untreated. It is fairly soft wood, and under heavy traffic should be protected from rail abrasions. It furnishes an ideal pole, straight and strong, but decays rapidly, and must be protected by a preservative treatment. It is preferable to treat the entire length of a sap-pine pole at a cost of $1.50. In regions of growth a sap-pine tie may be purchased for 20 cents or 25 cents, and a 30-ft. pine pole for not more than $1.50. Even with the added cost of freight charges for transportation to the point of consumption, it frequently pays the consumer to use this species of timber on account of its comparatively abundant supply.

There are several other forms of timber which electric traction companies can profitably treat. Pine cross-arms may be preserved almost indefinitely by a treatment with creosote, as well as wooden conduit for carrying wires underground. The joists and foundation timbers of car barns, freight houses and passenger stations frequently decay, while car sills are worthy of consideration. The thousands of posts used to fence the right of way, as well as signal posts and bridge timbers, should certainly be treated where possible, as should all forms of piling.

A less efficient but cheaper treatment can be secured by painting the surface of poles with at least two coats of hot creosote, or some similar preservative. If care is taken to thoroughly fill the innumerable small checks and other defects on the surface of the wood, a thin antiseptic zone may be created around the timber at the ground line, which, as long as it remains intact, will successfully prevent the entrance of wood-destroying fungi. It is especially important in this method that the timber be thoroughly air dry before treatment, otherwise the evaporation of water from the interior of the stick will cause checks to open up and so expose the unprotected wood to fungus attack. Even if this precaution is taken, however, a slight abrasion, such as might easily occur in the hauling or setting, or even after the pole has been placed in permanent position, will permit the entrance of the fungi and the destruction of the pole. Principally for these reasons this process cannot be recommended where a more thorough treatment is possible. It can often be used to good advantage, however, where the amount of timber to be treated is too small to justify the erection of even a small treating plant.

The treatment of railroad ties by painting the surface of the wood should not be considered. Ever so small amount of wear beneath the rails would expose untreated wood to decay. A tie, more than any other form of timber, must be penetrated by the preservative fluid to a reasonable depth if the treatment is to have any permanent value.

Wood preservation is not a merely visionary plan for conserving the forest wealth of the country. This it does, unquestionably, and if it were to be adopted universally—that is, if all the timber were treated which should be treated and which can be treated with a financial profit to the user—the estimated saving to the national forest resources would be approximately 5,000,000,000 ft., board measure, or about 10 per cent of the total number cut. But, in addition, wood preservation is distinctly practical. A theory of wood preservation, a new process, a new preservative or type of plant cannot survive, and should not survive, unless it will bring a financial profit to the user. It is the settled policy of the Forest Service, in its work in wood preservation, to carry on its more purely investigative work in the laboratory or at the more favorable field plants, and then to put the results to a practical test under such conditions as exist in ordinary commercial practice. The object of its investigations is, of course, to encourage the wider adoption of preservative methods, and it is realized that this can best be done by simplifying and cheapening the processes already in use, as well as by devising new ones, and in increasing their efficiency. Where it is believed that the results of its work will be of wide application the service often assists individual companies in deciding whether or not a timber-treating policy is practicable for their own conditions, and if it is, in selecting the most suitable preservative and process, and in designing the most efficient plant; and, finally, in supervising its preliminary operation until the details of the process have been adapted to the particular conditions of the co-operating company and until the local force is competent to continue the work independently.

The Forest Service will be glad to assist the electric railways in every possible way in the solution of their timber problems, and to place at their disposal whatever information and experience it has acquired.

CLEVELAND MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

A most successful meeting of the Central Electric Railway Association was held at Cleveland on March 25. A. A. Anderson, the newly elected president of the association, presided. The attendance was especially large and also was representative of the extensive interurban territory covered by this association. Members attended from cities as widely separated as Connellsville, Pa.; Jackson, Mich.; Michigan City and Evansville, Ind.; Louisville and Lexington, Ky.; Cincinnati, Ohio, and Wheeling, W. Va. In all 96 railway men, 25 visitors and 18 supply men registered. Special and private convention cars from Ft. Wayne and Anderson, Ind.; Louisville, Ky., and Dayton, Ohio, were a source of considerable comment by Cleveland newspapers and observers. The cars were exhibited during the day in the Cleveland public square. The "Dixie Flyer" of the Indianapolis & Louisville Traction Company made the longest trip. The scheduled running time of the car for the 508-mile trip from Louisville, Ky., to Cleveland, Ohio, was 18 hours. The car brought to the convention 57 railway men and guests. The private car "Martha" of the Indiana Union Traction Company made the run from Anderson, Ind., to Cleveland, 355 miles, in 11 hours and carried 20 guests. The private car "Lawton" of the Ft. Wayne & Wabash Valley Traction Company ran from Ft. Wayne, Ind., to Cleveland, 267 miles, in 9 hours and 30 minutes, carrying 25 in its party and a special car of the Dayton & Troy Electric Railway carried a party of 25 from Dayton to Cleveland in 10 hours and 15 minutes. All cars were routed to Cleveland by way of Toledo and thence by the Lake Shore Electric Railway to Norwalk and by the Lake Shore or the Cleveland, Southwestern & Columbus to Cleveland. Returning, some of the cars went by way of Mansfield and Columbus, Ohio, over the lines of the Cleveland, Southwestern & Columbus and the Columbus, Delaware & Marion. While en route home the special parties were entertained at the Mansfield works of the Ohio Brass Company.

President Anderson in his opening address urged the member companies to give attention to the following three subjects: (1) Standardization of equipment; (2) readjustment of rates for handling United States mail, and (3) encouragement of long-distance travel. The long special trips made to the Cleveland convention were held as examples of what might be done by the proper provision of more extended limited service between the populous terminals of the high-speed interurban lines. Likewise through freight traffic should be solicited for long runs.

Patient, persistent and concerted work would serve greatly to improve the long-distance business.

President Anderson expressed his sincere thanks to the association for electing him president at the Indianapolis meeting. The next meeting was announced for June 3 at Ft. Wayne, Ind. President Anderson extended an invitation of the G. C. Kuhlman Car Company offering the members and guests of the association an opportunity to visit its plant at Collingwood, near Cleveland, and inspect the following cars now in process of construction: Aurora, Engin & Chicago, five; Rochester Railway, four; Rochester, Syracuse & Eastern, two; Chicago, Lake Shore & South Bend, ten. Through the courtesy of the Municipal Traction Company a special car was provided for this trip.

After the reading of the minutes of the last meeting by A. L. Neereamer, secretary, a paper on "Little Things in Connection with Operation" was presented by W. A. Carson, general manager, Evansville Railway Company, Evansville, Ind. This paper will be found on page 625 in this issue.

Discussion on Operating Methods

The discussion of Mr. Carson's paper largely related to methods of discipline. President Anderson, in inviting discussion, called attention to a possible inconsistency in discipline methods brought about in the suspension of men for non-observance of rules. When a motorman or conductor is penalized by suspension his case is immediately brought to the attention of his comrades, who know that he is being punished and make every effort to learn the reason therefor, but on the contrary, when an employee is commended his name is not given public mention. Mr. Carson said that he would recommend the posting of names only when a man had been disciplined by suspension.

C. D. Emmons, general manager, Ft. Wayne & Wabash Valley, briefly described the merit and demerit system used on his road. A detailed description of this discipline system was presented in the Electric Railway Journal for May 30, 1908, page 904. Basing his opinion on experience with both the merit system and suspension system of discipline, Mr. Emmons did not favor suspension. It took away from a man his means of obtaining a livelihood and support for his family. Weekly meetings of the discipline committee on the Ft. Wayne & Wabash Valley serve to sustain the interest in the merit system and the make-up of this committee gave the men every assurance that its decisions would be impartial. Before disciplining a man the committee gave him one week in which to present his side of the case and then if he was to be disciplined the public notice presented on the bulletin board was impersonal as follows: "A motorman has been given 50 demerits for * * * ." After the publication of such an impersonal notice the trainmen were curious to learn who had been penalized and the moral effect of the giving of demerits was good. The public would report infractions of rules more freely when it was known that the penalization of a man for infraction of rules would not mean the loss of his wages and hardship for his family. For these reasons Mr. Emmons did not favor suspension.

Frank Hardy, superintendent, Ft. Wayne & Wabash Valley, described more in detail the merit and demerit system on that road. He believed that this method of disciplining men encouraged them to follow more closely the details of operation. Rivalry for a prize of $25 given each six months by the company, the awarding of which is based on discipline records, sustained the interest in the system. The merit board of the company comprises the general manager, superintendent of transportation and a division superintendent. One hundred demerits are sufficient to cause dismissal. At meetings of this board the superintendent is not permitted to make the first suggestion of the number of merits or demerits which he believes should be given the man whose case is being discussed. The name of the employee whose case is before the board is not divulged until after the board has passed its judgment on the case. After dismissal according to the merit system a man may be re-employed on the approval of the board, but not reinstated.

Charles L. Henry, president, Indianapolis & Cincinnati Traction Company, said that he agreed with Mr. Emmons in opposing the principle of suspension. Mr. Henry did not think that a discharged employee should be re-employed unless he had been discharged with the specific statement that he might be re-employed. Mr. Henry did not approve of re-employing a man elsewhere on the road when he had been discharged by the transportation department.

Mr. Carson, author of the paper under discussion, said that in his early experience on an Indiana road he had found the merit system to fail and so it had been abolished on that road. It since had been shown that suspension methods gave better discipline.

T. R. Cummins, engineer of maintenance of way and traffic manager, Chicago, Lake Shore & South Bend, briefly described the modified Brown system of book suspension used on that road. When a man is penalized a notice similar to the following is posted: "A motorman has been given five days for running through a switch." After the posting of this notice the other men show unusual interest in finding out who has been given the suspension. It should be remembered that a man so suspended is not relieved from work, but his suspension appears on his individual record kept in the general manager's office, to which no other trainman may have access. A total of three months' book suspension brings discharge. Book suspensions may be removed by good behavior.

C. C. Reynolds, general manager, Terre Haute, Indianapolis & Eastern, did not agree with those who favored the merit and demerit methods of discipline. Mr. Reynolds said that he preferred reprimanding, suspending or dismissing men according to the nature of their disobedience. The infliction of discipline in any one of these cases should, however, be tempered wth kindness. Mr. Reynolds had had six or seven years' experience on a steam road using the merit system and this experience had shown him many of its defects.

J. W. Brown, superintendent, West Penn Railways, asked for a discussion on how much the wishes of the claim department should influence a decision regarding the dismissal of an employee for disobedience. Mr. Brown himself believed that the claim and transportation departments should be fully divorced in such a situation.

President Anderson asked E. C. Carpenter, claim adjuster, Indiana Union Traction Company, whether in his judgment a trainman whose acts had brought about an accident should be discharged or allowed to remain in service until after the case had been tried. Mr. Carpenter did not recommend the retention of employees in such instances and thought that suspension or dismissal in the case of clear liability was more proper. However, before discharging the employee a clear statement should be obtained from him so worded that it would be accepted by the court. Discharged employees' testimony was thought

in such a situation to have more weight with a jury than if the same testimony were to be given by an employee retained for trial purposes only. Notwithstanding this fact, however, no definite rule should be followed with regard to retaining or discharging employees having to do with accidents which resulted in clear liability cases.

F. D. Carpenter, general manager, Western Ohio Railway, agreed with the previous speaker that each case should be judged on its merits, but if it was determined that an employee had clearly been to blame for a serious accident he should be dismissed without regard to the effect that it might have on the adjustment of claims.

Mr. Carpenter called attention to the fact that the increasing intelligence of men in the transportation department required that the companies continually improve their methods of supervision and discipline. When a man was discharged the necessity for his dismissal should be impressed upon him firmly. The reasons for discharge should be stated clearly and the company's representative, whether it be the superintendent of transportation or the general manager, should handle the case in a fair, but not weak manner. Mr. Carpenter urged that attention be given toward making the men feel that discipline was absolutely necessary for the protection of the public and was not inflicted for any other reason. If the records of a man justified it Mr. Carpenter after dismissing him would gladly assist him to a position on another road.

Mr. Broomhall, attorney, Dayton & Troy Electric Railway, was invited to present the ideas of the legal department regarding the dismissal of employees after accidents. Mr. Broomhall said that there should be first a searching investigation to find out the exact truth regarding the circumstances attendant upon the accident. As a part of this investigation the employees at fault should be examined carefully; then the action of the company should be based upon the facts. With the situation thus clearly outlined the general manager should be called upon to decide whether or not the good of the service demanded the dismissal of the employee.

C. N. Wilcoxon, general manager, Cleveland, Southwestern & Columbus, had had experience with the several discipline systems discussed and was satisfied with none of them. He was opposed to suspension and discharge if he could learn of any other way to obtain equally good results and to protect his patrons and employees. It was not a pleasant duty to discharge a man or to suspend him and thus work a hardship on his family, but the management should do what was necessary to protect the public and the property. The latter duty was the more important. From his observation of successful men Mr. Wilcoxon was led to believe that the best way was to use reasonableness in reprimanding employees, kindness in judging all cases and then discharge men if absolutely necessary. Discipline on any road would be weakened if the men felt that after discharge they might be taken back.

Mr. Wilcoxon did not favor an organization in which any one man had absolute authority. It was his policy to let the men know that if the decisions of the superintendents were thought unfair an appeal might be made to the general manager, and from his decision an appeal in turn might be taken to the president. He did not think that this plan would handicap the work of the superintendent who hired and discharged men only on the approval of the general manager.

C. L. Henry, recognizing that it was very difficult to know and understand human nature and that careless acts might be made by men with previously clear records, thought that department heads should always meet the employees half-way and give them opportunity to state their views. Mr. Henry approved the plan of keeping accurate records of employees' service to assist in passing judgment, so that decisions might be based not alone on immediate acts, but also on past records. Attention was called to the fact that superintendents usually have a great deal of sympathy for the men and are inclined to temper their statement of the circumstances to the general manager if possibly the men are to be discharged.

PRESERVATIVE TREATMENT OF TIMBERS

J. N. Nelson, Jr., forestry division, United States Department of Agriculture, Washington, D. C., presented a carefully prepared description of methods proper for preserving timber used by railway companies. This paper will be found on page 628 in this issue.

When questioned regarding the treatment of cypress timber Mr. Nelson said that cypress was naturally so durable that treatment was not recommended. It was far more profitable to treat cheaper woods.

The investigations of the forestry department had not shown any change in the durability of woods when transferred from one locality to another. Brush treatment, which cost 30 cents or 40 cents per pole and added but two years' life to chestnut, was not recommended because the labor cost was higher than for tank treatment. The tank treatment also would increase the usefulness of the wood for a longer period. Mr. Nelson stated that creosoted wood if properly drained will not be more inflammable than ordinary seasoned timber. There are now 20 or 30 commercial plants for preserving timber and all of them are busy most of the time.

W. G. Irwin, vice-president, Indianapolis, Columbus & Southern, stated that his company would have in operation in 30 days a plant for the treatment of the timber used in the maintenance and construction work on its road and that he would be glad to have members of the association visit the plant so that they might see it in operation.

ASSOCIATION AFFAIRS

S. D. Hutchins, Westinghouse Traction Brake Company, chairman of the Supply Men's Auxiliary Association, explained the regulations with regard to membership, attendance at meetings and the display of the association badge. The use of the badge was regulated by the organization agreement between the Supply Men's Association and the Central Electric Railway Association.

H. A. Nicholl called attention to the value of associate membership in the American Street & Interurban Railway Association. Mr. Nicholl's remarks were endorsed by E. M. Williams, of the Sherwin-Williams Company, a member of the executive committee of the American Street & Interurban Railway Manufacturers' Association.

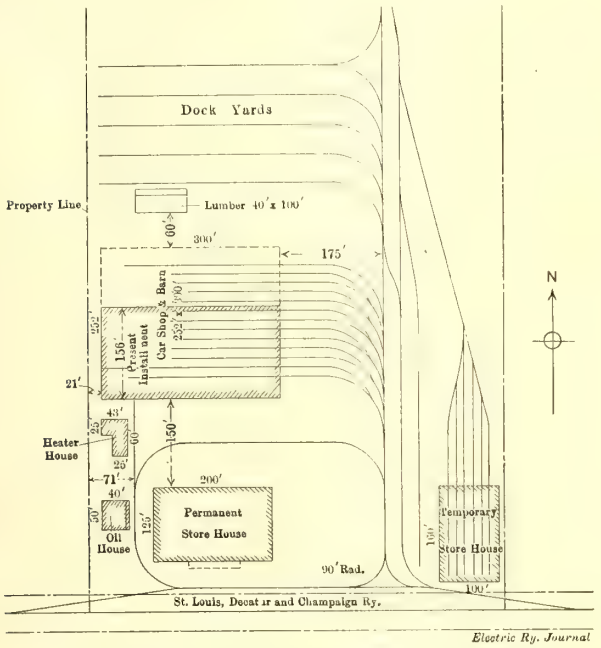
LOOSE-LEAF FILING SYSTEM

R. N. Hemming, assistant superintendent, Ohio & Southern Traction Company, presented a discussion on his proposed method for the loose-leaf filing of information contained in current periodicals and catalogs. An abstract of Mr. Hemming's paper appeared in the Electric Railway Journal for March 27, page 553.

On motion the chair appointed the following committee to consider recommendations made by Mr. Hemming: S. R. Dunbar, C. E. Morgan, L. E. Gould, S. D. Hutchins, H. T. Kenfield. Mr. Hutchins was appointed chairman.

SHOPS AND EQUIPMENT MAINTENANCE OF THE ILLINOIS TRACTION SYSTEM

The main shop of the Illinois Traction System for repairing all interurban cars is located 2 miles east of Decatur, near the junction of the Danville-St. Louis line and the Decatur belt line, which connects with the north and south lines between Decatur, Bloomington and Peoria. Inspection and light repair work is carried on in the car



Illinois Traction Shops—Plan of Buildings

houses and small shops at the various division headquarters, but the major part of the heavy work is handled at the Decatur shops. These shops have just been put into service and, with a contemplated addition, they will afford excellent facilities for construction and maintenance work.

A plan of the shop property is presented in the accompanying engraving, showing the general arrangement of the smaller buildings with reference to the large car shop.

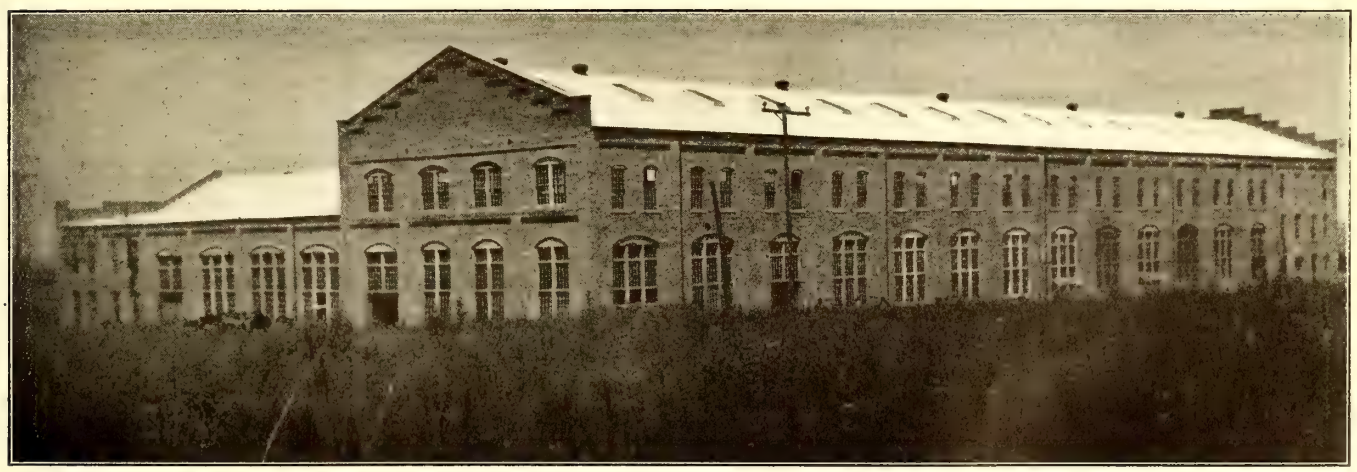
to provide steam for heat distribution by direct radiation. The steam feed pipes are carried in concrete troughs covered with concrete slabs. These pipe boxes are of permanent construction, and are buried in the dirt beneath the shop floor level, but can be easily opened whenever repairs are necessary.

A complete equipment of machine tools for handling heavy interurban work is installed along the south side of the shop. The tools and the adjacent pits are served by a 15-ton Shephard crane electrically operated. A stirrup with stiff but adjustable side pieces has been built for use in connection with lifting car bodies with the crane. Among the tools already installed in this shop are the following: 200-ton Niles wheel press, Niles wheel lathe, Bradley hammer with independent motor drive, and a pipe machine with 3½-in. to 12-in. range and independent motor drive. The car painting work, pending the erection of an additional shop building with a capacity for 40 cars, is carried on in a floor space 120 ft. x 45 ft., partitioned off by corrugated iron walls.

Current for the operation of the shops and also for the power used in the shops of the Curtis Motor Truck Company, located nearby, is received at a substation room in one corner of the shop. This power is taken from the transmission line at 33,000 volts and transformed to 440 volts, three-phase, and also to 125 volts, single-phase.

At the front corner of the shop is an office section three stories high. The first floor is used as a shop stock, tool room and shop foreman's office. On the second floor are two large, well-lighted offices for the superintendent of motive power and equipment and his clerks. The third floor has a space 25 ft. x 29 ft. arranged as a drafting room. To facilitate the work of designing and making large, full-sized detail drawings a drafting table 5 ft. 6 in. wide by 28 ft. long has been built in this room. The table has a cork-pine top 2 in. thick and so fastened that when its upper surface becomes mutilated with tack holes it can be redressed.

The draftsmen in this department have just completed the first few of a series of "standard" boards for the use of the shop foremen. A view on page 638 illustrates three



Illinois Traction System Shops—View of Main Building from Rear

A detailed plan of the main shop, showing the arrangement of pit tracks and the shop subdivisions, is presented on the following page. The main shop building is a fireproof structure of brick, with concrete floors and a steel-supported roof. It is 300 ft. long by 156 ft. wide. Adjacent to the shop building is the heating plant, with boilers

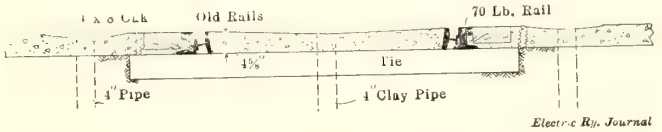
of these boards, each of which shows the finished dimensions of a standard axle. It is proposed to make similar boards for all the standardized parts of a car that may be manufactured in this shop. The boards are of thin well-seasoned wood on which a full-sized detail of the standard part is drawn with black paint and clearly lettered. When,

for example, an axle is to be turned the machinist obtains the board presenting the dimensions of the standard axle and hangs it directly in front of him back of his lathe. Then he can follow his work, not only in the usual way by reference to the dimensions, but also by actual comparison of the proportions.

STANDARDIZATION WORK

Some of the maintenance and construction work scheduled for this shop during the coming year is as follows: Changing equipment on 20 cars from a.c. to d.c.; standardizing the ends of 10 passenger cars, 6 motor express cars and 11 trail express cars (this standardization work includes removing drop platforms and extending the sills to the bumpers); superintending the construction of and installing the equipment on several new passenger cars to be purchased and two new private cars; installing M. C. B. type couplers on all rolling stock; standardizing brakeshoes, grab handles and small fittings.

New rolling-stock equipment now being built includes

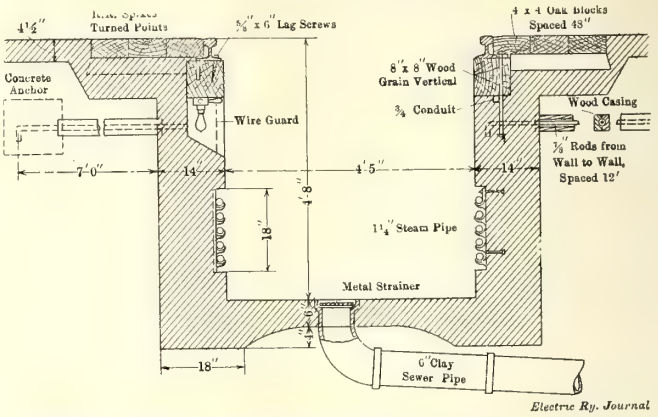


Illinois Traction Shops—Section Through Wash Track

three locomotives, two trailer sleeping cars, one special party car, office car for the general manager, one electric shovel and 25 box cars. Some of the details of construction of the new and the rebuilt cars are of particular interest as showing the standard types and parts adopted.

UNDERFRAME CONSTRUCTION

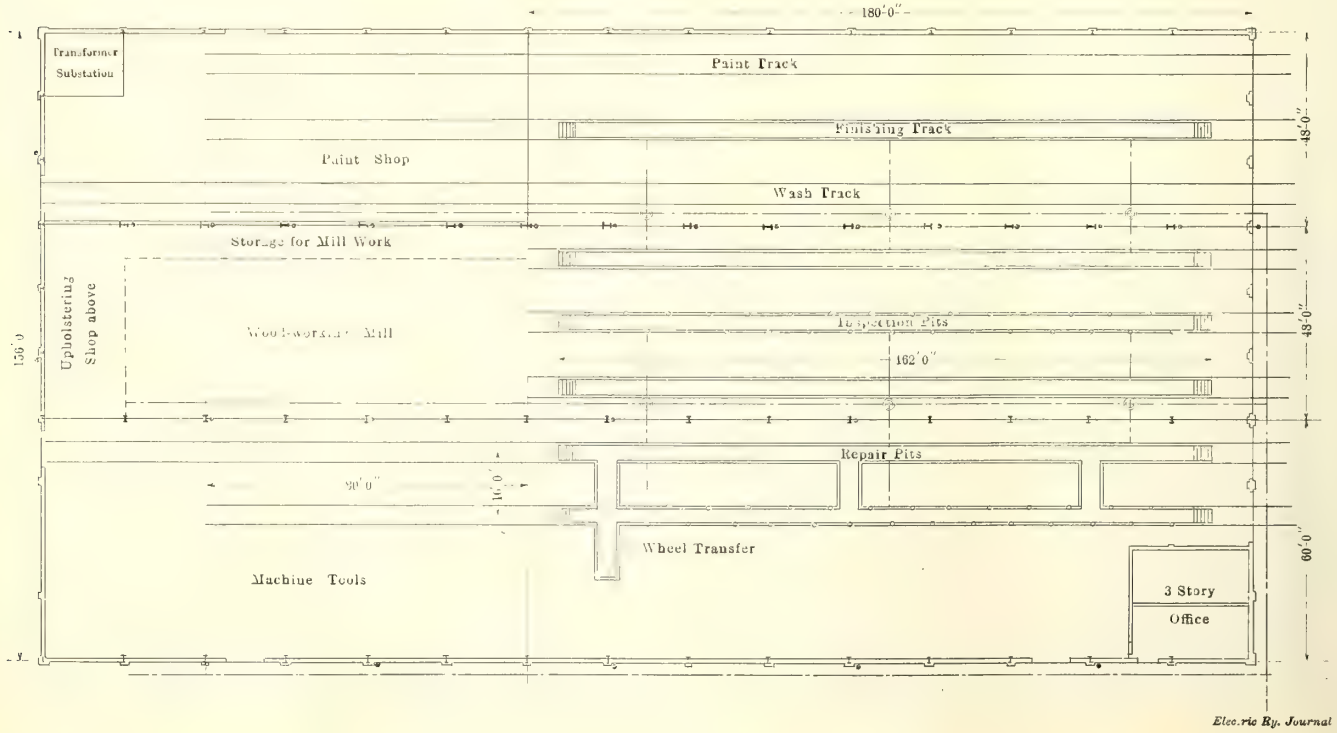
The body bolster (see page 637) has been designed to be removable from the bottom of the car without interference with the framing or the flooring. This bolster, which is used on all of the 53-ft. passenger cars, is a steel casting with the truss-rod struts cast integral with the bolster to support the truss rods without lateral strain on the bolster casting. The ends of the bolster are tied on the upper side with a 1-in. x 12-in. machine-fitted wrought-iron plate. The bearing plates are cast integral with the bolster and are fitted with removable wearing surfaces. The bolster has I-beam-section lateral braces at each center and intermediate sill. These braces are a part of the bolster casting and extend lengthwise of the car to prevent any distortion in the position of the bolster that might be caused by rapid



Illinois Traction Shops—Section Through Pit Track

acceleration or braking. The bolster carries the side truss rods inside of the outside sills and their point of support is raised as high as permissible to obtain the maximum stiffness. The tie rods are anchored by bolting through the composite side sill beyond the bolster toward the end of the car. This arrangement places the rods high enough to clear the wheels on sharp curves and permits the use of 18-in. struts at the needle beams, affording a total depth to the trusses of 24 in.

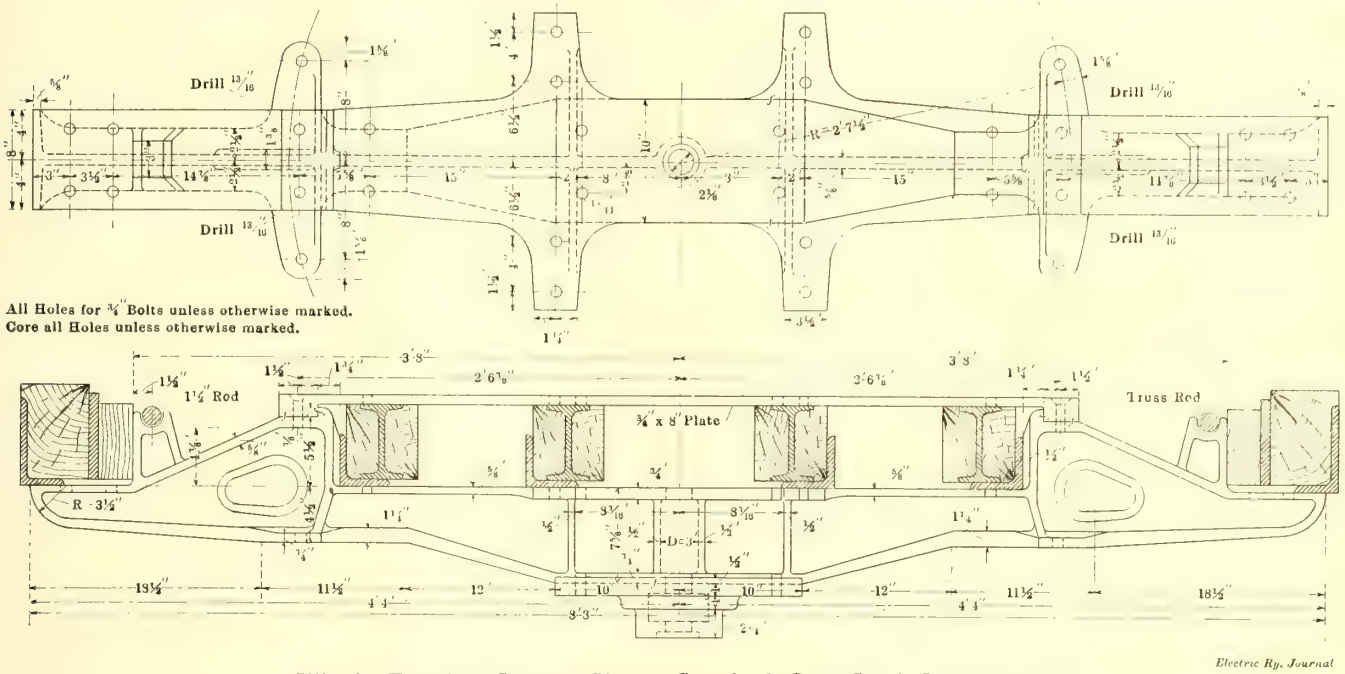
The underframe of the standard car has 5-in. 14.75-lb. needle beams superimposed with a 1-in. piece of wood on which the sills rest. This wooden piece, which may be cut easily, is used to permit of installing new pipes or conduit throughout the length of the car without cutting the steel members or bending the pipe. The center sills are spaced with malleable-iron box-shaped castings, affording a continuous pipeway from end to end of the car for conduit and air-brake pipes. At each cross framing are two



Illinois Traction System Shops—Floor Plan of Main Building

¾-in. wrought-iron tie rods with their heads let into the sills under the sheathing. These tie rods terminate in the malleable-iron filler castings held between the center sills. By the use of this arrangement of tie rods any shrinkage in the bottom framing may be taken up without disturbing the sheathing or marring the paint.

ried forward according to the accepted standards, a side baggage door is cut in and the old double-end cars are rearranged for single-end operation only, with a motorman's cab in the forward baggage compartment and a standard rear platform. Steps with trap doors are installed on both sides of the rear platform. In standardizing the platforms

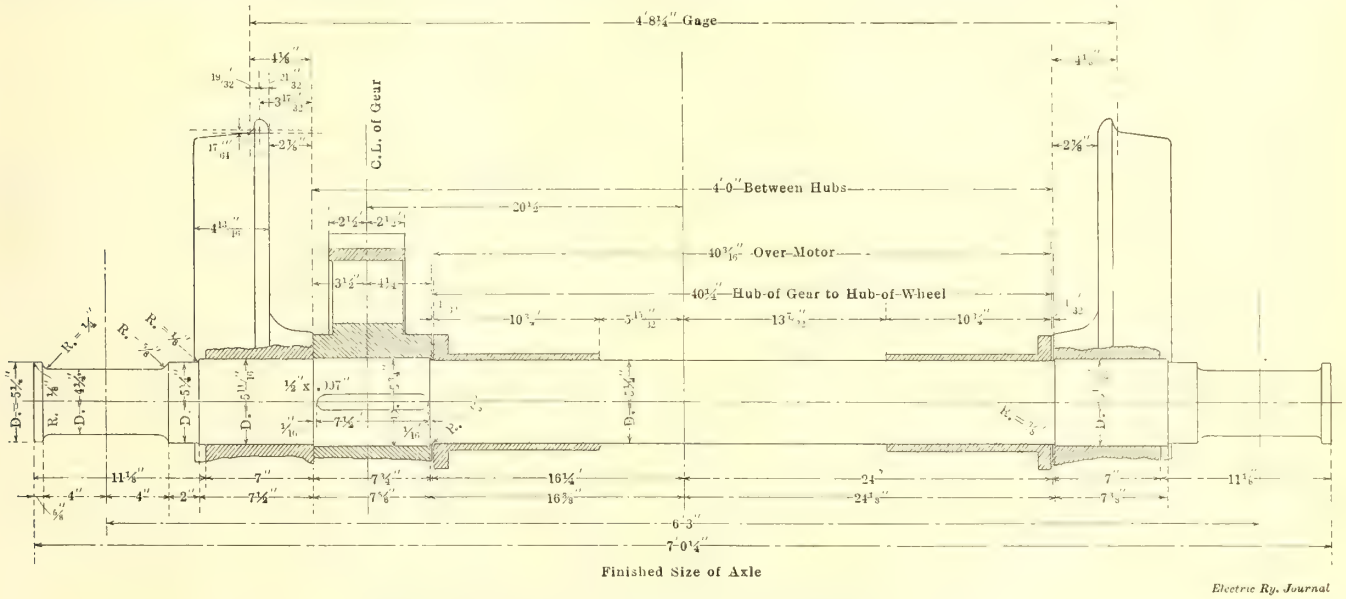


Illinois Traction System Shops—Standard Cast Steel Body Bolster

The shop work in connection with the re-equipment of the 20 single-phase cars for 600-volt d.c. operation will include rebuilding the platforms; installation of motormen's standard cabs; rearranging the floors to carry d.c. equipment; addition of automatic couplers; standardizing the steps, grab handles and buffer beams; installing automatic air brakes and changing wheels, axles and springs to accommodate this d.c. equipment.

of passenger cars end doors are built in the vestibules to permit of train operation.

In removing the drop platform and carrying forward the underframing, new 6-in. I-beam sill extensions are butted against each of the main sills and joined with ½-in. x 5-in. plates bolted on either side and extending from transom



Illinois Traction System Shops—Standard Motor Axle

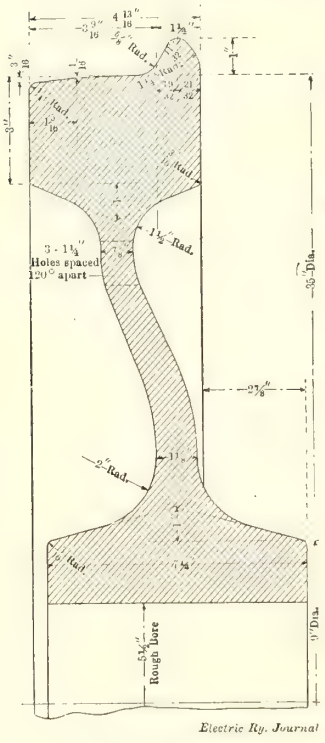
STANDARDIZING CAR ENDS

The drop platforms on all cars used in interurban service are being replaced with straight floors. When a car is received in the shops for standardization the entire platform and hood to a point back of the corner posts are removed. Then the framing of the sills and roof is carried to bumper. This new underframing is tied together at the ends with ½-in. x 5-in. U-shaped plates placed just back of the bumper. The bumper blocks are built out to a radius of 4 ft. 10 in. and extend 16 in. forward of the dash at the center of the car. Inasmuch as trouble has been experienced in the past with the bending down of the bumper block from shocks when coupling, the new bumpers as installed are not only bolted to the plates which tie the ends

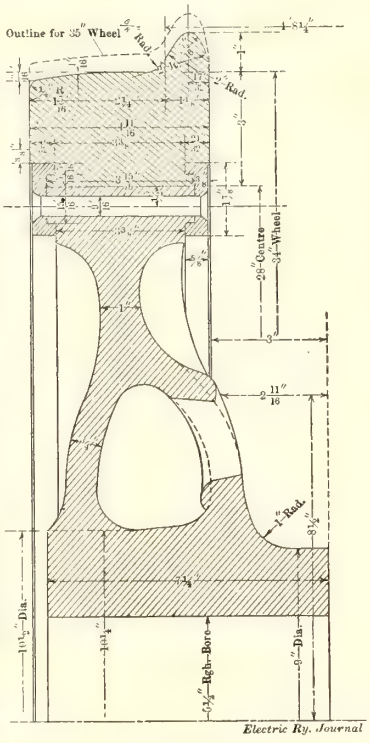
of the sills together, but also are supported on the extended bottom flange of the I-beam sills.

STANDARD WHEELS

Illustrations are presented showing the sections of the standard Midvale rolled steel and steel-tired wheels, which are being installed under all large passenger cars. The



Standard Solid Steel Wheel



Standard Steel-Tired Wheel

wheels are 34 in. and 35 in. in diameter with flanges 1 in. high and 1 3/32 in. wide. The tread proper is 3 9/16 in. wide. This width of tread is used so that the cars will be accepted by connecting roads requiring M.C.B. standards. All wheels are made with hubs 7¼ in. long extended on one side so that they may be fitted to motor equipments requiring either 48 in. or 50 in. of space between hub faces.

STANDARD COUPLERS

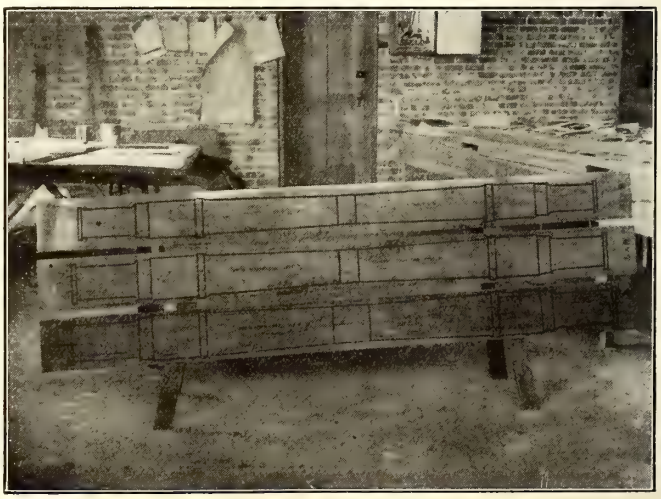
The coupler which is installed on all standardized cars has been developed by J. M. Bosenbury, superintendent of motive power and equipment. It has the standard M. C. B. contour with the addition of a projection on one side and a receiving lug on the other side. When coupled these projections and mates engage to hold the couplers rigidly in line. Also a knuckle has been introduced which, while having the M. C. B. contour on a horizontal plane, is extended vertically so that it is about 15 in. high, thus providing against parting of the couplers when two cars pass sharp breaks in grade. The couplers are attached to the cars with cast-steel radial bars riding on malleable carriers hung from securely bolted strap-iron supports. The results obtained with this type of coupler are said to have been excellent. Some of the equipments on this road are 68 ft. long over all and when cars of this length are coupled together they can be operated around curves of 35-ft. or 40-ft. radius.

NEW AND REBUILT CARS

A floor plan is presented of one of two 68-ft. combination cars which are now being rebuilt at the Danville, Ill., plant of The J. G. Brill Company. Formerly these were chair cars used for limited service, but they are now being rebuilt and refitted into three-compartment cars to accommodate freight and express at the front end, smokers at the center and general passengers at the rear. This floor plan shows the standard arrangement of the motorman's cab at the left-hand forward end of the body. It will be noted that considerable seating capacity is afforded by drop seats in the express compartment. The smoking compartment has 12 double seats and the main compartment has 18. The toilet room is placed at the rear of the main compartment with the heater on the opposite side. Steps are provided on both sides of the rear platform and while running are covered by Edwards trap doors. These cars will be equipped with four GE-205 motors and will be used in fast limited service.

The Danville plant also is building two 52-ft. 6-in. sleeping cars with interior arrangement as shown. These cars will be used as trailers because it has been found that with the two motor-equipped sleeping cars now in service the noise of the electrical equipment disturbs the passengers. The new sleepers will be built for operation in either direction and will be equipped with standard couplers so that they may be handled during the night by any train making the required schedule. The interior equipment of the cars will have 10 standard sections made by the National Sleeping Car Company and complete toilet facilities at both ends with large lockers for storage of linen. The cars will be heated by hot water.

A floor plan of a special party car, also being built at the Danville plant, is presented. This is a combination parlor, observation, dining and sleeping car suitable for private or public use. The car will not be equipped with motors, but will be arranged with end doors so that it may be coupled to a private car to be built for the general manager's use. The special party car will have a large observation platform with an ornamental brass railing and a 4-ft. 6-in. observation window at the rear. The rear compartment within the body will carry eight easy chairs and is arranged so that an extension folding table may be used for serving meals. In the center of the car are two standard sleeping-car sections of the National Sleeping Car Company's type and two seats arranged to pull out to form beds. Immediately forward of the standard sleeping-car sections will



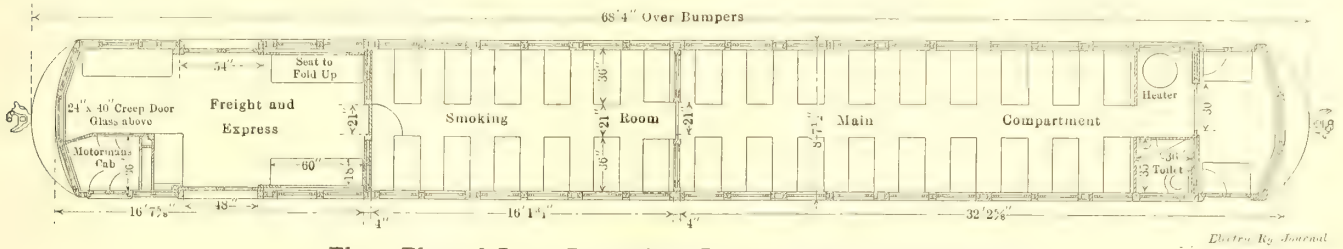
Illinois Traction Shops—Standard Axle Boards

be a toilet room on one side and a davenport bed with a locker below on the other side. The end compartment will be the kitchen, which is also provided with a sleeping-car section for the use of the cook and the porter. The car is to be 52 ft. 6 in. long over all. The sleeping accommodations will provide for nine people.

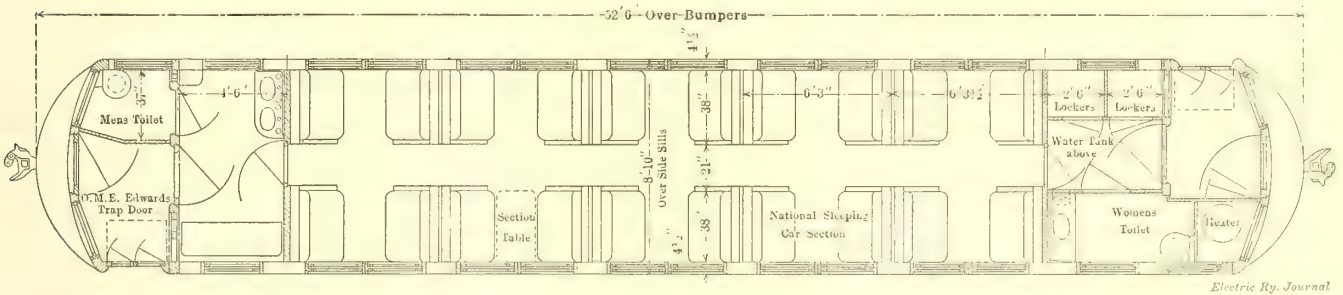
Plans are now nearly completed for the construction of a private office car for the use of the general manager. This car, which is shown in the accompanying plan, will be 59 ft. 10 in. long over couplers and will be provided with office, sleeping and dining facilities, etc. The car will be 9 ft. 3 in. wide over the sheathing, 57 ft. 6 in. long over bumpers, 9 ft. 5 in. high from sills to trolley board, and will be equipped with four motors carried on trucks spaced 34 ft. between center pins. The design of the body is similar to the company's standard passenger cars. It has seven Pullman windows on each side, one single window on the cab side in front and an exit door at the forward right-hand corner. The front end will have three windows and the rear end will be arranged as an observation platform 5 ft. 6 in. long with an ornamental brass railing and a wide window in the body end. The car body will have a sub-floor provided with a 1¾-in. space in which a packing of wool felt will be placed to deaden the noise and withhold the heat of the car. Above this packing will be the regular double top floor.

The interior of the car will be subdivided into an office compartment at the forward end with a roll-top desk, a typewriter desk and a letter file, and a long seat built so that it may be pulled out at night to form a berth. At the rear of the office compartment will be two National sleeping-car sections in close compartments, one of which will be provided with a Duner hopper and a folding washstand with hot and cold water. Next, in the rear, will be the toilet room and adjacent to that will be the kitchen provided with complete dining-car facilities. The rear compartment will have six easy chairs, a large dining table and a long cross seat which may be made up into a berth at night. The rear observation window, 57 in. wide, will be arranged to swing open for ventilation in the summer.

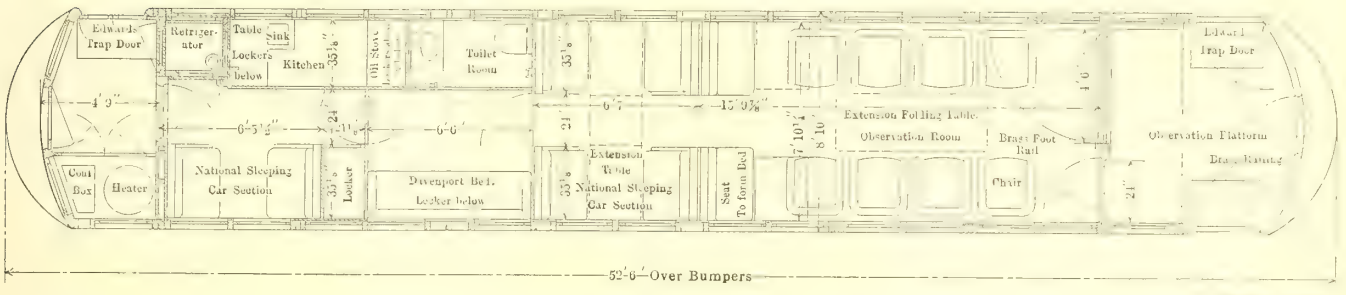
The interior of the car body will be finished in African mahogany and all the furniture will be of solid mahogany. The upholstering will be done in Spanish leather. All the fittings in the toilet rooms and in the kitchen will be of metal and the toilet rooms will be flashed up on the sides so that a ring shower bath may be used. This car will have a complete motor equipment with multiple-unit control and automatic air brakes. The air-brake pressure will be cut down by a reducing valve for use in forcing the water to the various toilet and kitchen outlets. The car will be heated with Peter Smith hot-water heaters placed in the kitchen.



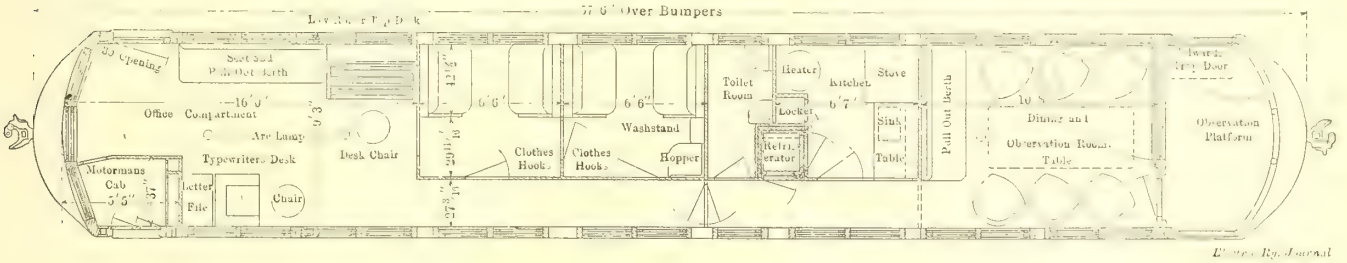
Floor Plan of Long Interurban Car for Fast Limited Service



Floor Plan of Trailer Sleeping Car



Floor Plan of Special Party Car



Floor Plan of General Manager's Office Car

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

During the hearing of the Milwaukee fare case by the Railroad Commission of Wisconsin at Milwaukee recently, one of the principal witnesses was Prof. M. E. Cooley, dean of the department of engineering, University of Michigan. Professor Cooley was on the stand during the sessions from March 5 to 10. Part of the testimony given by this witness was published in the report of the hearing which appeared in the Electric Railway Journal on March 13. An abstract of additional testimony by Professor Cooley follows:

PLANNING AN APPRAISAL

Professor Cooley said that in laying out the work for an appraisement the first step was the selection of experienced men as heads of departments for the different branches of the work. Each of these chief assistants was provided with assistants to take part in the details of the work and to secure the data from the records of the companies where available and also from the structures themselves by actual examination or inspection. In addition to this force of men, in making the Michigan railroad appraisal it was thought desirable to have the advice and counsel of a body of engineers who were not engaged in the appraisal itself. These latter engineers constituted what was called a board of review. The decision of this board on important questions was taken as indicating the direction which should be followed in the work. One of the main questions was, What would be the cost of securing a right of way? The conclusion reached, substantially the same as that formed in Wisconsin, was that the value of the right of way was about two and a half times that of the property adjacent to the roadway, and in cities something less.

The witness had examined the report of the valuation of the Milwaukee property by the Railroad Commission staff and assumed that the appraisal embraced practically everything that appeared in greater detail on the blank used in the Michigan valuations. The appraisal of the Wisconsin staff had been made in such a way that Professor Cooley was not disposed to criticise it in general at all. With the exception of a single item or two in the valuation, he had not questioned the items. He had found, however, a very material difference in the various percentages of allowance that had been used by the valuation staff as compared with those which he had used in making appraisals. The one conspicuous item in the appraisal was that of track and track structures, valued at $9,000 or $10,000 per mile. That seemed to be so extremely low that Professor Cooley went into it somewhat in detail, so far as he could without making an actual appraisal, mainly by the investigation of data submitted to him and also of those familiar with the track structure in Milwaukee. In the judgment of the witness this value was only about two-thirds as large as it should be; it ought to be not less than $15,000 per mile, which corresponded more closely with values that had been found elsewhere by him. Professor Cooley had assumed outright that a mistake had been made in the computation of this figure. He understood from the testimony that contractors' profits had been figured in each of the items in the appraisal, but he took exception to the rates of percentages and to the general percentages added in the appraisal. A table, reproduced herewith, was submitted by the witness, showing the reproduction cost of the physical property of the company, railway only, as determined by the valuation staff of the commission, with percentages added by the witness.

No working capital was included in the report of the valuation staff. Professor Cooley said that the object of the appraisal, as he understood it, was to discover how much money was invested to cover construction of the plant. To bring the property to an operating basis a working capital would be necessary. Until the working capital was taken into consideration there was nothing but an inert property. Capital had to be advanced and other steps taken to convert the static property into a dynamic condition.

APPRAISAL FOR RATE-MAKING A NEW REQUIREMENT

In most cases in the past where appraisals had been made there had been a desire for a general knowledge rather than for some specific knowledge of what the appraisal might afford. An appraisal for the determination of rates was comparatively a new requirement. In such an appraisal all legitimate expenditures that had appeared or were likely to appear should be shown. With that in mind Professor Cooley would include other items which were undoubtedly present in this property and undoubtedly present in every other property, but which were not usually included in an appraisal.

The first of these items would be the cost to make the property a going concern. The witness presented a diagram to illustrate this cost. To the cost of making the plant the diagram showed, in effect, the addition of the expense of getting the business required to make it operative on a paying basis. No interest on the deficit thus assumed was calculated in the diagram.

It would require a considerable expenditure of money

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY ONLY—REPRODUCTION COST OF PHYSICAL PROPERTY AS DETERMINED BY VALUATION STAFF WITH PROF. M. E. COOLEY'S PERCENTAGES.

1.	Land, including 10 per cent cost of acquiring		$597,845
2.	Track and track structures	$1,236,949	
	Add 50 per cent too low	618,475	
	Add 5 per cent contingencies	92,771	
3.	Cars and car equipments	2,007,876	
4.	Electrical distribution system	1,063,818	
	Add 5 per cent contingencies	53,191	
5.	Power plant equipment	1,060,615	
	Add 5 per cent contingencies	53,031	
6.	Buildings and miscellaneous structures	878,807	
	Add 5 per cent contingencies	43,940	
7.	Office furniture and appliances		23,443
	Add 5 per cent contingencies		1,172
8.	Tools, implements and machinery	285,564	
	Add 5 per cent contingencies	14,278	
9.	Horses, wagons and miscellaneous		32,419
	Add 5 per cent contingencies		1,620
		$7,409,315	$656,499
	Add 5 per cent general contingencies	370,466	
		$7,779,781	
	Add. 4 per cent engineering	311,191	
		$8,090,972	
	Add ½ per cent insurance during construction	40,455	
		$8,131,427	
	Add (1) land, including 10 per cent cost of acquiring.	597,845	
	Add (7) office furniture and appliances	24,615	
	Add (9) horses, wagons and miscellaneous	34,039	
		$8,787,926	
	Add 2½ per cent organization and legal expenses	219,698	
		$9,007,624	
	Add 6 per cent interest during construction	540,457	
	Total of construction and equipment	$9,548,081	
	Add stores and supplies	57,630	
	*Add working capital	263,270	
	Total, including stores and supplies and working capital	$9,868,981	
	Add 10 per cent cost of procuring a going value	986,898	
		$10,855,879	
	Bonds placed at 90	12,048,750	

*Working capital includes average monthly payroll for 1906.. $82,184.06
And average monthly vouchers (audited) for 1906..... 181,088.25
$263,272.31

to carry the condition of an operating property very much above 77 per cent of its reproduction value new. It would be rather easy to maintain a property up to, say, 75 per cent, but when it was brought up to 85 per cent, the cost of everything increased in much greater proportion than the value of the return. The question would become an economic one as to where it would be best to stop in order to get the best return for the money invested. Professor Cooley, in his computation, added together the amounts of the deficits during the years 1892 to 1895, inclusive, which appeared to be $1,556,752. Nothing was figured for loss of interest on the investment during that period, or any allowance for a sinking fund.

The expense of procuring a going cost was taken by the witness at 10 per cent of the cost preceding it. The final result of the computation by Professor Cooley of the reproduction cost of the property was based on the inventory of 1906 and did not refer to anything which might have disappeared in previous years, of which an inventory would make no record.

George P. Miller, of counsel for the company, asked Professor Cooley what he would do with the cost of a horse-railway system if he were valuing the going cost of an electric road after a change from horse power to electricity. The witness said he supposed he would do what was done in Chicago with the valuation of the old cable roads. The cable lines of the Chicago Union Traction Company were valued as if they were to be allowed the going value to-day, although they were to be converted into electric roads to-morrow and the cable stopped immediately. The Chicago ordinances required the valuation of the cable roads as going concerns, notwithstanding they were wiped out of existence immediately after the valuation was made.

In the absence of information to the contrary Professor Cooley would consider it necessary to include in a valuation the proper cost of acquiring subsidiary properties, when they were converted to electricity, even though they were scrapped the day they were acquired. The development of the art was progressing in 1890 at such a rate as to make it absolutely necessary to pass from one form of transportation to another, and these changes were demanded at that time by the public.

ALLOWANCES ABOVE INVENTORY VALUES

In the valuation of the Wisconsin staff the total percentage added to the values fixed in the inventory was 12 per cent. The aggregate allowances recommended by Professor Cooley was 22.2 per cent on the principal. The percentages were figured cumulatively. As a result of his own experience, the witness was satisfied that the percentage of allowances should be at least 20 per cent, and he thought perhaps 25 would be more nearly correct, considering the contractors' profits as having been included in the items.

Discussing depreciation due to accident, Professor Cooley said that an engine or a boiler might be wrecked and with it other machinery. Destruction of bridges or cars or other absolute destruction of property might result. The public demand was largely responsible for depreciation due to inadequacy. In speaking of depreciation due to obsolescence the witness said that owing to the rapid disappearance of coal beds, the price of fuel must advance, and this, before many years, would force the adoption of the producer-gas engine. Water powers were being developed, but to utilize them required the scrapping of large parts of machinery at present in use.

The expense of changes in alignment of roads might be brought into the appraisement as part of the inventory. Edwin S. Mack, of counsel for the company, suggested that if the city of Milwaukee repaved a street the company would have to conform, in relaying its tracks, to the repaving requirements, thus shortening the life of the existing track. The witness thought that might be designated as a class of depreciation of which care must be taken. Many of the steam railroads had corrected their alignment to the extent of abandoning miles of old grades and cuts and property and so far as the inventory was concerned, the appraisal would show less than a few years before the alignment was corrected and yet all the money expended in correcting the alignment should be carried somewhere in the accounts. A similar condition would occur if a street railway company improved its system by simplifying its method of transportation, creating a shorter route to give the public a better service.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, RAILWAY ONLY, DEPRECIATION BASED ON REPRODUCTION COST OF PHYSICAL PROPERTIES, PROF. M. E. COOLEY'S PERCENTAGES.

	Item or group.	*Reproduction cost.	Per cent.	Used by Prof. M. E. Cooley.	Per cent.	Given by heads of departments.
1	Paving	$823,871	10	$8,238,710	10	$8,238,710
2	Track and track structures.	2,158,429	8	17,267,432	8	17,267,432
3	Cars, including equipment.	2,335,777	8	18,686,216	6.75	14,766,495
4	Electrical distribution system	1,299,425	8	10,395,400	6	7,796,550
5	Power plant equipment...	1,295,513	8	10,364,104	6.7	8,679,937
6	**Buildings and miscellaneous structures	809,947 256,386	4 2	3,239,788 512,772	3 3	2,429,841 769,156
7	Office furniture and appliances	26,092	8	208,736	5	130,460
8	Tools, implements and machinery	348,808	8	2,790,464	7.5	2,616,060
9	Horses, wagons and miscellaneous	36,081	10	360,810	10	36,081
		$9,390,329		$72,064,432 —7.67 per cent.		$62,730,724 —6.68 per cent.

* Embraces all percentages down to and including interest, as shown on table headed reproduction cost, as determined by valuation staff with Cooley's percentages.

** Separated into two amounts, one for power plants, the other for ordinary purposes.

Gross earnings, 1906 ..... $2,973,443

Depreciation due to wear and tear and exposure to the elements ..... 627,307 per year
21.09 per cent gross earnings.

Depreciation due to wear and tear and exposure to the elements, including an allowance for obsolescence... 720,642
24.23 per cent gross earnings, or say 20 per cent and 25 per cent gross earnings.

From books:	Per cent.	Per cent.
Operating ratio, ordinary	48.96	48.96
Taxes	6.00	6.00
Operating ratio, including taxes	54.96	54.96
Depreciation computed	21.09	24.23
Operating ratio, including taxes and computed depreciation	76.05	79.19
Or say	75 and	80
From books depreciation taken at	10	
Operating ratio, including taxes and depreciation	64.96	

EXPENDITURES REQUIRED

A table submitted by the witness showing what, in his opinion, it would be necessary to expend if the property in Milwaukee is to be maintained indefinitely in its present state of efficiency, is reproduced herewith. As a basis of this computation, the figures of the valuation staff of the commission were used, but there was added to each of the elements the percentage which he had described and used in making his valuation of the property. The witness took a set of factors reached by himself and another set given by the heads of departments and worked them up, as a matter of fact, with factors used by others. The money represented in the nine items considered aggregated $9,390,329. Each of the items was then multiplied by its factor and the products summed up. The sum total of the products as given by the heads of departments was $62,730,724. Dividing this figure by the $9,390,329 gave as a result 6.68

per cent. This percentage of the $9,390,329 was required to take care of depreciation according to the factors furnished by the heads of departments. Figuring on the percentage stated $627,307.24 would be required annually to cover depreciation, of the property based on the estimates of the heads of the departments and on the valuation made by the engineering staff of the railroad commission with the various percentages which Professor Cooley had indicated should be made. The witness did not understand that the heads of departments considered that this sum would do any more than simply take care of the property.

If the property was to remain unchanged in characteristics this sum must be expended annually to keep it up to an efficiency of approximately 80 per cent of the cost value; the sum did not include an allowance for depreciation due to obsolescence, public demands or inadequacy.

An explanation was made by the witness of the reasons why the percentages given by him, as shown in the table, were larger in some cases than those recommended by the heads of departments. Professor Cooley was afraid that his figures did not include all of the elements of depreciation, but they were about as far as he dared to go just now; he thought that in a few years he would go very decidedly further, but he could justify the figures presented from his knowledge of to-day.

Explaining further the figures, as applying to the earnings of 1906, the speaker said they meant that in that year, according to the factors given by the heads of departments, the depreciation was $627,307, requiring 21.09 per cent of the gross earnings. According to the figures used by the witness, 24.23 per cent of the gross earnings would be required or, say, between 20 per cent and 25 per cent of gross earnings, including some allowance for obsolescence. The ratio of the ordinary operating expenses to gross earnings in 1906, according to the books, was 48.96 per cent and the allowance for taxes for the year was 6 per cent, making a total of 54.96 per cent. The company also set apart 10 per cent of the gross earnings as a depreciation fund, making a total of 64.96 per cent. If to the percentage of operating expenses, plus taxes, the rates of depreciation, as stated by Professor Cooley, should be added, they would bring the total up to 76.05 per cent in one case and 79.19 in the other, making an aggregate for 1906 of from 75 per cent to 80 per cent of the gross earnings to take care of the property and operate it. Professor Cooley thought that was conservative. It was his belief that a larger percentage rather than a lesser one would be shown to be necessary in the next 5 or 10 years.

RESULTS IN CHICAGO

The witness gave the percentages of gross earnings expended for operating expenses, including such depreciation provision as was set aside by the Chicago City Railway during a long period of years. He said that the Chicago Union Traction Company expended less than the Chicago City Railway. The lines comprised in the Chicago Union Traction System would have to expend nearly twice as much or at least 50 per cent more than the Chicago City Railway to raise the property to the conditions demanded to-day. If, with an expenditure of 75 per cent to 80 per cent of gross earnings in the Chicago City Railway, it required for rehabilitation $8,000,000 in 1907, what could be expected of the Milwaukee properties, where 10 per cent or 15 per cent less was spent. The money to keep up the property had to be taken out of the earnings or new capital had to be used.

In discussing the requirement of the Chicago ordinance that funds aggregating 14 per cent of the gross earnings shall be set apart for maintenance, repairs, renewals and depreciation, Professor Cooley said that the Chicago City Railway used 78.08 per cent of gross earnings in 1906 for operating expenses, including everything. The reproduction cost as determined by the appraisal in 1906 was $21,604,759. The gross earnings for that year were $7,871,126.63. Fourteen per cent of this amount was $1,101,958 and this figure, divided by the reproduction cost, gave 5.1 per cent.

In the case of the Chicago Union Traction Company, the percentage of gross earnings required for operating expenses in 1906 was 68.49. The reproduction cost in 1906 as determined by the appraisal was $29,131,616. The gross earnings for that year were $10,008,320, 14 per cent of which was $1,401,165. This, divided by the reproduction cost, gave 4.81 per cent. In the case of the Milwaukee Electric Railway & Light Company, for the railway property only the percentage of operating expenses, including taxes and depreciation as allowed for 1906, was 64.96. The reproduction cost of the properties in 1906, as taken by Professor Cooley in his calculation, was $9,400,000. These figures included paving and also some non-productive properties. The gross earnings in 1906 were $2,973,443, 14 per cent of which was $416,282. This sum, divided by the reproduction cost, was 4.83 per cent. If the Chicago City Railway expended 5.1 per cent of its reproduction cost and the Chicago Union Traction Company 4.81 per cent and in neither case the property was "maintained anywhere near the proper working condition," then it must follow, it seemed to the speaker, that these percentages were altogether too small to maintain the properties in a working condition.

DEPRECIATION FROM WEAR

Considering the subject of depreciation further, it was stated by the witness that the wear and tear of property was directly proportional to its use. Exposure to the elements was one cause of depreciation and to that cause there would be added the effect of wear and tear. A property that was used constantly and hard naturally wore out faster than one that was not so used.

To stop a car subjected all parts of the car to a strain. This strain was repeated such an enormous number of times that the result eventually was that the car became relatively weak and its life was shortened. The wheels of cars and also the brake shoes were worn out more rapidly by frequent brake application, and therefore the expense of maintaining the brake shoes and the wheels was increased. The rails themselves were worn more rapidly owing to the fact that more car-miles were traveled, and all these effects were reflected back into the power houses owing to the fact that increased consumption of power was required for frequent stops and starts. That meant increased work for the engines, dynamos, generators, boilers and, of course, greater wear. The wear on the trolley wire was directly proportional to the number of miles traveled by cars. The entire plant might be said to depreciate more rapidly owing to increased traffic.

Some idea could be had of the probable effect of the wear due to increased traffic in the city of Milwaukee when it was considered that since 1897 the car-miles per mile of track had practically doubled. In 1897 the car-miles per mile of track were 56,385, as compared with 98,681 in 1906. This statement did not attempt to take into consideration the substitution of larger cars. The general effect of the development of any street railway property during the past

15 years had been to increase the wear and tear and depreciation very materially. That was the experience everywhere.

While 8 per cent or 10 per cent, or even less, of the gross earnings was all that was necessary 15 or 20 years ago to maintain the property, those allowances were no longer sufficient. The general belief at the time electric power was introduced into street railway practice was that there would be a very material reduction in the operating expenses from the expenses of horse and cable roads.

Since the introduction of electricity changes had taken place toward larger cars and higher speeds, and with the larger cars heavier rails and better roadbeds had been introduced. With the increased speeds and larger cars had come larger generators, engines, boilers and larger power stations. Everything had increased, so that the conditions of 15 years ago, upon which the practice of those days was based, were no longer the conditions applicable to street railway practice with electric power, and it seemed to Professor Cooley that the conclusion that the operating expenses to-day were larger than were contemplated 15 years ago was a perfectly normal, natural and logical one.

ADVANCES IN LABOR AND MATERIAL COSTS

There had been a general advance not only in wages but also in the cost of a good many of the materials which entered into the expense of construction of railways. This tendency was a most serious consideration. It seemed to the witness that with the very general tendency of all things to advance, including the cost of living, nothing whatever going backward in the way of cost, the only solution of the street-railway problem in the future, if the properties were to be maintained, was not the present fare, but an increase of fare. These remarks were applicable to the entire country.

Answering a question on this subject by L. C. Manson, of counsel for the city, it was reiterated by Professor Cooley that the whole tendency of costs for labor and material was upward. There was a limit to the carrying capacity of a road and to the earning capacity of a car and no limit to the operating expense of a car, and the result must be, if the properties were to be maintained, an advance in the gross earnings, either by an increase of the rate of fare or by limitation of the transfer privilege. It was not possible to have a low rate of fare with the transfer privilege.

The number of transfer passengers in Milwaukee in 1906 was 33.40 per cent of the revenue passengers and the average for the last 12 years had been about 30 per cent. The average gross revenue per revenue passenger in 1906 was 4.3 cents; the revenue per revenue and transfer passenger averaged 3.22 cents. That simply meant that when all passengers who rode were included in the computation the earnings were going down toward 3 cents.

The witness stated that the question of the reduction of the rate of fare was considered in Chicago during the settlement, but not to any great extent because of the belief that it was not practicable to reduce the fare and give the transfers and through routes demanded.

W. J. Curtis, of counsel for the company, asked the witness how the Milwaukee company could have existed in the past and complied with his computation as to the proper amount of depreciation to set aside. Professor Cooley said that to some extent the road had been borrowing on the future and that probably a very largely contributory cause had been a most superior management and an esprit du corps that was admirable. The body corporate on the street railway in Milwaukee seemed to be a very unusual one.

The amount of depreciation which had been suggested as proper by the speaker could not be set aside in the first year of the corporate life of a railway company unless the money was borrowed. The general history of the street railroad business in this country had shown a marked tendency to an insufficiency of earnings to take care of the properties and therefore there would be insufficient money for depreciation. The larger the rate of fare the greater the gross earnings and therefore the possibilities of giving better service were increased. One was a function of the other.

TO MAKE INVENTORY COMPLETE

In a valuation the inventory to be complete must embrace not only the elements of the physical property that had been found by an inspection of the property, but also all of the elements that were not found, but which had really appeared in the property during its organization and during the period when it had been brought up to the condition in which it was when the inventory was made. The measure of the going concern should be taken when the earnings were sufficient to accomplish the original intent of the investment.

In a physical sense, the property might be a going concern simply because the wheels were turning, but the measure of the going concern at that time was, of course, less than at some other time when it was earning sufficient to return the interest on the cost, depreciation, expense of operation, taxes and a profit. Physically, the property would be a going concern when it began operation, but financially not until it reached full headway. Without any reflection on the subject, Professor Cooley would say that in determining the value as a going concern, the appraiser should stop when the property had a value as a going business sufficient to give a proper return on the investment.

Discussing further the various elements of depreciation, the witness spoke of casualties. He said that in mentioning the possible destruction of the property, he had in mind that the company was an agent of the city, exerting itself to supply transportation facilities to the city and exercising its very best judgment and that it did not desire an accident any more than did the city itself, but an accident had happened. It seemed to him that the business done by the company must be of a character to permit it to take care of happenings that were unavoidable. The city should be responsible to the extent of willingness to contribute a fare which would enable the company to insure itself if it liked.

Professor Cooley's idea of the depreciation fund was that it was not a fund to accumulate to a great extent, which in the end would be a distributed earning, but that it was a fund that would serve simply to maintain the integrity of the property at all times. In other words, it was incumbent upon the people to-day to so preserve the property that when their children inherited it they would find it preserved properly for their use. That was an obligation as he looked upon it. The citizens were just as much interested in preserving the property as the company.

He thought that in justice to the property, which was a magnificent one, all thought of whether it was this particular company or city should be taken away and the matter should be kept independent of any ownership or any particular responsibility and treated on a broad plane, separated from any personal character.

EXPENSES OF CONSOLIDATION

The inventory which was made in connection with an appraisal failed frequently to include money expended for

preparing the way to the construction of the property or to recognize such expenditure at anywhere near its actual amount. These were necessary expenditures in the acquisition of the several properties in a city preparatory to the investment which had produced a single system for the entire city as distinguished from five or six different properties before. No account was taken in such reproduction cost, as determined from the inventory, of the expenditures that were necessary to bring the several properties into one corporate whole.

Frequently in bringing several properties into one concrete whole the expense incurred had been great and seemingly out of proportion unless the advantages that might accrue as the result of the consolidation should be considered. If the advantage had been great enough, or was likely to be great enough, then the expense of bringing the property together, whatever amount it might be, was justified, and the expense became an actual and a proper investment, and one to be recognized in an inventory for the purpose of rate making.

The advantages to the public comprised a single system as against five systems, a single fare as against several fares and the ability to go from one part of the city to a distant part without change of cars; all had a value which the citizens were realizing and it seemed to Professor Cooley that the people should very properly recognize the cost of securing to themselves such a value. The advantage to the city was on the one side of the ledger and, of course, there was, or presumably should be, a corresponding advantage to the company. The constituent companies could have continued in business during the remainder of the life of their franchises and left the city without modern transportation facilities as compared with other cities.

The witness thought the necessity of scrapping large portions of the property which were acquired was the same with the new company as it would have been if each individual company had changed its horse power to electric power, maintaining its integrity and incurring as an individual company the expense of making the change. All over the country the same conversion from horse railways to electric railways took place; it had to be made.

BOND DISCOUNT

Mr. Miller stated that in making the appraisal of the Michigan steam railroads nothing was included for the cost of floating bonds.

Professor Cooley stated that the matter was discussed thoroughly with the board of review and it was determined with reference to the cost of floating bonds that each road would have to be treated separately. Some roads had been obliged to sell their bonds as low as 60 per cent, while others could dispose of their bonds at par or even at a premium, and the element was so uncertain and would require so extensive an investigation to arrive at proper quantities that it was determined to omit it altogether and state the fact in connection with the appraisal. The element of cost of procuring a going concern was not introduced for similar reasons. The time that would have been required to calculate this cost for each of the different properties was altogether too great.

Interest on cost during construction must necessarily be included as part of the cost of a going concern because the money to do the construction work had to be provided and interest paid thereon. The witness distinguished between two kinds of interest, one on construction and the other on the cost of getting the construction going. The principle was the same in the two. Interest must be paid on the money invested as well as upon the money borrowed to take care of the deficiencies.

Reference was made by the witness to the work of the block signal and train control board of the Interstate Commerce Commission. He said that the board, of which he is chairman, had rejected numbers of devices simply because, while they produced greater elements of safety, they hindered or impaired the transportation facilities of the road; the great problem was to make the road do a greater volume of business in order that it might receive a sufficient return to take care of the property.

Professor Cooley recognized a very decided difference between the cost of creating a going concern and the value of a going concern. He had previously considered the subject of calculating the cost of changing the property from a static to a dynamic condition, and the value of the property after it had been so converted was another question.

Under cross-examination Professor Cooley was asked a question by Mr. Manson regarding his estimate that the cost of reproduction of the track and track structures would be about $15,000 per mile. The witness had based his statement on the cost per mile of track in Chicago as determined in 1906, the estimates appearing in the reports of the Chicago appraisals and also upon talks with the heads of departments of the Milwaukee Electric Railway & Light Company.

CONTINGENCIES OF CONSTRUCTION

Mr. Manson asked how the allowance of 5 per cent for contingencies of construction was computed. The witness stated that he had been about 25 years arriving at his present knowledge of the cost of such contingencies. He had had occasion to make many estimates of the cost of construction and to know afterward what the construction actually cost, and from that knowledge he had learned that a contingency item in construction was absolutely necessary unless one added outright quantities which he did not expect to spend, but which he knew from experience he would spend. His contingency items had varied all the way from 5 per cent to 50 per cent, so that he thought that a 5 per cent allowance was pretty low for contingencies of construction. In this case he had divided his ordinary allowance in two on the theory that the inventory had disclosed many of the troubles that had actually been encountered and therefore a less number were left.

In the appraisal of the Michigan steam roads 10 per cent for contingencies was allowed at the close of the entire valuation. That covered contingencies of construction as well as of inventory and was more than the allowance in the Milwaukee case, because it was made at the end of the appraisal, not at the beginning. The results of the appraisal in Michigan in 1900 were increased in the valuation of 1903 for the very reasons that Professor Cooley had pointed out while testifying in the Milwaukee case. He thought the valuation was increased by nearly 25 per cent. In 1903 the engineers had learned something by experience and made a very careful study of a number of the questions that they were obliged to leave in doubt in 1900, and as a result of that study the value of the railroads was increased from about $200,000,000 to about $245,000,000, as he recalled it.

The addition of 5 per cent for contingencies in the valuation of the electrical distribution system was made by the witness on the assumption that a very careful inventory had preceded the calculation of the amount by the valuation staff of the commission. He believed, however, that it was impossible to make a close inventory of

overhead and underground construction work. In the Chicago valuation an allowance of 15 per cent was made on the overhead construction and 10 per cent additional.

Illustrating the fact that interest charges started long before the plant is ready for operation, Professor Cooley referred to a water-power installation in Wisconsin, on which bonds had been issued and had drawn interest for two years, although the plant did not turn a wheel and was only then about to begin operation.

ENGINEERING IN COST OF CARS

The witness was asked why he added 4 per cent for engineering to the cost of cars purchased from manufacturers. He said that specifications usually had to be worked up carefully to meet the requirements of the city in which the cars were installed and pains were taken to develop these specifications and plans.

Testifying further as to depreciation, the witness said that a new element, if put into a street railroad structure, began to depreciate instantly. A tie, for example, had a life of about seven or eight years dependent on circumstances and the kind of tie, and if the company had spent two years in laying its track the probabilities were that the ties were one-fourth or one-third worn out before operation started. The extent of the use of the rail had a material bearing on the extent of depreciation. Depreciation of some parts of power-plant equipment went on whether the equipment was used or not. Cars would suffer the normal depreciation that all wood suffered with age, but that would not be as great as the effect of use, which involved a strain of the parts of the car in addition. Carbodies that were apparently in most excellent condition were sometimes simply rotten.

ERRORS IN CONSTRUCTION

It was wise for a company to look into the future and to build in anticipation of future needs and was likely to prove to be an economy to the people served by the company in that the expense of construction would be much less than if the construction costs were divided. A company might very wisely build in excess of its present demands, expecting thereby to save on investment in the future. If such construction should prove in the future to have been unwise, where it was thought in the beginning to be a wise move, the witness believed that it was an error which should be included as part of the going value, as the necessary additional expenditures would be brought about by the development of the art.

If the management at the outset was believed to be a good management and there was no criticism, but if in the years to come it was proved to be a bad management, then the many losses of the bad management which was believed to be a good one should be included. It seemed to the witness, however, that any business should call for the employment of men who were skilled in the art to which the business related. Frequently in the development of an industry it was necessary to employ unskilled assistants owing to the fact that skilled assistants were not available, and the art had to be developed independent of the knowledge of it in other centers. It might be that a business managed on lines which had been successful in the past had ceased to be remunerative, owing to advance of the art. Therefore it had become necessary to revive or regenerate the property to bring it up to the state of the art and that cost, it seemed to Professor Cooley, was a fair one to include in the cost of the property. If a property had been kept up constantly during its life, to the state of the art, this expense would have been incurred and distributed over a period of years instead of being concentrated in a short period. No better illustration of this could be had than that of the transition period from horse car to the modern electric car.

HORSES GOOD MOTIVE POWER UNTIL ELECTRICITY WAS DEVELOPED

Up to the time electricity was applied in Richmond, Va., horses furnished very good motive power for street railways, the best for general purposes, excluding the cable, because that was applicable only to dense traffic. The men who were engaged in the street railway business prior to the introduction of electricity presumably did not know anything about the possible effect of the introduction of electric power and conducted their business as the past had taught them was necessary. Now the period was one of electric haul and the possibilities of change could not be foreseen. For the purpose of illustration, it might be considered that the flying machine would be adopted to take the place of electricity and that existing machinery would have to be scrapped and transportation companies be obliged to reinvest in flying machines. It seemed to Professor Cooley that it would be legitimate to add to the cost of the present plant the cost of the new plant.

The citizens demanded such changes and the corporations had to meet the demands. The fact of the insistence of the public upon a change to electricity was demonstrated by the existence of electric street railroads generally in all the cities of the land and also the fact that no municipality would consent to return to the older system of construction. In Chicago the cable roads were as good as they ever had been, worked as well as they ever had and produced as high profits as they ever had and perhaps even higher when they had to be scrapped. The people would not consent to have the cable roads continue in the streets. The companies there were willing to make the change if they could be assured of any adequate protection for the money to be invested. It did not need any demonstration to show that the public had demanded electric construction for the last 15 or 18 years and it was even talked of using electricity on steam roads. Electricity was predicted as one of the means of increasing the capacity of the steam roads in the future. In Chicago the company had a contract to operate the cable road for a number of years and could have insisted upon that right, but it was one of the conditions of the compromise that cable roads be abandoned and electric traction substituted and in this abandonment the city allowed the value of the full going value of the cable property.

The situation in New York was brought up and Professor Cooley said that he was not particularly familiar with it except to know in a general way that the transformation that had taken place from the old horse cars through the cable cars to electric cars had involved such enormous costs that it was practically impossible to swing the properties.

The question of reasonableness of the rate of return, of course, involved the question of reasonableness of investment. The reasonableness of investment involved as one of its elements the question of securing money for the undertaking. That might be a very important element, depending upon circumstances. If the bonds were sold at a very low rate from force of necessity, naturally the interest requirements of the property would be increased correspondingly.

APPRAISALS FOR VALUE AND FOR COST

It was testified by the witness that in referring to

the difficulties of making an inventory, he had endeavored to distinguish between an appraisal for value and an appraisal for cost. An appraisal for value took into consideration merely elements that were found, that were known to exist at the time of the appraisement, and the appraisal for the cost of property took in elements that had properly appeared in the cost accounts.

In discussing the increase in the cost of operation due to the employment of a higher grade of men on electric cars than were used on horse cars, the witness said that another element was that the help required in addition to that on the platforms was greater now than was needed in the earlier days of electric power. The repair gangs, forces in the power houses and other laborers had increased very generally. The cost of production of electric current per kw-hour had been decreasing with the large investments of capital in the large plants, but, of course, there had been a corresponding increase with street railroad traffic in the consumption of current.

INCREASE IN CURRENT REQUIRED

The amount of current required to operate a car per car-mile had increased in greater proportion than the increase in the weight of the car and in the load. While he had not developed any figures, in the old days the speed of cars was from 4 miles to 7 miles an hour, while it now ranged from 8 miles to 11 miles an hour. In the early days cars started very slowly, while now they started rapidly. The rapid acceleration was a tremendous factor in the consumption of current. If a car started 15 years ago in 5 seconds and started now in 2½ seconds, it required the use of four times as much current as in the earlier days. When the car was started there was the increased weight to propel above what existed in the earlier days. With the increase in weight there was an increase of other resistance. For instance, the wind resistance might be doubled or trebled.

LOSS DUE TO SHORTENED LIFE OF TRACK

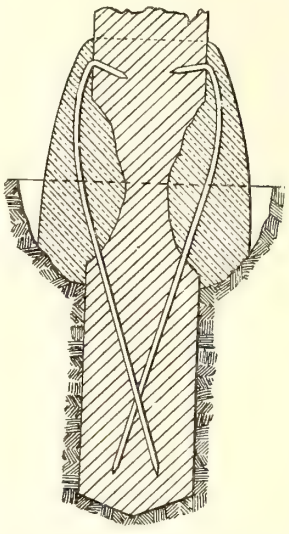
Professor Cooley discussed again the factor of depreciation due, for instance, to the requirements of the city that the track be torn out on account of repaving and before its life had expired. He said that when the pavement lasted 10 years and the track structure lasted 12 years and the pavement had to be renewed at the end of 10 years, it was better to remove the entire track structure so as to save tearing up the pavement again at the end of 12 years. By this process, however, the company lost two years of the life of the track structure in the expectation of saving the city or some one the cost of tearing up the pavement again.

When the company changed its alignment it was for the purpose of enabling it either to do a greater business or to save expense, one being the result of the other. In such a case there would be compensating advantages and, of course, it was also true that if the change was made at the demand of the City Council, an expense would be incurred.

As an instance of what he would charge to maintenance, the witness said that a piston rod nut of an engine might work loose and be detected by the peculiar sound. The cylinder head would be taken off and the nut tightened. The cost would be charged to maintenance in operating expenses. If the nut was not tightened and the cylinder and the entire engine were wrecked the cost of replacement would come from the depreciation fund, although sometimes it would be charged to maintenance.

REINFORCING WOODEN POLES

The limited supply and steadily increasing cost of wooden poles for electric light, telephone and railway transmission lines present a serious problem to large consumers of this kind of timber. Preservative treatment either by impregnation or painting offers a solution for prolonging the life and service of poles to be set in the future, but the constant renewals of old poles which were put in place before the value of preservative treatment was fully realized require enormous quantities of poles each year. It has been estimated that there are 50,000,000 wooden poles in use by electric companies in the United States, which require renewal at the rate of 3,500,000 each year. The cost of renewing a pole in place is much higher than the cost of setting a new pole, owing to the labor involved in removing and replacing the wires. Like every other large electric company, the Allegheny County Light Company, Pittsburgh, Pa., has expended large sums in renewing poles which were perfectly sound above the ground line, but which were dangerously decayed below that point. R. S. Orr, general superintendent of the company, devised last year a simple plan for reinforcing old poles which were sound and serviceable above ground with a cage of steel rods surrounded with a shell of concrete and thus prolonging their life for a period estimated as at least 10 years. In 1908 about 250 poles in various places in Pittsburgh and Allegheny were reinforced by this method and



Section Through Reinforced Pole

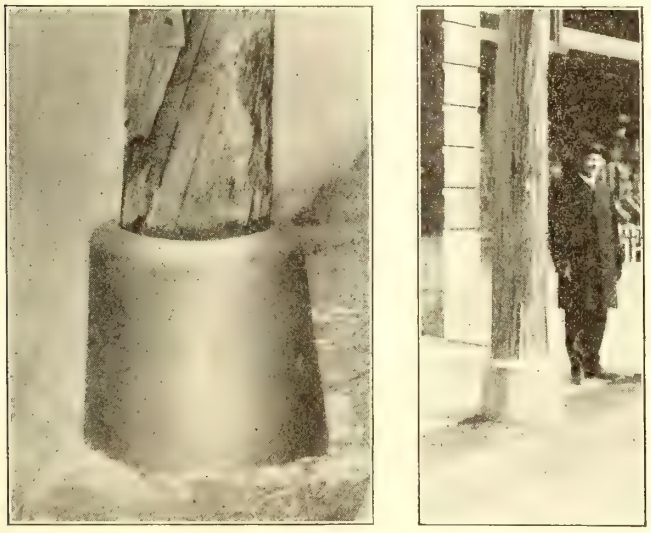


Reinforcing Rods in Place in Badly Rotted Pole Butt

the company is planning to apply it to more than 1000 poles during this season.

A short description of the method followed is of interest: The pole to be reinforced is supported by tripods or held securely in place by temporary guy ropes or wires; the earth is then removed for a distance of about 18 in. from the sides of the pole to a depth that will expose the solid portion of the butt remaining. The decayed portion of the pole is then scraped out. Steel rods ½ in. in diameter and from 3½ ft. 6 in. to 6 ft. long are used for reinforcing. The rods are pointed at both ends, the upper end being bent at right angles to form a dog or point from 5 in. to 6 in. long. The straight end of the rod is driven into the sound portion of the butt at an angle by the use of a special driving tool, as shown in one of the illustrations. The upper portion of the rod is then bent in toward the pole and the dog driven in to its full length. The length of the rod used is such as to permit the proper anchorage of its lower end in the sound wood of the butt and to allow the portion extending above ground to be of sufficient length to span the decayed section of the pole and be driven into perfectly sound wood. The points of the rods are usually driven into the pole from 12 in. to 18 in. above the ground level. From four to eight rods are used to form the reinforcing cage, depending on the diameter of the pole. Concrete is filled in around the pole, replacing the decayed portions of the wood and forming a protecting sleeve or envelope for the rods about 6 in. thick. This concrete extends above the ground sufficiently to cover the upper terminals of the rods and protect them from the action of the moisture in the air, forming a collar above ground and tapering from about 3 in. thick at the ground level to about 1½ in. at the top. It is finished off in a sightly fashion by a special sheet metal form designed for the purpose.

Where the butt of the pole is partly rotted away the rotten portions are removed and the space is filled in with concrete, thus providing an anchorage for the rods either in the solid wood of the butt or in the concrete. One of



Views of Finished Reinforced Bases

the engravings shows the rods twisted in the hollow butt before the concrete is put in. If the butt is entirely rotted away a concrete base is made of slightly larger dimensions than the pole and the reinforcing rods are firmly anchored in it at the bottom. The pole is then cut off square and allowed to rest on this concrete base. The upper portion of the rods projecting from the base and surrounding the pole are then bent in and the dogs driven home in the usual manner. A concrete shell is carried up around the pole to protect the rods, thus giving poles reinforced by either method a similar appearance above ground.

Another of the illustrations shows a special form of reinforcement made necessary by the condition of the pole.



Driving the Reinforcing Rods

It was found that dry rot had weakened the center of the pole for more than 2 ft. above ground while leaving a sound exterior shell. The ordinary reinforcing rods were put in, but in addition four longer rods were anchored in the concrete base and the dogs driven into the pole well above the top of the concrete cap, where the heart wood was perfectly sound.

It is claimed for this method of reinforcement that the steel rods and concrete form a practically homogeneous mass superior in strength to the wood alone when new and equally capable of sustaining the side strain which every pole must stand. Tests made of a new pole and one reinforced as described have conclusively proved this fact.

The entire process is simple and a week's instruction to any ordinary intelligent workman or foreman will enable him to do the work effectively; in fact, less skilful labor is needed in reinforcing an old pole than in setting a new one. It has been demonstrated that the process will meet many varying conditions. The Allegheny County Light Company has reinforced about 250 poles without having a case of butt decay which could not be successfully handled. The average cost of reinforcing should not exceed $3.50 at the most under ordinary conditions. The last 27 poles reinforced by the Allegheny County Light Company cost $3.14 each for labor and material.

The saving in cost by using the method of reinforcement instead of renewing poles may not be realized by many of the light and railway companies who do not keep full reports of renewal cost. One large company using many thousands of poles annually and keeping very exact figures of its construction costs gives the average cost of

a 30-ft. chestnut pole at about $9 set. Estimating $6 as the cost of transferring wires and hauling the old pole away, which is perhaps too low, gives an average cost of $15 for replacing a wornout pole of this size. The cost of renewing a pole of greater length largely exceeds this. The same company gives the cost of a 60-ft. pole as $32 in new construction work. This difference is accounted for by the greater value of the pole itself and the increased labor and hauling charges. In case of renewal the difference is rather greater than less because the higher the pole the greater the number of cross-arms it usually carries to support the wires and cables and the transference of these is very expensive. It is not an infrequent thing for the renewal of a 50-ft. pole to involve a total expense of $100. With the Orr method of reinforcing the cost of reinforcing a 60-ft. pole is very little more than reinforcing a 30-ft. pole.

The method of reinforcing has been fully patented and the patents are controlled by the Pittsburgh Reinforcing Pole Company, Pittsburgh, Pa.

BOSTON ELEVATED SHOP ECONOMY

The Boston Elevated Railway Company has paid special attention to questions of shop efficiency during the past year or two and has made a systematic effort to turn out a greater volume of work for a given expenditure. As a result of these studies a number of general points may be cited which tend toward creating a more efficient organization.

Cleanliness throughout the entire shop is insisted upon, and more stress has been laid upon the matter of orderliness. Greater care has been taken to see that all tools and supplies are kept in the proper places when not in actual service, and systematic checking of tools has been demanded in all departments. Punctuality has been enforced more strictly through the use of time clocks and special effort has been made to start all jobs promptly when the working hours begin. All practices on the part of workmen tending to delay production have been discountenanced. Special thought has been given to the proper maintenance of existing tools and better arrangements of the plant have been made, including improved washing facilities for the employees. So far as possible the same set of men has been kept on the same class of work, and when a force has been sent to do work outside the home shop in distant car houses or other portions of the system, the same men are sent again and again. This saves time in getting around the city, saves inquiries and the investigation of credentials, explanations of local facilities and delays in starting work in unfamiliar locations.

The company has gained much by settling upon a fixed definite number of cars per day to be passed through its paint shop, regardless of the variations in the condition of individual cars. In some instances departments or subdepartments have been relocated and combined, as in the case of a tin shop which was formerly located in a rather dark corner of the plant. This was moved to a location on the north side of the building where no artificial light is required and the division combined with the brass-finishing shop. The productive capacity of the tin shop was increased by using compressed air in operating a metal stamper. Department foremen have been held responsible for the production of fixed numbers of specific jobs in a given time and a long series of studies has been made of the time which should be required to turn out a given piece of work. Finally, by the introduction and steady extension of piece work the men have in general found it possible to earn substantial increases in wages and the company has gained through the production of a much larger volume of repairs and maintenance work per unit of labor expended.

CRITICISMS OF INTERURBAN RULES REQUESTED

The report of the committee on interurban rules, presented at the annual meeting of the American Street & Interurban Railway Transportation & Traffic Association in October, 1908, has been published by the association in booklet form. In a letter addressed to the general managers of member and non-member companies, accompanying the booklet, President C. Loomis Allen says:

This tentative code was not distributed to the member companies before the convention, consequently those attending the convention were not sufficiently familiar with the code submitted to enable them to intelligently discuss the rules in detail. It was, therefore, decided that the association should print this code in pamphlet form, giving it as wide a circulation as possible, with the view of obtaining criticisms and suggestions. With these in mind the committee was to revise the code again, with the object of making it standard for interurban operation throughout the country.

We would respectfully request that you send to the secretary such criticisms as a careful study of the matter would lead you to make. If a satisfactory code is to be formulated it can only be done with the hearty co-operation of the managers of interurban properties, and we earnestly suggest the great importance of this question and urge that you give it your personal attention.

Replies should be sent directly to the secretary, 29 West Thirty-ninth Street, New York, not later than May 10, 1909, in order that the committee may have sufficient time to properly consider the many suggestions it is hoped will be received.

PAMPHLETS ON ASSOCIATION WORK AND THE FARE QUESTION

Some pamphlets have been issued by the American Street & Interurban Railway Association relating to the work of the association and to the fare question. These contain articles by James F. Shaw, the president of the association, and by W. Caryl Ely, former president, discussing, respectively, the future and the value of the association; and articles on "The Reasons for Increased Fares on Massachusetts Street Railways" and various other articles and several editorials dealing with the financial situation confronting urban railways in several sections of the United States, all reprinted from recent issues of the Electric Railway Journal.

Another pamphlet gives "Facts of Interest Regarding the Membership of the Association." This states that "up to Feb. 15, 1909, annual dues have been received from 162 old companies, as against dues from 101 companies to the same date a year ago. In the same period 136 old associate members have paid their 1909 dues, as against 77 for the corresponding period of last year."

A list of the new active and associate members is given. The long list of new associate members shows their business connection and, if directly associated with railways, the department to which they belong.

A bill was introduced in the Prussian Diet on March 27 to empower the Government to spend $56,000,000 on the extension, completion, improvement in equipment and partial electrification of Prussian railroads. The construction of a number of branch lines also is to be undertaken.

RAIL CORRUGATION GRINDER USED IN PHILADELPHIA

The Philadelphia Rapid Transit Company has recently placed in service a rail corrugation grinder invented by H. B. Nichols, engineer of way. The machine, which is shown in the accompanying views, is the result of two years' experimental work and has proved so successful that several others are under construction. In speed it has been found at least four times as fast as hand grinders, and as workmen's fatigue is not a factor, its grinding is absolutely uniform. The machine now in use weighs 3800 lb., but is so constructed and balanced that it is easily removed and replaced in less than a minute by two or three men; consequently it offers no obstruction even if used in the daytime on lines with comparatively heavy traffic. It is arranged, however, with incandescent lamps for night operation as required. The new model will weigh 3500 lb., which is believed to be the most practicable minimum consistent with substantial construction and steady running.

As shown in the accompanying views, the grinder consists essentially of a grinder carriage or brickholder, the motor mechanism, the supporting truck and a pair of large wagon wheels to move the equipment when the grinder is not on the rails. The grinder carriage is mounted on one end of the truck and the motor on the other. The machine is held in proper vertical trim by an outrigger provided with wheels for the mate rail. A metal track brake forced down by a toggle joint lever prevents creeping on grades, but on level track the oscillations are so slight that they simply act as a shock absorber. The following paragraphs explain the construction and operation of the grinder in detail.

SUPPORTING TRUCK

The supporting truck, which is centered over the rail to be ground, is a channel iron frame 18 in. wide with two main wheels which are laterally adjustable to permit the grinding of off-side rails on sharp curves. The ends of this truck are provided with push bars to propel the equipment whether on or off the rails.

THE GRINDER CARRIAGE OR BRICKHOLDER

The grinder carriage, as shown at the left of Fig. 1, comprises a hollow slide frame and a cast-iron block reciprocated by the motor mechanism. The grinding bricks are held in an adjustable brass frame so pivoted at the bottom that the bricks may be tilted to correspond to the bevel of the rail head. While the frame has only the horizontal reciprocating motion, the cast-iron block therein also has end guides for vertical movements.

It is Mr. Nichols' belief that flat grinders offer the only practicable solution and that wheel grinders are not effective for this work. He is therefore using special grinding bricks, which are clamped in sets of four between an abutment at one end of the inner brass frame and a vertically wedged plate at the other end. The bricks are of such length that when placed ½ in. apart the grinder carriage has a stroke of 24½ in. The weight of the grinder carriage is 675 lb. and the pressure on the bricks is about 21 lb. per square inch. A cam lever is provided to raise the grinder carriage so that the bricks will not strike the pavement when the machine is taken off the track. Vertical screws are used to take up the wear of the bricks, and in general adjusting means are provided for all other parts subject to wear. The brick interstices previously mentioned serve for spillways, the grindings being washed off by pouring water through the carriage from time to time. These flat grinders are made of a carborundum mixture which contains such hard crystals that some of the abraded metal is taken off the rail like shavings from a metal planer.

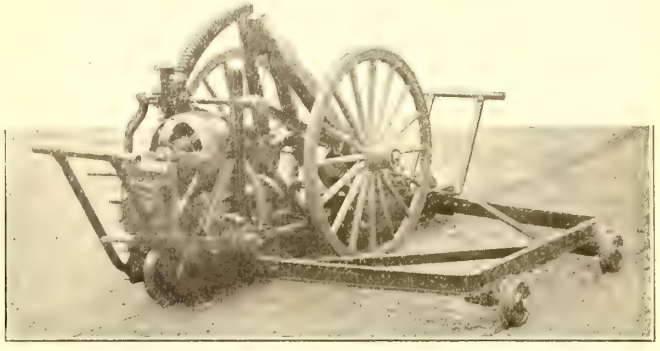


Fig. 2—View of Motor End and Outrigger

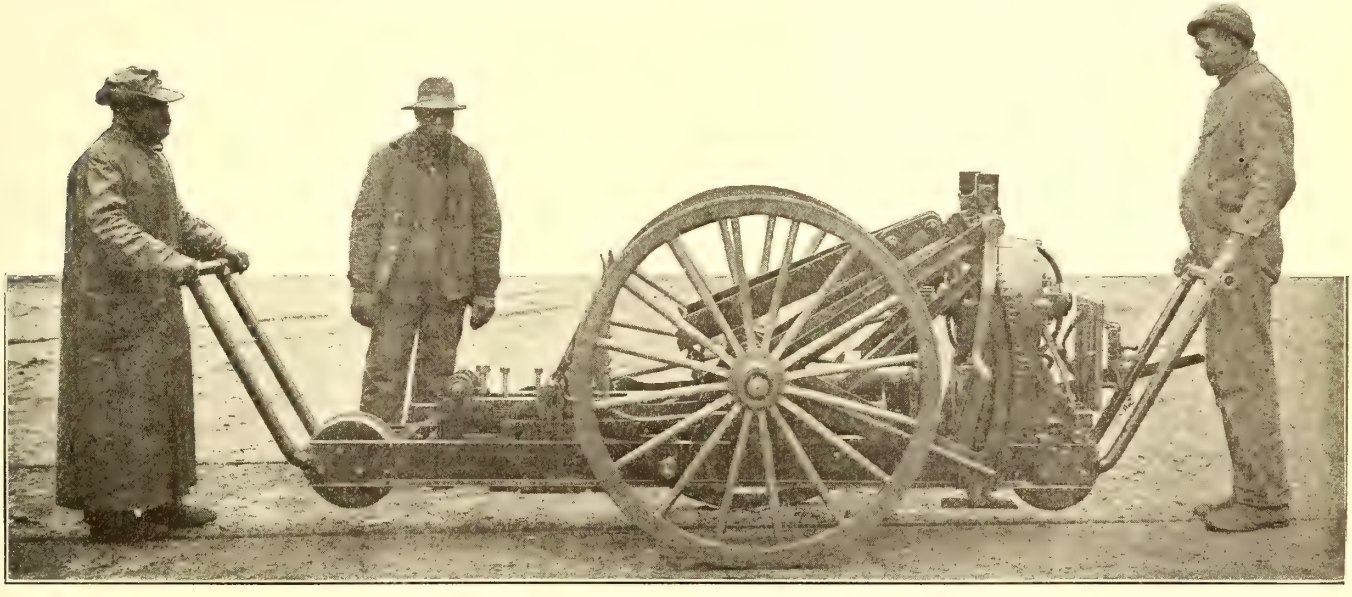


Fig. 1—Centering the Supporting Truck Over the Corrugated Rail

DRIVING MECHANISM

The driving mechanism requires only a 3-hp motor which has a rawhide pinion meshing into a cut gear. This gear is keyed to a shaft with a male cam block reciprocating

the rod connected to the grinder carriage. The development of this cam block is that of a harmonic curve—that is, the reversal occurs under zero conditions of momentum. The grinder carriage at starting is accelerated through about one-third of the stroke, has a constant speed through the middle third and slows to a stop on the last third. This method of reciprocation avoids sudden jerks, which would break the grinding blocks.

OPERATION OF THE GRINDER

When the grinder is to be placed in service the wheels of the supporting truck are centered about 6 in. over the

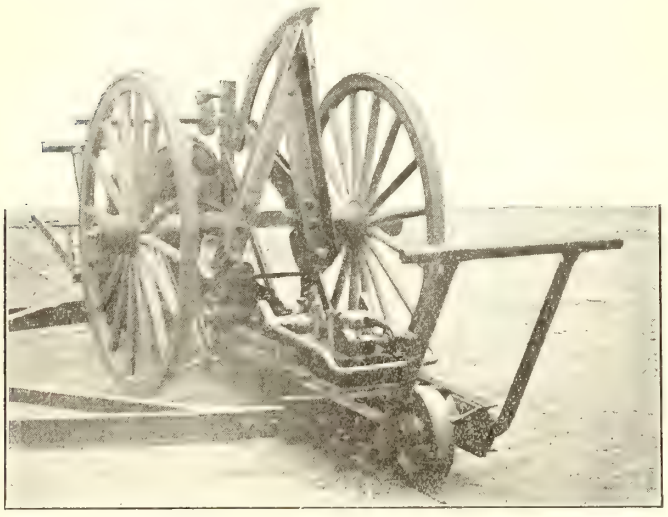


Fig. 3—Showing the Grinder Carriage and Chain Connection to Inverted V-Frame on Axle

selected portion of corrugated rail. The next step is to give a few turns to a large handle, the ratchet of which meshes into the segment of a gear. The latter is directly connected to a cranked axle which is provided with an inverted V-frame having chains secured to the center of gravity of the supporting truck. Consequently the turning of the cranked axle lowers the truck. A final turn of the same handle causes a small cam lever attached to the axle to bear against a roll on the side of the truck, thereby lifting the carriage wheels off the pavement. This prevents the

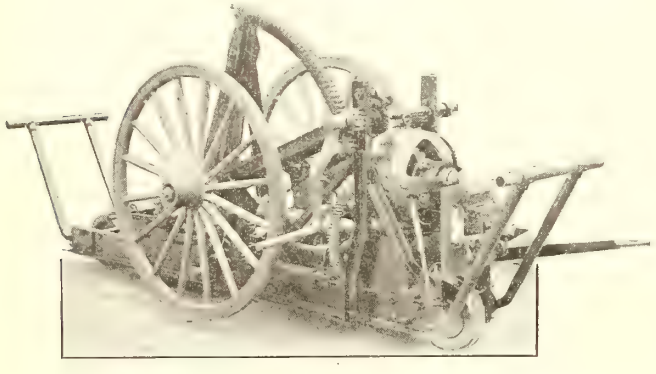


Fig. 4—View of Driving and Lifting Mechanisms

jarring of the large wheels, which are also saved from rattling by guides. The track brake is applied by the lever and ratchet, as shown on the left in Fig. 2, and the grinder carriage is lowered by turning over the cam lever illustrated in Fig. 3. Finally, the trolley connection is made and the motor started.

The machine is taken off the track simply by reversing the foregoing movements. The trolley feed is unhooked, the grinder carriage raised, the brake shoe taken up and the supporting truck lifted by turning the ratchet handle in the opposite direction. One of the carriage wheels serves as a pivot to swing the entire equipment through 180 deg., as the first turn of the handle sets these wheels on the ground.

The satisfactory results which Mr. Nichols has obtained with this grinder in Philadelphia have led William D. Gherky, of the Heed Building, Philadelphia, to secure from him the rights for using machines of this type in other cities.

STORE ROOM PRACTICE OF THE PHILADELPHIA RAPID TRANSIT COMPANY

The Philadelphia Rapid Transit Company owns about 3800 cars, which are operated on the surface lines from 19 operating car houses. Inspection and light repairs to cars are carried out at all of these depots, but heavier repairs are made at one of the two general shops of the company. One of these shops is located in the northeastern part of the city, at the corner of Kensington and Cumberland Avenues, and the other is located in the old car house at Eighth and Dauphin Streets. The methods employed by this company in distributing equipment supplies from the general storeroom, which is also located in the building at Eighth and Dauphin Streets, to the 19 operating depots and to the Kensington Avenue shops presents a number of interesting features.

The general storeroom at Eighth and Dauphin Streets handles all supplies for the mechanical department, the operating department and the general offices. All heavy material for the track department is stored in and distributed from five division store yards, which also carry the maintenance and construction supplies of the department of lines and cables. The distribution of supplies for these two departments is entirely separate from the jurisdiction of the general store keeper and will be referred to briefly later on. Small supplies for the power house, including nuts, bolts, washers and similar manufactured parts, are drawn from the general storehouse when required; but coal, lubricating oil, waste and packing are delivered direct to the power houses, which make monthly requisitions for these supplies to the purchasing department.

The supplies of all kinds for the Market Street elevated and subway division are purchased through the office of the purchasing agent of the Philadelphia Rapid Transit Company, but as this line is a leased property its accounts are kept entirely separate from the accounts of the Philadelphia Rapid Transit Company, and its supplies are handled through a separate storehouse.

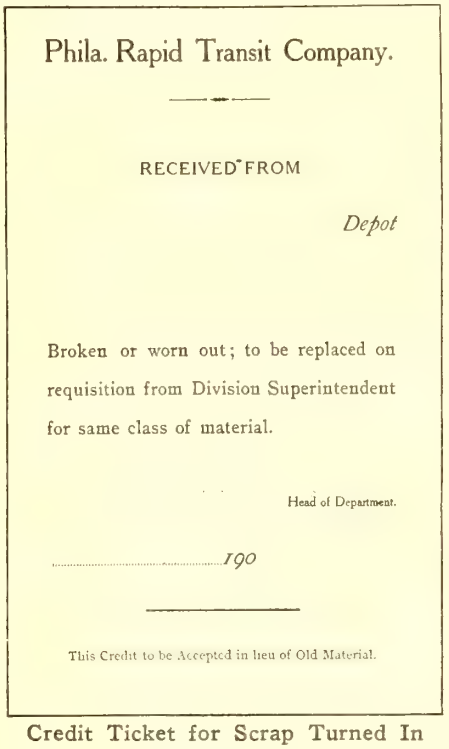
The Philadelphia Rapid Transit Company carries on its books only two accounts for supplies. One of these is the general supply account covering all of the material handled through the general storehouse at Eighth and Dauphin Streets; the other is a similar maintenance of way supply account covering all track material, also material used by the department of lines and cables. As material is purchased and placed in stock in the general storeroom, its cost is entered under the general supply account, which is carried as a capital liability on the balance sheet. Each month the disbursements from the general storehouse are deducted from this general supply account and charged directly to operating expenses, being divided among the several sub-headings of this general account, according to the use to which the material drawn out was put. The cost of coal, oil and other power-house supplies is charged

directly to operating expenses as delivered. At certain times, when a shortage of coal is threatened, large surplus stocks of coal are purchased ahead of requirements and a special capital account is opened on the books. As the surplus coal is used up its value is charged off to operating expenses against this special coal account.

The general storeroom at Eighth and Dauphin Streets is the central distributing point for all supplies required by the mechanical and operating departments. It is in charge of a general storekeeper, who reports to the purchasing agent. At the Kensington Avenue shops a branch storeroom is maintained under the direction of a storekeeper. This branch storeroom carries a stock of all supplies needed for the manufacturing and repair work carried on in the shop, but no supplies are issued from it direct to any of the operating depots. No stocks of such material as armature and field coil wire, paint and other supplies used solely in manufacturing and heavy repair work are carried in the Eighth Street storehouse. A complete stock of manufactured parts, however, is kept on hand at this place ready to be issued when required to any of the operating depots. All these rolling stock supplies and miscellaneous car house and office supplies, such as lanterns, brooms, fire buckets, stationery, ink, etc., are kept in stock at Eighth Street, and here also is kept the paper supply, which is issued from time to time to the printing department for use in printing transfers, tickets and office stationery.

An effort is made to limit the stock carried at each of the operating depots to an amount required for ordinary maintenance for not more than one week. Such supplies as are issued are charged to the car house foreman, who is responsible for their proper care and use. Each depot is provided with its own supply car, and a schedule has been arranged for the cars of all depots so that they make regular trips once each week, arriving at the Eighth Street storeroom at a fixed day and hour. When supplies are needed for an emergency these cars, of course, make special trips. The storehouse has a special freight car for its exclusive use. This car, which has a capacity of 30 tons and is mounted on double trucks, resembles a standard railroad box car, and is used for hauling the supplies from the railroad freight yards, with which the Philadelphia Rapid Transit Company has track connections, to the storehouse and for distributing supplies from the Eighth Street storehouse to the branch at the Kensington Avenue shops.

The keynote of the system of issuing supplies on this road is the requirement that for each new article delivered one worn-out or broken article of the same description shall be returned to the storeroom. This requirement covers all such parts as journal bearings, controller handles, trolley wheels, trolley catchers, brooms, oil cans and tools, ink bottles, and, in fact, anything which has a scrap value. Cast iron and malleable iron parts and such supplies as paper, waste, oil, brake shoes, etc., which are completely worn out or used up, or which have a comparatively small scrap value, are not subject to this requirement. It is not practical, of course, to actually charge up against the head of a department or any of the employees under him the scrap value of an article not returned, but a very effectual check against the abuse of the general requirement has been devised. The purchasing department requires that a requisition for new material which is not accompanied by the full number of scrapped articles to be turned in must be signed personally by the head of the department making the requisition. If 12 new trolley wheels, for example, are ordered and only 11 are returned, the assistant general manager, who is the head of the mechanical department, must personally sign the requisition before it will be filled by the storekeeper. Any carelessness on the part of the depot foreman in collecting scrap is thus brought to the attention of the head of the department, and an investigation can be made as to the reason for the shortage. This plan has another advantage: it requires the prompt return of scrap material to the scrap bins at the Kensington Avenue shops. No scrap of any kind is allowed to accumulate in the operating depots, and as a result the total amount of scrap returned is much larger than before the plan was put into effect. All scrap of small value, which is not required to be returned with requisitions, is collected at frequent intervals and shipped to the scrap bins for sorting and ultimate disposal.


Phila. Rapid Transit Company.

RECEIVED FROM

Depot

Broken or worn out; to be replaced on requisition from Division Superintendent for same class of material.

Head of Department.

.....190

This Credit to be Accepted in lieu of Old Material.

Credit Ticket for Scrap Turned In

The scrap bins at the Kensington Avenue shops are in charge of an inspector of the mechanical department, who acts as agent for the storekeeper in checking the quantities of scrapped material returned with requisitions. This man sorts over all kinds of scrap material turned in and makes a special study of broken parts for the benefit of the mechanical department, which is thus enabled to discover the nature of failure of parts of the equipment and to take steps to prevent them. The scrap inspector also sorts out all broken parts which can be repaired or utilized in any way in the manufacturing work in the shops. All bolts, nuts and screws turned in as scrap are tumbled in a foundry tumbler, which cleans off all mud and oil, and they are then sorted and picked over. Bolts with defective or worn-out threads are recut and put in stock, and perfect nuts, screws and washers are also returned. Bent or kinked trolley poles are straightened by heating and passing through a pair of grooved straightening rolls. Such wrought-iron rods and bars as can be straightened or welded and used again are sent to the smith shop and later put in stock. Once each month the company receives bids from junk dealers for scrap material on hand and makes a practice of disposing of all of it from month to month for the highest prevailing market prices. None is held as a speculation for higher prices.

In connection with the return of scrap, a credit system is used which allows all scrap to be promptly shipped to the Kensington Avenue scrap bins before new material is issued in its place. For all valuable scrap turned in without a requisition calling for an equal amount of new ma-

terial, a credit card is issued by the general storekeeper on memorandum of the scrap inspector. One of these cards, which are 4 in. x 6½ in. in size, is reproduced in an accompanying engraving. At any subsequent time the credits shown on these cards are accepted in lieu of old material when drawing new supplies. A credit card for six trolley wheels returned, however, is good only for six new wheels, and cannot be applied, for example, on a requisition for journal bearings.

In making out requisitions for car equipment supplies to be furnished the operating car houses, the requisition must be signed by the division superintendent and one of the five mechanical inspectors who have general charge of the inspection and light repair work in all of the 19 depots. They must state the number of articles wanted, the purpose for which used and the number of scrap articles returned, or the credit slips returned. If scrap is missing, the requisition must be signed personally by the assistant general manager, as before explained. These requisitions are forwarded to the general storehouse two or three days ahead of the scheduled trip of the supply car, and as far as possible they are filled in advance of the arrival of the car and are ready for loading without delay. The supply car goes first to the scrap bins at the Kensington Avenue shops and delivers any scrap which has accumulated during the week or which is to be credited on requisitions. The scrap inspector takes an accurate check count of the scrap delivered and issues a memorandum of the amount, which memorandum the crew of the supply car must deliver at the general storehouse before the new material called for will be delivered. This memorandum is checked against the requisitions on file in the storekeeper's office, and any shortages in scrap are deducted from the amounts of new material delivered.

When requisitions which cannot be filled from stock on hand are received from any of the operating depots at the general storehouse, the storekeeper makes out a requisition on the purchasing department, which immediately places an order for the material needed. The unfilled depot requisitions are kept on file until the necessary stock is delivered to the storehouse, when they are filled and transferred to the permanent files of requisitions.

The printed requisition blanks used by all departments for ordering supplies have spaces provided for entering on them opposite the name of the article ordered the price per unit quantity, and the total value of the stock ordered. In filling the order the storehouse attendants enter on the requisitions as the articles are removed from the storage bins the unit price, which is taken from the stock ticket kept in a holder over the bin. A clerk in the office of the purchasing agent checks these entries of unit prices and enters on the requisitions the total amount. Each day the requisitions received from each of the depots are gone over, and the articles ordered are segregated under four general heads, according to the use to which they are put, namely, motor repairs, car body and truck repairs, cleaning and supplies, and miscellaneous maintenance of equipment. The total value of each class of supplies issued on that day to each operating depot is entered on a daily distribution report, which is sent to the office of the assistant general manager. This report shows in condensed form the amount of supplies drawn by each of the depots and enables the assistant general manager to keep close check on the expenditures of his department for maintenance. Once a month the total value of the supplies drawn by each of the operating divisions for maintenance of equipment and other expenses is entered on a summary sheet, which is turned in to the general manager's office. The expenses of each depot are classified under the following seven heads: Motor repairs; car body and truck repairs; cleaning and supplies; miscellaneous maintenance of equipment; depot expenses; miscellaneous transportation expenses, and light account. Space is provided for entering the total mileage made during the month by the cars operated on each division, and also the total number of motors in service at each depot. The total cost of supplies for the month is shown on this sheet for each depot, and also the unit figures of cost per car-mile and cost per motor.

The cost accounting of the manufacturing operations in the Kensington Avenue shops is very simple. When the stock of any manufactured article in the storeroom gets low the storekeeper makes out an order on the mechanical department to manufacture the required number of new pieces. The mechanical department draws from the Kensington Avenue branch storeroom the required amount of raw material to fill the order. The labor cost of manufacturing the material is charged directly to operating expenses without being entered in the general supply account. As the manufactured supplies are issued to the depots for maintenance purposes, the value of the raw material only which was drawn for use in their manufacture is charged against the general supply account. No complicated bookkeeping is involved in this plan. The storekeeper is very careful to make sure that for a given amount of raw material issued for manufacturing purposes an equivalent number of manufactured articles are returned to stock. Any discrepancies are carefully investigated and the charges adjusted.

The storekeeping methods and blank forms described above are the result of many years of study and earnest effort to reduce the inherent evils of a large storeroom as much as possible.

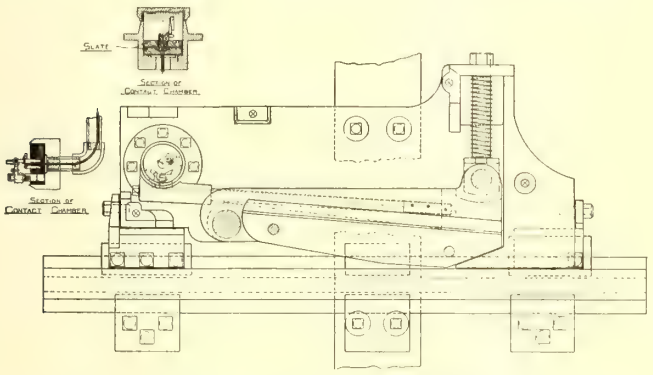
JOINT COMMITTEE ON ACCOUNTS, ENGINEERING AND ACCOUNTANTS' ASSOCIATION

The joint committee on accounts, the appointment of which was directed at the last annual meetings of the American Street & Interurban Railway Engineering Association and the American Street & Interurban Railway Accountants' Association, has been named. R. N. Wallis, president of the Accountants' Association, has appointed the following: C. L. S. Tingley, vice-president, American Railways Company, Philadelphia; F. B. Lasher, Mohawk Valley Lines, New York; P. S. Young, comptroller, Public Service Corporation, Newark, N. J. Paul Winsor, president of the Engineering Association, appointed the following: Wm. G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, Brooklyn, N. Y.; Chas. Hewitt, superintendent of motive power, Philadelphia Rapid Transit Company, Philadelphia; John Lindall, superintendent of rolling stock and shops, Boston Elevated Railway, Boston. Mr. Gove has been named as chairman of the joint committee.

A scheme has been prepared for an electric railway from Tiflis to Vladikaukas, a distance of about 130 miles. It will cross the Caucasus range through the Kvinamski Pass. A daily service of 20 freight trains and passenger service of eight trains every 24 hours will be given.

SIGNAL CONTACT MAKER FOR THIRD-RAIL SERVICE

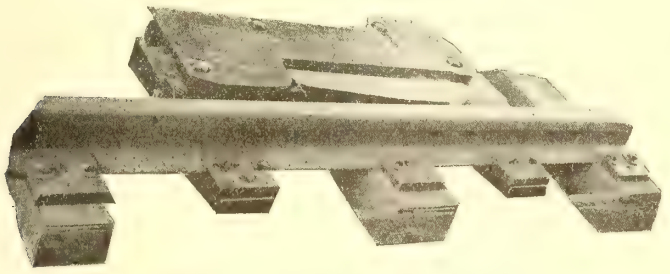
The United States Electric Signal Company, of West Newton, Mass., has recently perfected a track type contact maker intended for third-rail installations and other roads where an overhead contact would be inapplicable. The principal object sought in its design was to prevent moisture from penetrating the contact chamber through packed openings or bearings. The contact maker illustrated is 33 in. long and 14 in. wide. It consists of a bed plate with bracket extensions for attachment to the rail,



Signal Contact Maker for Third-Rail Service

a movable shoe, and a contact chamber containing the movable contact mechanism. The shoe is secured by a pivot at one end, its other end being free to move when operated by the flange of the car wheel passing between it and the rail.

The contact chamber has a pipe, which extends out from the bed plate to which it is secured. This pipe contains a lever which fits rigidly a short distance into the outer end of the pipe, and is tapered from there to the contact chamber. The pipe lever, being carried loose in this manner, will not bend when the surrounding tube is bent. Since the tube has one end attached to the stationary contact chamber and the other to the movable end of the shoe, it must bend whenever the shoe is actuated. The inside lever, however, will be deflected only at the small end in the chamber, to which the movable contact is connected. This action will cause the movable contact to move from



Signal Contact Maker in Track

its normal position, and thereby touch the stationary spring carrying the connecting wires from the signal box.

The tube is sealed at the outer end by a cap and at the inner end by being screwed into the contact chamber with leaded threads, as for steam fitting. The cover for the contact chamber is also screwed down with leaded threads, making it completely watertight. The operating wires leading from the contact chamber are run through a gas pipe similarly threaded into the contact chamber and reaching underground to the signal box. The entire contact maker is protected by a cover which leaves exposed only the narrow gap needed for the flange contact.

The shoe has a cold-rolled, case-hardened steel wearing surface, which is interchangeable and inexpensive to replace. The bracket extensions on the bed plate which secure the switch to the rail are adjustable to accommodate the various heights of standard T-rail, and are bored and set to adjustment at the company's factory from the customer's sketch of dimensions.

MOTOR-DRIVEN CONCRETE MIXER

The Cement Machinery Company, Jackson, Mich., has recently perfected an attachment by which an electric motor of any desired capacity and type can be used to drive a Systematic concrete mixer. By reason of this attachment the mixer is especially suited for electric railway work and in other places where electricity can be obtained for operating the motor. Power is supplied through an improvised lead, tapped to a commercial feed wire or trolley wire. The application of electric motor drive to concrete mixers mounted on trucks and wheels has, it is thought, never before been attempted, though the use of electric motors on stationary mixing plants is quite common. The Systematic mixer is usually provided with either an Ideal or an International gas engine, but when it is desired to use electric power the metal housing and the



Motor-Driven Concrete Mixer

gasoline engine are removed and steel standards on which the motor is mounted are attached in their place.

The accompanying engraving shows a standard motor-driven concrete mixer furnished by this company for the Brazilian Government at Rio de Janeiro. This mixer has high wheels, low hoppers, chainless and springless mechanism, and its initial cost is low. It is made in various capacities and can be used wherever high-grade continuous-batch concrete is desired.

The frame of the mixer is built of trussed 3-in. angle iron, and the bolsters are built of heavy cast iron. The cement and the sand and gravel hoppers are also constructed of cast iron. There are three of these hoppers, one on each side of the machine, and the third at the top and center. Either outside hopper can feed anything from a 98 fineness up to 3-in. in diameter. The center hopper can be used for cement, coloring material, lime, waterproofing compounds, or anything of like fineness. With these three hoppers any desired mixture can be delivered to the barrel of the machine. When the mixer is mounted on trucks having 24-in. front wheels and 36-in. rear wheels, the side hoppers are raised only 42 in. above the ground. The end from which the mixed product is discharged is 23 in. above the ground in the standard machine, but this

height can be regulated by using different sized wheels. The wheels are wrought iron, mounted on rolled steel axles.

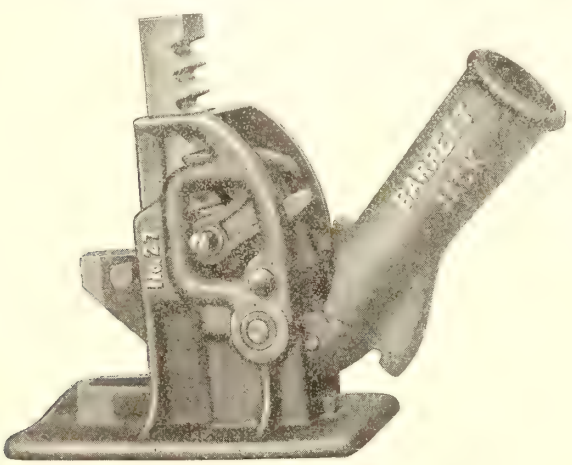
The mixing barrel, made of one piece of No. 10 gage steel, is 5½ ft. long (without the 1-ft. hood), 20 in. wide at the top, and 14 in. wide at the bottom. Its mixing paddles are arranged so that the mixture is turned forward and backward and thoroughly mixed before reaching the end from which it is discharged. The material is delivered to the barrel by an accurate and positive oscillating box feed, which feeds from each of the hoppers continuously to produce a uniform proportion. The feed is regulated by a "proportioner," which is a slide type of valve fitted at the bottom of the feed hopper and capable of delivering a mixture proportioned from 1:1 to 1:20. Locks are provided for locking the proportioning slides, thus making it impossible to change the mixture inadvertently. The mixing barrel has at the bottom double-hinged doors, 6 in. x 18 in. in size, which can be opened to allow the barrel to be cleaned quickly in emergency cases, but under normal conditions the machine is self-cleaning. These mixers are built for capacities ranging from 30 to 150 cu. yd. a day and vary in weight from 1600 lb. to 2400 lb.

The Systematic mixer also has proved satisfactory as a mortar mixer. Many of these machines are now used in New York and other large cities for mixing the mortar for the construction of large buildings. When the mixers are used for mortar the feed boxes and hoppers are not required.

The builder of this machine is also the pioneer manufacturer of the adjustable Monarch concrete block machine, the New York face-down and side-face block machine, the Normendin, the Peninsular, the Camaco, the Model and wide-range concrete block machine, the Favorite mechanical tamping sand cement machine and several other types of cement produce machines. The company has been established since 1900.

A NEW TRACK JACK FOR THIRD-RAIL ELECTRIC ROADS

The accompanying engraving illustrates a new type of Barrett track jack of special design, which is intended for use on lines equipped with third-rail. With a third-rail located close beside the track rail there is danger in using

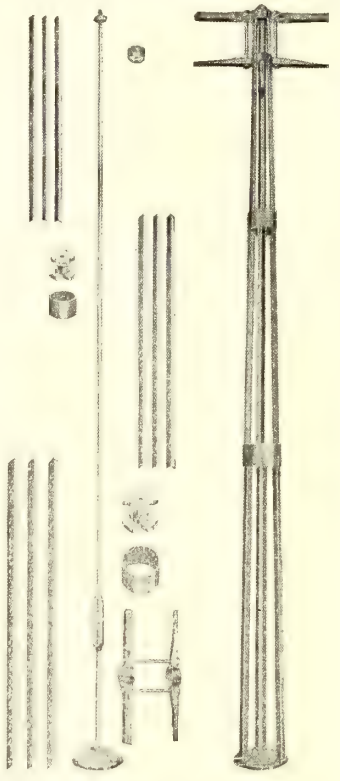


Track Jack for Third-Rail Lines

the ordinary type of track jack, which must be placed on the outside of the track rail, because the handle or lever may come in contact with the third-rail and cause a serious short-circuit. The new jack illustrated is built very low, so that it can be used inside the track rails with perfect safety. When the jack is dropped the top is 2 in. below the lowest point of locomotives or cars, and it is not necessary, therefore, to remove the jack to allow a train to pass. This allows track work to be done without sending a flagman a long distance back and holding up trains until the jack can be removed. The jack has a good raise and embodies all of the superior operating and constructional features of other types of Barrett jacks. It is made by the Duff Manufacturing Company, Pittsburg, Pa.

SECTIONAL STEEL POLES

The Sciple Sectional Pole Company, Minneapolis, Minn., has brought out some novel designs of steel poles made of various steel shapes to form a strong though light and symmetrical framing for railway and transmission lines. The type shown in the accompanying illustration is composed of three sets of steel angles, the abutting ends of which are received by a recessed cast spool. The angles and spool are held in place by a band slipped over the spool and longitudinal angles. At the top the converging angles enter a recessed cap. The rigidity of the pole is maintained by an inside turnbuckle tie rod extending from the base to the cap. These poles are practically steel towers, and as such they can be designed to meet any conditions of load and wind strain. They can be erected with very little apparatus, as the joint provides a strong connection without bolts or rivets. The ordinary types of cross-arms may be attached to this pole with clevis bolts, but the manufacturer is prepared to supply the special design shown. The weight of the latter cross-arm comes squarely upon the top instead of on the side of the pole.



Parts and Assembled View of Sectional Steel Pole

REMARKABLE SUCCESS OF UNUSUAL THERMIT RAIL WELDS

The Electric Railway Journal of June 27, 1908, contained a detailed description of some novel thermit rail welding done for the Union Railway Company, of New York. This work consisted in making 125 welds on a very shallow rail used in asphalt paving on and near the Central drawbridge at West 155th Street and Sedgwick Avenue, New York. During the following August the Goldschmidt Thermit Company also welded in its factory a number of compromise joints between the shallow bridge rail and the standard girder rail used at the approaches.

As both types of welds were of great interest in proving the adaptability of the thermit process for unusual conditions, it was determined recently to inspect their service behavior in company with J. D. Kent, chief engineer of the Union Railway Company. This investigation

showed that every weld was perfect. In fact, Mr. Kent stated that not a single defect had appeared since the original installations. The only change that has been made was required by the transfer of the eight lift pieces from the bridge to the roadway. Lorain guides are used at the drawbridge ends to prevent the flanges of jumping car wheels from tearing up the asphalt.

A NEW GROUNDING DEVICE FOR LIGHTNING ARRESTERS

Much attention has been given by electric railways to providing efficient lightning arresters for the protection of transmission lines, but not so much attention has been given to improved methods of conducting high frequency lightning discharges, as well as low-voltage battery current, to the ground. The Delta Electric & Manufacturing Company, Chicago, Ill., has developed the Universal non-inductive ground, which, it is claimed, possesses many advantages over the grounding devices commonly used. The Universal non-inductive ground consists of a cast-iron screw point covered with a copper coat. It can also be made of solid copper. The screw point, which is illustrated, can be made in any size desired, and is so constructed that it may be screwed down into the ground by means of a specially devised wrench to moist earth, or to any desired depth. A copper lead of either bare or covered wire is soldered to the screw point for connection to any type of lightning arrester. It is designed to replace the expensive copper plate grounds usually used, and is guaranteed to provide an absolute non-inductive low resistance course to the ground. It can be installed in less than 20 minutes with a nominal cost for labor, and is readily placed in position where the digging of holes is not feasible.



Screw Ground-Plate

STEEL CATENARY BRIDGES FOR ROCHESTER, SYRACUSE & EASTERN RAILROAD

The Rochester, Syracuse & Eastern Railroad, of which Thos. H. Mather is chief engineer, has purchased steel bridges for supporting the catenary trolley construction on the extension now being built from Port Byron to Syracuse. These bridges will be of the same design as the bridges used on the Syracuse, Lake Shore & Northern from Baldwinsville to Phoenix and Fulton. This type of structure was developed from the earlier type used on the Syracuse, Lake Shore & Northern from Long Branch to Baldwinsville. Owing to the recent drop in the price of steel it was found after comparing the cost of the catenary overhead construction complete, using these bridges, with the cost of a similar construction using wooden poles and span wires, that the difference was only about $500 per mile of double-track road, and it was therefore decided to use the bridges.

The bridges are to be set 300 ft. apart on tangents, and on curves the spacing is reduced to 200 ft., and pull-off poles will be used where required. The standard height of the trolley wire is 18 ft., and the bridges are 28 ft. center to center of bents. Wooden pole construction is used on the Rochester, Syracuse & Eastern for about 62 miles of double-track road, and the equipment of steel bridges ordered will be used on the completing link between Rochester and Syracuse. Anchor bridges are placed only where, on account of running into city or village streets, the construction changes from catenary trolley to ordinary trolley. These bridges are to be manufactured by the Archbold-Brady Company at its shop in Syracuse.

CAR WASH DISINFECTANT

Palustrol is a disinfectant made by Fred C. Adams, Chicago, Ill., for preventing the spread of disease. It has been used for several years past by many railway companies for deodorizing and cleansing street cars, railway buildings and other public places. The manufacturer states that when Palustrol is properly used it prevents contagion and leaves a clean and wholesome odor which is more pleasant than that left by coal tar and similar disinfectant products. It is asserted that this disinfectant does not adhere disagreeably to the clothing of people frequenting the places purified by its use. This cleanser is principally an essential product of pine oil, and as such has a pleasant odor. It is actively volatile and evaporates quickly. Since this product is a non-poisonous, non-corrosive preparation, it can be used with impunity. It is used in the proportions of 1 part Palustrol to 100 parts water, and is applied either as a spray or as a wash. In the proportions given, this preparation makes an inexpensive disinfectant, costing less than 2 cents a gallon.

ANTI-FRICTION BRONZE FOR ARMATURE AND JOURNAL BEARINGS

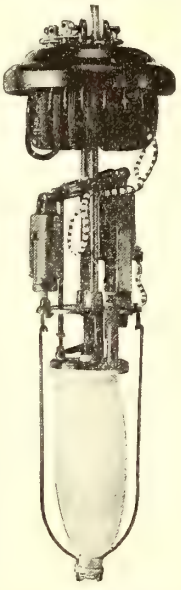
Thomas Paulson & Son, of Brooklyn, N. Y., are planning to exploit on a larger scale than before their anti-friction bronze, which has been used for all classes of bearing service for over 25 years. The company has made a specialty of this alloy, which it states will not cut or otherwise injure the journal nor require as much machining as phosphor or other bronze bearing metals. Special stress is laid on its high tensile and crushing strength, for satisfying the extreme demands of high-speed electric railway service. This composition is now used in many kinds of machine and automobile work with successful results. The company also is prepared to furnish babbitt metals of any desired composition for special purposes. In addition, it conducts a department to do a general foundry business, including the making of all kinds of castings in copper, aluminum, brass, zinc, phosphor and manganese bronze.

SPECIAL LAMPS FOR RAILWAY AND MACHINE SHOP SERVICE

The Clark Incandescent Lamp Company, Detroit, Mich., has brought out an incandescent lamp which is especially suited for cars, machine shops and other places where lamps are subject to severe vibration. The novel features embrace the use of a heavier filament and a thicker bulb. The reinforced filament serves to delay materially the inevitable loss in illuminating power and the stronger bulb is of particular value in situations where wire guards are impracticable. These lamps are made in all standard sizes from 2 cp to 50 cp, inclusive, and with bulbs of any desired coloring or frosting. The finished lamps are divided in two grades, the "Detroit" type representing those which have passed the highest tests, and the "Peninsular," those which have fallen a little short of the mark, although made of the same materials.

AN ARC LAMP FOR 25-CYCLE CIRCUITS

Heretofore the only low-frequency enclosed arc lamp available has been a modification of some lamp designed for higher frequency circuits, such modifications consisting of the use of extra or more flexible springs to take up the extreme vibration of the mechanism. A construction embodying the use of very light springs is decidedly questionable, as such springs must stand the strain caused by the inrush of starting current. To meet the severe conditions involved in the operation of such lamps the General Electric Company has brought out the lamp shown in the accompanying cut. The frame is of the well-known two-rod type, and the mechanism consists of a rocker frame carrying the lamp magnet and a suitable current-adjusting counterweight. The armature is of the standard laminated type construction, but is stationary and held rigidly to the lamp base casting. By the use of this considerable weight in the moving element and by making the armature a mechanical part of the lamp frame, all objectionable vibration is absorbed or deadened, thereby permitting the elimination of all springs. The lamp is said to be as quiet and free from vibration in starting and operating as standard lamps for higher frequencies. Where this lamp is to be operated on 220-volt or 440-volt circuits an external as well as internal compensator must be used, and a third binding post placed on the lamp top. For nominal 110-volt circuits the lamp is self-contained.



25-Cycle Arc Lamp

ELECTRIC CAR VENTILATOR

The General Railway Supply Company, Chicago, Ill., is now placing before a wider clientele the Garland car ventilator, a device which has been extensively used on steam railroads for several years, and more recently has met with favor on some large electric railways. This ventilator was designed by T. H. Garland, general agent of the



Ventilators on Chicago Railways Company Car

refrigerator service of the Chicago, Burlington & Quincy Railroad at Chicago. It is constructed upon the aspirator and injection principle, and is made of No. 24 galvanized iron. It is 30 in. long and 18 in. wide, and is formed to fit the curvature of the roof. Two flaring ducts, one opening toward the front and one toward the rear of the car are provided with each ventilator. These lead into a main exhaust duct, one end of which opens through a deck window into the car and the other toward the edge of the roof.

The action of the ventilator is governed by the motion of the car. When the car is running, air is forced into the forward flaring duct and is directed by its sides towards the outer opening of the main exhaust chamber. In passing through this chamber a partial vacuum is formed



Section of Roof Ventilator and View as Installed

and the vitiated air is drawn from the top of the car, and in turn is carried to the outer end of the duct. The current of the outside air in passing over the mouth of the main duct also forms a partial vacuum at its outer end, and likewise sucks the air from the inside of the car.

In order to replace the vitiated air drawn out, intake ducts are placed at the corners of the car. The air from these ducts is carried to small diffusing drums which are constructed around electric heaters under the car seats, by means of which the air is warmed. Four intakes are also provided in the floor near the center of the car. These connect with air-gathering ducts which are located under and at the sides of the car. The air entering through these ducts is directed to the heaters, through which it passes and is diffused. By this method no cold air is distributed inside of the car and no drafts are created.

Tests made on street cars show that each ventilator will exhaust about 100 cu. ft. of air per minute. The manufacturer recommends that three of the standard-size ventilators be installed on each side of the monitor deck and two smaller ones be placed in each vestibule. By this arrangement from 50,000 to 60,000 cu. ft. of air per hour is exhausted. The intake ducts will supply an ample quantity of air for all requirements of ventilation.

The new cantilever bridge over the East River at Blackwell's Island, connecting New York and Queens, was opened for traffic on March 30. The bridge cost $20,000,000 and has a main span 1182 ft. long; its total length, including approaches, is 7636 ft. Four trolley tracks have been built on the roadway deck and two elevated tracks above. The carrying capacity is estimated to be 125,000 passengers per hour.

The Keihan Electric Railway is building the third and longest electric railway in Japan. Its object is to link the former capital of the country, Kyoto, with Osaka. The total length of the new line is 30 miles, with a double track throughout its entire length, and the generating plant has a total power of 2550 kw, made up of three 850-kw turbo-generator sets. The electrical work is being done by Dick, Kerr & Company. The turbines are being built by Willans & Robinson, and the boilers by Babcock & Wilcox. The cars are being built. The line is to be standard.

LONDON LETTER

[*From Our Regular Correspondent.*]

As stated in the Electric Railway Journal recently, the Board of Trade has communicated with the various municipalities and companies operating tramways, advising them to equip their cars with speed indicators, but not compelling them to put an indicator on each car. The Tramways & Light Railways Association has taken up this question with the Board of Trade, and is desirous of securing information as to experiments with indicators, as from results already obtained the association does not consider that any satisfactory speed indicator has yet been produced. The association states also that the recommendation of indicators in the old "steam" days was practically a dead letter, and that, considering the enormous number of passengers carried annually and the few fatal accidents, no case has been established for the adoption of the instrument. The objection is also made that the indicator would only increase the burdens of drivers.

An interesting paragraph in a London contemporary calls attention to the number of pennies handled by the London County Council Tramways in a year. The figure is put at 200,000,000, giving an average of more than 500,000 a day. The British penny is a large coin, and as only one-quarter to one-half of those collected are returned to passengers, the Council has to deal with about four tons of metal in the shape of coins, for the banks will not take them. Consequently, a special department has had to be arranged, whose duty it is to find customers for the coins. This department packs them in parcels of 5 shillings each and delivers them by vans to various customers, chiefly large manufacturers, all over London.

The municipalities of Scotland are stirred by the fact that the North British Electric Power Syndicate has entered into arrangements with various railway companies for way-leaves for cables, the intention of the syndicate evidently being to transmit power from one or more generating stations to factories and works in the vicinity of the various railways. A deputation sent to the Board of Trade was received by Mr. Tennant, Parliamentary Secretary to the Board, who replied that he thought Glasgow was unduly alarmed, but gave no indication as to what his department was prepared to do, remarking that he thought it extremely improbable that any unauthorized body was likely to compete against the municipalities. He suggested, also, that a test case might be made to decide whether railway companies were entitled to authorize the use of their lines for electric cables.

The surface contact system does not appear to be increasing in popularity in England. Wolverhampton and Lincoln may be said to be the only examples which are working satisfactorily. Wolverhampton has quite a large system, and from the annual reports the difficulties there seem to have been overcome, and the system works well, whether as economically as an overhead system it is a little difficult to say. The short system at Lincoln is also satisfactory, but nowhere else does the surface contact seem to have approached satisfaction. Last year it was removed from the Wexborough lines, and in the annual report of the Hastings Tramways the possible dividends of the shareholders have all gone to the maintenance of the two or three miles of Dolter surface contact system which the Hastings Tramways was compelled to install on the front, as the corporation would not permit overhead construction. The Dolter system is also in Torquay, and the Board of Trade has refused to sanction any further extension of the system and is seriously considering whether it will not shortly be compelled to ask that the system be removed. The extension to Paignton will be equipped with the overhead system. As has been frequently noted in these columns, the experiments made by the London County Council on the Bow Road with the surface contact system has not proved satisfactory. The system is not in regular operation, and Mr. Mordey, the expert retained by the Council to report, has been experimenting after midnight with a car equipped with a special condenser to try and obviate the faults.

The London United Tramways, which operates a large system in the western suburbs of London, has suffered a considerable loss in revenue recently. Eight or ten years ago, when the company was started, 8 per cent dividends were paid on the ordinary shares of the par value of £10, but which changed hands freely at £20. For the past few years no dividend has been paid on the ordinary shares, and this year the dividend even on the preferred shares has been reduced to 3¾ per cent, so that the ordinary shares now stand at about £2. The reasons for such depression are, of course, complex, but are ascribed largely to the increased competition of the motor omnibus, the improved services on the old railways and the newer services on the tubes. The year just ended was anything but satisfactory. Even the Franco-British Exhibition seemed to take away the pleasure traffic which the company has enjoyed in other years. The divisible balance for dividends was only £61,500, compared with £71,700 in 1907 and £92,000 in 1906.

For the last two years or so Oxford has been discussing tramway problems, but no substantial progress seems to have been made. Some little time ago, as the situation seemed to be hopeless, Sir Alexander Kennedy was consulted on the subject, and he has now presented a long report to the City Council with regard to the Oxford Tramways. The dispute centered around surface contact systems, all of the various surface contact companies having presented propositions. Sir Alexander has stated most definitely that he does not think it would be advisable to adopt any one of these systems for Oxford. He advises the City Council to oppose the present bill which the company has in Parliament, and suggests that the corporation get the undertaking back into its own hands and inform the company that the Council is willing to compromise on the question of conduit and overhead systems. Nothing definite has been decided.

The annual official audit by the Local Government Board of the accounts of the London County Council has just been presented to that body for discussion. Dealing with the tramways, the auditor states that they appear to be worked on a very sound financial basis, and that adequate provision seems to be made for all contingencies which are likely to arise. This is in direct contradiction to the view taken by Messrs. Peat and Pixley, which was reported in the Electric Railway Journal last year, and which stated that the London County Council had lost enormous sums in the tramways, a view with which no one else seemed to agree. The present report shows that the receipts of the tramways were more than £1,250,000 during the year, and as the expenditures were less than £750,000, there was a surplus to the credit of net revenue account of over £550,000. The capital expenditures during the year were £3,260,983, and in the discussion on the report Sir John Benn clearly stated that if more money had been spent the necessity for raising the rate recently would have been avoided, as more money would have been earned. The delay alone in electrifying the Mile End Road Tramways, where the experiment with the surface contact system was tried, accounted for a loss of £333,000. A special meeting of the Council is to be held in April to discuss whether the 5½ miles of tramways in Hammersmith (now operated and owned by the London United Tramway Company), in accordance with the provision of the Tramways Act of 1870, shall be purchased.

A. J. J. Pfeiffer, late general manager of Calcutta tramways, who has just returned from India, has opened offices as consulting engineer at Broad Street House, New Broad Street, E. C. Mr. Pfeiffer has had wide experience in traction work, electric light and power transmission in America, India and on the Continent. Among other important undertakings with which he has been connected are the Niagara Falls transmission undertaking and the equipment of the Milan-Varese third-rail high-speed electric railway.

A. C. S.

The benevolent society organized in July, 1900, by the Grosse Berliner Strassenbahn to care for aged employees of the company and for the widows of former members has now 6810 members and a fund of 6,959,594 marks. The report for the year 1908 shows: Income from dues, 381,566 marks, from the company 435,322 marks and from interest 264,485 marks. Since July 1, 1905, when pensions were inaugurated, 165 employees and 44 widows have become beneficiaries. It was decided that after Jan. 1, 1909, the maximum pension should be increased from one-fourth to one-third of the wages on retirement, in accordance with the Government pension law. At the end of the fiscal year the sick benefit society had 10,293 male and 41 female members. This society employed 81 male physicians, 3 female physicians and 55 specialists. There were 7429 cases, with a total of 104,957 sick days. Free medical service and medicines are also given up to a maximum period of 26 weeks to the wives and children of the members. Injuries caused in service involved 658 members for 13,606 sick days. The income of the society from dues, including the balance from the preceding year, was 499,239 marks; from contributions for the care of relatives, 37,008 marks; from interest, 13,895 marks, with additional amounts from other sources, making a total of 600,980 marks. After deducting all expenses there was a surplus of 22,215 marks, of which 10,140 marks was turned over to the reserve fund, which now totals 374,700 marks. A fund is set aside for relief of indigent employees. During 1908 relief was given in 70 cases at a cost of 2761 marks. The employees of the company also had a loan society, which numbers 7800.

News of Electric Railways

Cleveland Traction Situation

A meeting of the Council committee of the whole was held on March 29 for the purpose of considering the street railway ordinance introduced on March 22. Mayor Tom L. Johnson presided. After reviewing the matter at some length, and stating that the ordinance merely presented a plan upon which to work, and was not the particular plan of any one so far as details are concerned, he said that the plan is to use the ideas suggested by Judge Tayler and to find some way of putting them into operation. Mr. Johnson then said it was not his purpose to enter into a long discussion, but that he would like to hear from the officers of the Cleveland Railway.

Horace E. Andrews, president of the Cleveland Railway, spoke for the company. He said that he and his associates had spent a week studying the matter, and that they are in favor of the Tayler plan. He said, however, that there are some differences of opinion as to the manner of carrying out the plan, and that Attorney John G. White had been requested to prepare an ordinance which would embody the details that would be favored by the company. Mr. White, however, did not act as the attorney of the company in this matter, but prepared the ordinance largely upon his own convictions. To a large extent it follows the wording of the ordinance prepared by City Solicitor Baker, and differs only where Mr. White felt that revision was necessary.

The White ordinance makes the maximum fare 5 cents, or 6 tickets for 25 cents, while the Baker ordinance provides for 7 tickets for 25 cents. This change was the source of considerable discussion. Mr. Andrews said that he felt that the maximum fare should be such as to attract money, and that the lower maximum fare would not have the same attraction as the higher one. So far as the officers are concerned, he said, the rate of fare does not make any difference, as they are assured 6 per cent on the investment for their stockholders. Because the city administration is reasonably sure that the maximum fare will not be necessary to produce that percentage of profit, Mr. Andrews said he believed that it would not make any material difference what the figure is for the maximum charge. However, the higher it is placed the easier it will be to secure money for improvements and extensions. He said that necessity demands that several million dollars be spent on the property at once and that $1,000,000 a year will be required after the first improvements are made in order to keep pace with the growth and necessities of the city.

The initial rate of 3 cents in the Baker ordinance, Mr. Andrews said, is too low to pay expenses. He said it would be better to make a figure that would produce the amount needed instead of having to make it up later. Mayor Johnson suggested that the fare in the ordinance must not be placed so high that the people will not vote for it on a referendum vote. Both Mr. Andrews and Mayor Johnson believe that the stock will have to be sold in Cleveland. The former said he had sounded several Eastern financial men, but did not receive much encouragement. He is of the opinion, however, that they would take bonds if the company is given a franchise that would protect the property.

Some of the Councilmen objected to capitalizing the deficits made during the past six or eight months; but Mayor Johnson said this is so small that the interest charges would be increased very little thereby. He stated that several million dollars of the earnings of the company in the past have been used in betterments and extensions and that the small amount of water injected into the stock in this way has been, or will be, offset. He said that the company should start with a clean slate as far as possible. Along this line Mr. Andrews said he thought that the debts of the company would have to be paid from the earnings.

Relative to the probable fare required for the future Mr. Andrews said that he believed the rate will be higher than at present, from the fact that some roads have already been compelled to increase their fare. The Public Service Commissions in New York, he said, have adopted a system of accounts which shows clearly that in some cases money that should have been set aside for depreciation has been paid out in dividends. In order to comply with the requirements of the commissions and still pay fair dividends, he said that there would not be much opportunity to reduce the rate of fare on any of the roads. In the year that the commissions have been at work they have required no company to make a reduction, but, on the other hand, have instructed some of the companies to increase their charges.

Mr. Johnson said that after the profit of 6 per cent is assured the officers are likely not to care whether the fare is reduced, and might desire to increase expenses rather than to reduce them. For this reason the Mayor thought that close supervision should be maintained.

A representative of the labor organizations stated that objection had been made to the clause limiting the wages of motormen and conductors to an average of the wages paid in Pittsburg, Buffalo and Detroit. He also said that the rule that only motormen and conductors in uniform would be allowed to ride free on the cars was an objection. Mr. Andrews stated that both these conditions had been omitted from the White ordinance. He said that if the property was turned back to the company under a new ordinance the company wanted to carry all its employees free of charge and to live up to the contract made in good faith with the motormen and conductors before the lease was signed. He said that he believed in paying the men fair wages and wanted to be free to do so. Mayor Johnson insisted that some rule should be adopted that would not allow the wages to become unreasonable.

One of the hardest points to settle will probably be the manner of supervising the operations of the company through a proposed street railway commissioner. The company desires freedom to take such measures as its officers and directors see fit for the good of the service, without continually seeking favors. The meeting adjourned until April 1.

Subway Proposals in New York

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, addressed a letter to the Public Service Commission of the First District of New York on March 24, in which he reiterated that his company was opposed to the proposed extension of the Hudson & Manhattan Railroad from Thirty-third Street and Sixth Avenue to the Grand Central Station, at Fourth Avenue and Forty-second Street, only because it might interfere with future extensions to the New York subway. Mr. Shonts said that the first level on Forty-second Street is occupied by the present subway, that the second should be reserved for future north and south subways, and that the third level belongs to the Steinway tunnel. He concluded that if the Hudson & Manhattan Railroad is permitted to occupy the second level in Forty-second street all future lines in New York crossing Forty-second Street between Sixth Avenue and Park Avenue will have to be made on the fourth level.

In reply, William G. McAdoo, president of the Hudson & Manhattan Railroad, said that the present line of the Interborough Rapid Transit Company now occupies the second level at Fifth Avenue, the first level having been reserved for a north and south line by the old Rapid Transit Commission. The plan of the Hudson & Manhattan Railroad is to occupy the third level at Fifth Avenue and Forty-second Street, according to Mr. McAdoo. Thus the fourth level could be used by the Steinway Company in extending its line. Mr. McAdoo reiterated that the extension of his road could be built without affecting the operation of the present subway lines.

At a hearing before the Public Service Commission on March 29 it developed that there is a pipe gallery in Forty-second Street that would interfere with the construction of the Hudson & Manhattan Railroad, and that the loop at the terminus of the Steinway tunnel below Forty-second Street and Park Avenue carries the tracks beyond Forty-second Street and into the ground beneath Park Avenue for a distance of 30 or 40 ft. The hearing on March 29 closed with the Interborough Rapid Transit Company agreeing to furnish the commission all the information in its possession relating to the situation around the Grand Central Station in the matter of the pipe gallery and the proposed connection with the Lexington Avenue subway if built in accordance with the plan of the Interborough Rapid Transit Company.

Metropolitan District Railway Meeting

The half-yearly meeting of the Metropolitan District Railway was held in London on Feb. 11. Sir George S. Gibb, chairman of the company, presided. The gross revenue amounted to £261,874, an increase of £37,411, or 16.67 per cent. The working expenses were £153,868, a decrease of £2,201. The company carried 31,503,722 passengers, an increase of 5,694,990, or 22 per cent. The passenger earnings were £243,117, an increase of £38,235, or 18½ per cent. The season-ticket revenue amounted to £22,043,

an advance of £6,691. Of this amount £10,000 could be traced as directly attributable to the traffic to and from the Franco-British Exhibition.

It was stated at the meeting that every company engaged in transporting passengers in London, supported by private capital, was suffering from the unsatisfactory condition of traffic. It was cited that the average receipt per passenger carried by the nine urban railways in London only ranged between 1.45d. on the North London (the lowest), and 2.03d. on the Central London (the highest). Mr. Gibb said that he had received several letters from shareholders suggesting that they should make further increases in their fares. The fixing of fares was a matter of policy. Some years ago some people who had the initiation of policy thought that the encouragement of traffic by very low fares was the way to prosperity. It had proved to be the way to misfortune. The prolonged and unhappy effort to carry on business on the basis of an inadequate price for the commodity supplied was an illustration of the power of a false idea. Mr. Gibb said he was not an advocate of high fares, and intimated that some few individual fares might even require reduction. The circumstances of the moment, he said, must govern the action of the moment, but fares must ultimately be fixed at figures which experience justified. To the correspondents who had been good enough to write him on the subject he must reply that nothing could be done at present, but the result of their experience on the District might gradually have its effect.

Investigation of Kansas City Railway

In accordance with the offer of the Metropolitan Street Railway, Kansas City, Mo., to place its books and records at the disposition of the city for the purpose of ascertaining the exact conditions which govern street railway operation in Kansas City, the City Council and the City Utilities Commission have retained Arthur Young & Company, Chicago, Ill., to prepare a report for them and have instructed Arthur Young & Company to ascertain:

Actual money expended by the Metropolitan Street Railway for its physical properties, betterments and equipment and actual development of system. Amount of bonded debt, preferred stock, common stock and other borrowed money, if any. Amount of gross income and sources of income and the disposition of same, whether it is for depreciation, repairs, betterment, extension, interest, dividends, damage to property or persons, or other purposes. Amount of so-called fixed charges and operating expenses and what constitutes the fixed charges and the operating expenses and all other data, facts and figures necessary for this committee to know, ascertaining the gross income and net income, and what would be a proper or necessary amount or per cent of the receipts to set aside for maintenance and repairs of system and necessary per cent to cover renewals and depreciation, so as to establish a fund to provide equipment and accommodations that will insure comfort, convenience and service for the public and such other and all other information as the expert accountant may deem necessary, or that the commission may from time to time recommend.

Twin City Rapid Transit Company Bulletins.—The Twin City Rapid Transit Company, Minneapolis, Minn., has published in pamphlet form the series of 27 full-page advertisements comprising a history of the Minneapolis Street Railway from 1873 to 1908. These advertisements were abstracted in the issues of the Electric Railway Journal for January and February, 1909.

Manila Strike Called Off.—The strike and boycott by the employees of the Manila Electric Railroad & Light Company, Manila, P. I., was declared off on March 25. The men quit work on March 4, demanding an increase in pay and a readjustment of the hours of labor. Non-union Filipinos and Americans were engaged at once to man the cars under a strong police force, and as stated on page 480 of the Electric Railway Journal of March 13, 1909, the strike had worn out by March 6. Thus the action of the employees in declaring the strike off was merely a formality which was purposely delayed by the union.

Removal of Offices of Third Avenue Railroad.—The Third Avenue Railroad, New York, has completed the work of renovating and extending its car house at 129th Street and Third Avenue, New York, mention of which was made in the Electric Railway Journal of Jan. 9, 1909, page 80, and has removed its offices to the remodeled building from the car house at Sixty-fifth Street and Third Avenue. The building contains the general offices of the Third Avenue Railroad and the Union Railway and the offices of the heads of the engineering department and the claim department. J. S. McWhirter, superintendent of car equipment of the company, retains his office in the barn at Sixty-fifth Street and Third Avenue. A feature of the building is a clubroom for the exclusive use of employees of the company, which contains billiard and pool tables, chess and card tables, a small library and other equipment, to retain the attention of the men and afford them recreation when they are off duty.

Missouri Electric Light, Gas & Street Railway Association.—Arrangements are now being made for the third annual meeting of the Missouri Electric Light, Gas & Street Railway Association, to be held on April 15, 16 and 17 at the Colonial Hotel, Springfield, Mo. The program this year calls for several long sessions, and a very interesting list of papers has been prepared for presentation and discussion. The convention will be called to order at 10 a. m. on April 15. The address of welcome will be responded to by W. B. Hays, president of the association, after which Mr. Hays will address the association. The program for the morning will be concluded with an executive session. The convention will reconvene at 1:30 p. m. for the presentation and discussion of the papers "Insurance and Public Service Plants," by C. W. Hough, and "The Tungsten Lamp from the Central Station Manager's Standpoint," by Paul J. M. Loewe. On April 16 the session will be opened at 9:30 for the presentation and discussion of the paper "Equitable Rate Making," by C. W. Hough. At the session in the afternoon, which will be called at 1:30 p. m., these papers will be presented and discussed: "The Value of an Engineering Equipment Station," by Prof. H. B. Shaw; "Some New Features of High Tension Transmission," by O. Wiemer. The banquet will be held at 7:30 p. m. on the evening of April 16. On April 17 the session will be opened at 9:30 a. m. Two papers, "Office System and Accounting," by N. J. Cunningham, and "Building of the Day Load," by E. L. Callahan, will be presented and discussed. There will be an executive session at 1:30 p. m. on April 17, after which the delegates will visit the power plant of the Springfield Gas & Electric Company.

Annual Convention of Arkansas Association of Public Utility Operators.—The second annual convention of the Arkansas Association of Public Utility Operators will be held at Hot Springs, Ark., on May 12, 13 and 14. The headquarters of the association will be at the Arlington Hotel. The session of the association on May 12 will be opened at 10 a. m. for the registration of members and friends. The meeting will be formally called to order at 11 a. m. At the morning session, the minutes of the previous meeting will be read, applications for membership will be balloted and reports of the executive, finance and by-laws committee and of the secretary and treasurer will be presented. At the afternoon session on May 12, the president of the association, D. A. Hegarty, treasurer and general manager of the Little Rock Railway & Electric Company, will present his address. The following papers have been announced for presentation at the meeting, but the exact program has not yet been arranged: "Relation of Operation of Public Utilities to Public," by J. M. Hewitt, general manager, Mariana Electric Lighting Company; "Filtration Modern Water Supply," by S. A. Stearns, manager, Home Water Company, Little Rock; "Gas Man—His Troubles," by B. C. Fowles, general manager, Pine Bluff Corporation; "Use and Abuse of Street Railway Transfers," by C. J. Griffith, general superintendent, Little Rock Railway & Electric Company; "Tungsten Lighting," by J. E. Cowles, superintendent, electrical department, Little Rock Railway & Electric Company; "Damage Suits," by S. E. Sawyer, attorney, Hot Springs Street Railway; "Question Box," by W. H. Walkup, superintendent, Searcy Light & Power Company. Arrangements have been made by the Business Men's League of Hot Springs to entertain the delegates and ladies, and the prospects now are that there will be a goodly number of representatives of public utility corporations in attendance. The progress of the association during the past year will be reviewed during the course of the convention.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The most important work of the session is now in progress, for hearings are being held on the proposal to create a public utilities commission of three members in accordance with the report presented by the special committee on corporations appointed by the General Assembly of 1907. Those in favor of the measure were heard on March 24. The opposition was heard on March 25. The hearing on March 25 was not concluded, however, and will be continued on April 1. As the committee has intimated that those in favor of the measure will be permitted to reply, there is no telling when the hearings may be concluded. Ralph O. Wells, secretary of the committee on corporations, which is responsible for the measure, explained its scope and provisions on March 24, and cited the

evils it is intended to correct. He said that it should be borne in mind that the proposed commission is not wholly a new body, as it is intended to supplant the present railroad commission. He laid particular stress upon the fact that under the provisions of the measure the rights sought in many bills that now have to be considered as special legislation could be granted or disapproved by the new commission, thus materially cutting down the length of the session of the Legislature or giving that body more time for the thoughtful consideration of general matters of really significant import to the whole State. Arthur C. Graves, New Haven, for the opposition, on March 25, said that demands for legislation of the kind proposed had recently developed into a kind of hysteria to emulate examples elsewhere, and concluded that sentiment for the bill was largely artificial. Mr. Graves also said that there is much ill-informed talk about overcapitalization and corporation abuses. He concluded with the statement that the bill creates a commission which is at once executive, judicial and legislative, and the enactment of the measure might mean the beginning of the end of the State's constitutional form of government. L. S. Storrs, vice-president of the New England Investment & Security Company and president of the Springfield (Mass.) Street Railway, also opposed the measure. He said that in Massachusetts a bond issue is not permitted until a railway is in operation and that additional issues of stock are not permitted unless dividends are paid. The result, according to Mr. Storrs, is that equipment suffers and extensions are checked. He said that rates of fare are being increased in Massachusetts, whereas rates are somewhat lower in Connecticut, and development has been more rapid recently in Connecticut than in Massachusetts. The committee on railroads has reported unfavorably the following bills: To compel the removal of snow by street railways; to regulate fares on the Hartford & Springfield Street Railway. Both reports have been accepted.

Massachusetts.—The committee on legislative matters has received an estimate from Secretary Beal of the Boston Transit Commission relative to the cost of restoring elevated train service in the Tremont Street subway in Boston, as proposed by a bill now before the committee on mercantile affairs. The Transit Commission reports that the work would cost $55,000, exclusive of the expense which the Boston Elevated Railway would sustain in alterations of track construction and equipment. The Boston Elevated Railway opposes the restoration of the trains on the ground of interference with the present rapid transit service and the reduction in traffic capacity which such a move would impose on the Washington Street tunnel and Atlantic Avenue elevated lines. The House has referred to the next General Court the petition of F. A. Lawler for legislation to require the Boston Elevated Railway to furnish service on Geneva Avenue, Boston. The bill introduced into the House on the petition of E. W. Ross for legislation to restrict the hours of labor of women and minors employed by public service corporations to the period between 6 a. m. and 6 p. m. has been given leave to withdraw by the committee on labor, to which it was referred for hearing. Petitions favoring the discontinuance of the elevated structures on Washington Street, Boston, and the extension of the Washington Street tunnel to the Dudley Street terminal of the Boston Elevated Railway have been referred by the Senate to the committee on metropolitan affairs, which has several subway and local transportation measures under consideration, as outlined in the Electric Railway Journal of March 20, page 524. Three bills relative to the development of electric transportation facilities in the Berkshire district by the New York, New Haven & Hartford Railroad are now before the committees on railroads and street railways, sitting jointly. Hearings have been closed on the Lawrence bills requiring the New York, New Haven & Hartford Railroad to dispose of its stock in the Boston & Maine Railroad and in domestic street railways, to prohibit railroads from acquiring an interest in other railroads, electric railroads or street railways, and to determine the value of stock of consolidated railroads and street railways through a specially appointed commission. The committee on street railways has closed its hearings on the Russell bill relative to the consolidation of properties of the Boston Elevated Railway and the West End Street Railway, and on the Elder bill authorizing the Boston Elevated Railway to extend its elevated lines from Sullivan Square, Charlestown, through Somerville to Medford.

New Jersey.—The Martin public utilities bill was passed by the House on March 24. Opposition to the measure is very strong, and the prospects are that it will be lost in the Senate. On March 25 Mr. Voorhees of Middlesex moved to reconsider the measure, but Mr. Lyons moved to lay the Voorhees motion on the table, and the Lyons motion was carried. Mr. Martin, the author, made a motion to reconsider the Lyons vote just before adjournment, on March 25, but the motion was lost. The measure abolishes the present railroad commission and creates in its place a public utilities commission of four members to be named by the Governor with the advice and consent of the Senate, the salary to be $6,000, except for the chairman, who shall receive $6,500. The term of office is made four years. The commission is empowered to appoint all necessary officers and is given authority to regulate all street railway traction, canal, express, gas pipe line, oil pipe line, electric light, heat, power, water, sewer, subway, telephone, telegraph and railroad corporations in the State.

New York.—The railroad committee has had referred to it the privileged resolution offered in the Assembly by Assemblyman Goldberg, New York, calling upon the Public Service Commission of the First District to furnish the Assembly within 30 days with a complete report on the commission's investigation relative to the restoration of transfers in Manhattan and the Bronx, and in particular as to what the commission has done regarding the transfer problem involving the Central Park, North & East River Railroad. Carrying out the recommendation of Governor Hughes in a special message to the Legislature, and the suggestions of Attorney-General O'Malley, Senator Mead and Assemblyman Waddell, chairmen, respectively, of the Senate and Assembly committees on taxation and retrenchment, have introduced a bill amending the tax law by making changes in regard to procedure upon return of a writ of certiorari obtained to review a special franchise assessment. The proposed law is designed to facilitate pending litigation involving about $41,000,000 in special franchise taxes. The bill provides that these proceedings shall be taken direct into the Supreme Court for trial without delay, instead of having them referred to referees. A bill approved by the Public Service Commission of the First District of New York has been prepared for introduction which will give that body power to accept the offer of the Bradley, Gaffney, Steers Company, mention of which was made on page 563 of the Electric Railway Journal of March 27, 1909. Senator Cobb has introduced a bill to permit common carriers, railroads and street railways to issue bonds payable at periods of more than one year when necessary for reimbursement of moneys actually expended for purposes for which the corporations are permitted to issue bonds under the present law. The bonds, however, must be issued pursuant to the terms of a mortgage theretofore executed by the corporation with the approval of the proper commission. The bill amends the Public Service Commission law.

Pennsylvania.—With only two weeks remaining of the present session, less than 100 of the more than 1000 bills introduced have reached the Governor, and the prospects are remote for bills getting out of committee, inasmuch as appropriation measures will now have the right of way. Three sessions a day will be the rule until final adjournment on April 15. The following new measures were introduced last week: Prohibiting persons not employees, or not in danger upon the cars of street railways or railroads, from alighting from the cars of any railway while the same are in motion; regulating the use of electricity in cities of the first class; providing for the examination and licensing of electrical contractors and certain electrical engineers; for the supervision and inspection of electrical installations in said cities; for the inspection of places of amusement maintaining electrical machinery or devices making the violations of the provisions thereof a misdemeanor and prescribing the punishment therefor; authorizing and empowering street railways and railroads heretofore or hereafter incorporated to connect their tracks and to interchange their cars, whether passenger or freight; conferring upon street railways and the lessees or operators thereof the right to transport all kinds of freight and property for reasonable compensation. The House has passed finally the bill allowing municipalities of the third class to tax the real estate of public service corporations for local purposes. This bill is being opposed by the electric railways and steam railroads. The House has defeated on final passage the bill making it a misdemeanor to trespass upon the right of way of any steam or electric railway other than upon a public highway. After a public hearing the railroads committee of the House killed the Kiess bill giving the State Railroad Commission the right to regulate issues of stocks and bonds of steam railroads and electric railways. Ellis Ames Ballard, representing the Philadelphia Rapid Transit Company, spoke against the Dempsey bill, requiring electric railways to equip their cars with vestibules and retiring rooms. The committee killed the bill. The Creasy bill compelling electric railways to transport freight has been referred to a sub-committee.

Financial and Corporate

New York Stock and Money Market

March 30, 1909.

After a week of light trading, the stock market yesterday and to-day has shown a revival of interest. The tone, even throughout the days of dull trading, has been strong and prices have advanced almost steadily. These advances have been especially marked in the old favorites which have been the market leaders for the last year. Union Pacific, Amalgamated, Reading, and especially Steel common, have been strong and popular with buyers. Taken altogether, the feeling in Wall Street is very satisfactory. The gross earnings of the railroads are increasing steadily and the increases in net earnings are sufficient to insure a continuance of dividends. The so-called steel war, while not bringing out the business that was anticipated, is not causing manufacturers to lose money. There is no longer any fear that the new tariff law will destroy the profits of the industrial corporations and there is a hope that the new bill will be adopted by the end of the fiscal year and the decks cleared for an active revival of business in the early autumn. The fact that commercial business continues to be light does not mean discouragement.

The securities of the traction companies on Manhattan Island continue to be weak and fairly active. Prices have regained but little of the losses sustained when they broke so sharply a week ago. If any definite plans for reorganization of the Interborough-Metropolitan system have been formulated they have not been announced. That there will be no attempt to delay the foreclosure sales is generally admitted. Just what method will be adopted by the Interborough-Metropolitan Company to protect its holdings in the Metropolitan Street Railway is unknown. Many traders believe that the Interborough-Metropolitan Company has already completed its financial plans.

The bond market remains good and money continues to be plentiful and rates easy. Call money to-day was quoted at 1¼ to 2 per cent, and 90-day loans at 2½ to 2¾ per cent.

Other Markets

In the Boston market, traction securities continue to be of minor importance. Only small lots were offered and prices remain practically stationary. Boston Elevated has been selling at 127 to 129, Massachusetts Electric common at 14½ and the preferred, which has been rather more active than any other traction issue, at 72 to 72½.

Traction securities were fairly active in the Philadelphia market. Philadelphia Rapid Transit and Union Traction especially were bought and sold readily, but price changes were insignificant. The tone of each was strong. At the present time Union Traction seems to be the favorite of the traders.

In Chicago, little was done in traction securities. Small lots of Chicago Railways, series 2, have been sold occasionally and some Subway stock found its way into the market, but there was no particular interest in the trading. Other securities were practically neglected.

United Railways bonds found a good market in Baltimore. The incomes sold at 53½ to 54 and the 4s at 87¼. The funding 5s sold at 79¾. A few shares of United Railways stock sold at 11½, but the trading in this issue was light.

Quotations of various traction securities as compared with last week follow:

	Mar. 23.	Mar. 30.
American Railways Company, Philadelphia	*45¾	*45¾
Boston Elevated Railway	126¼	129
Brooklyn Rapid Transit Company	71¼	76¼
Chicago City Railway	*185	*185
Cleveland Railway	—	—
Consolidated Traction Company of New Jersey	a77½	a77½
Consolidated Traction Company of New Jersey, 5 per cent bonds	a106	a106
Detroit United Railway	*61	*61
Interborough-Metropolitan Company	12	12⅞
Interborough-Metropolitan Company (preferred)	37¾	38
Manhattan Railway	143	*143
Massachusetts Electric Companies (common)	14¾	14½
Massachusetts Electric Companies (preferred)	71	72
Metropolitan West Side Elevated Railway, Chicago (common)	*19	*19
Metropolitan West Side Elevated Railway, Chicago (preferred)	*48	*48
Metropolitan Street Railway	*28	23
North American Company	*78⅜	79⅜
Philadelphia Company, Pittsburg (common)	41¾	42⅛
Philadelphia Company, Pittsburg (preferred)	*42¾	42⅛
Philadelphia Rapid Transit Company	28	28⅞
Philadelphia Traction Company	92½	93
Public Service Corporation, 5 per cent collateral notes	a100½	a100½
Public Service Corporation certificates	a82½	a82
Twin City Rapid Transit Company, Minneapolis (common)	*105	104¼
Union Traction Company, Philadelphia	53⅞	55

a Asked. * Last sales.

Annual Report of Berlin Street Railway

The Grosse Berliner Strassenbahn, operating the street railway system of Berlin, Germany, has recently issued its annual report for 1908. The company had a prosperous year, paying a dividend of 8¼ per cent on a capital stock of 100,082,400 marks, despite a decrease of traffic in the last three months as compared with 1907. The drop in travel was due partly to the industrial depression, notably in the building trades, and to the inauguration of service on some elevated-subway extensions. The amortization fund was increased by 2,007,515 marks and the renewal fund by 2,660,000 marks; the interest on funded debt was 231,689 marks; the profit was 9,946,674 marks. In accordance with the franchise conditions, the company paid to Berlin and other municipalities 2,650,748 marks from its gross earnings, and to the municipality of Berlin alone 889,326 marks from its net earnings. During the fiscal year the company's reserve fund reached the legal point of 10 per cent of the capital, so that no additions will be necessary.

The company settled some important litigation with the city whereby the latter must reimburse the railway for any traffic losses which may be incurred from the opening of the proposed north and south subway. Similarly the municipality will have to make good any losses in traffic which the Grosse Berliner Strassenbahn may suffer through the contemplated operation of municipal cars over the city tracks.

During 1908 the railway carried 397,200,000 passengers, an increase of 5.02 per cent over 1907; the income from passenger service was 37,836,922 marks, an increase of 5.17 per cent; the number of car-kilometers was 90,961,698 (56,396,252 car-miles), an increase of 6.12 per cent; the gross earnings per car-kilometer were 41.6 pfg (17.3 cents per car-mile), a decrease from 42 pfg in 1907. The comparative gross earnings from all sources were 38,496,353 marks, against 36,592,441 marks in 1907, and the comparative total expenditures were 21,569,950 marks and 20,255,066 marks. In 1908 the operating expenses were 56.03 per cent, and in 1907 55.35 per cent of the total income. The expenditure for salaries and wages of the transportation department was 9,593,824 marks, and for all departments 12,707,502 marks. The company spent 739,344 marks for employees' welfare purposes, including old age and invalid pensions, widows' and orphans' funds and sick benefits.

The cost of power was 4,542,794 marks, equivalent to 21.07 per cent of the total expenditures. In 1907 the cost of power was equivalent to 22.47 per cent, and the reduction is ascribed to the introduction of wattmeters on the cars during the latter part of 1908.

The maintenance of way and feeder lines cost 950,549 marks; damages and insurance, 670,724 marks, of which 201,258 marks are held in reserve. The cost of car maintenance was 3,012,758 marks.

During 1908 the total amount of track was increased from 521.7 km to 526 km (326 miles). The total number of cars in service was 2495. The total number of employees was 10,488, of whom 1116 are employed on subsidiary lines. The earnings of these latter lines are not included in the preceding figures on wages and salaries.

Annual Report of London Street Railway

Gross earnings of the London (Ont.) Street Railway in the year 1908 were $235,032, a slight increase over the previous year. Operating expenses were $167,567, or 71.3 per cent of earnings. Of the total expenditure for operating expenses, $41,702 was used for maintenance; this sum is equivalent to 24.9 per cent of the total operating expenses, or 17.7 per cent of gross earnings. The earnings for two years compare as follows:

	1907.	1908.
EARNINGS:		
Passengers	$226,510	$230,866
Miscellaneous	5,867	4,166
Gross earnings	$232,377	$235,032
EXPENSES:		
Maintenance:		
Way and structures	$17,295	$13,574
Equipment	24,279	28,128
Transportation:		
Power plant	32,883	30,125
Car service	65,865	68,845
General	27,703	26,895
Total operating expenses	$168,025	$167,567
NET EARNINGS	$64,352	$67,465
DEDUCTIONS:		
Interest on bonds	$25,000	$25,006
Interest on overdraft	2,229	3,449
Total deductions	$27,229	$28,455
NET INCOME	$37,123	$39,010

In his statement to shareholders, Henry A. Everett, the president, said, in part:

"Your directors met the committee of the city council relative to this matter in accordance with their request on Feb. 6, 1908, but since then there have been no further developments.

"Your directors have great pleasure and satisfaction in being able to state that the sentiment in the community generally is favorable to the company, and it is the constant aim of the management to so improve the service as to merit the good will of the patrons.

"A committee of citizens desirous of obtaining Sunday cars secured the consent of the council to authorize a vote on the matter at the municipal election in January, which resulted in a substantial majority in favor of same.

"Your directors disposed of $50,000 of bonds during the latter part of the year at a very fair price, considering the financial depression and prices of like securities.

"In view of the general decline in business throughout the country we draw your attention with pleasure to the increase in the gross earnings and surplus for the past year. We confidently expect that the coming year will prove quite as satisfactory."

The statistical statement contained in the report, showing various results from 1896 to 1908, inclusive, gives the following for the last three years:

	1906.	1907.	1908.
Gross earnings	$202,911.68	$232,376.59	$235,032.40
Operating expenses and taxes	$159,428.39	$168,024.88	$167,566.72
Expenses, per cent of earnings	78.5	72.3	71.3
Net earnings	$43,483.29	$64,351.71	$67,465.68
Net income, per cent of capital	3.50	6.88	7.10
Passengers carried	5,502,555	6,321,994	6,442,998
Car earnings, per revenue pass., cents	3.67	3.63	3.64
Transfers	860,668	1,039,362	1,062,306
Total passengers	6,363,223	7,361,356	7,505,304
Car earnings per passenger, cents	3.13	3.07	3.07
Car mileage	1,310,483	1,435,993	1,427,353
Gross earnings per car-mile, cents	15.48	16.18	16.47
Operating expenses per car-mile, cents	12.16	11.70	11.74
Net earnings per car-mile, cents	3.32	4.48	4.73
Number of miles of track	31.45	33.25	33.25
Gross earnings per mile of track	$6,451.88	$6,988.77	$7,068.64
Population (city estimate)	44,704	47,769	49,431

Memorandum by Court in Sale of Metropolitan Street Railway, New York

The following memorandum supplements the extracts from Judge Lacombe's decree ordering the sale of the Metropolitan Street Railway, New York, under foreclosure, on June 1, which were published on page 566 of the Electric Railway Journal of March 27, 1909:

"The elaborate provisions proposed as to inventory of the personal property are rejected, not because of the great labor involved in complying with them, but because they seem impracticable and unnecessary.

"The cars will be listed, described and identified by numbers, and so will the larger units of machinery. The annual inventory and the books of the receivers will be open to bidders, who will be given access to all power houses, shops, car and storage barns. Certainly no one will bid for this railroad property without the advice of skilled and experienced engineers, whose inspection of the property and what may be found on it, coupled with the list of cars, etc., provided for in the decree, will give all the information needed for the exercise of an intelligent judgment.

"The suggestion that the bidder should have some security against receivers' disposing of material and supplies at intermediate sale and delivery is not persuasive; the only disposition that can properly be made of them is to put them into the road or its operation. If, for example, the supply of coal runs down during the period and is not replenished the purchaser will not get as much coal as he saw when he made the survey, but per contra there will not be an unpaid coal bill to that extent for him to assume the obligation of paying. If 500 tons of rails are taken from supplies and laid on the yokes, he will get them just the same as if they remained in storage.

"The Central Park, North & East River Railroad objects to having its lease included among the properties sold since it has taken back its road upon non-payment of the rent. That road and also the Twenty-eighth & Twenty-ninth Street Crosstown Railroad and the Fulton Street Railroad are not included for reasons stated in the opinion filed.

"Under the right reserved to the purchaser to refuse to adopt any particular lease or traffic agreement, it is possible that one or more of the leased lines may be thrown off, but the court is unwilling at this stage of the proceedings to permit a complete disintegration of the system. For that reason the proposed clauses providing that on the request of any one interested the property be offered in separate parcels are not approved. To do so would put it in the power of the owners of roads which are now money-makers for the system to take them out of it."

Annual Report of International Traction Company

Gross earnings of the International Traction System of Buffalo for 1908 were $5,056,741, a decrease of $218,087, or 4 per cent, from the previous year. Operating expenses were reduced $267,970, and amounted to 54.2 per cent of gross earnings. No details of the operating expenses are given, but there was appropriated for "depreciation" $403,280, or 7.7 per cent of gross earnings. The appropriation for this purpose was larger than that made in 1907, which amounted to $269,022, or 4.9 per cent of gross earnings. The figures for two years compare as follows:

Earnings:	1908.	1907.	Increase.
Passenger	$5,056,742	$5,272,112	*$215,370
Freight	98,251	103,756	*5,505
Mail	1,818	1,938	*120
Express	2,772	2,606	166
Advertising privileges	36,000	35,166	834
Income from securities owned	606	600	6
Miscellaneous	30,794	28,892	1,902
Gross earnings	$5,226,983	$5,445,070	*$218,087
Expenses:			
Operating expenses	$2,831,469	$3,099,439	*$267,970
Depreciation	403,280	269,022	134,258
Taxes	297,106	284,141	12,965
Total expenses	$3,531,855	$3,652,602	*$120,747
Total income	$1,695,128	$1,792,468	*$97,340
Fixed charges	1,522,837	1,480,208	42,629
Net income for year	$172,291	$312,260	*$139,969

* Decrease.

Thomas Penney, the president, states in his report to stockholders:

"The decrease in gross earnings is the direct result of the general business depression prevailing during the year.

"The high standard of service given to the public has been carefully maintained, and improvements in the equipment and transportation facilities have been made consistently with the established policy of the company. The pay-as-you-enter cars have demonstrated their advantages for quicker and safer transportation and there are now 80 of this type in service. Additional lines will be furnished with this improved equipment during the current year.

"The integrity of the property has been fully maintained. Liberal appropriations were made from income to the fund for depreciation to cover expenditures on account of extensive renewals and replacements of track, paving, rolling stock, and other equipment."

Organization of New York State Railways

The organization of the New York State Railways has been completed by the election of the following directors: W. K. Vanderbilt, Jr., W. C. Brown, E. V. W. Rossiter, John Carstensen, A. H. Harris, Horace E. Andrews, Walter N. Kernan, A. M. Lindsey, and Granger A. Hollister. The directors organized by electing the following officers: President, Horace E. Andrews; vice-presidents, W. K. Vanderbilt, Jr., John J. Stanley, Walter N. Kernan (also general counsel), C. Loomis Allen and E. J. Cook; secretary and auditor, J. C. Collins; treasurer, E. L. Rossiter; assistant treasurer, C. A. Tucker; assistant secretary and general auditor, A. L. Linn, Jr.

The New York State Railways is a consolidation of the Rochester & Eastern Rapid Railway, Rochester Railway and Rochester & Sodus Bay Railway. It has acquired the railway securities heretofore held by the Mohawk Valley Company. The latter company still retains its gas and electric lighting interests. The principal office of the New York State Railways will be at Rochester.

American Light & Traction Company, New York, N. Y.—Emerson McMillin, president of the American Light & Traction Company, in order to correct misapprehension regarding the extra stock dividend to be paid by the company in February, 1910, issued the following statement on March 26: "There is no probability that there will be a change in the policy of the company in the near future in regard to the payment of cash dividends. In fact, a meeting of the executive committee was held on March 25 chiefly for the purpose of reaffirming the policy mapped out at the organization of the company on July 1, 1901. At that time it was the belief and the intention of the board that the company should pay no dividends on the common stock for three years, and then pay 3 per cent and increase the rate 1 per cent per annum until 8 per cent would be reached. After

that to hold the dividend at 8 per cent but pay a stock dividend of probably 10 per cent per annum, indefinitely if the earnings warrant it, the preferred stock always receiving its 6 per cent. The company's earnings have been equal to our estimates, and the executive committee will recommend to the board that a 10 per cent stock dividend be paid in November, 1909, so as to receive the cash dividend Feb. 1, the date for the next increase in amount of cash dividend, the rate remaining at 8 per cent. On present earnings the rate of 8 per cent cash and 10 per cent of stock can be continued indefinitely."

Boston (Mass.) Elevated Railway.—The protective committee of the stockholders of the West End Street Railway is sending to shareholders of the West End Street Railway a report of its findings upon the proposed consolidation of the West End Street Railway and the Boston Elevated Railway. The committee suggests that the merger be carried out by exchange of common and preferred stock of the West End Street Railway into first and second preferred shares of the Boston Elevated Railway of the same par value, instead of $100 par as suggested in the present bill. Both issues should be closed, according to the committee, and dividends made cumulative. The committee also says both the first and second preferred issues of Boston Elevated Railway should be secured by deeds of trust, so that dividends on these stocks shall be the first lien on gross earnings after operating expenses, taxes, interest on such amounts of West End Street Railway and Boston Elevated Railway as at the time of their issue do not exceed the amount of Boston Elevated Railway stock outstanding, together with subway rentals and rentals of lines other than the West End Street Railway, now under lease to the Boston Elevated Railway. Dividends on both issues at the rate of 8 per cent and the division of some $1,317,000 of net free assets of the West End Street Railway among the preferred and the common stockholders of the West End Street Railway are also suggested.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has approved the lease of the property of the Buffalo & Lackawanna Traction Company by the Buffalo & Lake Erie Traction Company for 999 years.

Eastern Ohio Traction Company, Cleveland, Ohio.—Robert D. Beatty, receiver of the Eastern Ohio Traction Company, has made application to the Cuyahoga County Common Pleas Court to sell the Cleveland and Chagrin Falls division of the property under foreclosure, the action being taken under a suit brought by William N. Gates. Some of the bondholders recently organized under J. R. Nutt and it was supposed that a reorganization would be attempted by them. It seems now that there will be competition from others who are interested in seeing the property operated as an entire system, as at present. The receiver states that there is due on bonds secured by first mortgage, $231,854.81, held largely by the Guardian Savings & Trust Company, Cleveland, Ohio, and $116,171.02 on second mortgage, held by the old Dime Savings Bank Company, Cleveland, Ohio. There is also something due on consolidated mortgage bonds and $20,466.66 on receiver's certificates. It is said that the division is not paying expenses and for this reason the sale is asked.

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—The Union Trust Company, Indianapolis, Ind., as receiver of the Indianapolis, New Castle & Toledo Electric Railway, has been ordered by Judge Carter of the Superior Court at Indianapolis to issue receiver's certificates for the completion of the road, limiting the cost, however, to $450,000. The road has been completed for about three-fourths of the distance between Indianapolis and New Castle.

Lehigh Valley Transit Company, Allentown, Pa.—A special meeting of the stockholders of the Lehigh Valley Transit Company has been called for May 26 to consider the authorization of an issue of bonds to the amount of $1,500,000, to take up the floating debt, amounting to about $500,000, and for improvements and extensions.

Norfolk & Portsmouth Traction Company, Norfolk, Va.—At the recent annual meeting of the stockholders of the Norfolk & Portsmouth Traction Company, the directors were re-elected with the exception of A. J. Phillips, who is succeeded by W. G. Jackson. The officers were all re-elected.

West India Electric Company, Ltd., Kingston, Jamaica.—The West India Electric Company, Ltd., has made public its earnings for 1908. The gross receipts were $217,410, as compared with $198,845 for 1907. The operating expenses were $92,040, as compared with $94,805 for 1907. The fixed charges were $49,044, as compared with $46,953 for 1907. The net income was $76,325, as compared with $57,086 for 1907.

Traffic and Transportation

Report of Philadelphia Committee on Transfer Abuse

The complete report of the joint special committee of Councils of Philadelphia, which visited various cities in order to secure information bearing on the local transit problem, has been issued. One part of the report, relating to the abuse of transfers, is as follows:

"The transfer problem is one of the most serious with which the railway managers have to contend, and all agreed that its abuse was great, without offering any remedy.

"Mr. Shonts, of the Metropolitan System in New York, went into the subject at great length. He said: 'I went into the question (of transfers) some time ago and found some very interesting statistics. I was told that the original idea of a transfer was to confine it to one transfer. That was extended by legislation. In September, 1907, 57 3/10 per cent were taking transfers and they were trafficking in them, and while the surface lines had a law passed making that punishable we could not get the courts to convict any person; the law was a dead letter. The average fare ran down from 4.94 to 3.11.' Again speaking of the abuse of the system, he said: 'The privilege is used or abused by a large percentage of passengers to make a round trip to their starting point for a single fare. Many years' experience with transfers on a large system confirms the conditions that the use of transfers to any extent is a constant menace and source of loss.'

"Mr. Sergeant, vice-president of the Boston Elevated Railway, speaking of the transfer system in Boston, said:

"'We have but one fare, straight 5-cent. We have opportunity for free transfers that is altogether too wide for us to live under.' He explained that where possible, transfers were made by agent instead of checks or tickets to minimize the abuse, and stated that the transfer system was terribly abused.

"Mr. Winter, of the Brooklyn Rapid Transit Company, referred to the trading in transfers in that city, saying:

"'The transfer system affords much traffic in saloons, shops, bootblack stands, etc. A friend came down and stopped at his shoemaker's, and said, "I will go down and do some shopping," and the clerk said, "Can I give you a transfer?" "What's that?" "We have these for a good many of our customers." That sort of thing is going on right along.'

"John I. Beggs, president of the Milwaukee system, when asked whether it issued a transfer on a transfer answered emphatically, 'No, sir, that is a crime.' He explained at length how passengers took transfers which they did not intend to use and gave them to their friends, thus defrauding the company of a cash fare from the second passenger. The Milwaukee company issues transfers only when asked for at the time a fare is paid; they are plainly marked 'not transferable,' and the date and hour are plainly punched on the ticket so that if 'correctly issued by the conductors and properly used by the passengers under the conditions they are issued, there would be no abuse.'

"In Pittsburg, also, the transfer must be asked for when the fare is paid, and the same provision is about to be put into effect in Buffalo."

The report states concerning the Cleveland situation:

"In compiling this report it has been found impossible to include any data with relation to the Cleveland situation. Mr. du Pont, the president of the Municipal company, stated that he was unable to answer the formal questions submitted, and in the course of his general examination admitted that the 3-cent fare was an experiment. As the experiment has since failed and the city voted to put the property back in the hands of its former owners, the Cleveland conditions, as your committee found them, throw little light in working out the problems in Philadelphia."

Hearing by Massachusetts Railroad Commission on Fares in Salem

The Massachusetts Railroad Commission held a hearing on March 24 on the petition of the Mayor and the City Solicitor of Salem for a reduction in fare on the Boston & Northern Street Railway between Salem and Boston. The city was represented by Acting City Solicitor Quinn and the company by its attorney, Bentley W. Warren, Boston. Mr. Quinn contended that the existing fare of 20 cents between Salem and Boston is unreasonable. Mr. Warren stated that the company made no promise of a 5-cent fare on this line between Salem and Lynn. The distance from Town House Square, Salem, to Scollay Square, Boston, is 14.713 miles. The 20-cent fare applies from any part of

Salem to Boston and from any part of Beverly, beyond Salem, to Boston, from which through service is maintained.

Mr. Warren said that simply because a few persons wanted a lower rate did not lay the burden of proof of the reasonableness of the existing rate on the company. The Boston & Northern Street Railway serves a population of 700,000, every one of whom would be glad to require the company to prove the reasonableness of any rate which is not accepted as the limit of cheapness. It is true that by patronizing the Loring Avenue line through Swampscott and Lynn, and using transfers, one can go from Salem to Boston for 15 cents, but this condition is the result of local consolidations, is not a through fare, and the rate of 15 cents is in existence on a route patronized by only a few people.

The through line from Salem to Boston was built at great cost to provide fast through service, in large and expensive cars, and is very generally patronized in the travel between the two cities. The company could not afford to maintain this line on a lower fare. The present rate figures 1.25 cents per mile, which is very reasonable. Some of the rates on the Boston & Northern Street Railway are too low, as a result of local conditions and consolidations, and if the absurd rates now in force on some parts of the system were applied generally the company would go into a receiver's hands inside of six weeks. As long as the public is not inconvenienced it should make no difference how and where the units making up the through fare are collected. The company is just beginning to recover from the effect of the industrial depression, and a review of the condition of the company as a whole shows that a reduction is out of the question if the credit of the company and its ability to serve the public are to be preserved. Attention has been called to the heavy riding on Sundays and holidays as an evidence that the line pays a large return. The commission should consider the traffic on the other 300 days of the year. Mr. Warren concluded by offering to supply the commission any data it desires bearing on the case. The commission took the matter under advisement.

Hearing on Side-Door Subway Cars in New York

The hearing on the operation of side-door trains in the New York subway was continued before Commissioner Eustis of the Public Service Commission of the First District of New York on March 25. The Interborough Rapid Transit Company was represented by A. A. Gardner as counsel and Frank Hedley, vice-president and general manager. Bion J. Arnold, consulting engineer to the commission, and Geo. A. Damon, who was in charge of the tests with the side-door train for the commission, were in attendance. Mr. Arnold's report to the commission covered the period of operation of the train from Feb. 16 to Feb. 27, when it was withdrawn to make some minor alterations proposed by Mr. Arnold. During the 10 days the train was in operation it made more than 115 trips and according to Mr. Arnold, fulfilled in a degree greater than he expected, the requirements for which it was designed. Mr. Arnold said in his report that the public being unfamiliar with the cars caused much confusion and that the guards and station men in general did not seem to know what was expected of them in handling the train. He said that despite these difficulties the data which were collected by the inspectors of the commission, and the observations which he made while riding on the train support the following conclusions:

"1. Although the train often carried from 25 to 40 per cent heavier load than the trains immediately preceding and following, the duration of the stops at the principal express stations was no longer than the other trains and very often was much less.

"2. When the trains were heavily and equally loaded the side-door train demonstrated its ability to save from 10 to 15 seconds of the time required by the trains of regular cars.

"3. The public readily learned to go in one door and leave by the other with a surprisingly small amount of confusion.

"4. The conflict between the leaving and entering passengers was entirely eliminated."

As mentioned in the Electric Railway Journal of March 27, Mr. Arnold recommended that when the side-door cars are again put in operation the eight cars now ready be put into service in eight separate trains, thus giving the public an opportunity to become accustomed to their operation.

Mr. Arnold said that there was an inspector of the commission on the side-door train, that there was an inspector on the train preceding the side-door train and one on the train following the side-door train and that inspectors of the commission were detailed to the principal stations to make observations. Mr. Hedley said that he did not agree with Mr. Arnold as to the efficacy of the train, and asked to be permitted to inspect the figures of Mr. Arnold for the purpose of reconciling them with statistics which he had prepared. Mr. Arnold agreed to this and the hearing was adjourned until April 1. Mr. Hedley said that he would prefer in the meantime not to operate the train. There was no objection to this by the commission.

Indiana Commission Asks for Rules Governing Employees

The letter addressed by the Railroad Commission of Indiana, under date of March 22, 1909, to the electric railways of the State asking for information regarding the requirements of applicants for employment and the method of instructing employees in their duties and enforcing rules, follows:

"The Railroad Commission of Indiana, through formal reports made to it, and from its official investigations, is advised that a large proportion of accidents upon the electric railways is caused by the failure of employees to obey standard operating rules or special instructions in force for the same movement of trains. To the end that the commission may have all attainable information regarding methods used in examining applicants for employment, in instructing employees regarding rules and their duties under them, and the systems adopted for enforcing observance of said rules, it requests of you the following statements, with full explanation thereof:

"A statement showing, as to each of the following classes of employees, namely, conductors, motormen, towermen, telegraph operators, train dispatchers, any other employees engaged in operating trains, what examination or inquiry, if any, is made previous to their employment in or promotion to such positions, as to their mental and physical capacity, their experience, habits and general fitness for the proposed employment.

"A statement showing what steps are taken to require of each employee a competent knowledge of the operating rules governing his duty and conduct as such employee.

"A statement showing what examinations or investigations are made from time to time, either regularly or otherwise, to keep informed as to whether employees of the said several classes are familiar with the rules and instructions governing their duties and conduct, and what measures are taken to improve the effectiveness of operating rules from time to time and their applicability to disclose accident situations.

"What record, if any, is kept of violations of rules and instructions committed by any of the aforesaid employees?

"What system of rewards or other method of recognition is adopted, as an inducement and encouragement to employees to become proficient in the rules and to render faithful service?

"Any other information which may, in the opinion of the chief operating officer of each of said railways, be of use to the commission in investigating the causes of accidents so far as the latter result from neglect by employees or nonobservance by them of rules and instructions."

Schenectady Railway Denies That 5-Cent Fare Is Unjust or Unreasonable

The action of the Schenectady (N. Y.) Railway in discontinuing the sale of six tickets for 25 cents on the city lines, leaving the rate of fare 5 cents beginning on March 1, was followed by a complaint to the New York Public Service Commission, Second District, by a committee of citizens. After this complaint had been made, an answer to the various charges which it contained was filed with the commission by E. F. Peck, general manager of the Schenectady Railway. This answer is as follows:

"The defendant, answering the complaint herein, denies that it availed itself of certain franchises, rights and privileges as provided for in an ordinance adopted by the Common Council of the city of Schenectady on May 28, 1907, notably laying double tracks on Park Place and Nott Street, but alleges the fact to be that an additional track was laid on said streets by said company by virtue of and in accordance with the terms of its original franchises granted to said company prior to the adoption of said ordinance by said Common Council, and further alleges that the aforesaid ordinance was of the nature of a proposed contract between the city of Schenectady and the Schenectady Railway, but that said contract was never executed by the said railway company, was never consummated and never became effective, and that by reason thereof said railway company did not accept or avail itself of any of the proposed privileges or franchises therein contained.

"Defendant denies that the rate of fare of 5 cents charged by it for local service is unjust or unreasonable.

"Defendant denies that the rate of fare now in force between Albany and Schenectady and Schenectady and Troy is unjust and unreasonable.

"Defendant denies that its service is inadequate, but believes that the service rendered by it is as good as can be given, taking into consideration its track facilities and the other attendant conditions. Defendant refers to its tariffs, timetables and schedules on file with the commission and prays leave to refer to same with the same force and effect as though included in this answer.

"Defendant denies that its passenger station is inadequate.

"Defendant denies that it maintains a mechanical apparatus on State Street, Schenectady, in front of its waiting room without permission from the city. It alleges that it has permanently discontinued the use of such apparatus, and that whatever alleged detriment to the service has been caused thereby has been removed.

"Wherefore, the defendant asks that the complaint herein be dismissed."

Rear Cars for Women in Hudson River Tunnel

The Hudson & Manhattan Railroad, operating the tunnel under the Hudson River between New York and New Jersey, has issued the following notice:

"Beginning March 31, 1909, and continuing until further notice, the rear car on every train leaving Hoboken for New York between the hours of 7 a. m. and 9 a. m. and leaving Twenty-third Street and Sixth Avenue, New York, for Hoboken between the hours of 4:30 p. m. and 7 p. m. will be reserved for the exclusive use of ladies.

"This is an experiment which the management hopes will prove successful in practice, and which it reserves the right to terminate if it should be found to work unsatisfactorily.

"Uniformed porters wearing red caps, will be found on the platforms at the Hoboken Terminal and at the Twenty-third Street and Sixth Avenue station, New York."

In explanation, Wm. G. McAdoo, president of the Hudson & Manhattan Railroad, said:

"We believe that progressive railroad management demands that new problems, as they arise, should be met and solved rather than be disregarded or postponed. When the suggestion about separate cars for women was first made we doubted its practicability. After careful consideration, however, we have become convinced that it ought to be tried in actual practice. We are heartily in favor of anything which will make it more comfortable for women and children, particularly those who have to use crowded public utilities, and we hope that the result of our experiment will demonstrate that the plan is not only practicable, but that it will accomplish the desired purpose."

The Public Service Commission of the First District of New York at its meeting on March 26 adopted a complaint order requiring the Interborough Rapid Transit Company to answer within 10 days the complaint of the Women's Municipal League that inadequate accommodations are provided by the company for women passengers in the subway and to show cause why the rear car of each express train should not be reserved for women as suggested by the league.

Limited Service Between Toledo and Fort Wayne.—On April 1 the Ohio Electric Railway, Cincinnati, Ohio, will establish limited service between Toledo and Fort Wayne, the same date that has been set for beginning the Toledo-Dayton service.

No Special G. A. R. Rates.—At a meeting of the representatives of the traffic departments of the electric railways in Indiana, held at Cleveland, Ohio, before the meeting of the Central Electric Railway Association on March 25, it was deemed advisable not to make any reduction in rates to the G. A. R. Encampment at Crawfordsville, Ind., on May 19 to May 21, 1909.

Special Excursion Fare Over Ohio Lines.—At a meeting of the representatives of the traffic departments of the electric railways of Ohio, held in Indianapolis on March 13, it was recommended that a rate of one and one-half the first-class fare for the round trip be made to Newark, Ohio, good going June 14, 15, 16, 17 and 18, and returning up to June 19, from all points north, south and west of Dayton, Ohio, and north of Urbana and Mansfield, all tickets to be marked excursion, and that the excursion fare shall not in any case be lower than the regular round-trip rate from Dayton, Urbana and Mansfield to Newark.

New Indiana Law Does Not Apply to Interurban Railways.—Charles B. Riley, secretary of the Railroad Commission of Indiana, writes that J. F. McClure, of the Indiana Railroad Commission, did not prepare an opinion holding that the 2-cent fare law applied to electric railways, as published in last week's issue. The opinion expressed by Mr. McClure was an oral one, given to some steam railroad men in conference, in which the law was construed to the effect that in transportation charges all fares should be based on the nearest multiple of five, whether charged for a ticket or collected on the train by the conductor. Electric roads were not considered in the conference.

Complain of Fare Between Albany and Rensselaer, N. Y.—Residents of Rensselaer appeared before the Public Service Commission of the Second District of New York recently in the interest of the complaint of the Rensselaer Chamber of Commerce against the 6-cent fare charged between Albany and Rensselaer by the United Traction Company. The Rensselaer people hold that the company is violating chapter 358 of the laws of 1905 which provides for a 5-cent fare between Albany and Rensselaer. Lewis E. Carr, attorney for the United Traction Company, contended that the company was only charging a 5-cent fare and that the extra cent was for bridge toll exacted by the Albany & Greenbush Bridge Company.

Railroad Inspectors of Indiana Increase Scope of Inspection.—The Railroad Commission of Indiana has addressed the following communication to all steam and electric railways in Indiana: "The Railroad Commission of Indiana has instructed its corps of inspectors to enlarge the scope of their inspection of cars, so as to include both defects penalized by the State law and those having no penalty affixed, but which render the operation of cars dangerous. Hereafter your equipment will be inspected for such defects as cutting out of air; crippled hand brakes; broken cut chains; hand brakes missing; defective grab irons; broken or missing brake shoes; defective couplers, and other defects in safety appliances and general condition."

Committee of the Transportation & Traffic Association Meets.—J. W. Brown, superintendent of transportation of the West Penn Railways, Pittsburg, Pa.; C. D. Emmons, general manager of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.; W. R. W. Griffin, general superintendent of the Rochester Railway, Rochester & Suburban Railway and the Rochester & Sodus Bay Railway, Rochester, N. Y., all of whom are members of the committee on training of transportation employees of the American Street & Interurban Railway Transportation & Traffic Association, met at Cleveland on March 25 to plan committee work preparatory to formulating their report for the 1909 convention.

Proposal for Interurban Terminal in Cincinnati.—The Federated Improvement Associations of Cincinnati have taken up the subject of presenting a bill in the Legislature in 1910 in the interest of a terminal for the interurban electric railways operating into Cincinnati. It is proposed that the State abandon the canal at a point south of the Mohawk Bridge and that all the ground be used for surface, elevated or subway tracks for the entrance of all the interurban lines to the city. The right of way is to be 32 ft. wide. This will leave 50 ft. on each side of the tracks, which it is proposed the city shall boulevard. The plan includes an operating company, which shall build the tracks and suitable passenger and freight stations and charge each road 1 cent per mile for each passenger and 1 cent per passenger for the use of the depot and for the maintenance of a ticket office. Charges are also to be made for express and freight handled at the depot. The local fare is to be 5 cents. W. C. Culkins is president of the Federated Improvement Associations.

Freight Station Proposed at Columbus.—Plans are being considered by the Ohio Electric Railway for the erection of a freight station in Columbus, Ohio. The company expects to maintain the present station for passenger business only and to handle all freight from the new station. The site at Town Street and Third Street on which it is proposed to erect the new freight station is a part of the site on which the Schoepf syndicate expected to erect an interurban union station several years ago. The company was unable to secure certain concessions from the city in connection with the proposed union station and did not carry out the plan. The ground for the building was all optioned, however, and is said to be still at the disposal of the company. One feature of the company's plan is to obtain a franchise from the city for a line on Town Street to connect the line at Scioto Street and Town Street, where cars coming into the city from the west enter the loop, with the opposite side of the loop at Third and Town Streets. The object of this is to avoid running freight cars around the loop. The company also proposes to ask permission to divert all through passenger cars including limited cars to this cutoff, thus shortening the distance in the city and saving time.

Personal Mention

Mr. Howard D. Manington has resigned as secretary of the Ohio Railroad Commission to become secretary of the Ohio Coal Operators' Association.

Mr. Borden D. Whiting, of the New Jersey Board of Railroad Commissioners, has been elected president of the Board of Railroad Commissioners, to succeed Mr. David Baird.

Mr. Charles J. Hughes, counsel for the Denver (Col.) Tramway Company, is the subject of the article "Pike's Peak or Bust" in the "Who's Who—and Why" page of the *Saturday Evening Post* of March 27, 1909. Mr. Hughes is the new Democratic senator from Colorado.

Mr. William Barclay Parsons, New York, who was recently elected a director by the Underground Electric Railways, London, Eng., sailed for Europe on March 23 to study traffic problems in London. Mr. Parsons is familiar with the situation in London, having been retained by the British Government to serve as advisory engineer to the Royal Commission on London Traffic.

Mr. H. T. Bunn has resigned as treasurer and auditor of the Knoxville Railway & Light Company, Knoxville, Tenn., to accept a similar position with a department store in New Orleans, and Mr. Leon Fender, secretary of the company, has been elected secretary and treasurer of the company, and Mr. J. E. Tappan has been appointed auditor of the company.

Mr. W. D. Wright, the newly elected president of the New England Street Railway Club, is superintendent of equipment of the Rhode Island Company, Providence, R. I. Mr. Wright was engaged in central station lighting work for several years previous to 1890, when he entered the railway department of the Thomson-Houston Company and engaged in installing railway plants. In the fall of 1891, while in the employ of the Thomson-Houston Company, Mr. Wright assisted in the work of electrifying the Union Railroad, Providence, and after the road had been accepted, he entered the employ of the Union Railroad, as chief electrician. He continued in this position until 1901, when he was appointed superintendent of equipment, and has since held that position with the Rhode Island Company, successor to the Union Railroad, the Woonsocket Street Railway and the Pawtucket Street Railway. Mr. Wright has been a very active member of the New England Street Railway Club for several years, being on various committees of the organization, and in 1908 was elected vice-president of the club.



W. D. Wright

OBITUARY

Thomas Fitzgerald, general manager for the receivers of the Norfolk & Southern Railroad, Norfolk, Va., died at his home in Baltimore, Md., on March 28. Mr. Fitzgerald was born at Fairmont, W. Va., on Jan. 1, 1853, and was in the employ of the Baltimore & Ohio Railroad 42 years, becoming general manager of the company in January, 1905. He continued in this position until Jan. 1, 1908. The Norfolk & Southern Railroad operates an electric line from Norfolk to Virginia Beach and also an extensive steam railroad system.

John H. Starin, vice-president of the original Rapid Transit Commission of New York, and head of the Starin City, River & Harbor Transportation Line, died at his home in New York City on March 22. While he was a prominent figure in the business life of New York City, for 34 years a member of the Chamber of Commerce and at one time a Congressman, Mr. Starin will be best remembered for his successful work as a Rapid Transit Commissioner. Together with Mr. Alexander E Orr and Mr. Abram S. Hewitt, he was a member of the commission at the time the contract was awarded for constructing the present subway. His great ability as an organizer and his long experience in transportation problems of wide scope eminently fitted Mr. Starin for the position he so long occupied in the railway and business world. Mr. Starin was 83 years old.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Ozark Traction Company, Eureka Springs, Ark.**—This company has been incorporated for the purpose of building an electric railway from Eureka Springs to connect with towns in north Arkansas. Capital stock, $50,000. Officers: S. M. Mitchell, president; W. T. Ayers, vice-president; B. J. Rosewater, secretary; O. H. Orendorf, treasurer.

***Modesto Interurban Railway, Modesto, Cal.**—This company has been incorporated in California for the purpose of constructing an interurban railway from Modesto to Empire, Waterford and Oakdale, also from Modesto to Newman and Crows Landing. It will be about 53 miles in length. It is stated that the company intends to operate gasoline electric cars. Capital stock, $200,000, of which $57,000 has already been subscribed. Directors: T. K. Beard, G. P. Schafer, H. T. Crow, W. H. Frazine, George Perley, D. E. Saunders and L. L. Dennett, all of Modesto.

Lewiston Terminal Company, Ltd., Lewiston, Idaho.—This company has been incorporated in Idaho for the purpose of laying tracks in Lewiston which are to be sublet to all interurban railways as terminals at a uniform rental or basis of charge when companies now building toward Lewiston shall reach the city limits. Capital stock, $100,000. Incorporators: W. F. Kettenbach, J. M. Keatings, E. J. Hall, Wm. A. Libert, Wallace Stainton, M. A. Means and J. B. Morris. [E. R. J., Feb. 6, '09.]

***Western Shore Electric Railway, Florence, Neb.**—This company has been incorporated to build an electric railway from Florence to Blair. Capital stock, $150,000. Incorporators: L. M. Allen, L. C. Nebergall, Don C. Gould, J. F. Munro, and T. J. McVittie.

***Erie & Union Railroad, Union City, Pa.**—This company has been chartered for the purpose of building an electric railway from Crooked Street, Union City, over the old-established grade of the Union & Titusville Railroad to the Erie water front at the junction of Mill Creek and Lake Erie. Capital stock, $250,000. Directors: Wm. J. Smith, Titusville, president; Jesse L. Straus, New York, N. Y.; Cornelius M. Sexton, South Orange, N. J.; Charles E. Wellborn, Weston, N. J.; S. Grumbine, A. Egbert and B. E. Currie, Titusville.

Inter-County Electric Railway, Topton, Pa.—This company has been chartered for the purpose of building a high-speed electric railway between Lyons and Allentown, 21 miles. Capital stock, $250,000. Directors: Maxwell H. Bochow, Topton, president; George F. Souwers, Bateman Saddington, Joshua H. Fisher and Fred R. Perry. [E. R. J., March 27, '09.]

FRANCHISES

New Castle, Ind.—The City Council has refused to grant a franchise to W. L. David and L. C. Nichols, Findlay, Ohio, who are planning to build from Muncie to New Castle. [E. R. J., March 27, '09.]

La Porte, Ind.—The Electric Railway Journal is informed by the Indiana Union Traction Company that an error was made on page 487 of the issue of this paper for March 13, where it was stated that the Indiana Union Traction Company had filed a petition with the County Commissioners of La Porte, Starke, Pulaski and Cass Counties for a franchise for the construction and operation of an interurban railway through the counties to connect Logansport, Winamac, Bass Lake, Knox, La Porte and intermediate towns.

Topeka, Kan.—The Topeka Railway has asked the City Council for an amendment to its franchises granting the company three more years in which to build extensions to its lines.

St. Joseph, Mo.—The Interstate Railway and the Missouri River & Cameron Railway have applied to the County Court for rights-of-way for their proposed electric railways which are projected between St. Joseph and Kansas City. Both companies contemplate double tracks, on 80-lb. rails. The Interstate Railway will be equipped with the third-rail system, while the Missouri River & Cameron Railway is a combination electric and steam road and will use an overhead trolley. The projectors of both contend that they have obtained at least 75 per cent of the right-of-way, and that the actual construction will begin this spring. Joseph A. Corby is president of the Interstate Railway. [E. R. J., Jan. 16, '09.]

St. Louis, Mo.—The City Council has amended the franchise of the Illinois Traction System so that it will be per-

mitted to operate trailers over its terminal tracks in the streets of St. Louis. The Illinois Traction System is now building a bridge over the Mississippi River at St. Louis which, with terminal approaches, will cost about $3,000,000. It is planned to give a bridge-car service between the heart of the business district in St. Louis and Granite City, Ill. A large terminal property in St. Louis has been purchased on which tracks will be laid for the accommodation of interurban passenger and freight trains. The present amendment to the franchise permits the company to handle freight and passenger trailers, including Pullman sleeping cars, over the 4½ miles of street track which is to form the loop through the city.

*Florence, Neb.—The Western Shore Electric Railway, which was recently incorporated to build an electric railway from Florence to Blair, has applied to the Florence City Council for a 50-year franchise to operate a street railway over Calhoun road and the river road in Florence and over certain streets which will connect the two.

Omaha, Neb.—The County Commissioners have granted the Nebraska Traction & Power Company a franchise to cross certain public roads. The company proposes to build an electric railway from Omaha to South Omaha, Ralston and Papillion, a distance of about 6.5 miles. [E. R. J., Jan. 23, '09.]

***Oklahoma City, Okla.**—It is stated that Homer W. Hurst, Holdenville, has applied to the City Council for a franchise to build and operate an electric street railway in Oklahoma City.

***Roseburg, Ore.**—Application has been made to the City Council of Roseburg, by Kendall Bros., owners of the local water and light systems in Roseburg, for a franchise to build a street railway in Roseburg.

***Salem, Ore.**—The City Council has extended A. Welch's street railway franchises for 90 days, increasing its bond from $5,000 to $7,000.

Grove City, Pa.—The Slippery Rock & Grove City Railway has applied to the City Council for a franchise to construct a street railway over the streets of Grove City. The proposed railway will extend from Slippery Rock to Grove City via Harrisville. The company has an engineering corps at work making the surveys for the route. [E. R. J., Oct. 24, '08.]

Johnstown, Pa.—The City Council has granted the Southern Cambria Railway and the Johnstown Terminal Railway a two-years' extension of time in which to have their electric railways in operation between Johnstown and Ebensburg.

Waco, Tex.—The City Council has enacted an ordinance granting the Citizens' Railway a franchise to extend its railway across the Brazos River, on the suspension bridge, into East Waco.

Ogden, Utah.—The Ogden Rapid Transit Company is said to have applied to the City Council for a franchise to extend its railway south on Wall Avenue from Twenty-fifth Street to Thirty-second Street.

Wauwatosa, Wis.—The Town Board has granted the Milwaukee Light, Heat & Traction Company, Milwaukee, Wis., a franchise to build and operate a street railway over certain streets of Wauwatosa.

TRACK AND ROADWAY

Tampa-Sulphur Springs Traction Company, Tampa, Fla.—L. Brill, manager, advises that this company is engaged in building 2½ miles of track, 70-lb. 7-in. rails being used.

Tri-City, Northeastern & Interurban Railway, Port Byron, Ill.—J. W. Simonson writes that this company has been formed for the purpose of building an electric railway from Watertown to Hampton, Rapids City, Port Byron, Cordova and Albany. It has not yet been decided when the company will begin the construction of its proposed railway. Capital stock authorized, $10.000. Officers: J. W. Simonson, Port Byron, president; W. H. Ashdown, Port Byron, vice-president; George W. Turner, Hampton, secretary; C. H. Peck, Albany, treasurer; Wallace Treckler, chief engineer. [E. R. J., Jan. 16, '09.]

Central Illinois Traction Company, Mattoon, Ill.—This company has awarded the contract for the excavating and building the lake at Urban Park to Loomis & Rose. Active work has already begun on the lake, which is to be 200 ft. x 1000 ft. It will have an average depth of 12 ft. It will also be supplied with boats, bath houses and bathing pools.

St. Joseph Valley Traction Company, Elkhart, Ind.—J. D. Wood advises that this company has already constructed a 20-mile section of its proposed railway which is to connect Elkhart, Bristol, Middleburg, Shipsmann and Lagrange. It is the intention of the company to construct the railway into Elkhart this year, a distance of 15 miles, also to connect with the Toledo & Western Railroad on the east at Pioneer, a distance of 25 miles. Mr. Wood states that gasoline motor cars will be operated at first and later on the railway will be equipped for electrical operation. Capital stock authorized, $700,000; bonds authorized, $700,000. Headquarters, Elkhart. Officers: H. E. Bucklen, 275 Michigan Avenue, Chicago, Ill., president; W. B. Pratt, Elkhart, vice-president; Stafford Maxon, Elkhart, secretary; C. H. Winchester, treasurer; R. Jones, Langrande, manager.

Gary, Hobart & Valparaiso Traction Company, Hobart, Ind.—Blake A. Mapledoram, chief engineer, writes that this company is planning to begin the construction of its proposed electric railway April 10. The railway as now proposed will be 17.5 miles in length, with extensions contemplated, and will connect the cities named in the title. The company has recently established its headquarters in Hobart. [E. R. J., Dec. 26, '08.]

Consolidated Street Railway, Strong City, Kan.—George A. Crum, secretary, advises that this company expects to relay 50 tons of new 36-lb. T-rails and to purchase 2000 ties, also braces, splices and spikes.

Wichita Railroad & Light Company, Wichita, Kan.—W. R. Morrison writes that this company expects to begin work within a few weeks on the construction of 4½ miles of new track. All material for this improvement has already been purchased.

Shreveport (La.) Traction Company.—This company expects to place contracts during the next few days for special work and renewals of curves amounting to $3,500. L. M. Levinson, general manager.

Gallatin Valley Electric Railway, Bozeman, Mont.—It is officially announced that this company has placed a contract with Westinghouse, Church, Kerr & Company, New York, N. Y., for the construction of its proposed electric railway which it is to extend from Bozeman to Ferris, Hot Springs and Salesville. About 16 miles of single track are covered by this contract. Officers: H. S. Buel, president; Charles B. Anderson, secretary; George Cox, treasurer. [E. R. J., Dec. 19, '08.]

Third Avenue Railroad, New York, N. Y.—The Public Service Commission of the First District has granted Receiver Whitridge of the Third Avenue Railroad permission to continue the work on the Fort George extension.

South Shore Traction Company, Patchogue, N. Y.—The Public Service Commission of the Second District has given its approval for the South Shore Traction Company to construct and operate an extension of its railway in the villages of Sayville and Islip.

Rochester, Syracuse & Eastern Railroad, Rochester, N. Y.—Announcement is made that this company has let the contracts for the construction of its extension from Port Byron to Syracuse; to I. M. Luddington, Rochester, the contract for the construction of the roadbed for one-half the distance between Port Byron and Syracuse; to the American Bridge Company, New York, the contracts for five steel railroad bridges have been given. These will be placed over canal and railroad crossings between Port Byron and Syracuse. The company has further purchased and contracted for 125,000 ties to be used in the track work.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—It is reported that John G. Webb, president of this company, is arranging to construct the gap between the northern terminus of the Columbus, Delaware & Marion Railway at Marion and one of the lines out of Toledo. The proposed extension will extend from Marion to Fostoria by way of Upper Sandusky, or to Findlay, by way of Carey.

City Railway, Dayton, Ohio.—T. E. Howell, general superintendent, states that this company expects to relay and pave one-half mile of double track.

Columbus, Marion & Bucyrus Railway, Delaware, Ohio.—The Supreme Court has affirmed the decision of the Marion County Circuit Court giving this company the right to cross the tracks of the Toledo, Walhounding Valley & Ohio Railroad, near Bucyrus, at grade.

***Simcoe Electric Railway & Power Company, Midland, Ont.**—It is officially announced that this company will begin this year the construction of an electric railway to connect Penetanguishene, Midland, Victoria Harbor, Waubaushene and Coldwater. The company expects to build a power plant at Big Chutes, on the Swern River. It is the intention to furnish power for lighting purposes. Capital stock authorized, $500,000. Bonds authorized, $400,000. Provisional directors: James Playfair, Douglas L. White, W. Finlayson, Midland; W. J. Sheppard, Waubaushene, and W. J. Lovering, Toronto.

Portland Railway, Light & Power Company, Portland, Ore.—This company is said to have placed an order with

the Lorain Steel Company for 1500 tons of steel rails. The rails will be used on the construction work of the railroad during the coming summer and the order was made for immediate delivery. Part of the rails will be 6 in., 72 lb., and the remainder 7 in. and 80 lb. The order includes only a part of the rails that will be needed for additional construction during 1909.

South Bethlehem & Saucon Street Railway, Bethlehem, Pa.—This company has awarded a contract to W. F. Glose, Fountain Hill, for a fill of 1500 ft. on Weaver's farm, near Centre Valley. It is said that the other work of extension of the railway from Colesville to Centre Valley will be performed by the company's forces.

Mercer County Street Railway, Greenville, Pa.—It is stated that A. G. Shaw, chief engineer, and 10 surveyors have begun the final survey for this company. The surveys are being made from New Wilmington to Big Bend, a distance of 11 miles, the only unsurveyed stretch on the 42 miles from New Castle to Conneaut Lake. This railway is being built under the franchise of the New Castle & New Wilmington Railway, which has recently been purchased by the Mercer County Street Railway. [E. R. J., Feb. 27, '09.]

Valley Traction Company, Lemoyne, Pa.—The Supervisors of East Pennsboro have given permission to the Valley Traction Company to double track its railway from Rossmoyne Street, Lemoyne, to the river.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—This company expects to soon begin the construction of a 1700-ft. spur from its present terminus in Linesville to the Pennsylvania Railroad depot. The company also expects to build two 50-ft. girder bridges. F. R. Shryock, general manager.

***Pittsburg, Pa.**—J. H. Barrett, 331 Fourth avenue, Pittsburg, chief engineer of the proposed electric railway between Rochester and Mars, writes that the project is at present only in a preliminary stage. The surveys have been completed and the majority of the rights of way have been secured. Mr. Barrett states that he is now at work securing the necessary franchises. It is expected that the company will be prepared to begin construction about July of this year.

***Laurens, S. C.**—At a business meeting of the Laurens Chamber of Commerce, the matter of an electric railway from Laurens to Clinton was the subject of considerable discussion, which resulted in some definite action on the part of the business men concerned. Committees were appointed to get the movement in shape. The committee appointed on incorporation consists of: Robert A. Cooper, W. R. Ritchey, Sr., and A. C. Todd.

Corsicana (Tex.) Transit Company.—J. W. Carpenter, president, writes that this company is ballasting its track; also displacing the light rails with heavier ones.

Port Arthur (Tex.) Street Railway.—H. J. Myers advises that this company will soon work on its proposed 6-mile electric street railway in Port Arthur. The plans call for the construction of a power plant and repair shop at Port Arthur. An amusement park will be operated by the company, but its location has not yet been decided upon. Ten cars will be purchased. The officers have not yet been elected. Principal office, 501 Conover Building, Dayton, Ohio. [E. R. J., March 27, '09.]

***Clintwood, Va.**—It is reported that the business men of Clintwood are planning to organize a company to build an electric railway from Clintwood to the nearest point on the Carolina, Clinchfield & Ohio Railway, which is being constructed through Dickenson County down the McClure River. The length of this electric railway will be about 6 miles. Some of those who are interested in the enterprise are Roland E. Chase, A. A. Skeen and Columbus Phipps, all of Clintwood.

Roanoke Railway & Electric Company, Roanoke, Va.—J. W. Hancock, general manager, reports that this company is engaged in constructing an extension of its railway in the town of Salem for a distance of about a mile.

Vancouver (Wash.) Traction Company.—It is stated that this company intends to begin construction work on the extension of the electric railway from its present terminus at the St. John Road to Orchards, a distance of 5 miles, within 30 days after the farmers in that section raise a bonus of $10,000 and sign contracts granting free rights of way through their property to the railway.

***Wheeling, W. Va.**—Albert M. Shenk is reported to have announced that he has closed a deal with Pittsburgh capitalists to build a high-speed electric railway that will connect Wheeling and Pittsburgh. A railway will be constructed from Wheeling to Middletown, in Washington County, Pa., 15 miles, and thence 30 miles to Pittsburgh. A 90-minute service between the two cities is proposed.

SHOPS AND BUILDINGS

Gary, Hobart & Valparaiso Traction Company, Hobart, Ind.—This company, which proposes to build an electric railway from Gary to Hobart and Valparaiso, will erect its car house in Hobart. The building will be 41 ft. x 128 ft., will be of brick with fireproof roof, and will contain three tracks, the center one to be a pit for the examination and care of cars from underneath. This building will contain a conductors' wash room and lockers. The cars to be accommodated in this building will be two 50-ft. cars, two 40-ft. cars, one express car and one snow plow. Blake A. Mapledoram, Hobart, chief engineer.

Corning & Painted Post Street Railway, Corning, N. Y.—This company advises that it will begin within a few weeks the construction of an addition to its repair shop. B. L. Bradley, superintendent.

Second Avenue Railroad, New York, N. Y.—Maynicke & Franke, architects, have filed for the Second Avenue Railroad plans for rebuilding the old car house of the company on Second Avenue, from Ninety-sixth Street to Ninety-seventh Street, to comply with an order issued by the Buildings Department to repair the structure, which was recently found to be unsound in various parts. The old foundations and parts of the outer walls, which are in a sound condition, will be utilized in the reconstruction, and the building will be finished with an ornamental façade crowned by a crenelated parapet cornice. It will be three stories high. The alterations, it is said, will cost $300,000.

Rome City Street Railway, Rome, N. Y.—The new office and car house erected by this company to take the place of the building burned Oct. 28 last have been completed. The structure is of brick, with concrete roof and steel girders, and is fireproof. There are accommodations for 30 cars and a snow plow. The size of this building is 60 ft. x 150 ft., and here is located the private office of the superintendent. Adjoining are the smith shop, oil, storage and boiler rooms.

Cincinnati (Ohio) Traction Company.—It is stated that plans are being prepared by Thomas Elliott, chief engineer of this company, under the direction of W. Kesley Schoepf, president, for a clubhouse for employees of the Cincinnati Traction Company, to be built at the Brighton car house at a cost of $15,000. The building will contain the offices of the Street Railway Employees' Protective Association, a large assembly hall, billiard and pool tables, bowling alleys, library and baths, and possibly a café.

Belton & Temple Traction Company, Temple, Tex.—This company on March 19 awarded a contract to H. D. McCoy, Cleburne, for an extension to its car house at Midway. This addition will provide for a paint shop and more storage room.

POWER HOUSES AND SUBSTATIONS

Keokuk Electric Railway & Power Company, Keokuk, Ia.—This company announces that it is in the market for 1 150-kw railway generator. A. D. Ayres, manager.

Citizens' Railway & Light Company, Muscatine, Ia.—This company advises that it expects to award contracts during the next three months for a steam turbine and generator. E. M. Walker, manager.

Gary, Hobart & Valparaiso Traction Company, Hobart, Ind.—This company, it is announced, will erect its power plant in Hobart, close to the car house. Both will be under one roof but with a fireproof wall between them. This building will be constructed of brick and will be 47 ft. x 98 ft. In the boiler room section will be located three 300-hp boilers and in the other section will be the engine and other machinery. The equipment will also include two 450-hp non-releasing, 4-valve Ball engines, to which will be directly connected two 300-kw, 600-volt generators. The company will erect both the car house and power station itself.

Edgerton Tramway Company, Ltd., Stellarton, N. S.—This company is reported to have purchased the power plant of the New Glasgow Electric Company, Ltd. It is proposed to move the plant from New Glasgow to the former company's buildings at Stellarton. It is probable that considerable new equipment will be installed.

Western Ohio Railway, Lima, Ohio.—It is officially announced that this company is considering the purchase of an 800-kw generator. F. D. Carpenter, general manager.

London (Ont.) Street Railway.—It is announced that this company expects to use additional power for the coming summer season, but it has not yet been decided as to what kind of electrical equipment will be installed. C. B. King, manager.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—The Electric Railway Journal is informed that this company is planning to purchase mechanical stokers. F. R. Shryock, general manager.

Manufactures & Supplies

ROLLING STOCK

San Jose (Cal.) Railway will purchase from 16 to 20 new double-truck cars.

Consolidated Street Railway, Strong City, Kans., expects to purchase 1 car this year.

Keokuk (Iowa) Electric Railway & Power Company, will purchase 3 18 or 20-ft. car bodies.

Port Arthur (Tex.) Street Railway, a proposed electric road, will soon purchase 10 motor cars.

Little Rock (Ark.) Railway & Electric Company is in the market for 11 double-truck, center-aisle trail cars.

Grand Rapids (Wis.) Street Railroad will buy four motor cars through the Knox Engineering Company, Chicago, Ill.

Lowell & Fitchburg Electric Street Railway, Ayer, Mass., suffered a loss of three large cars and a snow plow in a fire which destroyed the company's car house in Ayer.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., will purchase within two weeks several sets of motor equipment for single-truck cars and also a number of trucks.

Long Island Railroad, Long Island City, N. Y., will, it is reported, purchase 120 steel passenger motor cars, for service in the Pennsylvania tunnels into the New York City terminal of the Pennsylvania Railroad.

Tioga Traction Company, Wellsboro, Pa., a proposed road of which W. A. Seltz, Jersey Shore, Pa., is promoter, expects to purchase two 60-ft. interurban, semi-convertible cars for use when the road is completed.

Tampa-Sulphur Springs Traction Company, Tampa, Fla., mentioned in the Electric Railway Journal of Jan. 2, 1909, as contemplating the purchase of six 12-bench cars, has ordered four 12-bench open cars from the American Car Company.

Union Traction Company, Sistersville, W. Va., has ordered two 45-ft. closed cars and one 15-bench open car from the Cincinnati Car Company, Cincinnati, Ohio. Standard Motor Truck Company's O-50 trucks and National Brake & Electric Company's semi-automatic air brakes were specified.

Findlay-Marion Railway & Light Company, Columbus, Ohio, mentioned in the Electric Railway Journal of Feb. 13, 1909, as being in the market for 12 cars, advises that they will buy passenger, baggage and freight cars. In addition to this equipment it will purchase 2 electric locomotives.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y., mentioned in the Electric Railway Journal of March 20, 1909, as having purchased 8 cars from The J. G. Brill Company, through Meikleham & Dinsmore, New York, advises that 13 double-truck, closed cars were ordered from Wason Mfg. Company's works.

Gary, Hobart & Valparaiso Railway, Valparaiso, Ind., mentioned in the Electric Railway Journal of March 20, 1909, as being in the market for 4 cars, advises that Standard 0-60 trucks have not been specified and that it will purchase 2 50-ft. and 2 40-ft. passenger cars, 1 express and 1 snow-plow car. The company expects to have the road in operation in a few months.

Michigan United Railways, Lansing, Mich., which was reported in the Electric Railway Journal of Feb. 20, 1909, to be in the market for four interurban cars, also plans to purchase five double-truck city cars for use on the company's lines in Jackson and Lansing. These cars will have 28-ft. bodies, an overall length of 41 ft., and a width over posts of 8 ft. 3 in.

TRADE NOTES

Baldwin Locomotive Works, Philadelphia, Pa., announce the death, on March 23, 1909, of William P. Henszey, one of the partners of Burnham, Williams & Company, who had been connected with the works since March 7, 1859.

P. Edward Wisch Service, New York, N. Y., recently secured evidence which resulted in the sentence of a conductor on March 22 to three months in jail for stealing fares on Newark cars of the Public Service Railway of New Jersey. The detective agency presented eight witnesses to prove the conductor's guilt.

Cameron Electrical Manufacturing Company, Ansonia, Conn., during the past year did not materially reduce its working force and the over-product has been put into stock. The company has now over 2000 new commutators of all types and sizes in stock. This policy of keeping a large stock of commutators on hand in the spring and fall, about the time when the railways are overhauling their summer and winter cars, has been adhered to for a number of years.

Standard Varnish Works, New York, announce that L. Robinson has been appointed manager of the insulating department of the company, with headquarters in New York. Mr. Robinson has been identified with the Standard Varnish Works during the past four years. For 15 years previous to Mr. Robinson's connection with the Standard Varnish Works he held numerous responsible positions in the operating departments of electric railways in the United States, Canada and Europe.

W. P. Pressinger, New York, who recently resigned as general manager of the compressor department of the Chicago Pneumatic Tool Company, has organized the W. P. Pressinger Company, to handle the vacuum-cleaning machines, both portable and stationary, made by the Keller Manufacturing Company, Philadelphia, Pa., and formerly sold by the Chicago Pneumatic Tool Company. The new company has opened offices and salesrooms at 1 West Thirty-fourth Street, New York City, and will establish local agencies at all distributing points throughout the eastern states.

D. & W. Fuse Company, Providence, R. I., advises that tests were made recently to compare the properties of its Deltabeston magnet wire with those required and covered by the United States Government specifications. The specification reads in part as follows: "When subject to a temperature of 160 deg. C., neither the asbestos covering nor the waterproof compound shall be injuriously affected. Six-inch samples of wire, with carefully paraffined ends shall be immersed in fresh water at a temperature of 22 deg. C. for a period of 24 hours. The percentage of water absorbed by the insulation during such immersion shall not exceed 4 per cent." As the result of these tests, Deltabeston magnet wire was chosen and the contract was awarded to the D & W Fuse Company.

Wonham, Magor & Sanger, New York, N. Y., manufacturers of the H.B. life guard, advise that a demonstration of the successful operation of the H.B. guard was made on March 24, when a motorman in the employ of the Metropolitan Street Railway, New York, fell in front of a car of the Third Avenue Railroad equipped with the H.B. guard and, in spite of the fact that the car was running at a high speed, the prostrate motorman was picked up unhurt. The account of the accident printed in the New York *Times* follows: "Frederick W. Whitridge, receiver for the Third Avenue Railroad, says that he has in use a street car fender that will really save lives. A demonstration of its usefulness was made this morning, when Thomas Cummings, a motorman on the Metropolitan Street Railway, fell in front of a northbound Third Avenue car at Ninety-ninth Street and Third Avenue. In spite of the fact that the car was bowling along at a high speed, Mr. Whitridge says the wheel guard caught the prostrate motorman up, carried him until the power was shut off, and dumped him out safe and sound with no more damage than the mussing up of a uniform. Mr. Whitridge, who has not thought particularly well of the Public Service Commission's experiments with dummies, has notified the members of that body of his success with a real live subject." Wonham, Magor & Sanger announce that George E. Willis, for six years with the Sterling-Meaker Company, has accepted a position with Wonham, Magor & Sanger. Mr. Willis has represented the Sterling-Meaker Company in all parts of the country and has an extensive acquaintance throughout the United States.

ADVERTISING LITERATURE

Cheatham Electric Switching Device Company, Louisville, Ky., is distributing a booklet describing in detail its automatic switching device. The general agent of this company is Samuel Bowman, St. Louis, Mo.

Goldschmidt Thermit Company, New York, N. Y., publishes in *Reactions* for the first quarter of 1909, an illustrated description of various forms of welded compromise joints as well as many other applications of thermit.

Allis-Chalmers Company, Milwaukee, Wis., has issued, in pamphlet form, a description of the hydro-electric development of the Great Northern Power Company, the largest of its kind in the world, and located near the head of Lake Superior.

The J. G. Brill Company, Philadelphia, Pa., in its *Brill's Magazine* for March, publishes an interesting article on the conditions which govern the type of car for service in Detroit. Instructions are also given as to the proper method of ordering repair parts of Brill trucks.

Dossert & Company, Inc., 242 West Forty-first Street, New York, has just published its fourth annual catalog of Dossert solderless connectors, cable taps and terminals. The pamphlet contains descriptions of several new designs of connectors in addition to the styles heretofore made.

TABLE OF MONTHLY EARNINGS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Feb. '09	136,504	80,541	55,963	43,731	12,232
	1 " " '08	119,301	78,466	40,835	43,755	†2,920
	2 " " '09	284,399	165,251	119,148	87,683	31,465
	2 " " '08	245,427	160,358	85,038	87,642	†2,573
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Jan. '09	33,348	19,749	13,599	8,820	4,779
	1 " " '08	32,538	16,861	15,676	8,298	7,379
	12 " " '09	363,062	209,646	153,416	100,214	53,201
	12 " " '08	357,943	201,095	156,849	89,833	67,015
BINGHAMTON, N.Y. Binghamton Street Ry. Co.	1m., Feb. '09	24,061	13,220	10,841	9,411	1,430
	1 " " '08	21,364	14,358	7,006	8,269	†1,263
	2 " " '09	50,354	27,635	22,719	18,315	4,404
	2 " " '08	43,799	28,561	15,238	16,565	†1,327
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Feb. '09	177,454	*108,447	69,006	44,786	24,221
	1 " " '08	167,342	*109,848	57,494	43,524	13,969
	2 " " '09	369,797	*228,083	141,714	89,569	52,145
	2 " " '08	345,087	*235,651	109,436	87,305	22,132
CHAMPAIGN, ILL. Illinois Tr. Co.	1m., Feb. '09	321,847	*186,030	135,817	.....	.....
	1 " " '08	304,538	*183,368	121,170	.....	.....
	2 " " '09	674,803	*392,523	282,281	.....	.....
	2 " " '08	632,448	*377,022	255,426	.....	.....
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Feb. '09	59,024	37,658	21,366	13,992	7,375
	1 " " '08	58,232	39,410	18,822	13,443	5,378
	12 " " '09	756,327	489,512	266,815	165,800	101,015
	12 " " '08	727,661	467,082	260,579	162,006	98,573
CHICAGO, ILL. Aurora, Elgin & Chicago R. R. Co.	1m., Jan. '09	99,637	61,938	37,699	28,190	9,510
	1 " " '08	93,985	58,903	35,082	28,112	6,970
	1 " Feb. '09	94,335	58,218	36,117	28,261	7,856
	1 " " '08	85,552	54,825	30,727	28,184	2,543
	8 " " '09	975,017	528,908	446,110	222,928	223,182
	8 " " '08	962,760	527,479	435,281	222,879	212,402
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1m., Jan. '09	18,318	*9,855	8,463	8,112	351
	1 " " '08	18,332	*10,137	8,194	7,947	248
DALLAS, TEX. Dallas Electric Corporation.	1m., Jan. '09	102,252	65,799	36,454	28,839	7,615
	1 " " '08	90,592	63,875	26,716	29,298	†2,581
	12 " " '09	1,182,604	783,887	398,717	347,234	51,483
	12 " " '08	1,127,965	756,290	371,675	326,646	45,030
DETROIT, MICH., Detroit United Ry. Co.	1m., Dec. '08	613,104	*376,534	236,570	133,606	102,964
	1 " " '07	558,044	*339,606	218,438	134,042	84,396
	12 " " '08	7,179,716	*4,559,123	2,620,593	1,618,665	1,001,928
	12 " " '07	7,161,531	*4,492,544	2,668,987	1,569,261	1,099,726
	1 " Jan. '09	571,006	*354,696	216,310	153,702	62,608
	1 " " '08	514,679	*339,473	175,206	136,046	39,160
EL PASO, TEX. El Paso Elec. Co.	1m., Jan. '09	51,512	30,282	21,230	7,903	13,327
	1 " " '08	46,802	31,886	14,916	7,203	7,713
	12 " " '09	538,933	383,035	155,898	87,593	68,305
	12 " " '08	516,453	373,934	142,518	70,950	71,569
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Jan. '09	109,673	64,272	45,401	.....	.....
	1 " " '08	103,020	57,497	45,523	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Jan. '09	88,938	54,543	34,394	17,183	17,211
	1 " " '08	74,202	43,355	30,847	14,073	16,774
	12 " " '09	1,095,313	641,240	454,073	192,652	261,421
	12 " " '08	1,060,203	594,332	465,871	158,938	306,933
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Jan. '09	91,436	58,999	32,436	22,032	10,404
	1 " " '08	80,616	51,087	29,528	20,492	9,036
	12 " " '09	1,099,267	635,885	463,382	246,818	216,564
	12 " " '08	1,055,867	621,421	434,446	227,775	206,671
HARRISBURG, PA. Schuylkill & Dauphin Traction Co.	1m., Feb. '09	1,928	1,018	910	566	344
	1 " " '08	623	.....	.....	.....	.....
	10 " " '09	24,321	13,727	10,594	8,000	2,594
	10 " " '08	17,482	.....	.....	.....	.....
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Jan. '09	23,561	15,737	7,824	5,297	2,527
	1 " " '08	18,678	12,628	6,050	4,831	1,219
	12 " " '09	270,459	151,354	119,105	60,098	59,007
	12 " " '08	252,652	144,058	108,594	57,171	51,423
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Jan. '09	37,936	22,222	15,714	8,346	7,368
	1 " " '08	32,860	20,830	12,030	7,981	4,049
	12 " " '09	435,914	255,335	180,579	99,274	81,305
	12 " " '08	393,527	232,269	161,258	78,132	83,125
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Jan. '09	534,528	315,497	219,030	152,802	66,229
	1 " " '08	496,321	258,831	237,490	151,278	86,213
	8 " " '09	4,343,307	2,466,917	1,876,390	1,240,142	636,248
	8 " " '08	4,175,059	2,140,245	2,034,814	1,228,022	806,792
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m., Feb. '09	43,867	*22,602	21,266	11,483	9,783
	1 " " '08	42,991	*23,310	19,681	11,398	9,283
	2 " " '09	92,085	*47,270	44,815	22,967	21,848
	2 " " '08	81,496	*50,095	31,401	22,846	8,555
LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Feb. '09	54,537	*25,097	29,441	*11,034	18,407
	1 " " '08	51,276	*26,850	24,426	9,730	14,696
	2 " " '09	114,442	*54,640	59,801	21,760	38,041
	2 " " '08	106,956	*53,213	53,744	19,309	34,434
MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Feb. '09	118,092	*76,788	41,304	35,251	6,053
	1 " " '08	112,646	*75,197	37,449	34,451	2,998
	2 " " '09	246,561	*161,818	84,743	70,851	13,892
	2 " " '08	231,407	*153,760	77,647	68,950	8,697
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Feb. '09	319,032	170,095	148,937	100,118	48,819
	1 " " '08	300,434	173,173	127,261	95,978	31,283
	2 " " '09	663,668	334,714	318,954	203,985	114,970
	2 " " '08	615,142	353,818	261,324	194,087	67,237
Milwaukee Lt., Ht. & Tr. Co.	1m., Feb. '09	100,255	29,281	70,975	59,929	11,046
	1 " " '08	94,726	29,505	65,221	55,980	9,241
	2 " " '09	203,462	58,793	144,669	120,263	24,406
	2 " " '08	194,137	60,254	133,883	112,897	20,986
MINNEAPOLIS, MINN. Twin City R. T. Co.	1m., Jan. '09	525,661	285,825	239,836	133,963	105,873
	1 " " '08	469,891	258,201	211,690	121,956	89,735
	1 " Feb. '09	483,101	273,785	209,317	133,963	75,354
	1 " " '08	453,944	253,644	200,301	122,789	77,512
	2 " " '09	1,008,762	559,610	449,152	267,926	181,226
	2 " " '08	923,836	511,844	411,991	244,744	167,247
MONTREAL, CAN. Montreal St. Ry.	1m., Feb. '09	284,090	199,912	84,178	32,037	52,141
	1 " " '08	270,224	201,449	68,775	32,948	35,828
	5 " " '09	1,514,615	959,552	555,063	145,342	409,721
	5 " " '08	1,458,463	943,476	514,987	148,135	366,852
OAKLAND, CAL. Oakland & San Jose Ry. Co.	1m., Jan. '09	70,194	34,137	36,056	23,142	12,914
	1 " " '08	70,026	36,771	33,256	20,852	12,404
Oakland Traction Co.	1m., Jan. '09	214,584	109,030	105,554	45,367	60,186
	1 " " '08	225,085	118,905	106,180	45,831	60,350
PADUCAH, KY. Paducah Traction & Light Co.	1m., Jan. '09	19,048	12,253	6,795	7,043	†248
	1 " " '08	19,916	12,703	7,213	7,019	194
	12 " " '09	225,746	132,944	92,803	82,573	10,229
	12 " " '08	237,035	152,319	84,715	82,293	2,423
PENSACOLA, FLA. Pensacola Electric Co.	1m., Jan. '09	19,784	11,591	8,193	4,407	3,787
	1 " " '08	18,156	12,209	5,947	4,166	1,781
	12 " " '09	210,811	144,253	66,558	51,402	15,156
	12 " " '08	228,998	146,765	82,232	47,680	34,552
PHILADELPHIA, PA. American Rys. Co.	1m., Feb. '09	199,094	.....	.....	.....	.....
	1 " " '08	192,605	.....	.....	.....	.....
	8 " " '09	1,893,841	.....	.....	.....	.....
	8 " " '08	1,973,426	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Jan. '09	7,086	6,074	1,012	2,156	†1,144
	1 " " '08	6,587	7,327	†741	2,348	†3,089
	12 " " '00	122,765	87,187	35,578	26,563	9,015
	12 " " '08	119,756	84,037	35,719	27,156	8,564
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Feb. '09	355,002	167,376	187,626	.....	.....
	1 " " '08	332,299	174,758	157,541	.....	.....
	2 " " '09	694,228	353,253	340,975	.....	.....
	2 " " '08	673,112	348,347	324,765	.....	.....
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Feb. '09	73,250	38,664	34,586	.....	.....
	1 " " '08	66,812	36,063	30,750	.....	.....
	2 " " '09	152,685	80,502	72,183	.....	.....
	2 " " '08	136,971	73,979	62,993	.....	.....
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Feb. '09	808,160	*531,778	276,382	234,917	41,465
	1 " " '08	775,454	*519,540	255,914	233,418	22,496
	2 " " '09	1,637,196	*1,076,530	560,666	470,485	90,181
	2 " " '08	1,602,852	*1,073,899	528,953	466,872	62,081
SAVANNAH, GA. Savannah Elec. Co.	1m., Jan. '09	49,986	32,256	17,730	15,843	1,887
	1 " " '08	46,321	37,686	8,635	15,448	†6,813
	12 " " '09	599,484	383,400	216,084	187,009	29,075
	12 " " '08	603,279	392,794	210,485	176,384	34,101
SEATTLE, WASH. Seattle Elec. Co.	1m., Jan. '09	402,811	250,293	152,517	98,238	54,279
	1 " " '08	365,750	239,585	126,165	83,508	42,657
	12 " " '09	4,557,549	2,680,960	1,876,589	1,105,376	771,213
	12 " " '08	4,191,673	2,474,804	1,716,869	939,054	777,815
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Jan. '09	127,254	102,837	24,417	44,054	†19,637
	1 " " '08	122,978	83,708	39,271	42,683	†3,412
	12 " " '09	1,699,249	1,115,877	583,372	516,511	66,861
	12 " " '08	1,679,744	1,033,583	646,161	462,134	184,027
TAMPA, FLA. Tampa Elec. Co.	1m., Jan. '09	50,978	29,965	21,014	4,509	16,505
	1 " " '08	45,294	29,834	15,459	2,116	13,344
	12 " " '09	558,259	368,039	190,219	42,167	148,052
	12 " " '08	522,480	376,609	145,871	17,888	127,983

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, APRIL 10, 1909 No. 15

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Separate Cars for Women

The practicability of reserving for the exclusive use of women the rear car of a train in rush hours where traffic is heaviest will be given a thorough trial by the Hudson & Manhattan Railroad, of New York. Upon the result of this experiment will depend the introduction of a similar innovation by the Interborough Rapid Transit Company in the trains of the New York subway, although the conditions under which the two systems are operated are dissimilar in the vital point of congestion. The Hudson River tunnel system started the experiment in recognition of a public agitation before the New York Public Service Commission, First District, that measures be taken to overcome the crowding of women in subway trains during rush hours, and it is entitled to the credit which it has received for acquiescence in what has seemed to be a public demand. Following this action of the Hudson & Manhattan road, the Interborough company signified its willingness to make a similar experiment if the commission should so direct, and observations will be taken to determine the effectiveness and value of the plan during the preliminary trial on the Hudson tunnel system. It is, of course, possible that the scheme might work to advantage with the relatively light traffic carried at present by the Hudson tunnel, but that it might be a dismal failure if applied to the serious congestion which makes the superb operation of the New York subway so difficult to maintain. It would undoubtedly be an advantage if women could be spared undue crowding, but a transportation company is under the necessity first of providing service for the majority of its patrons, and in a city as crowded as New York the real problem arises from the fundamental urgent need of keeping the traffic moving.

Fare Increase in Schenectady

The action of the Schenectady Railway in discontinuing the sale of six tickets for 25 cents on its city lines, maintaining the cash fare of 5 cents, is an important movement designed to produce a larger revenue from existing urban passenger traffic. As stated in previous issues of the ELECTRIC RAILWAY JOURNAL, the company filed new tariffs of passenger rates with the New York Public Service Commission, Second District, and, after a complaint regarding them had been filed by citizens of Schenectady, a formal answer was made to the commission. An official explanation of this change in the rate of fare, made by Edward F. Peck, general manager of the company, states that the officials have not been satisfied with the earnings of the road for some time. Without any allowance for depreciation, the company earned in 1908 less than 2 per cent on its investment, and the increase in fixed charges and in taxes had made impossible, with prevailing rates of fare, an adequate return on the capital invested in the property. Mr. Peck added that during the last year every possible economy had been instituted to reduce operating expenses, but the result had been disappointing, and the management had been forced to take steps to increase the revenue of the company. The 5-cent cash fare became effective on March 1. The significance of the statement made by Mr. Peck regarding the inability of the company to earn 2 per cent on the investment last year, when no provision was made for depreciation, will be

better understood when it is remembered that the classification of operating expenses prescribed for street railroad corporations by the Public Service Commission contains accounts covering depreciation of equipment and of way and structures. These accounts must be followed by the railways, in compliance with the order of the commission, beginning July 1, 1909. Since the introduction of the depreciation accounts will add another element to operating expenses, it is evident that with the greater requirements, arising from the introduction of the new system of accounts, the revenues in 1909, if there were no improvement over 1908, would be farther from adequate than they were last year. The movement instituted by the Schenectady company follows the advances in fares made by various Massachusetts lines. The tendency clearly defined throughout the country, but more marked in the East, is toward a higher level of fares.

Advertising and the Engineering Department

This is the era of publicity, and many corporations, even the most conservative, are announcing their plans and making public news of their affairs and purposes to an extent never before experienced. In the adoption of this new policy public service companies, including electric railway companies, have been particularly prominent, and it is interesting to note that in many cases announcements of proposed improvements include engineering data and drawings to elucidate to the lay mind the benefits to be derived from the changes proposed. This is illustrated, for instance, in a recent advertisement published in the daily papers by the Boston Elevated Railway Company for the purpose of acquainting the public with the advantages of the modified plans of the present Dudley Street station of the elevated division in connection with the extension of the train service to Forest Hills. A reproduction was given of the engineering department's plan and elevation of the modified station, showing the arrangement of tracks, platforms, passageways and waiting rooms, with a tabulated statement of the advantages of the plan and a note of the single disadvantage which the layout entailed, as the price of the improvement. The company pointed out the separation of the entering and leaving passengers, the new platforms and extensions of the old platforms made available, the trebling of the present platform area, train and surface car accommodations, facility of transfer, protection of passengers from the weather, and avoidance of congestion—all made possible by the plan. Another example of the policy to which we refer was the carefully executed but simplified drawing of the proposed station improvements of the New York Central Railroad, issued to the press while Mr. Wilgus was vice-president of that company in charge of this work.

By utilizing its engineering plans in this way, a company enables the public to study any proposed arrangement in the fullest detail and thus creates a favorable sentiment and sound understanding of the situation. Such a method, of course, is intended for the more intelligent readers among the public, but to them it appeals more strongly than a written description of the proposed improvement, and the thinking element in the community is, after all, that which a company is most anxious to reach. There is undoubtedly room in other cases for the application of similar means of instruction through the co-operation of the engineering and advertising departments of electric railways.

Detriment to the Public in Franchise Controversy

Albion E. Lang, president of the Toledo Railways & Light Company, in an interesting address before the Toledo Transportation Club, on March 20, considered the detriment to the public interests inevitable when the date of expiration of the limited franchise of a public utility company approaches. Mr. Lang recognizes the condition that, under the Ohio laws, no street railway franchise can be authorized for a period exceeding 25 years, but assumed that the laws provide a way for the renewal of the franchise and that reliance can be placed upon the public intent to deal fairly with the company under these conditions. Any other policy would be detrimental to the reputation of the community for fair dealing, and difficulty will always arise when subsequent attempts to secure funds for development are made by the community affected. States in the Far West have suffered for years and will continue for a long time to feel the effects of their failure in the past to give adequate protection to capital which was lured from financial centers and invested in the development of facilities that contributed to the advantage, health and comfort of the community.

The situation in Toledo, as presented by Mr. Lang, is that of 69 miles of streets occupied by the railways of the company, the right to use 20 per cent expires in about two years and the remainder in subsequent years. The near terminations of grants "enable the capitalists advancing money for the construction" of roads to "exact high rates of interest and heavy discounts." No developing community of size and importance should tolerate a state of affairs which makes impossible the upbuilding of its public utilities with capital borrowed at reasonable rates. It is desirable in the highest degree that the financing of public utility corporations shall be conducted on a basis that will maintain the integrity of their capital investment and secure a reasonable return thereon.

An effort was made a few years ago to secure an extension of franchises by those who formerly controlled the company represented by Mr. Lang, but the failure to agree upon an ordinance "had been so thoroughly advertised throughout the country that the impression prevails in the minds of capitalists and financiers that the city declines to treat this great industry fairly," and "insists upon conditions quite impossible for the company to assume." While capitalists will withhold funds from investment, in the opinion of Mr. Lang, until agreement is reached upon an ordinance fair to the city and the public, it was made clear in the address that an early and speedy decision regarding the franchise question would stimulate rapid advancement of the commercial, manufacturing and industrial growth of Toledo. As that city, with its natural advantages and other facilities, needs industries, and is seeking to induce capital to increase its manufacturing interests, the removal of the street railway problem from its central position as an element of controversy would be desirable and for the good of the city.

Taking up the history of the Toledo system, it was shown that in 1881, when Mr. Lang became interested in the urban railway properties of the city, seven independent street railway corporations were in operation. No double track existed then, except at switches, and the maximum ride possible for a single fare was 3.75 miles. In the intervening years transfer privileges have been inaugurated and extended from time to time until there is possible today a ride of 12 miles for one fare. Combined ownership and control have been, therefore, of decided benefit to the entire community.

After showing that the business of the combined property had been practically at a standstill for the last five or six years, because of the threat of expiring franchises, Mr. Lang proceeded to outline the improvements which were needed, the cost of which is estimated, as the result of a recent exhaustive examination, at above $3,000,000. These include the reconstruction of many miles of track, the construction of several miles of double tracks, the purchase of additional cars and a large interurban station in a central location.

To deny that these important improvements would be of benefit to the citizens, taxpayers and traveling public would be to question the advantage of progress in the service that can be rendered by public utilities if they are allowed fair remuneration for their efforts. It will be in the interest of Toledo if it arranges a fair settlement and avoids the long-continued and distressing conflict on this subject which is part of the history of Chicago and Cleveland.

Smoke Prevention and Electrification

The elimination of smoke from locomotives is one of the arguments which is usually cited in favor of terminal electrification of steam railways. The agitation against the smoke nuisance in Chicago practically forced the Illinois Central to the determination to change its terminal and suburban district to electric operation, and in the New York and Baltimore entrance tunnels the total elimination of smoke was the controlling motive for the change. Elsewhere the conditions may not be so imperative against its abolition, but smoke-producing locomotives are not popular in any community and the steam railroads are keenly alive to the importance of smoke reduction. This is evidenced by a paper recently prepared by A. W. Gibbs, general superintendent of motive power of the Pennsylvania Railroad, at the request of the American Civic Federation.

Mr. Gibbs first points out the great difficulty of controlling the emission of smoke from a locomotive in which the boiler is fired far beyond the maximum of stationary boiler practice and is subject to sudden and violent fluctuations of load. He then discusses four possible methods of reducing the smoke, namely: (1) Use of smokeless fuel; (2) use of devices which assist in creating more perfect combustion; (3) education of the men operating locomotives and careful and constant supervision of their work; (4) conversion to electric traction. After considering the merits of each, he concludes that thorough instruction in methods of firing coal and operating the locomotives, followed by systematic supervision and discipline for violation of instructions constitutes the best method of smoke prevention.

Mr. Gibbs expresses doubt about the immediate possibilities of electrification because of its enormous cost and meager return on the investment, and also because of the unsettled state of the art of heavy electric traction. Among the objections raised are that the cost of electric apparatus is very large, the charge for electric locomotives, for example, being twice as much as steam locomotives; that the cost of operation is increased; that both the overhead conductor and third-rail systems present serious difficulties from an operating standpoint; that the change from electric to steam locomotives on through trains at the end of the terminal district involves excessive delays and introduces difficulties in heating trains by steam, and, finally, that electric locomotives are still in the experimental stage. He concludes with the assertion that capital diverted toward electrification could be employed far more usefully in other directions.

Some of the author's objections are valid; others are generalizations so broad as to be open to argument. It is true that electrification is expensive; nevertheless in many cases it is possible to earn a fair return on the additional investment required. A study of the problem as relating to one of the railroads entering New York which handles a large suburban traffic as well as considerable through freight and passengers showed a probable return of between 7 per cent and 10 per cent on the additional investment. This was after very liberal allowances had been made for all contingencies and maintenance provided for. The Southern Pacific electrification of its Sierra Nevada mountain division is to be undertaken instead of double-tracking the road in order to increase the carrying capacity of the single line of rails. The cost will be great, but the return is expected to justify the outlay. Other similar instances might be quoted. Although many have freely criticized both overhead and third-rail conductors, the New Haven with the former system and the New York Central with the latter are operating without any serious difficulty. Each is apparently satisfied with its own system. The change of locomotives at the end of the electric zone also is being accomplished by both roads without serious delays.

The design of high-speed electric locomotives is yet far from being wholly satisfactory, as Mr. Gibbs says. Nevertheless, the experimental work done by the locomotive builders and the experience gained through the operation of the locomotives of the New York Central, the New Haven and the Grand Trunk is fast clearing up some of the unsettled points. The author remarks that the multiple-unit system has been worked out fairly well—a significant statement, in view of the fact that the Pennsylvania electrification so far has been only with this type of equipment. This is an encouraging sign, as we pointed out in discussing this subject in these columns a few weeks ago. We trust that after electric locomotives have been put in service hauling Pennsylvania trains in and out of New York, Mr. Gibbs will find it possible to speak equally as well of them as the New Haven and New York Central engineers have done in the many discussions on heavy electric traction during the last two years.

THE CHICAGO, LAKE SHORE & SOUTH BEND RAILWAY

One of the most important single-phase installations now operating in the United States is the Chicago, Lake Shore & South Bend Railway, extending from South Bend, Ind., to Pullman, Ill., a distance of 77.5 miles. This new road furnishes direct communication in connection with the Illinois Central Railroad suburban service, between Chicago, Pullman, Kensington, Hammond, East Chicago, Indiana Harbor, Gary, Michigan City and South Bend. The territory around the south shore of Lake Michigan has recently shown such a remarkable growth in its industries and population that it evidently will afford traffic to support a line built in the most modern manner.

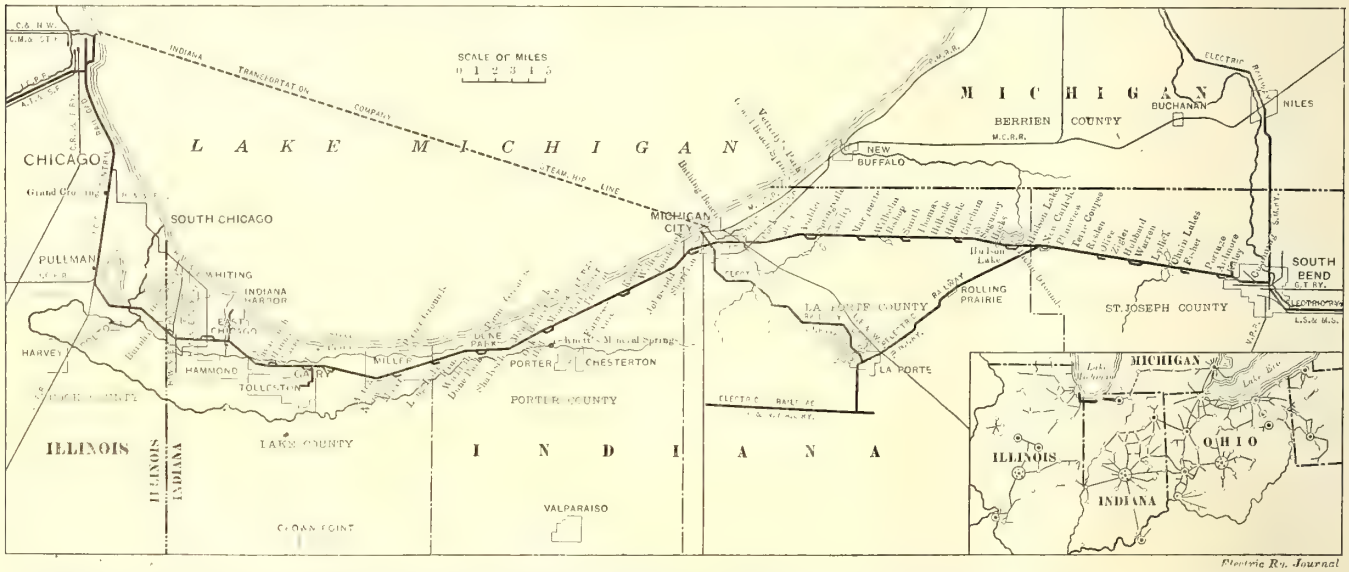
Several years ago a syndicate of Cleveland capitalists, recognizing the value of a road through this territory, obtained franchises and grants of especial value, including private rights of way through the new town of Gary. The Illinois Central Railroad Company agreed also to construct and equip that portion of the new line in Illinois and give the electric road the exclusive use of this track from Hammond to Pullman, Ill., at which point the electric line joins the Illinois Central suburban system.

chise in South Bend and private right of way within the city limits. In nine minutes after leaving South Bend terminal the cars can reach a point on the private right of way where a car can be run safely at high speed.

The western terminus is at Pullman, Ill., where, for the present, passengers will transfer from and to the suburban trains of the Illinois Central Railroad, which run at intervals of 40 minutes to and from the heart of Chicago. An overhead footbridge has been constructed here for the convenience of the public, connecting the interurban platform with the suburban platform of the Illinois Central Railroad and permitting joint use of the depot at Pullman The train schedules are arranged so that cars of the new road make close connections with the Illinois Central suburban trains, offering quick and convenient service to the downtown district of Chicago at the Randolph and Van Buren Street stations of the steam road.

ROADBED AND TRACK

The roadbed has been constructed according to modern steam railroad practice; a maximum gradient of 2 per cent exists in but one place, which is the approach to a steam railroad crossing. Outside of cities the maximum



Chicago, Lake Shore & South Bend—Map of Route Traversed Between South Bend and Pullman, Showing also Connections with Other Interurban Lines in Northern Indiana and Illinois

The financing of the railway was undertaken and completed by Cleveland capitalists representing several of the leading trust companies in that city. A syndicate management was formed, with M. H. Wilson, vice-president of the Cleveland Trust Company, as the head. During the recent financial depression, when nearly all railway construction was either greatly restricted or entirely suspended, the work on this line was carried forward without delay, and all obligations were taken care of promptly.

The construction of the roadbed, inclusive of bridges, was done by a construction company organized for the purpose. The construction of the electrical distribution system, power house equipment and buildings was supervised by the Cleveland Construction Company, of Cleveland, Ohio, as consulting engineer. After careful examination of the different methods available for operation of the new line, the engineers recommended the use of the single-phase distribution system, which was adopted.

ROUTE

The eastern terminus is in the center of South Bend, Ind., directly in front of the Oliver Hotel, near the City Hall and Court House. The company owns a street fran-

curvature is 3 deg., with the exception of one 6-deg. curve. Tangents of 7, 8 and 14 miles exist, and all track work was designed for safe operation at the high speeds.

The main line track comprises 70-lb., A. S. C. E., 33-ft. rails laid on 6-in. x 8-in. x 8-ft. white oak ties spaced on 24-in. centers. The track in city streets is laid with 80-lb. Shanghai rails in 60-ft. lengths, with steel rail braces placed every 10 ft. All special track work is arranged for the standard M. C. B. flange and tread. Standard steam road spring frogs are used throughout. The switchstands are of the semaphore type, equipped with long-burning oil lamps with red and green lenses. At all crossings with main line steam tracks the grades are separated, except in cities, where derailers are installed. A grade crossing with the Chicago Outer Belt Line Railroad near East Chicago is protected by an interlocking plant, with a signal tower.

All bridges over other railways are of steel designed for Cooper's E-50 loading. Highway bridges are of reinforced concrete. There is but one section of pile trestle on the property, and this comprises the approaches to the Calumet River bridge. This wood trestle will be partly filled with sand and partly replaced by a steel viaduct.

Large culverts and cattle passes are of reinforced concrete. A minimum clearance of 17 ft. 6 in. above the rail is maintained under all structures over the track, to allow for catenary construction and the use of a pantograph.

The rail bonds outside of cities are No. 0000 copper, with ⅞-in. solid terminals placed under the base of the rails.



Chicago, Lake Shore & South Bend—A Long Tangent

The holes for the terminals were made with hydraulic punches which left cone-shaped openings with their larger diameter at the top. The bonds were inserted from underneath and the terminals expanded into place with hydraulic compressors at a pressure of about 15 tons per square inch. After four months of use by heavy ballast trains and 70-ton locomotives operating over the unballasted track not one loose terminal has been found, al-



Chicago, Lake Shore & South Bend—Siding and Standard Switchstand

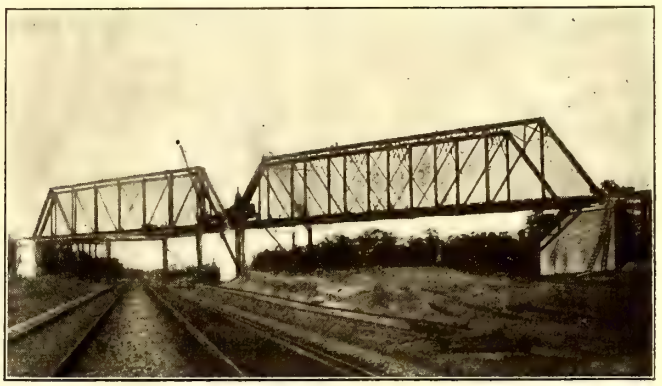
though a considerable number of bonds have been broken by the excessive movement of the loose joints.

No. 0000 cross-bonds were spaced 700 ft. apart. On account of the industry of copper thieves it was found impossible to maintain these bonds in the vicinity of Gary, and now it is proposed to replace the stolen bonds with heavy iron bars extending between the rails and connected to both by the ordinary rail bonds. The incentive for theft will thus be reduced to a minimum. All special work is shunted by two No. 0000 wires attached to cross-bonds at each end.

TRANSMISSION LINE

All the power for the operation of the entire road and the shops is generated in the Michigan City power station, which will be described in a later article. The trolley wire is fed near the station at the generating pressure of 6600 volts and the ends are also fed by two step-down transformer stations located respectively 24 miles east and west of Michigan City. The transmission voltage is 33,000 and the single-phase high-tension circuit from Michigan City to each of the two substations mentioned is carried on the tops of the same poles which support the trolley brackets. The pole line is exceptionally substantial. It is constructed of 45-ft. creosoted Southern pine poles with 9-in. tops. Each pole is set 6 ft. in the ground. Into each hole two barrels of concrete were placed, equally divided and tamped firmly at the top and bottom of the hole to afford a secure bracing.

One of the engravings shows the details of a pole top of standard design. Stranded aluminum conductors of No. 2 copper equivalent are used for high-voltage circuits. The two wires are spaced 65 in. apart at the ends of a 4-in. x



Chicago, Lake Shore & South Bend—Through Truss Bridge Crossing Tracks of the Pennsylvania Lines West and the Wabash

5-in. creosoted cross-arm. In place of cross-arm braces of iron, triangular blocks or gussets were spiked to the poles under the high-tension cross-arms, and to prevent the tearing of the wood the usual lag-screw fastenings were replaced by galvanized hinged spikes with wedge-shaped points specially made by the American Steel & Wire Company.

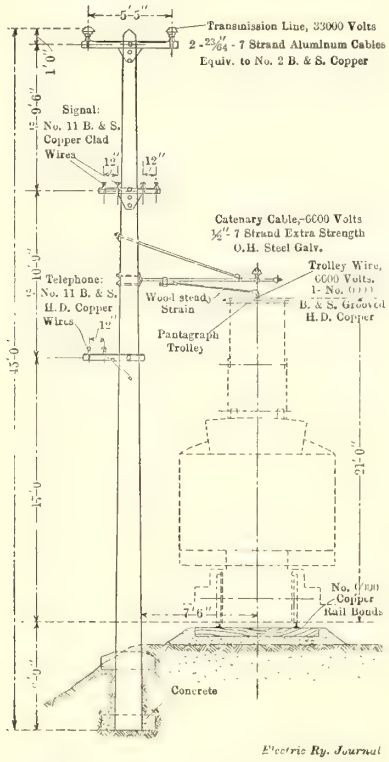
The insulators on the transmission system are 33,000-volt porcelain, spray tested to 80,000 volts, and were supplied by the Ohio Brass Company. They are supported on special wooden pins impregnated by the vacuum process with a bituminous compound similar to that used for insulating railway motor fields. The transmission line as here described is about 50 miles long.

TROLLEY LINE CONSTRUCTION

A trolley voltage of 6600 is used throughout. Arrangements are made so that in East Chicago, Indiana Harbor, Michigan City and South Bend, where it may be necessary to work on the trolley wire, it can be fed with 700-volt current distributed through single-phase transformers. The shop and yards are normally supplied with 700-volt current. No direct current is used in the trolley system. This use of alternating current only is important since it

entirely avoids the complication of control apparaus required where car equipments must be operated on both direct and alternating trolley currents.

The trolley wire throughout is No. 0000 GE grooved section, supported by a ½-in. extra-strength double-galvanized catenary cable, except in city streets, where span construction is used. Special care was taken in the specifications for the catenary cable to insure high strength and proper galvanizing. The cable has an 18-in. sag between supports, which are 166 ft. apart on tangents and closer on curves in proportion to the rate of curvature. The trolley hangers are rods of ⅝-in. galvanized round iron with sister hooks at the top. They are spaced 12 ft. apart. A wedge clamp serves to secure the trolley wire to the hangers. The overhead fittings were supplied by the Ohio Brass Company.



Chicago, Lake Shore & South Bend—Standard Track and Trolley Construction

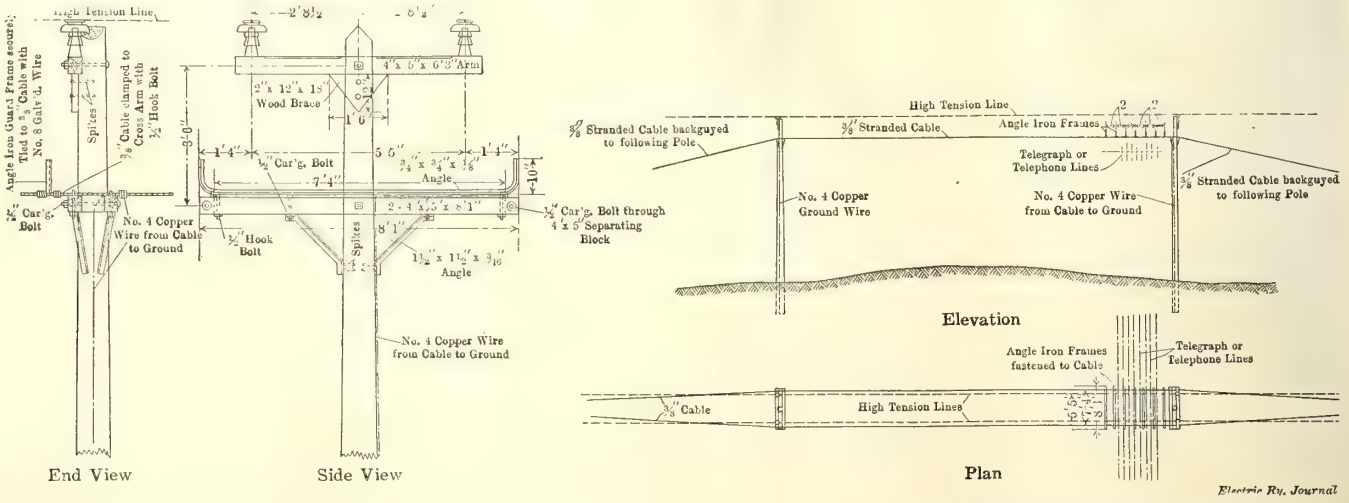
The catenary cable is supported on porcelain insulators tested to 20,000 volts, attached to T-iron pole brackets 9 ft. long with ⅝-in. overtruss rods. The trolley is further supported transversely by wood steady strains placed at every second pole on tangents and every pole on curves. When the catenary insulators were screwed to the iron bracket pins the pins were first wrapped with rubber tape. This affords some elasticity between the porcelain and the metal and has prevented a breakage of insulators which has been serious in several other installations. During four months of operation not one trolley or high-tension insulator has broken down in service.

The trolley and catenary cable are anchored at both ends of every curve and at 1-mile intervals between curves. An extra pole is set for each anchorage and the trolley and messenger are held against movement in either direction, thus preventing the falling of a length of wire in case of breakage. The catenary cable is anchored on each side of all overhead structures and the section between anchors carries no current.

To obtain an even deflection on curves 14-in. Detroit type trolley clamps are used. The trolley splices are of cold-drawn copper tubing 36 in. long soldered the entire length. To permit satisfactory operation of the pantagraph collectors at the very high speed desired (max. 75 m.p.h.) it was found necessary to maintain the trolley exceedingly taut and the original splices, 24 in. long, pulled out about as fast as they could be put in. It was found necessary to pull up the line with a dynamometer so that the messenger and the trolley wire had the correct and uniform tension.

The trolley wire is sectioned about every 10 miles by a high-tension insulator with impregnated wood for insulation. Each breaker has a grounded brass band encircling the center of its insulation. This feature is of especial value at junction points of high and low voltage sections, because it assures safety from high voltage to any one working on the low-tension section. As the trolley and messenger are of the same potential porcelain spool section breaks are also installed in the catenary cable directly over the trolley section insulators. From either side of such a section-break a No. 0000 wire is run to a disconnecting switch on the pole opposite. Under ordinary operating conditions these switches remain closed, but in case of line trouble any switch can be opened by the dispatcher at Michigan City. The standard semaphore operating equipment of the Telegraph Signal Company is used for this purpose.

In cities where a span wire suspension is used the construction is of standard type with heavy fittings. Steel poles are used in the downtown district in South Bend and high-tension porcelain strain insulators are used in spans and guys next the poles. Because of the excessive drop in both rail and overhead conductor within the cities when a potential of only 700 volts is used the length of the trolley sections is limited to about a mile. Transformers in fireproof stations are spaced accordingly and are fed from the 6600-volt trolley which is carried past each low-tension section on the poles at one side. Each section of No. 0000 trolley, which is arranged so that high or low voltage may be used, is supplemented by two No. 0000 stranded feeder

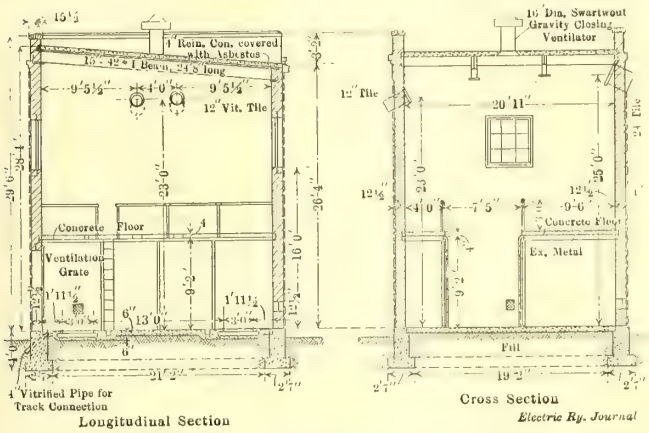


Chicago, Lake Shore & South Bend—Details of Standard Catenary Trolley and High Tension Pole Line

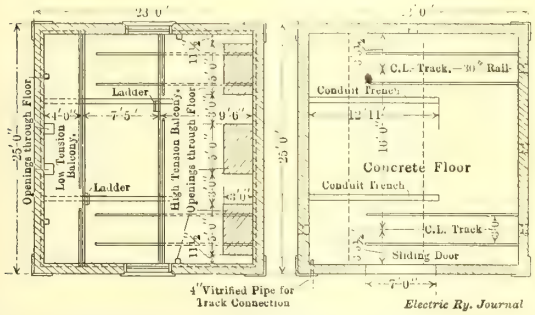
cables, which parallel the trolley for substantially its entire length.

SUBSTATIONS

There are nine substations, two at the terminals of the 33,000-volt line, reducing to 6600 volts to supply the outer



Chicago, Lake Shore & South Bend—Sections Through Static Transformer Substation Building



Chicago, Lake Shore & South Bend—Plans of Upper and Lower Floors of Static Transformer Substation Building



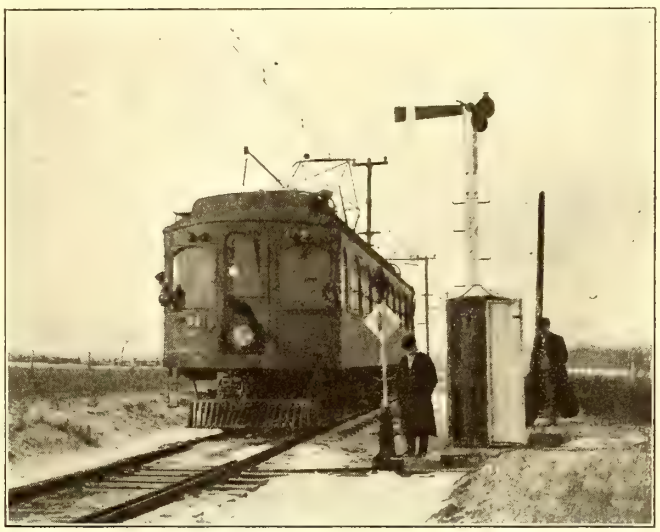
Chicago, Lake Shore & South Bend—Static Transformer Substation

ends of the road, and eight available for supplying low-tension sections in towns if desired and at the car shops near Michigan City. The latter are connected between the trolley wire and track on both primary and secondary sides.

The larger high-tension substation at East Chicago contains three 500-kw oil-insulated self-cooling single-phase transformers and the smaller, at Terre Coupee, contains two of the same units with room for a third. In these large substations the 6600-volt circuits have oil switches, but the 33,000-volt switches are the Westinghouse stick type using enclosed expulsion fuses.

The low-tension substations are located as follows: Three in East Chicago to supply 2 miles of main-line and 2 miles of branch-line trolley; two in Michigan City to supply 2.25 miles of main-line trolley; two in South Bend to supply 2 miles of main track and one at the car shops. All the low-tension substations are similar in equipment. That at Michigan City has duplicate equipments in one building. Each installation includes one 200-kw oil-insulated, self-cooling transformer with a stick-type, 6600-volt circuit breaker and low equivalent lightning arrester and an automatic oil circuit breaker in the connections to the low-tension trolley. The latter switch has a time lag which is materially shorter than that of the stick breaker.

It was not practicable to equip the substation buildings with cranes and therefore the following expedients were



Chicago, Lake Shore & South Bend—Dispatcher's Signal and Telephone Booth at Siding

used to assist in handling the transformers: In the high-tension substations the transformers are all set on trucks running on rails in the floor so they can be pulled out under a steel beam in the roof to which a chain hoist can be attached and any transformer lifted from its case. In the low-tension substations the track was not thought necessary, but each transformer was set on a concrete pedestal with a similar steel beam overhead so that the working part can be lifted out of the case and lowered to the floor. All the substation transformers are set high enough above the floor so that a standard oil tank can be rolled under the oil outlet when it is desired to drain the case.

The stick-type circuit breakers with enclosed fuses were adopted for the substation primary circuits because no substation attendance was expected; such breakers when seldom operated are less likely to get out of order than oil switches. The heavy time lag is also desirable so that the generating station breakers may have every chance to open first on an overload.

The substation buildings are simple fireproof structures. Accompanying engravings illustrate their general dimensions and design. During the past summer while the transformers were being dried out the trolley line 75 miles long

was fed at its midpoint and the cars were satisfactorily operated over its entire length without using the transformer stations.

TELEPHONE LINE

There is one telephone circuit throughout the length of the line and a duplicate from Gary to Pullman, 17 miles.



Chicago, Lake Shore & South Bend—Interior of Passenger Car

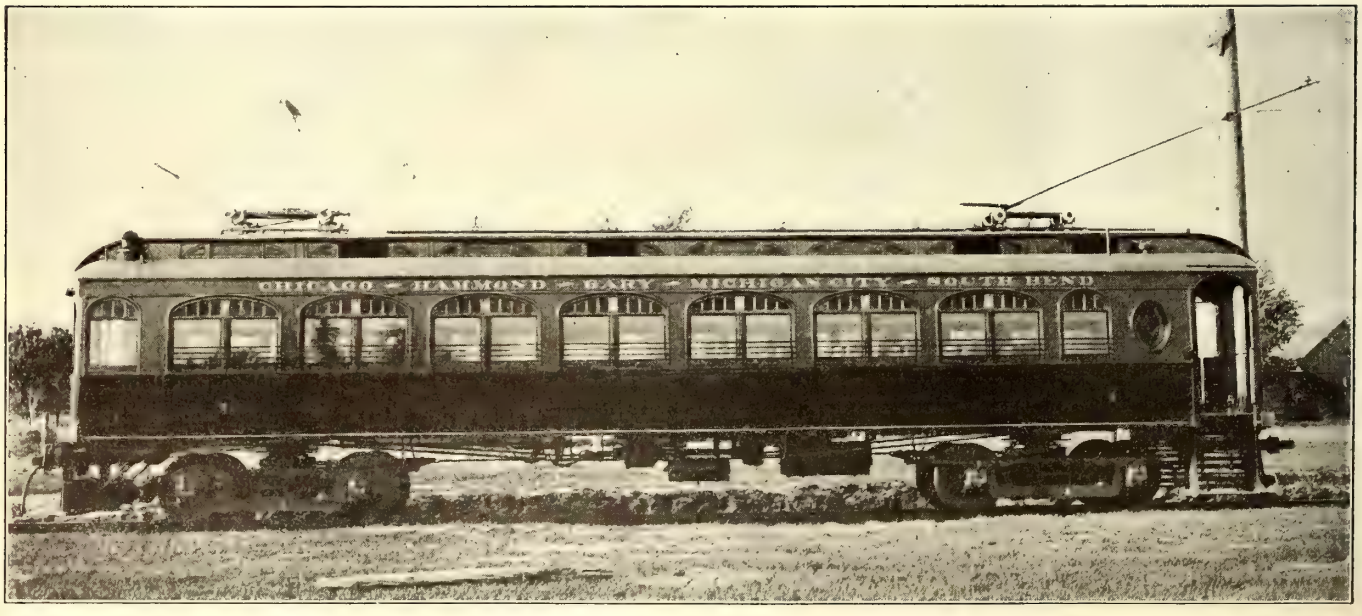
Each circuit consists of a pair of No. 11 copper-clad steel wires supplied by the Duplex Metals Company. The telephone circuit is half spiraled every second pole with vertical double insulator brackets. Owing to the fact that the telephone line is on the same poles with the 33,000-volt transmission line and also with the 6600-volt trolley, extreme care was exercised in its construction. In addition to the transpositions a 1-to-1 ratio transformer, insulated for 30,000 volts and with a grounded core, was installed for each telephone. These transformers perform two valuable functions: They eliminate substantially all of the noise due to induction and leakage and also protect the telephone instruments from high-tension current. It is said that it is possible to cross one of the telephone wires with the 6600-volt trolley wire and still maintain ordinary conversation.

In South Bend, owing to the obstruction of trees along the line, arrangements have been made with one of the local telephone companies to support the two railway wires through the city to the ticket office on the telephone company's poles. A transformer similar to those mentioned above was installed at the city limits, thus protecting all the local wires in case of a cross or ground.

Telephone booths of sheet steel are placed at each siding and at important stops. These booths contain a telephone instrument, block signal apparatus, described later, and an Egry autographic register for trainmen's use in taking and recording orders. All wires are brought into the booths under the tracks in steel conduit and a switch is located in the booth interlocking with the door. When entering the booth a party desiring to use the telephone must first close this switch and again he must open the switch as he leaves or the door of the booth cannot be closed. All booth telephones are without ringers and current is taken from the lighting system of the office building at Michigan City to operate the dispatcher's ringer. The switchboard at the dispatcher's office has provisions for extra lines and is connected to the long-distance Bell lines.

SIGNAL SYSTEM

To assist the dispatcher in handling trains with the telephone the Telegraph Signal Company's system, made by the Stromberg-Carlson Telephone Manufacturing Company, of Rochester, N. Y., was installed. A system of synchronous clocks, one located at each meeting point, and a master clock in the dispatcher's office, control the semaphore blades along the road. Any one of these boards may be thrown by the dispatcher. The semaphores indicate stop by a horizontal position of the arm by day and a red light by night in the usual manner. When a car is blocked by a semaphore the conductor proceeds to the 'phone, obtains his order by the Egry register system and upon receiving an order from the dispatcher sets the signal again to safety by pulling down a lever within the booth.



Chicago, Lake Shore & South Bend—Standard Motor Passenger Car

The clocks are operated by weights and require winding about once in 30 days. The signal circuit consists of two hard-drawn copper wires. This installation has given full satisfaction.

CARS AND EQUIPMENT

The rolling-stock equipment includes 24 large passenger cars, one high-powered utility car, four smaller cars for local service, 20 Hart convertible cars, 3 box and 12 flat cars and 1 Russell No. 1 snow plow. The passenger cars were described and illustrated in the ELECTRIC RAILWAY REVIEW for May 23, 1908, page 628. Express cars are now being constructed. The passenger cars were built by the Niles Car & Manufacturing Company.

From the following general dimensions presented it will be noted that the passenger-car bodies are of the regular steam coach width, which is a desirable feature that few interurban railways have been able to obtain.

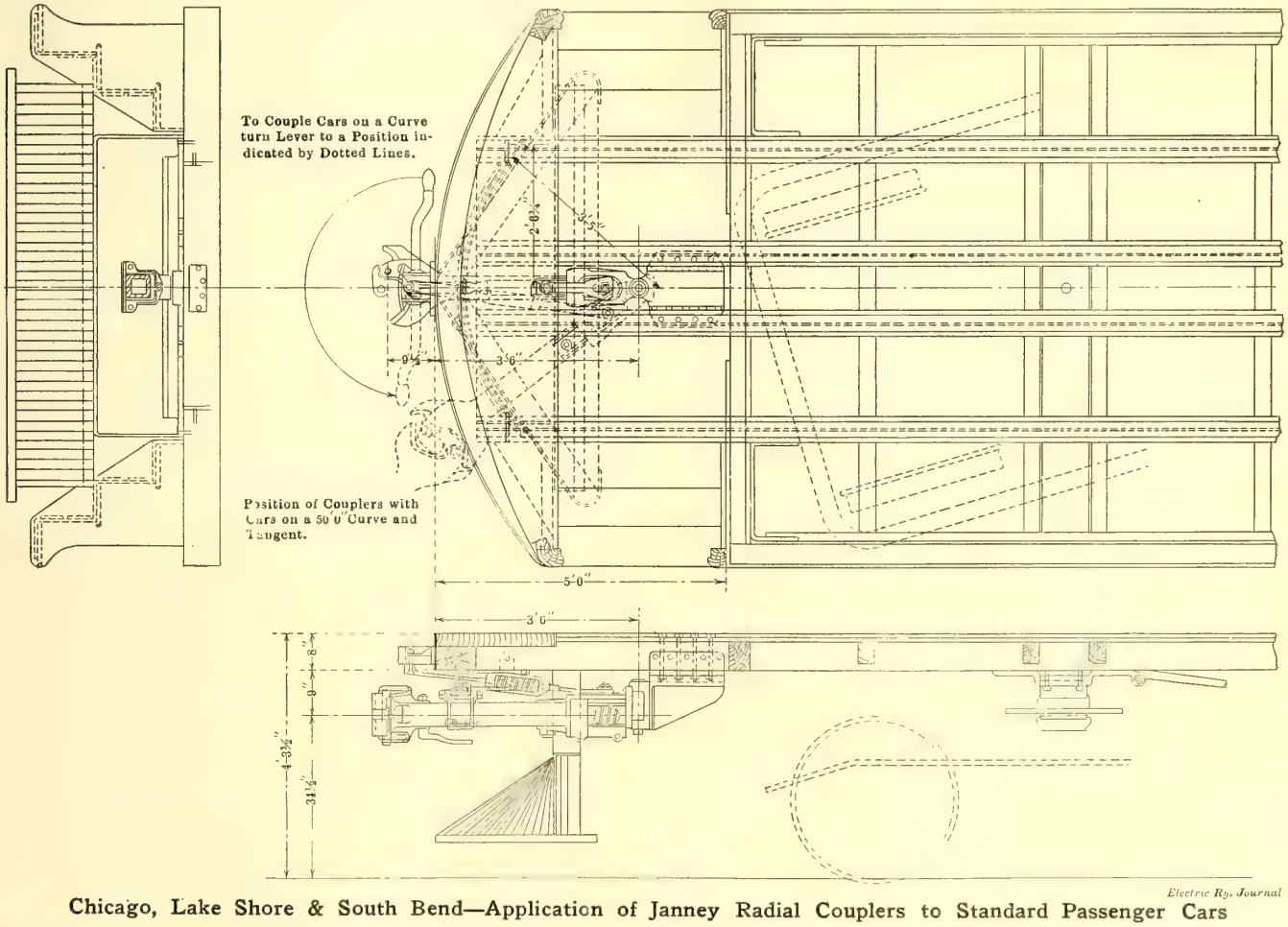
Length over all	57 ft. 2 in.
Length over body	47 ft. 4 in.
Width over all	10 ft.
Height from floor to top of roof	9 ft. 5 in.
Truck centers	35 ft. 6 in.
Width of aisle	24 in.
Width inside	9 ft. 7½ in.

The underframing of the passenger cars is of semi-steel construction with double outside sills that have ⅝-in. x 10-in. steel plates bolted between them. The four center and intermediate sills are 6-in. I-beams and extend the full length of the car from buffer to buffer. End doors in the vestibules with spring buffer platforms are provided so that passengers may pass from car to car. Over the vestibule step openings are self-opening trap doors manufactured by the O. M. Edwards Company.

The interiors of the car bodies are richly finished in polished dark mahogany. The ceilings are full Empire style, artistically decorated and illuminated with incandescent lamps enclosed in Holophane bowls. An individual lamp is also supported over each seat by an artistic bronze bracket. The passenger cars have a seating capacity for 60 persons; the seats, manufactured by Hale & Kilburn, have stationary backs, foot rests, bronze grab and offset handles and arm rests and are upholstered in leather. The cushions are 38-in. long and the seats measure 48 in. from the inside of the car to the outside of the arm rests. A toilet room is located at the rear of the main passenger compartment.



Chicago, Lake Shore & South Bend—Russell Snow Plow Pushed by Standard Passenger Car



Chicago, Lake Shore & South Bend—Application of Janney Radial Couplers to Standard Passenger Cars

These cars are mounted on Baldwin Locomotive Works,

Class 90-35 M. C. B. trucks with 7-ft. 6-in. wheel base. Each truck was designed for a working center plate load of 35,000 lb. Standard Steel Works solid steel wheels, 38 in. in diameter, are mounted on axles 6½ in. in diameter at the center, 7½ in. at the gear seat and 7 in. at the wheel seats. The journals are 5½ in. x 10 in., inclosed in Syming-



Chicago, Lake Shore & South Bend—Repair Shops at Michigan City

ton journal boxes. Ball-bearing center bearings are used on all trucks.

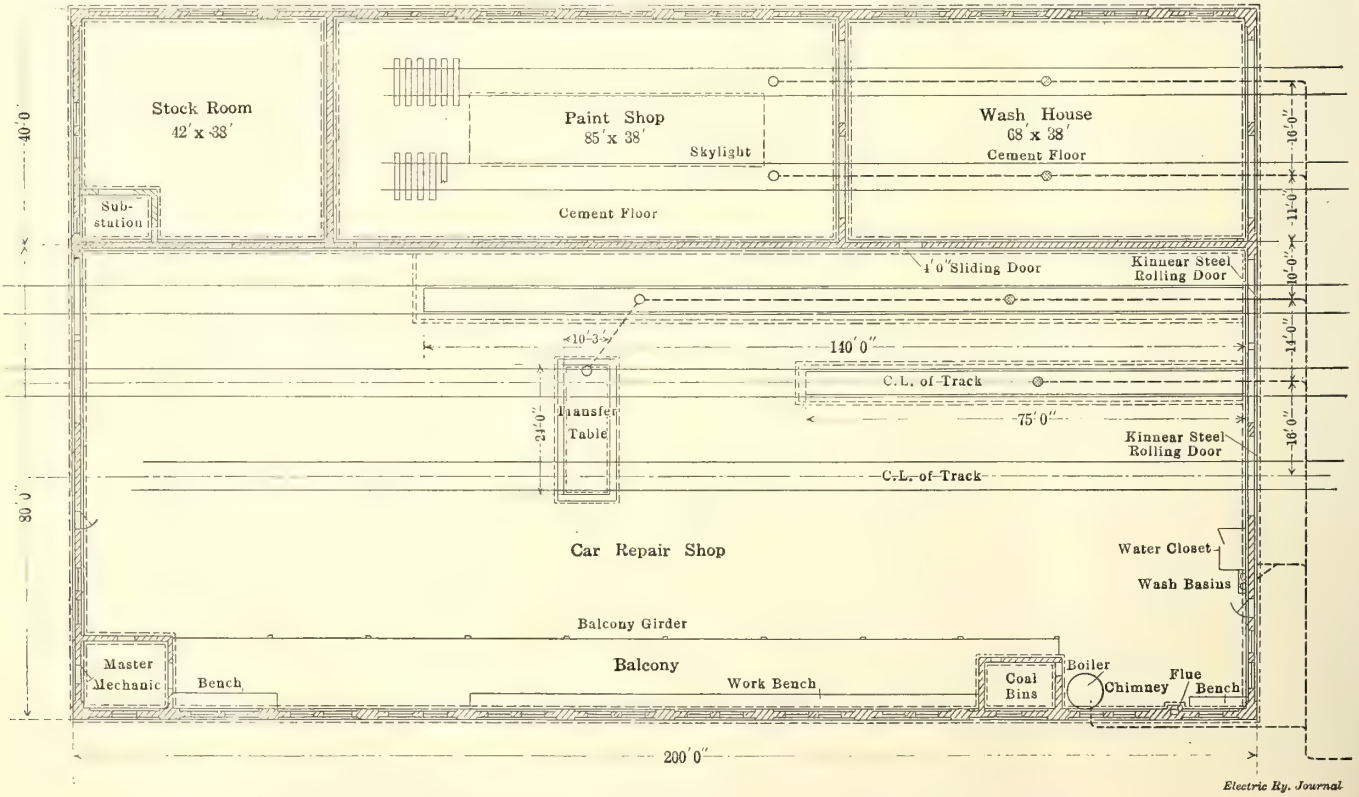
The electrical equipment includes four Westinghouse No. 148 single-phase motors rated at 125-hp capacity each and multiple-unit control. The special equipment of the cars includes Peter Smith hot-water heaters, Westinghouse automatic air brakes, Peacock hand brakes, Lintern markers and classification lights and Knutson trolley retrievers.

All the cars are equipped with Janney radial M.C.B. coupler equipment made by the McConway & Torley Company, of Pittsburg, Pa. The coupler head is the same as that used extensively on the passenger coaches of steam railroads. Wide lateral movement of the coupler is required, owing to the severe curves over which the cars travel, while to automatically hold the coupler in the central position on the car for coupling on straight track, a special centering bar and spring are mounted immediately over and parallel with the drawbar. At the forward end of this centering device is a cam and lever, by means of which the compression can be removed from the centering spring, after which the coupler may be moved to any point required for coupling on curved track. On the side of the coupler head is a horn or bracket made to engage the guard arm of the opposing coupler, its object being to minimize the tendency of the couplers to buckle and to strengthen them in pushing cars around curves.

As security against any electrical injury the roofs of the cars are covered with 16-oz. sheet copper well grounded. The exteriors of the cars are painted in three shades of maroon with silver lettering. This exterior finish is similar to that of the Chicago & Alton limited trains. Each passenger car is provided with two wheel trolleys and a pantograph collector, the latter being used on 6600-volt current only. By means of a change-over switch either trolley can be operated on either voltage as desired.

The utility car is a combination equipment which can be used for a construction locomotive or for hauling freight trains. The underframing of this car is built of heavy steel with continuous sills 40 ft. long. The electrical and braking equipment is similar to that of the passenger cars. This car has been fitted with a box body. Both ends of the body have double doors through which such large pieces of freight as theatrical scenery may be loaded.

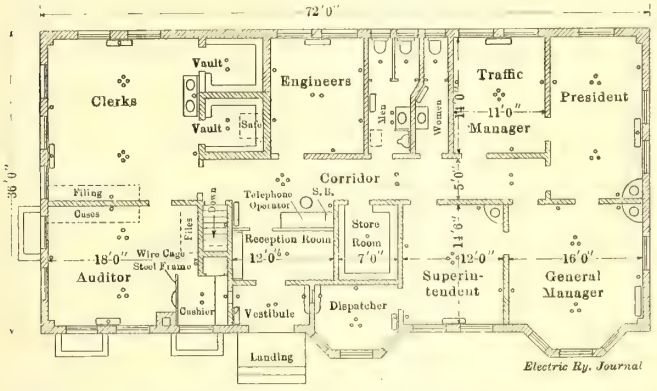
The interurban rolling-stock equipment since the beginning of operation in the summer has given excellent satisfaction. The cars start easily and accelerate with little noise to speeds of more than 60 m.p.h. For 14 miles west of South Bend the electric railway is parallel with and adjacent to the main-line track of the Lake Shore &



Chicago, Lake Shore & South Bend—Plan of Repair Shops at Michigan City

Michigan Southern Railway. Frequent races take place between the steam and the electric equipments and it is said that the electric cars have time and time again outdistanced the steam trains, including the famous Twentieth Century Limited.

The four small cars earlier mentioned are in service in East Chicago and Indiana Harbor on about 4 miles of low-tension line. These cars are 42 ft. long, of the Brill semi-convertible type, and are equipped with Brill and Baldwin trucks. The motor equipment consists of two



Chicago, Lake Shore & South Bend—Floor Plan of General Office Building at Michigan City

75-hp Westinghouse single-phase motors with platform control so arranged that the cars may be operated on the 6600-volt sections.

REPAIR SHOPS

The repair shop of the system is located at East Michigan City and consists of a large building of sand-lime brick with a steel truss roof. It includes a general motor repair shop, armature room, store room, paint shop and wash room, all steam heated and well lighted. Two pits and a transfer table are provided, together with swinging cranes, compressed air and all the necessary tools for car repairs, including a 400-ton wheel press and a wheel-turning lathe. The tools are driven by 30-hp Westinghouse induction motors. Fire protection is provided by a 25,000-gal. tank erected on a 60-ft. tower and a centrifugal pump of 500 gal. per minute capacity, operated by an induction motor installed in a fireproof building 50 ft. distant from the main building. There is also a separate fireproof building adjacent to the shop for storing sand, oil and wrecking tools. The main repair shop presents an unbroken space without columns or partitions.

OFFICE AND STATION BUILDINGS

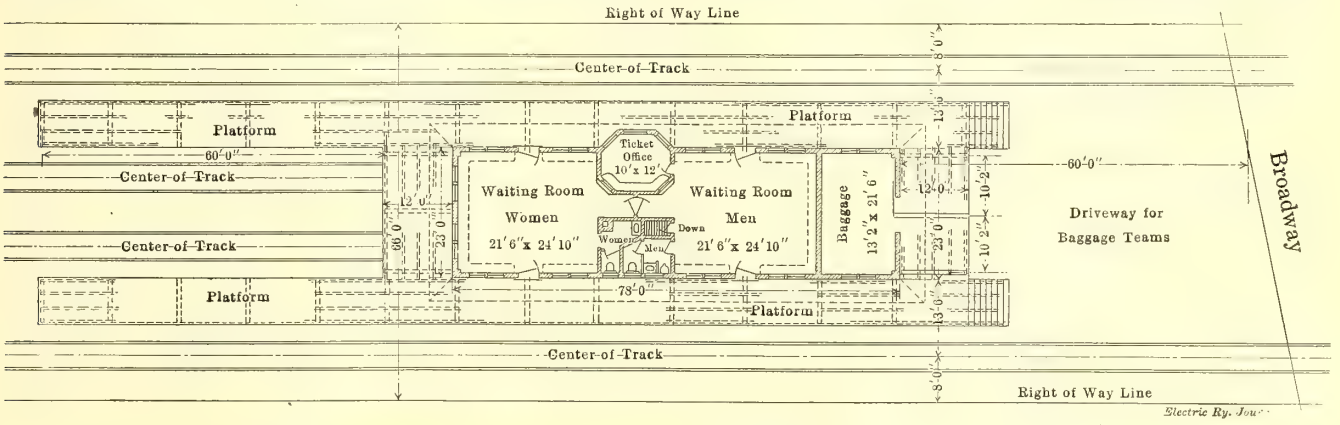
The general offices are also located at East Michigan City, adjacent to the repair shops. The office building is of white brick with red tile roof. It is one story high with a basement and contains offices for the general manager, auditor, electrical engineer, traffic manager, engineers, accountants, cashier, superintendent and train dispatchers, as well as telephone desk room, reception room, general store room, toilets, fireproof vaults, etc. The water supply is provided from the general storage tank for the shops and the lighting from a step-down transformer feeding from the 6600-volt trolley. The office building is splendidly located, being substantially at the center of the system and but 10 minutes' ride by local cars from the business district of Michigan City.



Chicago, Lake Shore & South Bend—General Office Building at Michigan City

At Gary, Ind., is a substantial brick station building 23 ft. x 78 ft., with tile roof, similar in general appearance to the office building previously described. This contains a ticket office, waiting rooms, baggage room, etc. The location is near the plant of the United States Steel Corporation at the head of Broadway and is close to several steam road stations. A 200-ft. platform, level with the car floor, is provided for the use of passengers and the handling of freight and express. It is expected that the business between Gary and Hammond, East Chicago and Chicago will be extremely heavy and a storage yard and "Y" for turning have been provided.

At South Bend a large waiting room and ticket office have been secured on Main Street, close to the Oliver Hotel, opera house, county building, city hall and the terminus of the other traction lines. Arrangements also have been made here for the proper handling of freight and express, for which the company is now making especial preparations.



Chicago, Lake Shore & South Bend—Plan of Station and Platform at Gary, Ind.

At Michigan City the depot for the present is located in a store building adjacent to the tracks in the center of the city. The waiting room in this building is 20 ft. x 57

ft. in size and at the rear is a freight and baggage room 20 ft. x 30 ft. Local ticket offices also are being installed in all of the larger cities and towns through which the road passes.

Neat wooden waiting stations and platforms are located at the principal highway crossings and stopping places. The road crossings have been named so that there may be no confusing of numbers. At each road intersection, crossing post or way station is posted a time-table showing when trains are due to stop at that point. These time-



Chicago, Lake Shore & South Bend—Terminal at Kensington on Illinois Central Railroad

tables are painted with white letters and black background on a piece of tin about 6 in. x 8 in. in size. The permanent-way fixtures have all been installed with regard to the best high-speed service. Semaphores and switch targets are clear of the pole line, whistle posts are placed for each highway and at each local stop posts have been set so that the motorman may more easily stop the car with the rear platform at the best loading point. The name of the next station is painted clearly on each whistle post and every fifth pole is numbered so that car crews may accurately report location.

The schedules offer a local train in either direction every two hours and limited trains in between. On the west end between Gary and Pullman the local service is on 40-minute headway to connect with each Illinois Central Railroad suburban train going into Chicago. An accompanying engraving exhibits the mileages and the one-way and round-trip fares between all stations on the new road. Because of the excellent roadbed the cars of this road can make fast time. The limited trains between Pullman and South Bend make the run of 77 miles in 2 hours and 15 minutes. It requires 45 minutes to travel by the Illinois Central suburban express trains from Randolph Street to Pullman, a distance of 15 miles. Thus

MILES	South Bend, Ind.	Chain Lakes.	Lydick.	Terre Coupee.	New Carlisle.	Hudson Lake.	Smith.	Springville.	Michigan City.	Furnessville.	Mineral Springs.	Dune Park.	Miller.	Aetna.	Gary.	East Chicago.	Hammond, Ind.	Hegewisch, Ill.	Pullman.	FARES
		.10	.15	.20	.25	.30	.40	.55	.65	.80	.85	.95	1.10	1.10	1.15	1.25	1.25	1.30	1.35	South Bend, Ind.
		.20	.25	.35	.45	.50	.70	.90	1.00	1.20	1.35	1.55	1.75	1.75	1.85	2.05	2.05	2.15	2.25	
6.0			.05	.10	.15	.20	.32	.44	.55	.70	.75	.85	1.00	1.00	1.05	1.15	1.15	1.20	1.25	Chain Lakes.
			.10	.20	.25	.35	.50	.70	.90	1.10	1.25	1.45	1.65	1.65	1.75	1.95	1.95	2.05	2.15	
7.0	1.0			.10	.10	.15	.30	.42	.55	.70	.75	.85	1.00	1.00	1.05	1.15	1.15	1.20	1.25	Lydick.
				.20	.20	.25	.50	.70	.90	1.10	1.25	1.45	1.65	1.65	1.75	1.95	1.95	2.05	2.15	
12.0	6.0	5.0			.05	.08	.24	.32	.40	.55	.60	.70	.85	.85	.90	1.00	1.00	1.05	1.10	Terre Coupee.
					.10	.15	.35	.55	.70	.90	1.05	1.25	1.45	1.45	1.55	1.75	1.75	1.85	1.95	
14.0	8.0	7.0	2.0			.05	.15	.28	.40	.55	.60	.70	.85	.85	.90	1.00	1.00	1.05	1.10	New Carlisle.
						.10	.25	.50	.70	.90	1.05	1.25	1.45	1.45	1.55	1.75	1.75	1.85	1.95	
16.0	10.0	9.0	4.0	2.0			.14	.25	.35	.50	.55	.65	.80	.80	.85	.95	.95	1.00	1.05	Hudson Lake.
							.20	.45	.60	.80	.95	1.15	1.35	1.35	1.45	1.65	1.65	1.75	1.85	
22.0	16.0	15.0	10.0	8.0	6.0			.12	.25	.40	.45	.55	.70	.70	.75	.85	.85	.90	.95	Smith.
								.20	.40	.60	.75	.95	1.15	1.15	1.25	1.45	1.45	1.55	1.65	
28.0	22.0	21.0	16.0	14.0	12.0	6.0			.15	.30	.35	.45	.60	.60	.65	.75	.75	.80	.85	Springville.
									.20	.40	.55	.75	.95	.95	1.05	1.25	1.25	1.35	1.45	
34.0	28.0	27.0	22.0	20.0	18.0	12.0	6.0			.15	.20	.30	.45	.45	.50	.60	.60	.65	.70	Michigan City
										.20	.35	.55	.70	.75	.85	1.05	1.05	1.15	1.25	
41.0	35.0	34.0	29.0	27.0	25.0	19.0	13.0	7.0			.08	.16	.28	.30	.35	.45	.45	.50	.55	Furnessville.
											.15	.30	.50	.55	.60	.80	.80	.90	1.00	
45.0	39.0	38.0	33.0	31.0	29.0	23.0	17.0	11.0	4.0			.08	.20	.20	.30	.40	.40	.45	.50	Mineral Springs.
												.15	.35	.40	.50	.70	.70	.80	.90	
49.0	43.0	42.0	37.0	35.0	33.0	27.0	21.0	15.0	8.0	4.0			.12	.15	.20	.30	.30	.35	.40	Dune Park
													.20	.25	.35	.55	.55	.65	.75	
56.0	50.0	49.0	44.0	42.0	40.0	34.0	28.0	22.0	15.0	11.0	7.0			.05	.08	.18	.18	.23	.28	Miller
														.10	.15	.35	.35	.45	.55	
57.0	51.0	50.0	45.0	43.0	41.0	35.0	29.0	23.0	16.0	12.0	8.0	1.0			.05	.15	.15	.20	.25	Aetna.
															.10	.30	.30	.40	.50	
60.0	54.0	53.0	48.0	46.0	44.0	38.0	32.0	26.0	19.0	15.0	11.0	4.0	3.0			.10	.10	.15	.20	Gary.
																.20	.20	.30	.40	
67.0	61.0	60.0	55.0	53.0	51.0	45.0	39.0	33.0	26.0	22.0	18.0	11.0	10.0	7.0			.05	.10	.15	East Chicago.
																	.10	.20	.30	
69.0	63.0	62.0	57.0	55.0	53.0	47.0	41.0	35.0	28.0	24.0	20.0	13.0	12.0	9.0	2.0			.05	.10	Hammond, Ind.
																		.10	.20	
71.0	65.0	64.0	59.0	57.0	55.0	49.0	43.0	37.0	30.0	26.0	22.0	15 0	14.0	11.0	4.0	2.0			.05	Hegewisch, Ill
																			.10	
77.0	71.0	70.0	65.0	63.0	61.0	55.0	49.0	43.0	36.0	32.0	28.0	21.0	20.0	17.0	10.0	8.0	6.0			Pullman.

Light face type figures show single fares. Heavy face type figures show round trip fares.

Chicago, Lake Shore & South Bend—Through Passenger Tariff and Mileage Chart



Chicago, Lake Shore & South Bend—Station at Gary, Ind.

the trip between Chicago and South Bend, 92 miles, can be made in three hours. Limited trains make stops in but six towns in the 77-mile run. Local trains stop on signal at all highway crossings in the country and at all street crossings in the cities, and make the 77-mile run in 2 hours and 55 minutes.

The personnel of the managerial and operating staff of the Chicago, Lake Shore & South Bend Railroad includes: H. U. Wallace, general manager and purchasing agent; G. A. Buchanan, superintendent; Fred Hume, electrical engineer; T. R. Cummins, engineer maintenance of way; George F. Faber, traffic manager.

PUBLICITY SERVICE IN NEW JERSEY

The Public Service Corporation of New Jersey is another of the large companies which has recently established a publicity campaign to enlighten the public on some of the difficulties of conducting a railway and lighting business, and thus create more friendly relations with the community which it serves. The announcements which it has been publishing have taken the form of a series of advertisements in the Newark papers at intervals of about once a week, commencing with Jan. 25. The company supplies electric lighting, gas and railway service, so that the topics discussed relate to all three of these utilities. One of the early articles says:

We are well aware of the fact that many of the criticisms leveled at us have been unjust and unmerited because they were based on a misapprehension of the facts. We are not finding fault with honest criticism. On the contrary, when just criticism is offered in a spirit of fairness, we will welcome it and try to profit by it, but we do not think that we should be measured by the standard of the irresponsible critic who puts surmises forth for facts, lets prejudice supplant judgment or permits a plain grouch to take the place of reason.

Another article says:

When you hear a man talking about what he would do if he were only running the trolley roads it doesn't necessarily follow that the speaker is endowed with superior talent which would enable him to stand out pre-eminently as an operator in the street railway world. Maybe, when it came right down to facts, the same fellow wouldn't be able to tell the difference between a deck sign and a switch iron.

But we all talk, and it seems to be one of the weaknesses of human nature that makes men believe they could do so much better than the other fellow if they were in the other fellow's place. That's why so many people think they could run a hotel, a newspaper or a base ball team.

The articles point out that since 1903 the company has expended more than $30,000,000 in improving its railway and gas and lighting systems; has built or rebuilt 156 miles of track; has added 860 cars to its rolling stock equipment; has increased its power station capacity from 47,700 kw to 102,900 kw; is carrying annually about 300,000,000 passengers; that about 65 per cent of each day's riding is done within five hours; and that the cost of supplies of every kind and the cost of living have increased, but that more transportation is being given for 5 cents in the district served by the company than ever before.

The advertisements are two newspaper columns in width and average about 10 in. in length. The series has not been concluded.

The City of Launceston, Tasmania, has voted in favor of establishing a municipally owned tramway system to cost $300,000. Water power owned by the city will be used to generate electricity to operate the lines.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

Included in the material presented to the Railroad Commission of Wisconsin as evidence on behalf of the Milwaukee Electric Railway & Light Company in the case involving the rates of fare in the city of Milwaukee, is a report by Dickinson, Wilmot & Sterrett, certified public accountants. Testimony regarding the report was given on Feb. 26 and 27 by Charles J. Marr, resident partner at Chicago of this firm. An abstract of Mr. Marr's testimony was published in the account of the hearing contained in the Electric Railway Journal of March 20, 1909. An abstract of the testimony given by the accountant for the city in this case, Edward E. Gore, was published in the issue of Aug. 1, 1908.

The report of the accountants resulted from an examination of the books of the Milwaukee Electric Railway & Light Company, made for the purpose of ascertaining the investment in the street railway property of the company and the net income from operation in the 10 years from Jan. 1, 1897, to Dec. 31, 1906.

The scope of the examination was defined by the accountants as follows:

The facts to be ascertained are:

The cash investment of the company in the railway property, divided into—

(a) Physical property, i.e., real estate, buildings, plant, railroad and equipment;

(b) Other assets, representing the cash cost to the company of the acquisition of the various properties necessary for the consolidation into a unified electric system of the various separate companies with inferior systems of traction which existed prior to the date as of which our investigation commences.

The gross earnings from operation for the period of 10 years.

The operating expenses proper, comprising those expenses which are generally included under the head of operating expenses, such as maintenance of way and structures, maintenance of rolling stock, conducting transportation and general expenses, but not taxes or depreciation.

The legitimate deductions to be made in respect of—

Taxes;

Depreciation or wear and tear of the operated property;

Provision for depreciation or extinguishment of other assets;

Other deductions.

COST OF PROPERTY

The report then refers to the history and organization of the company. After describing the steps leading to the acquisition of the property by the present company and the basis of the issue of securities, the report continues:

On the showing of these facts and precise figures, which were put in evidence in the 4-cent fare case in 1897 and accepted by the court as authentic and conclusive, we have adopted the figure of $10,511,581.78 as the total cash invested in the property at the inception of the present company, of which $8,885,644.17 is applicable to the railway and $1,625,937.61 to the lighting property. The figure of $8,885,644.17 is somewhat less than that arrived at by the city's accountants, and it is perhaps unnecessary to explain exactly how the difference arises.

With regard to the additions or expenditures since Jan. 1, 1897, these amounted to a total of $5,432,868.41, and are made up thus:

New construction charged in the books to:		
Construction account	$5,029,972.06	
Depreciation reserve	861,149.94	
		$5,891,122.00
Less credits to cost of property account in respect of sales in excess of purchases of real estate, etc		458,253.59
		$5,432,868.41

These figures will agree with the city's accountants'

figures if we include therewith the amount of $861,149.94 reported by them as having been charged to depreciation reserve and the balance of purchases and sales of property charged and credited direct to cost of property ($458,253.59), and not to construction account. A comparison of our figures with those of the city's accountants follows:

	City's accountants' figures.	Our figures.	Excess of their figures over ours.
Original cost	$9,020,146.51	$8,885,644.17	$134,502.34
Construction and improvement expenditures, 1897-1906	5,489,187.67	5,432,868.41	56,319.26
	$14,509,334.18	$14,318,512.58	$190,821.60

The difference of $134,502.34 is due to a difference in the method of ascertaining the first cost of the property, and the second difference, of $56,319.26, is due to a clerical error on their part. In both cases the construction and improvement expenditures include the cost of the Public Service Building.

In their comments relating to the amount on which the company is entitled to a return, however, the city's accountants would take exception to the inclusion in the original investment of any items not represented by physical property at the time the present company was formed. This treatment appears to us to be unsound, and also to be contrary to the ruling of the court in the earlier 4-cent fare case, where precisely the same question arose. * * * Upon the various considerations stated the court reached the conclusion that a substantial sum over and above the cost of reproduction was entitled to equitable consideration as being really and necessarily invested, though it was not essential for the purpose of that case to fix the precise amount.

Accepting this view, it next becomes necessary to consider whether the whole of the excess of the original investment over the value of physical property then existing was both really and necessarily invested in the enterprise. Seeing that the purchase of the several old lines was essential to the consolidation of the railways, which was the object of the formation of the Milwaukee Street Railway and which has resulted in so greatly improved service and facilities for the citizens of Milwaukee, it would seem not unreasonable to claim that the amount of the bonded debt of that company and of the underlying mortgages, which the new company was compelled to assume or provide for, fairly represents the amount really and necessarily invested. On this basis the investment would be $9,921,700, or $1,036,055.83 more than is shown by us. Our figure represents as nearly as can be ascertained the actual outlays on the property in cash, and it seems to us that no possible exception can be taken to this figure as being really and necessarily invested in the property.

In effect it seems to us that out of the needs of the public for a new and improved service and out of the readiness of the investors to provide for these needs there grew in effect a well understood and clearly defined partnership or community of interest, in which one party, the city, expected to receive, and did receive, very great practical benefits without assuming any risk, and the other party, at its own risk, contributed in good faith a large sum of money for the purpose of providing those benefits. It would be in the highest degree inequitable for the city to deny those contributing the necessary capital any return on a portion thereof merely on the ground that it is not now represented by physical property.

GROSS EARNINGS AND OPERATING EXPENSES

The books and records of the company show the gross earnings to have been $21,683,929.39 for the 10 years, ranging from $1,409,017.04 in 1897 to $2,973,443.17 in 1906.

The books and records of the company show the operating expenses to have been $11,158,573.12, ranging from $1,007,019.64 in 1897 to $1,455,763.88 in 1906. These comprise all expenses ordinarily comprised under the head of operating expenses, but not taxes or any provision for depreciation or accruing renewals. The figures ascertained and reported by the city's accountants differ from the book figures by an aggregate amount of $750,441.97, they having eliminated items amounting to $750,441.97, which they consider to have been improperly charged to operating expenses in the books.

After giving a summary of the items thus eliminated by the city's accountants, Dickinson, Wilmot & Sterrett continue as follows:

With regard to the items of $136,337.98 and $4,342.47, the city's accountants, while excluding these items from operating expenses, have not included them either in construction or reconstruction. We have, however, in our accounts taken them into the reconstruction account, and inasmuch as the difference between the total construction and reconstruction expenditures on the one hand and the appraised value of the property on the other is dealt with by us as depreciation, the effect of the transfer of the items to reconstruction is to increase the amount of the charge for depreciation, and it follows that the elimination of the items from operating is of no ultimate effect on the question of net earnings.

TAXES

The taxes charged to the railway in the books and accounts of the company have amounted to $1,014,669.35. This is the aggregate amount reserved for taxes in the 10 years, in conformity with the policy of the management to provide monthly for charges of this nature by means of reserves based on certain definite percentages of the gross earnings. On the basis of the taxes actually paid and chargeable in each year the total charge amounted to only $932,001.84, and the city's accountants have adjusted the amount accordingly, and no exception is taken to the adjustment.

DEPRECIATION

In taking up the subject of depreciation the report enters fully into the theories and conclusions of the city's accountants, saying in part:

It has been the practice of the company since the commencement to set aside annual reserves for depreciation beginning with arbitrary sums of $180,000 each in 1898, 1899 and 1900 and thereafter based on 10 per cent of the gross earnings. The total so set aside in the 10 years ended Dec. 31, 1906, has amounted to $2,063,511.16, equivalent to an average of $206,351.11 per annum. The city's accountants take exception to the charge as excessive and in their adjusted accounts have substituted therefor a provision of $1,734,714.35, equivalent to $173,471.43 per annum, the reserve so allowed by them being calculated at 8 per cent of the annual gross earnings, which they state is "regarded as sufficient by some authorities who have carefully investigated the subject."

The identity of these authorities is not disclosed in their report, but it may perhaps be assumed that one of them was the case of the City of Chicago. Two objections to this case as an authority are:

Firstly—That the rates fixed in the ordinance are to be regarded as minima only since special provision is made that the amount of 14 per cent fixed for the maintenance, repairs and depreciation is not to be held as limiting in any way the obligation of the company to expend whatever sums may be necessary.

Secondly—That the regular fare in Chicago is 5 cents per passenger, whereas in Milwaukee, by reason of the sale of 25 tickets for $1 and 6 tickets for 25 cents since 1900, the rate has averaged 4¾ cents per passenger for the whole term of 10 years. It is obvious that the same percentage of gross earnings will not provide for depreciation regardless of the rates charged, and the arguments which would justify a charge of 8 per cent in Chicago would indicate a rate of 8.421 per cent in Milwaukee, either charge being equivalent to $0.004 out of each fare collected.

While the rate of fare has averaged 4¾ cents for the whole term of 10 years, it is necessary to explain that in 1905 and 1906 the averages were only 4.35 cents and 4.32 cents, respectively, which would justify a reserve of 9.238 per cent.

Clearly the only proper way in which depreciation can be provided for by a percentage of gross earnings is as a matter of convenience after the actual depreciation has been ascertained from a study of physical facts. Comparisons with other properties and a consideration of the

adequacy of any given percentage in this particular case must, therefore, if they are to be sound, be based on the relation between the amount provided by the percentage and the value of the property subject to depreciation and the estimated life of the different parts of that property.

The report states that this phase of the question was practically untouched by the city's accountants "and such references as are made to physical facts are such as not only would be absolutely inconclusive, if correct, but are also unsound in principle and erroneous as statements of fact." The report then analyzes the references in the report of the city accountants.

ACTUAL DEPRECIATION

Taking up the subject of actual depreciation of the property the report says in part:

For the purpose of determining the actual depreciation in this case the depreciated value at Dec. 31, 1906, as reported by the valuation staff of the Railroad Commission predecessor company show that approximately $3,000,000 was expended in cash on the property (excluding real estate purchased) between the years 1891 and 1893. The depreciation on this property may for the present purpose fairly be assumed as 5 per cent per annum for three years, which would give a value at Jan. 1, 1897, for the property so acquired of about $2,550,000

To this there should be added the real estate shown in the Clark appraisal 450,000

And also the value of the mileage (20 miles) and of the equipment, estimated at 60 cars, and of the plant and buildings of the West Side Railroad, which was electrically equipped about the year 1890. This value may be taken at $30,000 a mile, or $600,000, less depreciation for, say, six years at 5 per cent, $180,000. 420,000

$3,420,000

Allowing for the Whitefish Bay dummy line and equipment and for miscellaneous buildings and other property

THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

TABLE OF RATES OF DEPRECIATION SUGGESTED AS APPLICABLE TO ELECTRICAL STREET RAILWAY PROPERTIES, SUBMITTED WITH REPORT OF DICKINSON, WILMOT & STERRETT, ACCOUNTANTS FOR THE COMPANY

	J. I. Beggs		Engineer of Valuation Staff of R.R. Commission		Chicago Union Traction Company				Third Avenue, N. Y.	Cardiff (Eng.) Company	Glasgow Tramways	Officials of the M. E. R. & L. Co.	Rate adopted in adjusted accounts
					Adopted by Company		Recommended by Stone & Webster						
	Life	Rate	Life	Rate	Life	Rate	Life	Rate	Rate	Rate	Rate	Rate	
Track and Roadway:		Per cent		Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Track, Ties, Bonding, etc.	12	8.5			12.85	7.75	13.86	7.2	8 to 9	5	8	7.5	7.5
Special Work and Installation	12	8.5	8–14	12.5–7	12.85	7.75	13.86	7.2		5		12	8
Paving and Grading:													
Granite Block	12	8.5			16	10–4	16	10–4		5		10	8
Cobble Stone					25		25						
Asphalt					10		10						
Ballasting	12	8.5								5		5	
Rolling Stock:													
Bodies and Trucks	15	6.66	15–20	6.66–5	20	5	20	5	5	10	7.5	7.5	5
Electrical Equipment	12	8.5			12–15	8.5–6.66	12–15	8.5–6.66		10	7.5	6	7.5
Fenders, Registers, Lights, Clocks, etc.										10		10	10
Overhead System:													
Poles	12	8.5									3.06	7.5	5
Iron			40	2.5	20	5	20	5					
Cedar			12–15	8.33–6.66									
Wiring, Fittings, etc.	12	8.5			7–10	14–10	7–10	14–10			3.06	7.5	10
Underground System:													
Conduits									3	3	3.06	2	2
Feeders, Cables, etc.			25	4					3	3	3.06	5	4
Power Plant Equipment:													
Engines			15–20	6.66–5	15	6.66	20	5	4	5	5	5	5
Boilers			12–15	8.5–6.66	15	6.66	20	5		5	5	7.5	7.5
Heaters, Economizers, Pumps, etc.					15	6.66	20	5		5	5	5	7.5
Piping			20	5	15	6.66	20	5		5	5	7.5	5
Traveling Crane					15	6.66	20	5		5	5	3	5
Belting, Shafting, Ropes, etc.					15	6.66	20	5		5	5	7.5	5
Coal and Ash Conveyors and Hoist Wagons			5	20	15	6.66	20	5		5	5	10	5
Dynamos			20	5	15	6.66	20	5		5	5	7.5	5
Generating Apparatus			20	5	15	6.66	20	5		5	5	5	5
Storage Battery					15	6.66	20	5		5	5	10	10
Switchboard and Cables			50	2	15	6.66	20	5		7.5	5	5	5
Shop Tools and Machinery			10–30	10–3.33	20	5	20	5		7.5	7.5	7.5	7.5
Buildings and Improvements			50	2	50	2	50	2	2	2.5	2.5	3	2
Power Plants					20	5	50	2					
Telephone System												7.5	7.5
Furniture and Fixtures											7.5	5	5
Engineering and Superintendence													5
Miscellaneous													5

Notes.—The rates mentioned by Mr. Beggs were those quoted by him in the Milwaukee Railway 4-cent fare case in 1897.

The rates appearing in the column headed "Engineer of Valuation Staff" are the rates quoted by W. D. Pence, the engineer who had charge of the valuation of the Milwaukee Electric Railway & Light Company's property.

The rates quoted for the Third Avenue (N. Y.) Railroad Company are the rates testified to by M. G. Starrett and others in the franchise tax case.

of Wisconsin may be adopted as the fair present value, and the report of the city's accountants as to the amounts expended for construction and reconstruction (corrected as to palpable accounting errors) may be accepted as a sufficiently correct statement of the amount expended on the property in the 10 years; thus two out of the four factors required to ascertain the depreciation during that period are known, and it only remains to ascertain the depreciated value of the property in service at Jan. 1, 1897.

In connection with the 4-cent-fare case in 1897 testimony was given by W. J. Clark that the "value new" of the property in existence at Jan. 1, 1897, was $5,153,268.76 and this testimony was accepted by the court as substantially correct. Unfortunately this valuation does not include any statement of the depreciation accrued or the depreciated values at that date, and it is, therefore, necessary to estimate the amount of that depreciation.

Much of the property included in the Clark appraisal must have been comparatively new, as the accounts of the taken over and adding, say, 12 per cent for engineering and superintendence, interest during construction and contingencies, it would seem that a fair depreciated value to be placed upon the property at Jan. 1, 1897, would be not less than $4,000,000. This value would be equivalent to 77.62 per cent of the new value, including real estate, or practically the same proportion that the depreciated value at Dec. 31, 1906, reported by the valuation staff bears to the new value at that date, which, to a certain extent, confirms the result already arrived at, since the property, being to a large extent new in 1896, cannot be supposed to have fallen in value to a smaller percentage of cost than the property in 1906.

Accepting the foregoing estimate as correct, the report adds to the $4,000,000 stated the expenditures on the property during the 10 years, excluding repairs charged to operating expenses, these expenditures amounting in the aggregate to $7,277,146.18. There was deducted

$458,253.59 for sales in excess of purchases of real estate and other property, making together a total expended on the property of $6,818,892.59, or a final total of $10,818,892.59. From this total the value of property in existence at Dec. 31, 1906, in its then existing condition as estimated by the valuation staff, $7,161,926, was deducted, leaving as the balance or difference, being the loss or waste by depreciation in the 10 years, $3,656,966.59. The report adds:

We should explain that the report of the appraisers does not anywhere specify the precise figure of $7,161,926 above quoted. It gives the values "new" and "depreciated" of the operated property of the two railway companies together and separately, but it does not separate the values of the non-operated property. We have, therefore, for the purpose of the present report, adopted the figures quoted by the city's accountants in this connection, which are $9,410,177 for "new" and $7,161,926 for "depreciated" values of the Milwaukee Electric Railway & Light Company, as compared with the corresponding figures in the valuation staff's report of $8,931,317 and $6,742,271 for operated property only, and we have assumed that the city's accountants were correctly informed of the division of the values of the non-operated property. We have further assumed that on the whole the division by the valuation staff of the values of the property common to both railway and lighting has been made in the same relative proportions as that made by the city's accountants, which latter was based on the proportion of the current supplied to the two departments.

DEPRECIATION AND MAINTENANCE

It will be generally recognized that the depreciation of a property depends to a considerable extent on the way in which it is maintained and it may, therefore, be useful now to consider the charges for depreciation in conjunction with those for maintenance. In doing so a valuable standard of comparison is to be found in a report made by Stone & Webster, engineers, under instructions of Judge Grosscup, of the United States Circuit Court, in Chicago. In a lease of the North and West Chicago Street Railroad Companies to the Chicago Union Traction Company it was provided, among other things, that there should be deducted from the gross income "a reasonable charge for depreciation of the plant and equipment" and, exception having been taken by the lessor companies to the deductions made by the lessee company under this head and the lessee company being at the time in the hands of a receiver, Stone & Webster were retained by the court to report what would be a reasonable deduction for depreciation. It will be seen, therefore, that that report was made by a strictly impartial authority, acting under instructions of the court, and not in the interests of either party to the suit, and, in view of these facts and of the high standing of the engineers, it may be regarded as authoritative.

The provision for depreciation recommended by the engineers was equivalent to 5.59 per cent of the original cost in the case of the North Chicago lines and 5.68 per cent of the original cost in the case of the West Chicago lines. The total charge in respect of maintenance and depreciation recommended by them was equivalent to 21.77 per cent and 23.70 per cent of the gross earnings of the North and West Side lines, respectively. For the purposes of comparison with the Milwaukee company, Dickinson, Wilmot & Sterrett said, it was necessary to allow for the difference in the rate of fares. To provide the same amount as would be derived from 22.73 per cent (being the average of Stone & Webster's figures) of a 5-cent fare would require 23.93 per cent of a 4.75-cent fare, which is the average received in the city of Milwaukee in the 10 years ending with 1906.

The provision for depreciation arrived at by Dickinson, Wilmot & Sterrett is equivalent to 5.37 per cent on the cost of the physical property, the percentage being determined thus:

	Additions.	Balances.	
Reproductive value of physical property at Jan. 1, 1897 (per Clark valuation)	.....	$5,153,268.76	
New credits, year 1897	*$248,007.75	4,905,261.01	
Additions, year 1898	221,482.22	5,126,743.23	
Additions, year 1899	379,555.72	5,506,298.95	
Additions, year 1900	593,261.50	6,099,560.45	
Additions, year 1901	529,635.49	6,629,195.94	
Additions, year 1902	730,466.46	7,359,662.40	
Additions, year 1903	931,403.18	8,291,065.58	
Additions, year 1904	930,015.15	9,221,080.73	
Additions, year 1905	598,500.11	9,819,580.84	
Total additions	$4,666,312.08	.....	
Total balances		$68,111,717.89	
Average balance		$6,811,171.78	
Total depreciation		$3,656,966.59	= 5.37 per cent
Average depreciation		$365,696.65	= 5.37 per cent

*Debit.

The report continues:

The combined depreciation and maintenance arrived at by us are equivalent to 25.37 per cent of the gross earnings, as will be seen from the following table:

Depreciation during the 10 years	$3,656,966.59
Add:	
Maintenance of road and structures, included in operating expenses	915,949.77
Maintenance of rolling stock, included in operating expenses	929,360.11
Total maintenance and depreciation	$5,502,276.47
Gross earnings for 10 years	$21,683,929.39
Percentage maintenance and depreciation to gross earnings	25.37 per cent

On the other hand, the depreciation provided by the city's accountants is 2.55 per cent on the cost of the physical property and their combined allowances for maintenance and depreciation just 16.5 per cent of the gross earnings.

The question of depreciation is not frequently a difficult one to deal with—we do not mean the question of deciding whether depreciation has or has not accrued, because the inevitableness of depreciation must be recognized like any other economic truth—but the matter of determining the amount of depreciation which has taken place and of making adequate provision for it as it accrues from year to year. Fortunately in the present case the ascertainment of the depreciation which has accrued and the amount it is necessary to provide out of revenue to make good that depreciation is less of a theoretical question than it frequently is, because of the fact that we have reliable data as to the property at the beginning and end of the period, as well as in regard to the expenditures during the period.

Amortization or Extinguishment of Amount Invested in Intangible Assets.—The company's franchises expire in December, 1934, and, if it be conceded that the company is entitled to a return on the amount necessarily invested in intangible assets, it follows that provision should be made for repayment of the principal so invested. * * * In view of the uncertainty of the future and the impossibility of forecasting events over so long a period as 38 years, it would be reasonable to claim that the company should recoup itself for its investment by equal annual installments over the period rather than by a sinking-fund plan. Inasmuch as the latter plan would provide for increasingly larger contributions as the years elapsed and for the return of the amount only at the end of the franchise in one lump sum, the return of any substantial proportion of the investment is made dependent on the future, and having regard to all the contingencies that may arise in the future, the company would be justified in expecting a return of the capital ratably over the whole period if, indeed, it might not fairly claim that it should recoup itself over a shorter term.

Difference in Investment in Physical Property at Expiration of Franchise and Scrap Value Thereof.—In our accounts no provision has been made for the loss which may arise under this head, but as the franchise contains no provision by which the city is obligated to pay for the fair value of the tangible property as a going concern at the expiration of the franchise, it would seem proper to consider what the realizable value of that property would be and to provide by annual installments out of income for the difference between that value and the value as a going concern at that date. * * * The property employed in

the operation of a railroad will wear out at different times and must then be replaced and it is found that there is a certain standard of efficiency up to which the property must always be kept to permit of its operation and particularly to permit of its operation so as to give a return on capital such as is under consideration in the present case.

CERTAIN PERCENTAGE OF ORIGINAL COST SHOULD BE MAINTAINED

The report of the valuation staff shows that the property is now worth about 76 per cent of its original cost, and while it is possible that, in view of the expiration of the franchise, the property might be allowed to run down below the standard, there is a certain percentage of original cost, which is probably not lower than 60 per cent, beyond which the property could not be allowed to deteriorate and continue to be operated with safety.

During the 10 years under consideration out of a total depreciation of $3,656,966.59 no less than $1,386,024.18 has been made good by reconstruction expenditures, and this is in spite of the fact that at the commencement of the period a large part of the property was practically new and that the investment has been materially increased during the period.

At any given date the property of the company as a going concern should be worth a percentage of its cost, which may fluctuate within extreme limits of, say, 60 per cent and 85 per cent, and the provisions for depreciation if made on sound principles should be such that at all times there would be in the fund a credit balance substantially equal to the difference between the actual value as a going concern and the new value of the tangible property. We have no figures as to the probable scrap value of the property, but we are of the opinion it would be entirely legitimate to provide a fund which would at the expiration of the franchise amount to a sum sufficient to take care of the difference between the scrap value and, say, a minimum of 60 per cent of the original cost as representing its operating value.

Reserve for Interest on Average Working Capital.—While ordinarily the working capital of a street railway company would not amount to a very considerable sum, seeing that it is largely a cash business, still in actual practice some working capital would be found to be absolutely necessary and the difficulty in the present case is to estimate the amount so required.

RESERVES FOR CONTINGENCIES

The report discusses very fully the reserves which have been set aside from earnings of the company and expresses the following conclusions:

Injuries and Damages.—To deal with these liabilities only as and when they are paid must result in burdening the accounts of one year with expenses which do not belong in that year and in relieving the accounts of prior years of expenses properly chargeable to those years. To allow considerable liabilities of this nature to overlap from one year to another would be evidence of bad management and bad bookkeeping. In view of the fact that in the operation of most carriers there is at all times a considerable liability in respect of pending claims and that at any time the liability may by some unfortunate accident assume very considerable proportions, it is generally recognized as wise to set aside liberal reserves for contingencies and it was a wise step on the part of the management of the Milwaukee Electric Railway & Light Company at the outset to adopt a policy of building up substantial reserves of this character.

Insurance Reserve.—It seems to us that your company is entitled, and as a business proposition is compelled, to maintain reserves to meet possible contingencies of fire or accident. Losses under both of these headings are largely a question of average and a disaster may easily occur in either direction in some year, against the possibility of which a prudent management would carry a reserve.

APPORTIONMENT OF EARNINGS AND EXPENSES BETWEEN THE TWO COMPANIES

The city's accountants having raised a question as to the apportionment of the earnings and expenses between the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, this point is discussed by Dickinson, Wilmot & Sterrett, who say in part:

The earnings credited to the traction company are, of course, the actual earnings which are readily segregated from those of the parent company and no difficulty should arise in this connection, except that it may be well to state that all passengers carried in suburban cars while operated within the city fare limits are considered city passengers and the fares collected from them for their transportation to and fro within the city limits are counted as city fares.

With regard to the division of expenses which are common not only to the two railway companies, but as to some part thereof to the lighting businesses as well, the basis is, generally speaking, as follows:

General Expenses.—After first deducting from the total expenses such items as pertain directly to the railway business, such as reserves for damages and legal expenses, etc., there is then deducted and charged to the lighting business that proportion of the general expenses which the total earnings of the lighting business bore to the total earnings of the railway business in the previous year. The balance remaining for division between the two railway companies is then subdivided between them in the proportion that the car-hours of each company bears to the total car-hours of both companies.

Conducting Transportation.—This comprises wages (consisting mainly of wages of motormen and conductors) and cost of power, i. e., the cost of the power actually supplied to the railway department, and the lighting department having been previously charged with the cost of the power supplied to that department, the whole of the expense of "conducting transportation" is, therefore, chargeable to the two railway companies and is charged to them on the basis of car-hours.

Maintenance of Way and Structures—Maintenance of Rolling Stock.—All expenses under these two heads are applicable to the railway companies and the lighting department is not concerned therein, and, like conducting transportation and general expenses, the maintenance accounts are divided between the two railway companies on the basis of car-hours.

It is possible that some of the expenditures such as "wages of motormen and conductors" or "maintenance of way and structures" could be distributed on some basis other than that of car-hours, such as car-miles, for instance, but we are not prepared to say that the adoption of any of these other bases would lead to more correct results, as this is an important qustion and one requiring careful consideration. The facts will show, however, that heretofore the expenses have been divided in accordance with a carefully thought-out rule, which has been strictly applied, and that there has been no attempt to favor one company at the expense of the other as is suggested by the city's accountants.

THE ARGENTINE CENTENNIAL TRANSPORTATION FAIR IN 1910

The Argentine Republic is extending invitations to manufacturers of railway apparatus and accessories to exhibit at its International Exhibition of Railways and Land Transport to be held in Buenos Ayres, May 25, 1910, to Nov. 25, 1910, in honor of the centennial of Argentine independence. Buenos Ayres has a population of 1,200,000, and is the chief city of a country with 3,000,000 sq. km of fertile territory. It now has 25,000 km (15,500 miles) of railways, but it is hoped to increase this to 100,000 km (62,000 miles) within the next generation. The republic depends upon foreign manufacturers to supply the bulk of this railway material. Applications for space at the exhibit should be sent to the Buenos Ayres executive committee, of which A. Schneidewind, C.E., is president and Ed. Schlatter, C.E., secretary.

BLOCK SIGNALS IN DES MOINES

A simple and reliable block and danger signal has been in use on the lines of the Des Moines City Railway Company and Interurban Railway Company for the past two years. Having tried various makes of signals on the city and interurban lines during the past seven or eight years with indifferent success and feeling the necessity of a simple and dependable signal, E. R. Cunningham, after considerable experimenting, designed a one-wire signal which has been adapted to a number of interesting uses.

The signal is built to be operated either electrically or mechanically by the trolley or car wheel. On city lines it is preferable to operate the signals either electrically or mechanically by the trolley wheel, but for high-speed interurban service, where there are no turnouts, it is preferable to operate them mechanically by the car wheel.

Fig. 1 is the wiring diagram of one complete block between two turnouts, *A* and *B*, designed to be operated mechanically by the trolley wheel. The car entering the block at station *A* passes under the lever 10, raising the movable armature or core 14, the upwardly projecting shaft 16 and the disk 18. Disk 18 then closes contacts 20, 21 and 22. Current passes through the trolley connection 26 to contact 20, through the disk 18 to contacts 21 and 22 in multiple. From contact 22 current passes through the connection 27 to holding solenoid 15, through the connection 28 to contact 29 of the non-interfering relay, through the disk 60 of this relay (providing danger signal 57 is not set, in which case disk 60 would be up and setting circuit would be open between contacts 29 and 30) to contact 30, through the connection 30 to safety signal 32, through the connection 33 to line wire 34 and through polarized relays cut in the line wire at all curves and dangerous points along the line, thence through the line wire to station *B*. The polarized relays set intermediate direction signals which may or may not be used between block stations. At station *B* current passes through the danger signal 35 and the connection 36 to non-interfering relay solenoid 37, through the connection 38 to contact 39, through the disk 40 to contact 41, through the connection 42 to releasing switch 43 and through the connection 44 to ground, 45.

It will be observed that current in passing through solenoid 37 raises disk 47, opening contacts 51 and 52 and

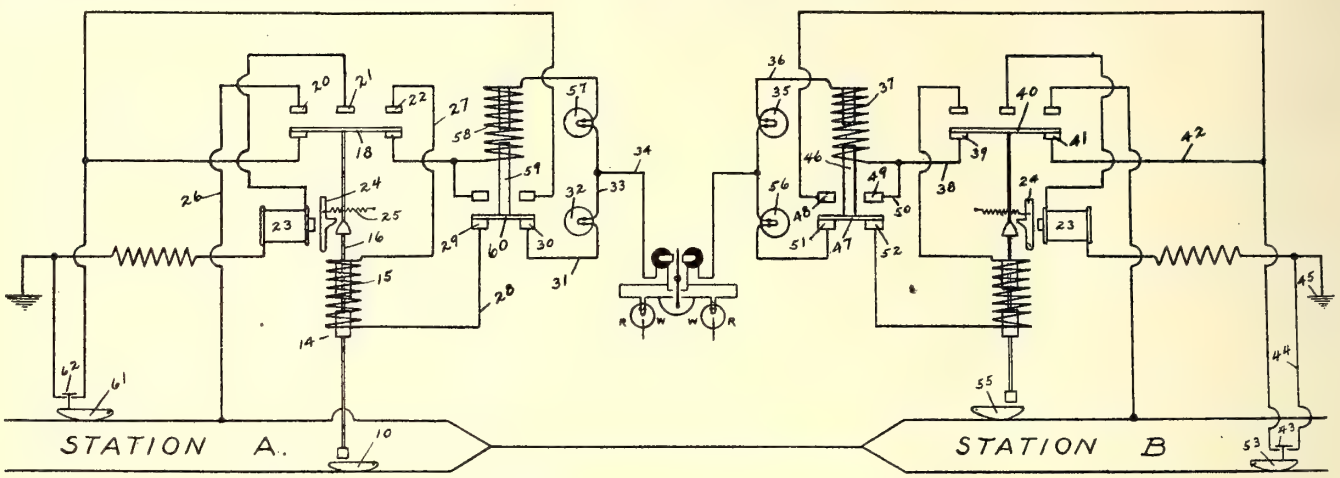


Fig. 1—Diagram of Circuits for Single Block, with Mechanical Trolley-Operated Switches

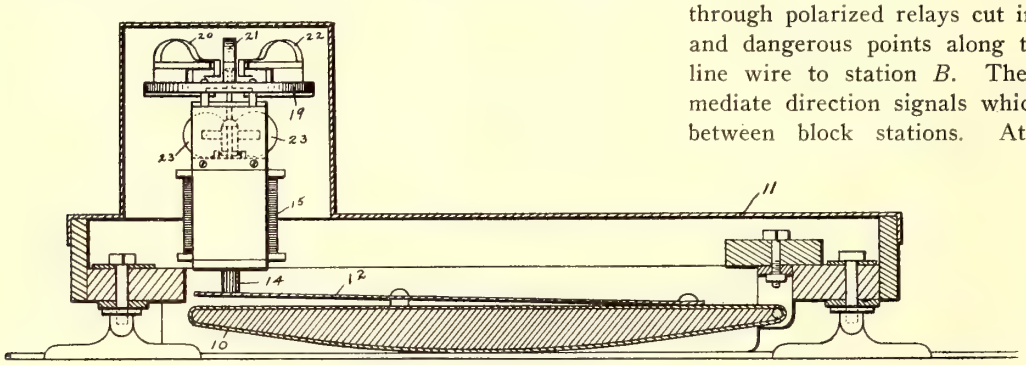


Fig. 2—Mechanical Trolley Setting Switch

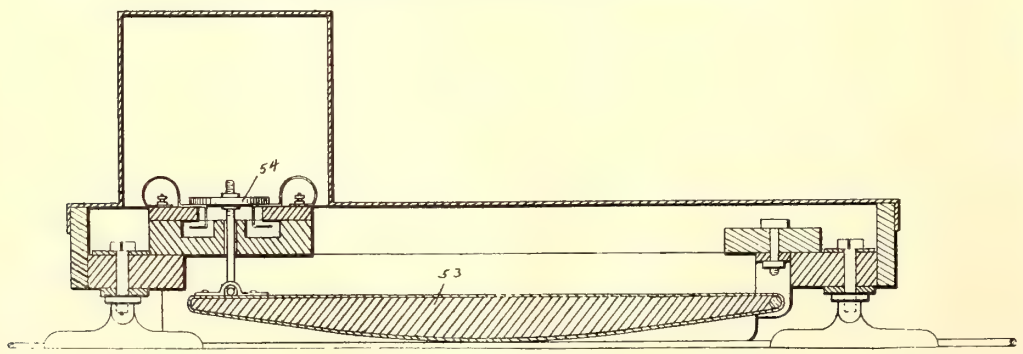


Fig. 3—Mechanical Trolley Releasing Switch

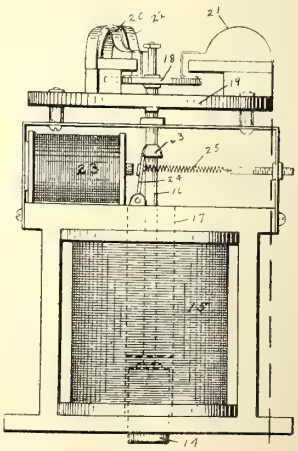


Fig. 4—Detail of Setting Switch

closing contacts 48 and 49, thus cutting out the setting switch at station *B* so that an opposing car at station *B* cannot get a safety signal or release the danger signal by passing under the setting lever 55.

The safety signal 32 at station *A*, the direction signals within the block and the danger signals at station *B* will remain set until the car passes out of the block under the lever when the setting switch is closed, the lock lever is pulled over by the coil spring 25 and engages with lock flange as shown in Fig. 4, when the power goes down on the line. When the setting switch is released by a car passing out of the block by way of the releasing switches, power is retained on the lock magnet until the lock flange has fallen below the lock lever. This is ac-

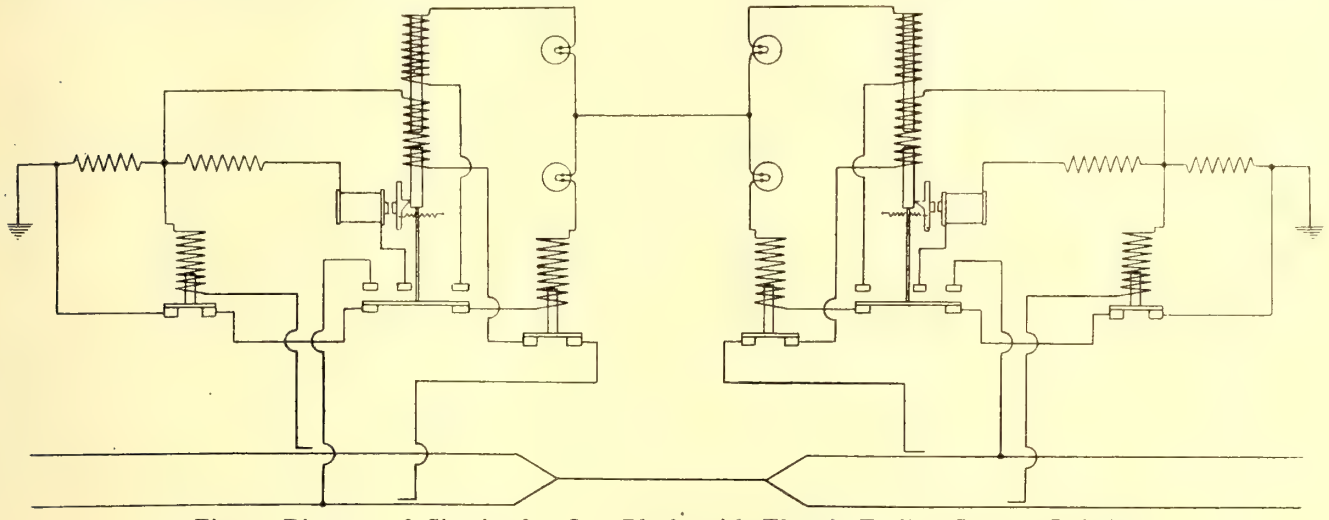


Fig. 5—Diagram of Circuits for One Block, with Electric Trolley Contact Switches

releasing lever 53, which momentarily opens the circuit by means of releasing switch 43. The opening of the circuit by means of the releasing switch allows the moveable portion of setting switch at station *A* to fall by gravity, restoring all signals to position indicating a clear block.

A car entering the block at station *B* by way of setting switch 55, would set safety signal 48 at station *B* and current would flow in the opposite direction through the line wire and polarized relays, setting opposite direction signals through the block and at station *A* would set danger signal 57 and cut out the setting switch at this station by raising disk 60 of the non-interfering relay and would release the signals by passing under the releasing switch lever 61.

The trolley operated setting lever and switch is shown in Fig. 2 and the trolley operated releasing lever and switch is shown in Fig. 3.

If power should go down while a car is in the block the setting switch is automatically locked in position. This is done by means of lock lever 24 engaging with lock-flange 63 of the setting switch (Fig. 4). When the power goes down on the line the holding power of the solenoid 15, which holds the movable portion of the setting switch up, and the holding power of lock magnet 23, which holds the lock lever away from the lock flange 63, are removed simultaneously, and since the inertia of the lock lever is less than that of the movable portion of the setting switch and since the lock flange rests about ⅛ in. above the lock

complished by the spring contacts 20, 21 and 22 following the disk 18 down about ¼ in.

When the signals are operated mechanically by the car wheel the same wiring and connections are used as when operated by the trolley wheel, the only difference being in the design and location of the operating levers and the location of the setting and releasing switches.

The operating levers of the mechanical wheel-actuated switches are located at the side of the rail and are so designed that when a car enters a block the flange of the car wheel runs over the lever, giving it a downward or vertical movement, and when it runs out of the block the flange of the wheel runs between the rail and lever, giving it an outward or horizontal movement. The same lever is connected to both the setting and releasing switches, which are located on a post at the side of the track in such a manner that the vertical movement operates the setting switches and the horizontal movement operates the releasing switches. This gives the track operated signals an advantage over the trolley operated signals, for the reason that if the car enters a block and then backs out it will release the signals. With the trolley operated signals, when a car has entered a block and set the signals it must pass through the block to release them unless an extra releasing switch is provided in advance of the setting switch. The track operated switches can be operated at a higher rate of speed than the trolley operated switches and can be used on lines operating both steam and electric cars.

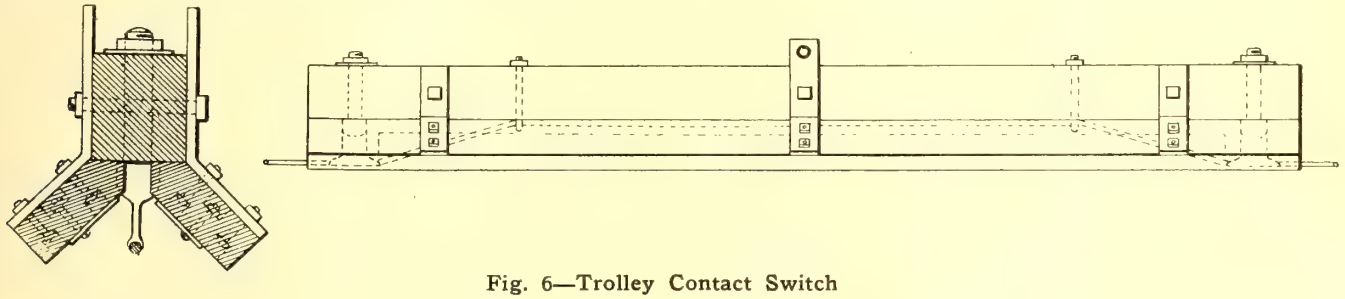


Fig. 6—Trolley Contact Switch

The electrically operated signals operate on the same principle as the mechanically operated signals except that they are set and released by electrically operated solenoids energized by means of a trolley contact. The wiring plan of the electrically operated signals is shown in Fig. 5.

These signals are used in Des Moines not only as block signals on single track, but are used for protecting curves on double tracks that are too close for double-truck cars to pass on the curve. When used for this purpose but one setting and releasing switch is required, as the signals are placed on one track only, usually on the in-bound track, giving the in-bound car the right of way. The setting switch is located on the in-bound track a sufficient distance from the curve so that an in-bound car as it approaches the curve will set a danger signal at the curve far enough in advance to warn the out-bound car and hold it back a safe distance from the curve until the in-bound car has passed around the curve and released the signal. This saves the inconvenience and danger arising from one car having to back up when both have approached too close to the curve to clear each other in passing.

The same setting and releasing switches are used for operating crossing and danger signals, such as bells, semaphores and lights. They are also used to warn towermen in advance of an approaching car, so that they will have plenty of time to operate the interlocking switches; and are also used at stations and car barns to notify the station agent or barn foreman in advance of the arrival of a car so that he may be ready with any orders or supplies that he has for the crew.

The distinguishing features of these signals are their simplicity and the speed at which they can be operated; and since but one wire is used, it is absolutely impossible to set both safety and danger signals at the same time.

The polarized relays used along the line are not a necessary part of the signal, but may be used as an extra precaution to set direction signals at all curves and dangerous points through the block when desired.

STATISTICS OF SURFACE AND ELEVATED ELECTRIC RAILWAYS IN ILLINOIS

A copy of the introduction to the annual report of the Railroad & Warehouse Commission of Illinois for the year ended June 30, 1908, has been received from William Kilpatrick, the secretary. The total number of miles of main line and branches of surface and elevated electric railroads was 1303.91. The interurban electric railways increased their main track mileage by 119.28 miles. The mileage of this class of roads projected for completion during the present year is very large, the report states. An abstract of features of the report relating to surface and elevated electric railways follows:

The statistics contained in the tables relating to electric railways are only applicable to purely interurban lines, incorporated under the general railroad act, and contain nothing in regard to street railways, the latter roads being specifically exempt by statute from the jurisdiction of this commission. The interurban electric road is becoming a very potent factor in the transportation business of our State, and these roads are constantly extending their facilities so as to include sleeping car, express and freight service, adding materially to the convenience of the public.

The capital stock and funded debt of this class of roads for the year ending June 30, 1908, was $209,929,526, an increase of $32,486,519.

The average capitalization, capital stock and funded debt per mile of road of surface and elevated electric railways for the year was $161,000.

The average capitalization (capital stock and funded debt) per mile of surface roads was $83,230. The average per mile of road for the elevated roads was $1,778,631.

The total income from operation of the surface and elevated electric railways for the year was $16,570,381, an increase of $2,614,171. The operating expenses were $9,814,966, an increase of $2,067,634. The income from operation was $6,804,309, an increase of $595,431. Income from property and other sources was $1,020,195, an increase of $127,329, making a total income from all sources of $7,817,865, an increase over the previous year of $716,121.

The fixed charges were $6,464,155, an increase of $1,477,990, leaving a net income of $1,901,035, a decrease of $480,763. This decrease may be accounted for largely by the fact that, in accordance with the requirements of the Interstate Commerce Commission's rules, some of these roads have charged off large amounts to depreciation account.

The total amount paid in dividends by the surface and elevated electric railways for the year ending June 30, 1908, was $1,141,190, an increase over the previous year of $6,825.

The total assets and liabilities (capital stock and funded debt) of the surface and elevated electric railways were: Assets, $222,484,143; increase, $27,009,922; liabilities, $221,158,186; increase, $30,160,145. The net surplus of assets over liabilities was $1,325,957.

PASSENGER AND FREIGHT SERVICE

The total income from passenger service of the surface and elevated electric railways for the year, including mail, express, advertising, etc., was $13,350,168, an increase of $978,472. The total received from freight service was $426,057, a decrease of $168,314. This is largely accounted for by the fact that the Chicago & Milwaukee Electric Railroad showed a large sum as freight earnings for the year ending June 30, 1907, and none at all for the year ending June 30, 1908.

The total earnings and income of the surface and elevated electric railways from all sources for the year were $15,392,609, an increase of $998,052.

The total expenditures in Illinois of the surface and elevated electric railways for the year for maintenance of way and structures, maintenance of equipment, conducting transportation and general and unclassified expenses and fixed charges, were $14,181,546, an increase of $1,822,046.

The number of passengers carried yielding revenue by the surface and elevated electric railways was 210,516,171, an increase of 12,734,260. The number of tons of revenue freight was 854,032, a decrease of 598,086 tons. This decrease, as in the item of freight earnings previously referred to, was largely accounted for by the Chicago & Milwaukee Electric Railroad and by the result of the commercial depression.

The passenger earnings per mile of road were $11,052, an increase of $502. The freight earnings per mile of road were $553, a decrease of $267. The gross earnings per mile of road were $12,914, an increase of $1,362. The operating expenses per mile of road were $7,700, an increase of $1,142. The net earnings per mile of road were $5,314, an increase of $220.

RAILROAD EMPLOYEES IN ILLINOIS

The number of officers and employees on the surface and elevated electric railways for the year was 7467, an increase over the previous year of 790. There was paid in salaries to these employees a total sum of $5,111,572, an increase over the previous year of $631,830.

For the year the average for all classes, including general officers, was $2.25 per day, which is an increase over the preceding year of 6 cents per day.

During the year 743 tons of steel rails were laid and 63,092 new ties were laid on the surface and elevated electric railways in the State. The number of stations on these roads is 391, being a decrease of 50 stations.

The number of highways crossed at grade is 2688, an increase of 213 for the year. The number of overhead highway crossings is 170 and under-highway crossings 138.

The number of miles of road equipped with block signals is 154.79 miles.

The number of passengers killed by the surface and elevated electric railways for the year was 29, an increase of 10; the number of employees killed was 16, a decrease of 3; other persons killed, 68; an increase of 30. Total number of passengers injured, 536; an increase of 58; number of employees injured, 198; an increase of 49; other persons injured, 107; an increase of 39. Total number killed, all classes, 113; an increase over the previous year of 37; total number injured, all classes, 841; an increase for the year of 133.

The amount of taxes paid for the year was $723,476.18, an increase of $39,153.25.

NEGOTIATIONS FOR NEW ORDINANCE IN CLEVELAND

At the meeting of the council committee of the whole, on April 2, Mayor Johnson took the position that if the city should ever exercise the option to purchase the property of the Cleveland Railway, which he proposes shall be incorporated in the franchise, the contract should not contain the provision that the city will be directly liable for the bonded indebtedness of the company. He said that such an agreement would make municipal ownership impossible, or, at least, endanger it, as the State Legislature, in any statute that may be enacted, was not likely to so word it as to include liability for the debts of a street railway company whose property might be purchased. In case the statute did not fit the contract made with the company now, it would be impossible for the city to secure the system, even though it might be willing to do so. He said further, that while the city might be able to raise enough money on new bonds to purchase the stock, it might not be possible to secure enough to pay off the bonds. He objected to any plan that would make the city directly liable for the payment of the bonds, but said that the property itself should be good for them.

President Horace E. Andrews stated that if the company should sell the property to the city, the stockholders would want to transfer all the business and relieve themselves of further responsibility, and would insist that no loophole be left by which the property might be thrown back into their hands. He said he could not understand the idea of the Mayor in insisting that the city should not assume the indebtedness absolutely if it should take over the road at any time.

Attorney John G. White, who drew the new ordinance, said that the Legislature of Ohio would never authorize cities to own street railway systems without making it possible to pay for them.

City Solicitor Newton D. Baker suggested that instead of wording the ordinance as Mr. White had, providing that the city should assume the bonded indebtedness, it should read, "The city shall provide for the bonded indebtedness," or something to that effect. He said that the city could not purchase the property and fail to make provision for the payment of the entire sum agreed upon, including both stock and indebtedness.

The amount of current liabilities the company might have at any time was also discussed at this meeting. At first it was suggested that it should not exceed the amount of cash to be allowed for the interest fund to start with, $500,000, but several other suggestions were discussed. Mr. Andrews said that the sum suggested seemed small, as the business of the company would probably increase with the growth of the city, and that the margin of unfunded debt should vary with the needs of the railway. He suggested that the limit be fixed by allowing a certain percentage on the gross earnings. Mr. Johnson said he felt that 6 per cent would be sufficient, but Mr. Andrews objected on the ground that this would be too small. Secretary Henry J. Davies said that the basis for reckoning the sum should be the capital valuation, and this proved satisfactory to both Mr. Andrews and Mr. Johnson, although the rate was not determined. Mr. Johnson said that the company might expend as much as it pleased and cover it in this form of indebtedness, but that the difference between the amount of the debt and the maximum allowed in the contract should be deducted from the price in the event of purchase by the city. Mr. Andrews contended that this would put the company in the light of breaking its contract, which did not seem right to him. The rate will be discussed later.

CONTROL BY CITY

On the evening of April 2 the question of city control occupied the attention of the committee again. With Mayor Johnson contending that the City Council should have complete control of the schedules and routing of cars, on the plea that it would be to the interest of the owners of the property to keep up the fare, an impartial board of arbitration was proposed to take charge of this phase of the business, one member to be chosen by the city, another by the company and the third by these two. Both the Mayor and City Solicitor Baker opposed this plan, and stated that the City Council should have full control. Judge Tayler made the following statement regarding the subject of city control:

Fundamentally, and so far as this plan of settlement is concerned, the company is not concerned in the control over the service. I think that a large control over the nature of the service and the routing of the cars should repose with the City Council, but the Council is human, and I do not think we can always trust ourselves. The community will feel safer and in better humor with the plan if it is provided that in the event of differences between the railway company and the Council the decision should be left to impartial arbitration. I do not think that serious differences should occur for the reason that the company is guaranteed 6 per cent on its investment, and is under no impulse to increase or reduce the service on its own account. The company will be ready to do as asked by the Council.

So, also, the Council has no interest but that of efficient service that will satisfy the people. But other influences may in time operate either upon the company or the Council. In that event the community would feel safer if it were known that the differences would be settled by an impartial board of arbitration whom we could trust better than ourselves.

Mr. Johnson said he did not agree with Judge Tayler, and insisted that there be no appeal to any other power after the Council had acted. President Andrews expressed a preference for a permanent board of arbitration to pass upon service questions.

Regarding the rate of fare, Mr. Andrews stated that the initial fare should be six tickets for 25 cents or 5 cents cash for a ride. He said that the company would be compelled to raise a large amount of money at once, as improvements were needed badly and 450 pay-as-you-enter cars must be furnished within a few months. A lower fare would not take care of the expenses of operation under the circumstances and yield 6 per cent on the investment. Nothing less than six tickets for 25 cents would meet the necessity at the beginning.

The question of grants in the suburban towns was taken up again. Mr. Johnson stated that the city should have something to say in this matter if the grants affected the car-mile cost of operation; in fact, the Council should have the right to veto any action thus taken. Mr. White said

he was opposed to any kind of a zone system, and that matter should be left to a board of experts to decide.

ENTRANCE OF INTERURBAN LINES

There was also some discussion of the interurban lines and their entrance over the tracks of the local company. Mr. Andrews, in answer to a question, said that the wear on the tracks by the heavy interurban cars was much greater than that by city cars. Mayor Johnson proposed that some limitation as to weight and depth of flange be made to prevent this. A suggestion that the cars be stopped at the city limits did not meet with a hearty reception. Cincinnati had an arrangement of that nature for a long time, but now an effort is under way to get the terminals of all lines into the business section of the city, because of the advantage to business houses and manufacturers.

One of the subjects considered at the meetings on April 3 was the assertion of Mr. Andrews that he would concede a 4-cent fare with 1 cent for transfers, as the maximum in the new ordinance, instead of either the six or seven tickets for 25 cents with the transfer conditions attached, as provided in the two drafts of ordinances under consideration.

Although questioning the advisability of doing so, President Andrews stated that he would concede the matter of putting on 450 pay-as-you-enter cars within a few months after the settlement. He said that about 200 new cars would have to be secured, and that the expenditure would be about $1,000,000. Mr. Andrews believes that the service will have to be increased from 15 to 20 per cent over that existing at present to give satisfaction. On the other hand, he said that the price at which the city should take the property at the end of a fixed period, if it so desires, ought to be 120 instead of 110, as proposed by the Mayor.

Mr. Andrews stated that the company wanted protection against the cutting of service by the City Council to secure very low fare. City Solicitor Baker stated that he would be willing to insert in the franchise a condition that the city should not require so much service as to interfere with the 6 per cent dividend to the stockholders and also make it possible to enter into a new contract if it should be found that the maximum fare was too low. Mr. Andrews said that protection is needed both ways. The company did not want the city to have power to cut the service to such an extent that the people would not be satisfied.

In making improvements and betterments Mr. Andrews said he thought the company should be allowed to proceed without delay. Mr. Johnson said that all the city desired was that the company should not increase its capital account without the consent of the Council.

In making the settlement, City Solicitor Baker said that the Johnson-Goff valuation should be used as the basis. The $2,000,000 allowed for good-will, he said, rather represented consolation to the company for disputes and disagreements in the settlement, and the $6,000,000 for unexpired franchises had been offset to a great extent by the fact that the people rode for nine months at a 3-cent instead of a 5-cent fare.

Vice-President J. J. Stanley and A. B. duPont will begin work on the schedules with the idea of ascertaining a proper car-mile charge for operation to be incorporated in the new franchise.

At the meetings on April 1 the most vital question discussed was that of city control of service and schedules. Mr. White stated that he had modified the Baker ordinance to some extent because of the fact that the City Council, in its desire to secure lower fare, might do great damage to the city by cutting down the service or, for personal reasons, might favor one part of the city as against another. He stated that the referendum vote was against the franchise under which the Municipal Traction Company operated because of the poor service that was given. This was proof that the people wanted a good service, even though the fare was more than 3 cents.

The duty of the Street Railway Commissioner, for which provision is made in the Baker ordinance, would be to furnish information to the City Council. His salary would be $1,000 a month.

The question of suburban lines was raised in this connection. Mr. White said that if the lines to the suburbs were to be treated differently from those inside the city, they would have only the value of junk when the franchises expired. Both Mr. Andrews and Mr. White want the system treated as a whole in anything that is done.

PAY-AS-YOU-ENTER CARS

Mr. Andrews stated that he was not in favor of the provisions of either the White or the Baker ordinance regarding the pay-as-you-enter cars. He said that he had been making a study of pay-as-you-enter cars, and he was not yet sure of their success. In some instances a saving of from 8 to 10 per cent was shown by their use, while in others there was no difference. This class of cars is undergoing development, and he said he would not want to equip the whole system with a certain kind or any kind within a year, and then find that they were not up to date. The subject was passed for the time.

Regarding the date at which a new ordinance should go into effect, the suggestion of City Solicitor Baker that the ordinance terminate on May 1, 1934, was adopted. As provided in the White ordinance, it was agreed that the Neutral Street Railway lines be included in the consideration of the new franchise. The extension of several lines and contracts with interurban railway companies were discussed, but the decisions were left for a future time. The free territory, as provided in the White ordinance, was also discussed, without arriving at a decision. Mayor Johnson suggested a specific valuation of $20,000 a mile in arriving at the cost of joint use of tracks, with a larger amount for special work. Mr. Andrews said that the valuation in future years might be as high as $100,000 a mile, because of the use of underground or elevated tracks. Mr. Baker suggested that the valuation of tracks in free territory be left to arbitration.

Judge Tayler has stated that the greatest difference between the two ordinances is the quality and quantity of supervision to be exercised by the city over the operation of the system. He said that it may cost a certain rate at present to transport a passenger, but in 10 years it may cost half as much or it may cost twice as much. No one can tell anything about it, and for this reason he holds that the sliding scale of rates is the only correct measure to adopt.

REPORT OF SPECIAL MASTER ON CLAIMS

The recapitulation of a partial report made by Special Master Irving Belford to Judge Tayler, of the United States Circuit Court, is as follows:

Claims allowed as preferential		$212,225.37
Claims allowed as preferential, objected to by Cleveland Railway		89,321.57
General claims (extensions, betterments and improvements)		3,542.53
General claims		37,347.63
Claims dated April 27, 1908, and prior:		
Cleveland Railway	$33,844.60	
Municipal Traction Co	15,334.39	
Forest City Railway	872.45	50,051.44
Disputed claims, subject to further consideration		35,540.02
Personal injury claims, adjusted		5,980.50
Notes of Cleveland Railway—endorsed		182,000.00
		$616,009.06

PROPOSAL OF INTERURBAN ROADS

The discussion on the morning of April 5 related to the questions of admitting interurban cars over the tracks of the local company. President E. W. Moore, of the Lake Shore Electric Railway, and officers of other roads were present. Mayor Johnson said that he did not want to stop the cars at the city limits, but did want the companies to bear their share of the cost of operation. Receivers of the local properties stated that the cost of operating an interurban car was about 10 per cent more than a city car. Mr. Andrews placed the cost somewhat higher. Mayor Johnson proposed that an amount be fixed as the cost of operating the cars of the five interurban companies over the city tracks. If there was a surplus after collecting the fares in the city, it should go to the interest fund to reduce city fares, but if there was a deficit it should be made good by the companies. Attorney T. H. Hoggsett, representing the interurban roads, said that if the companies were to make deficits good they should have the advantage of any surplus that might accrue also. A pooling arrangement among the interurban roads, with a sliding rate of fare was proposed by E. W. Moore, of the Lake Shore Electric Railway. The consideration of the subject was put over for a week, after protests had been made against interference with interurban traffic by the Chamber of Commerce and the Retail Board of the Chamber of Commerce.

A resolution was adopted instructing Prof. E. W. Bemis to make a report on the value of the property, including franchises at the present time. This is the beginning of a contest for a lower basis of valuation; certain members of the council claim that the property has depreciated and the value of the franchises has become less during the past year.

City Solicitor Baker said that if this was true, the people would have to stand it, as there should be no reduction in valuation from that computed when the property was leased to the Municipal Traction Company. Mr. Andrews said that if the council should insist upon a valuation lower than the one fixed it would prevent a settlement, because neither he nor his stockholders would be willing to make any reduction. He said that all the depreciation of the last year, if there had been any, took place after the property was forced out of the hands of the company and that it would have to be borne by the people or anybody else they want to consider liable for it.

STREET RAILWAY ARRANGEMENTS TO HANDLE ALASKA-YUKON-PACIFIC EXPOSITION TRAFFIC IN SEATTLE

The purpose of the Alaska-Yukon-Pacific Exposition, which will be held at Seattle, Wash., from June 1 to Oct. 16, 1909, is to exploit the resources of Alaska and the Yukon territory and to promote trade on the Pacific Coast. The exposition grounds cover 250 acres on the campus of the University of Washington, which will make use of many of the buildings after the exposition closes. The State of Washington has appropriated $600,000 for buildings which will later be used by the University and $400,000 for State buildings. The United States Government has appropriated $650,000 for representation, and citizens of Seattle have subscribed $1,000,000 stock. Work on the buildings has progressed rapidly, and it is believed the exposition will be ready at the time set for the opening.

In anticipation of handling large crowds of visitors to the exposition, the Seattle Electric Company has expended during the last two years a total of nearly $1,750,000 for additional lines to the fair grounds, new cars and additions to its generating equipment. Seattle is growing rapidly, especially in the direction of the university grounds, and while the exposition traffic is expected to bring some immediate returns on the investment in new tracks and cars, the natural growth of the city would probably have required the betterments to be made within a short time.

Seattle has a very hilly and broken surface contour, being built on long, narrow ridges lying between Puget Sound on the west side and Lake Washington on the east side. Lake Union, a large body of water connected by canal with Lake Washington, is situated in the heart of the city, just north of the business section. All of the street car lines which run north and south, parallel with the ridges, are operated by electricity, but there are three crosstown lines operated by cable and running from Puget Sound back to Lake Washington over the steep dividing hills. The exposition grounds are situated on the shore of Union Bay, an arm of Lake Washington, about 5 miles northeast of the center of the city. They are accessible, therefore, by boat trip on Lake Washington as well as by street car. In addition, the main line of the Northern Pacific runs through the grounds, and there is a suburban station and entrance at Brittnall Place, near the south end of the grounds. The Northern Pacific, however, will not run exposition trains from the Union Station in Seattle, unless the street rail-



Two-Car Train to Be Used for Exposition Traffic in Seattle

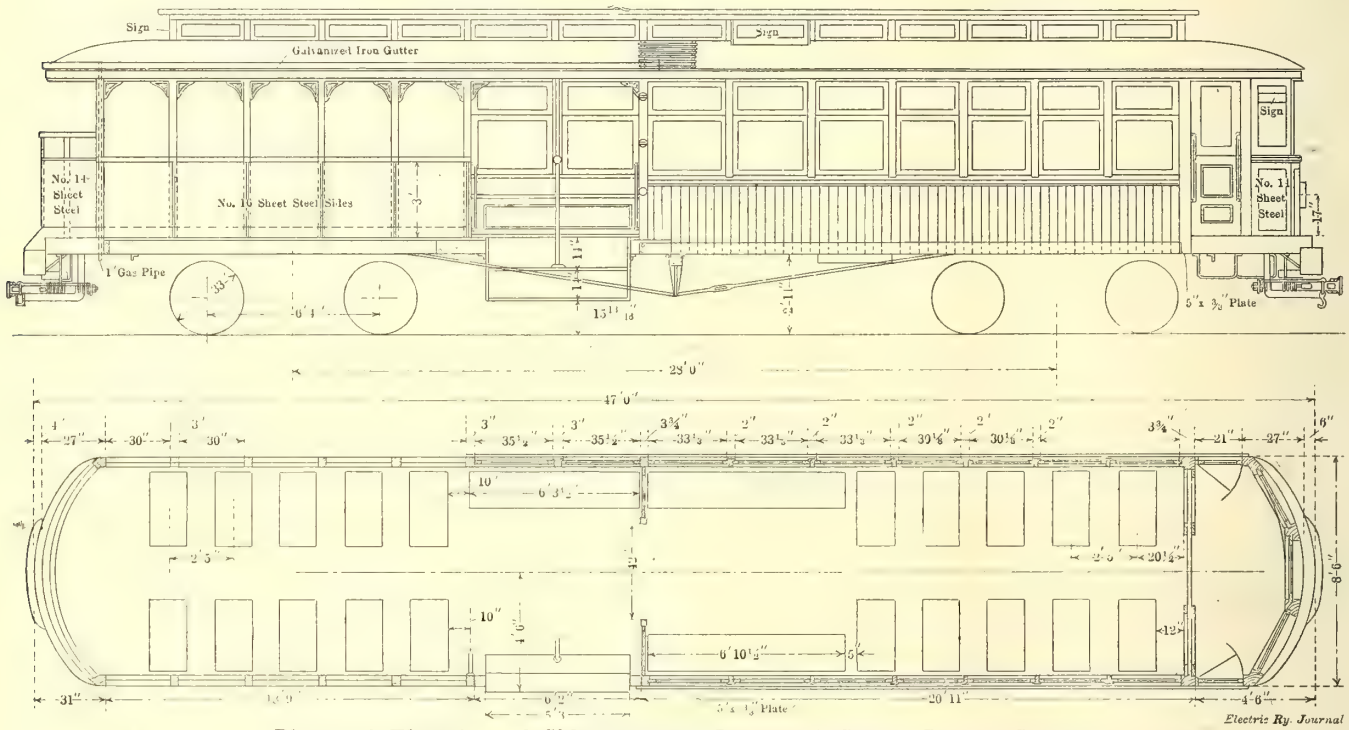
way lines are unable to handle all of the traffic. Local excursion trains from nearby towns will be unloaded at the Brittnall Place entrance, but all overland trains from the east will be run through to the Union Station.

The Seattle Electric Company has three double-track lines leading directly to the main entrance of the exposition grounds. Two of these lines run downtown within one block of the Union Station, so that there will be good service to the grounds for visitors alighting from incoming trains. From the center of the city the Wallingford line makes a wide detour around Lake Union, but the Broadway and Eastlake Avenue lines run parallel to each other straight north until they converge at a bridge crossing the canal connecting Lake Union with Lake Washington. After crossing this bridge the line turns east ½ mile to the exposition grounds. The Wallingford line is less direct, but as it is carried for 1½ miles on a trestle along for storing cars near the grounds and the dangerous grade crossing at Brittnall Place will be removed. An additional improvement made necessary by these changes will be the double tracking of the trestle bridge over the canal.

In addition to these three double-track lines leading to the main entrance of the grounds a fourth double-track line will be built this spring running north from the center of the city on Twenty-fourth Avenue and terminating in a loop near the boat landing wagon entrance.

A fleet of boats will be operated on Lake Washington from landings at the foot of each of the three crosstown cable lines to a direct entrance to the grounds on the shore of Union Bay. Lake Washington has a beautiful shore line and the boat trip is expected to prove very popular.

The directors of the Alaska-Yukon-Pacific Exposition and the transportation companies expect to have 3,000,000 visitors to the grounds during the 138 days the fair is open,



Plan and Elevation of Side-Entrance Open and Closed Car for Seattle

the west shore of Lake Union, on which there are no stops, the cars can be run to the grounds from the Union Depot in 40 minutes, which is approximately the same running time as required on the Broadway and Eastlake Avenue lines.

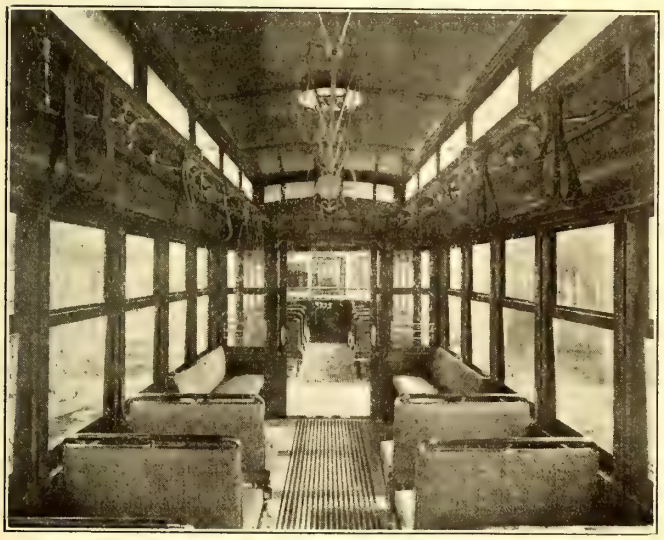
A number of changes in the track arrangement near the exposition grounds have been made to provide loop tracks and storage tracks. After crossing the bridge over the canal the Broadway line formerly turned east before reaching the tracks of the Northern Pacific and ran south of but parallel to these tracks to Brittnall Place, where it turned north and crossed the steam road at grade. An under crossing has been built just north of the bridge, and the Broadway line now continues under the steam tracks, which are 20 ft. above street grade at this point, before turning east on Fortieth Street. At Fifteenth Avenue, opposite the main entrance to the grounds, a loop has been built, around which the Broadway, Eastlake Avenue and Wallingford cars will be run. The Wallingford line turns east on Forty-fifth Street after making the detour around Lake Union and then south on Fourteenth Avenue to the loop. The old tracks formerly used by the Broadway line lying south of the Northern Pacific tracks will be used only which is an average of nearly 22,000 persons a day. Probably a fair maximum for the big special days of the exposition will be 30,000. A 2½-minute car service past the exposition grounds has been guaranteed by the Seattle Electric Company. On the estimated basis of 3,000,000 people for the 138 days, or 30,000 as a maximum for a day, probably not over 15,000 round-trip passengers will be handled by the street railway system in any one day. With a 2½-minute service and the storage provided for extra cars for the rush hours in the morning and evening the Seattle Electric Company will probably be able to handle the traffic to and from the exposition without undue crowding of the cars or delay due to congestion of terminal tracks.

The Seattle Electric Company is now receiving 100 combination open and closed side-entrance cars which are being built by the St. Louis Car Company. The general design of these bodies is of particular interest because of the door arrangement. Each car has but one entrance which is at the side and just at the rear of the middle of the car. Of this order 64 of the cars are to be equipped with motors and 36 will be trail cars. Illustrations are presented showing the exterior and interior of the car body and the seating arrangement with general dimensions.

The body design is the same for motor and trail cars. The general dimensions of the body follow:

Length over buffers	47 ft.
Length closed compartment	20 ft. 11 in.
Length open compartment	22 ft. 6 in.
Width over all	8 ft. 8 in.
Height from rail to under side of sill	2 ft. 11 in.
Truck-center distance	28 ft.
Truck wheel base	6 ft. 4 in.

The underframing of the car body includes side sills of 7-in. 20-lb. I-beams and center sills of 5-in. 12.5-lb. I-beams, faced for the length of the body with long-leaf yellow pine. The I-beams which comprise the underframing are fastened together 12 ft. from the ends with ¾-in. x 4-in. iron plates riveted to the beams. This underframing is so designed that it will clear the motors and trucks when two cars are coupled on a 36-ft. radius curve. All the cross framing is of oak and a clear space is left between the center sills to accommodate the motor-cable conduits and the air-brake pipes. The main flooring is 1-in. x 4-in. yellow pine laid crosswise. On top of this is a second layer of flooring laid lengthwise under the seats only. The depression in the aisle between is fitted



Interior of Side Entrance Car for Seattle

with hard maple floor slats which reach to the same height as the flooring under the seats. The floors in the two sections are at the same level.

The body framing for the closed section has maple side and corner posts and the posts of the open section are of oak. The sides of the car are straight and the box portion is sheathed with ⅝-in. tongued-and-grooved white wood. Vertical strips run from the oak drip rail to the bottom of the side sills. The cars are built for single-end operation and the motorman is given a compartment the full width of the car and about 3 ft. long with two stationary windows and one sliding window at the front end. A sliding door is fitted in the bulkhead between the forward and the passenger compartments. On either side of the motorman's compartment 21-in. swinging doors serve as exits. These doors are cut in half so that the tops can be opened separately. An iron stirrup is provided under each door of the motorman's compartment. In the trail cars there are no doors between the open and closed sections of the car, the opening here being 42 in. wide.

The roof framing is made up of steel carlines with the curved and smaller pieces of ash. The deck rail is yellow pine. Sixteen-oz. No. 8 duck is used to cover the roof. No. 18 sheet steel is used as a headlining. This steel is well painted on top to protect it from dampness and the exposed side within the car is painted and decorated to match the interior finish. Along the ceiling of the car the steel headlining is broken into panels with cherry molding.

The single side entrance and exit used by all passengers is 6 ft. 2 in. wide in the clear and has two steps 5 ft. 3 in. long, the lower one of which is 15 13/16 in. above the top of the rail. The next two risers are each 14 in. high. A heavy pipe stanchion is placed at the middle of the top step. The entrance is provided with Wood folding gates fastened to the car framing and arranged to fold against the car body on one side and to a pipe stanchion on the other. The step treads are supported by steel plates and each is fitted with a Universal safety tread. A similar tread also is placed in the car floor at the entrance, sunk so that its top is flush with the floor.

The bumper of the car is built up of a 4 x 7 angle and a sheet-steel protection enclosing solid oak blocking. This bumper extends the full width of the car and projects 6 in. beyond the face of the dash at the front end and 4 in. at the rear end. There is no paneling on the outside of the dash. The dash of both ends are covered with No. 14 sheet steel arranged for easy removal. Reference to the illustrations will show that these bumpers are built with considerable vertical height so that over-riding may not take place between cars of different heights. Under each bumper is carried a Van Dorn coupler with No. 11½ rigging. The coupler head is supported on an angle-iron carrier of such proportions that any car may couple with another on a 36-ft. curve. Drawbars are placed 19 in. above the tops of the rails.

The closed passenger compartment has seven window openings on a side, each 30⅛ in. wide. The sash are fitted with double thick American glass for the main windows and white chipped glass for the deck openings. The openings between the posts of the open section of the car are 30 in. wide and are fitted with "Oakette" waterproof curtains. Curtain Supply Company fixtures are used.

The interior of the car is finished in cherry except below the arm rail, where No. 16 sheet-steel sheathing is painted and grained to match the natural wood. The exteriors of the car bodies are painted with Harrison Brothers & Company car-body yellow "D" colors.

One of the engravings shows the seating arrangement of these cars. In the box portion of the motor cars are 10 reversible 34-in. cross seats set on 29-in. centers and two 6-ft. 10½-in. longitudinal seats without arm rests. The cross seats are of the St. Louis Car Company's latest design upholstered in rattan. In the trail cars the seats in the box section are stationary with wood strips. In the open section of the motors and trailers are 10 wood-strip seats of dimensions similar to those above given and one longitudinal seat 6 ft. 3½ in. long.

Each car body is carried on two C-50 6-ft. 4-in. wheel-base trucks manufactured by the Standard Motor Truck Company. These trucks have 33-in. wheels and are placed on 28-ft. centers. The electrical equipment includes four GE-80 motors with K-28-J controllers. All light, air-brake and control wiring is carried in Sprague flexible conduit. The brake equipment comprises schedule M E for motor cars and T E for trail cars manufactured by the National Brake & Electric Company. Peacock hand brakes are used. Some of the special fittings on these cars follow: Neal 10-in. headlights, lever-connected sand boxes, International registers, Wilson trolley catcher No. 2.

INVESTIGATION OF THE STREET RAILWAY QUESTION IN DETROIT

The organization of the Committee of Fifty, appointed by Mayor Breitmeyer, of Detroit, to investigate the street railway question, was effected shortly after its initial meeting on Jan. 20 by the formation of the following sub-committees to consider the subjects assigned:

SUB-COMMITTEES

Ways and Means.—Whose duties it shall be to procure necessary funds for all purposes pertaining to the work of the committee and to supervise the expenditure thereof.

Statistics and Regulation.—Whose duties it shall be to procure and assemble data relative to street railways in other cities and the terms and conditions of the franchises under which they are operating.

Appraisals.—Whose duty it shall be to ascertain the present value of the properties of the Detroit United Railway in the City of Detroit, both tangible and intangible.

Cost of Service.—Whose duties it shall be to ascertain the cost of operating the lines of the Detroit United Railway in the City of Detroit, and to determine therefrom the average cost of carrying a passenger; and this committee to submit a special report on the history and condition of stocks, bonds and mortgages from their inception to the present time.

Legal.—Whose duty it shall be to consider and pass upon such legal matters as may come before the committee or sub-committees during the investigation.

Franchise.—Whose duty it shall be to examine the present franchises under which the Detroit United Railway is operating, the dates granted, the dates of expiration, what tracks covered, and the essential features of each franchise as to rate of fare, taxation, paving, etc.

Schedules.—Whose duty it shall be to examine the schedules of the Detroit United Railway to determine when and where the service is inadequate and to what extent said service can be improved.

Conference.—To confer with the Common Council on matters pertaining to the investigation and to arrange with the Detroit United Railway for procuring such information and data as may be required from time to time by the various committees.

Extensions and Rearrangement.—To ascertain what extensions of lines throughout the city are necessary and in what manner present trackage can be rearranged to provide adequate service and effect economy in operation.

Municipal Ownership.—Whose duty it shall be to consider the question of municipal ownership, whether by operation by the city or ownership of tracks only.

Taxation and Paving.—Whose duty it shall be to consider the most equitable method of taxation and to ascertain the amount expended by the City of Detroit for paving and repair on the tracks of the old Detroit Railway lines since their construction and what sum will be required to be expended by the city under the terms of the Detroit Railway franchise to put said tracks in good condition.

PURPOSE OF CREATION OF COMMITTEE

The purpose of Mayor Breitmeyer in appointing the committee was explained by him in a short address at the organization meeting, in which he said:

I have asked you gentlemen to undertake this investigation because of my firm belief that it is purely a business proposition, and that the greatest hope of settlement lies in approaching it on a business basis.

There are represented on this committee all kinds of business, and I hope and believe all shades of opinions on what will constitute the proper settlement of the street car question. The committee must be representative in character if it is to truly reflect the sentiment of our people, and the greatest good will come from your deliberations if men of different minds will discuss the matter fairly and fully. I ask of you but one thing, and that is that you all approach this question with minds sufficiently open so that your present opinion may be modified or strengthened as the case may be by what is developed during your sessions.

We cannot settle the street railway question by saying in advance this arbitrary price must be charged for fare or extension must necessarily be made. What Detroit wants and must have is a complete street railway system, adequate service and the least possible rate of fare which will yield an honest return to the operating street railway company upon an honest capitalization. Detroit has no money to pay interest on stock increases or bond issues which cannot be shown to have been honestly necessary in the upbuilding and carrying on of its street railway system. On the other hand, I do not believe that Detroit has any desire to refuse honest earnings to the dollar which has been honestly invested.

I ask you to remember that in approaching this question you are representing the whole people of the City of Detroit. They are with you in any progress made toward the settlement which means so much for the city, and I have confidence that when you have completed your labors the result will be one which will satisfy the whole people.

WORK OF THE COMMITTEE

Frank W. Eddy, a prominent merchant, is chairman of the committee, and its secretary is Paul C. Renaud. As indicated by the description of the activities to which the various sub-committees will devote themselves, the work outlined by the committee makes necessary an examination of the accounts of the Detroit United Railway to ascertain the cost of operation and the average cost of carrying a passenger and a careful appraisal of the property, tangible and intangible. The examination of the accounts of the company is being conducted by William D. Gridley. The appraisal is in course of preparation by Frederick T. Barcroft, consulting engineer. Every facility that would aid in the examination of the accounts and the valuation of the property has been afforded by the company.

The Committee of Fifty holds public meetings in the council chamber, open to the public, at which various aspects of the problem are discussed. At one of these meetings an address was made, as stated in a previous issue of the Electric Railway Journal, by Charles V. Weston, president of the South Side Elevated Railroad of Chicago. Mr. Weston discussed the points brought out in the two articles contributed by him in the issues of the Electric Railway Journal of Dec. 26, 1908, and Jan. 2, 1909, respectively, and also other features of the traction problem.

Mr. Weston said in discussing radical differences between British and American systems:

COMPARISON OF DETROIT AND BRITISH CITIES

Comparing the service in the United States and British cities, we will take your own city, Detroit, Leeds and Liverpool, England, and Glasgow, Scotland:

	Detroit. 1907.	Leeds. 1906-7.	Liverpool. 1906.	Glasgow. 1906-7.
Population	350,000	463,000	770,000	1,050,000
Miles single track	188	96.5	104	165.5
Population per mile of track	1,862	4,798	7,404	6,344

What do these figures indicate? They show that Leeds, England, with 25 per cent more population than Detroit, has only one-half as much street railway; that Liverpool, with more than double the population of your city, has 40 per cent less street-car track; they show that Glasgow, with three times the population of Detroit, possesses only 88 per cent as much street railway. These figures emphasize the projection of our street-car lines into new and undeveloped territory—relieving congestion in the city and giving the city worker a chance to live amid more healthful conditions. The population per mile of track in Detroit is approximately 1862; in Leeds, 4798; Liverpool, 7404; Glasgow, 6344. I am aware that the advocates of municipal ownership say that population per mile of track is no test of public or private ownership; that it merely indicates density of population. I contend that it indicates enterprise on the part of street railway managers in the United States which has no parallel in any European coun-

try—an enterprise which has not only made for the health and comfort of the people, but has vastly increased the wealth of the country and the revenue of the State by enormously enhancing real estate values; and that the indirect benefits to the common good represent vastly greater values than all the money that has ever been paid toward relieving rates by all the municipalized urban transportation enterprises in the world.

Moreover, the service supplied to the people of this country, by privately operated street railways, costs the users of that service less than is paid for poorer service by the people of European cities whether the facilities be privately or publicly operated.

Twenty-two British towns received the sum of $1,625,496 toward the relief of rates for the year included in statements published in June, 1908.

The city of Chicago received last year from its surface railways as its share of the net revenue earned under the new contract ordinances the sum of $1,600,000. In addition to this sum the companies paid taxes amounting to $640,000. The amount paid toward the public good by the railway companies of the city of Chicago for an equivalent period is much greater than the aggregate of the sums paid for a similar purpose by the municipalized operations of the 22 British towns which I have mentioned, irrespective of the fact that the population of these towns is considerably more than double the population of Chicago, and irrespective of the fact that the British people paid more per unit of service rendered than the Chicago people paid, which is a very strong indication that the blessings in privately operated public service utilities under proper regulation exceed those in municipalized undertakings of similar kind.

Besides the direct benefit to the common good from public service corporations in this country, we should not lose sight of the large sums which accrue to the State from taxes paid by holders of the capital stock of street railway companies, and when all these different elements are taken into consideration it will show that the net returns to public authorities in the United States are vastly greater from privately operated public utilities than they are in Great Britain from municipalized utilities. The conditions as they are to-day make a very favorable showing for the urban transportation facilities of the United States, when they are compared with those of the United Kingdom. But conditions in this country are susceptible of great improvement. In fact, there is a peril in the present general situation of urban transportation affairs in this country, a peril that has grown out of misunderstanding between the people and public service companies.

UNIFORM FARES

Mr. Weston also discussed the subject of uniform fares and the failure which German experience had proved them to be. He said in part on this subject:

The system of uniform fares in Germany has proved a failure. It has often involved considerable losses, and whenever the system has been extended it has been found necessary to replace uniform tariffs by graduated charges. In places where the uniform tariff is supposed to rule, it applies only to short hauls within town limits, extra charges being made for any extensions of the lines. Variable fares fixed by zones have given good results, because they permit an extension of the system without deranging the balance between receipts and expenses, it being possible to adjust the lengths of the sections according to the ruling conditions.

To illustrate to some extent the conditions which prevail in cities of Germany in regard to rates of tariff for street railway service, I quote the following from the operating statistics of several of the traffic systems in leading cities of Germany:

Dresden—Fare 10 pfg. (2.4 cts.), where the greatest distance of haul is 3.42 miles. Where a transfer is given the charge is 15 pfg. (3.6 cts.). For exterior lines the charges are 10 pfg. (2.4 cts.) for 1.87 miles; 15 pfg. (3.6 cts.) for distances up to 3.74 miles, and for distances up to 7.6 miles 20 pfg. (4.8 cts.) is charged.

Munich—With a population of 500,000 and a system containing 30 miles of track, the road was operated at a loss with a uniform fare of 10 pfg. (2.4 cts.) for any distance. The rates of fare were changed to a charge of 10 pfg. for short hauls within the city limits and 5 pfg. (1.2 cts.) for every 1800 meters (1.12 miles) outside of the 10 pfg. zone.

Düsseldorf—The road was operated at a loss with a 10 pfg. (2.4 cts.) fare for any distance, and the following rate tariff was adopted in place of the 10 pfg. uniform fare: 5 pfg. (1.2 cts.) for 1.37 miles, and 5 pfg. (1.2 cts.) for each 0.91 mile outside of the first 5 pfg. zone.

Cologne—The road pays 5 per cent on the investment and was formerly operated at a loss for 10 pfg. (2.4 cts.) fare for any distance. The rates of fare were changed to 10 pfg. (2.4 cts.) for 1.4 miles and 15 pfg. (3.6 cts.) for a ride over any part of the system, the average distance being 3.6 miles.

Mannheim—The road pays 3.4 per cent. The fares are 10 pfg. (2.4 cts.) for 1.3 miles; 15 pfg. (3.6 cts.) for 2.17 miles, and 20 pfg. (4.8 cts.) for any distance beyond. This is a very small system of railway, there being only about 10 miles of road.

Königsberg—Road was operated at a loss with a uniform fare of 10 pfg. (2.4 cts.) for any distance, and the charges were changed to 10 pfg. (2.4 cts.) for a distance of less than 2½ miles, and the same fare (10 pfg.) was charged for a distance of 1.55 miles outside of the limits of the first zone; 15 pfg. (3.6 cts.) is charged for a distance of 3.4 miles.

CHARGE OVER ONE CENT PER PASSENGER MILE

It will be seen from these data that the charges for the service in the cities of Germany are in excess of one cent per passenger mile.

It has been determined by experience in the operation of large urban transportation systems, not only of the United States, but of the world, that adequate service cannot be rendered, the physical property be maintained in good condition, fixed charges and depreciation be provided for, and a reasonable return earned upon the investment at an average rate of compensation less than one cent per passenger mile. Where a flat rate is charged, irrespective of the length of ride, transferring passengers has the effect of increasing the average distance of haul and of reducing the rate of fare per passenger.

W. D. MAHON AND A. B. DU PONT IN MOVEMENT FOR MUNICIPAL OWNERSHIP

One of the members of the Committee of Fifty is W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America. Mr. Mahon is also active in an independent committee which has been formed and is promoting a movement for municipal ownership of the Detroit lines. The movement for municipal ownership is supported by the Detroit *News*, one of the leading daily newspapers in the city. This paper has printed various interviews with A. B. du Pont, of Cleveland, bearing on the Detroit traction situation. To one of these interviews and a subsequent editorial published by the Detroit *News* a formal reply was made by J. C. Hutchins, president of the Detroit United Railway. The letter of Mr. Hutchins was as follows:

Having quoted A. B. du Pont the other day as saying that the physical properties of this company in Detroit, which were inventoried to be worth $7,806,737.42 10 years ago, have not been increased in value and are worth only about the same amount now, you, this morning, in commenting upon his statement, express the belief that it must be true because no officer of the company has challenged it.

I have preferred that a statement of all facts relating to this property shall come from the Committee of Fifty in connection with the pending investigation. But I am curious to know just how you would treat the following information:

The inventories Mr. du Pont refers to were taken at the beginning of the year 1899. They showed the value of the city lines to be about $16,000,000, of which amount $7,806,737 covered their physical value. These inventories,

taken at the beginning of the year, were based upon conditions as they existed at the end of the year 1898.

In the year 1898 there were carried on all of the Detroit city lines, including transfer passengers, a total of 55,378,918 passengers, of which number 44,197,122 were pay or revenue passengers. In the year 1908 there were carried on these lines a total of 148,840,835 passengers, an increase of nearly 100,000,000. Of these, 40,447,333 were carried as transfer or free passengers, being very nearly as many as were carried, all told, for pay in the year 1898.

You would hardly contend that these results could have been accomplished without some additional facilities. I would mention one item: Every electrical device in the power houses of this city, with the installation of which Mr. du Pont had anything to do, has been replaced since the year 1899 by machinery suitable for our present traffic conditions. And in meeting these traffic conditions every feature of the company's plant has required the expenditure of large sums of money.

Mr. du Pont and Mr. Johnson have paid us the compliment of saying in Detroit that it should not cost any more than $50,000 a mile to build and equip a street railway, and that any street railway capitalized in excess of that amount is capitalized on water, pure and simple. Their railway in Cleveland was turned over to what they call the "Government" at about $129,000 a mile. The compliment is an implied one, of course, meaning that we should be able to do as much with 30 cents as they are with $1.

I rather expect you or them to come back at me with the argument that we are crowding all of the added millions of passengers into the same old cars of 1898. But in view of the fact that most of our cars now in use are commodious double-truck cars, and there were none of that type in Detroit 10 years ago, this argument would hardly be fair. On this point possibly du Pont and Johnson, who testified in the Detroit courts that we should be required to operate cars 20 seconds apart, can tell you why in their efforts to avoid a loss of $1,000,000 in six months in their 3-cent experiment last year, they were justified in withdrawing from service about one-quarter of the cars which had been in use in Cleveland.

THE JOHN A. BRILL MEMORIAL MEDAL

In the fall of 1908 The J. G. Brill Company made public an offer to senior students of the technical schools of the United States of three prizes of $250, $150 and $100 for essays on the subject "Design of an Electric Railway Car for City Service." The company reports that the interest awakened in the contest among the students has been quite remarkable and that there is every evidence of a large number of essays being submitted before the contest closes on June 15, 1909. Electric railway officials have shown their approval of the contest, which is designed largely to draw more young men into electric railway work, and the American Street & Interurban Railway Association has manifested its interest by authorizing the president of the association to appoint one of its members, W. A. House, of Baltimore, on the jury of awards.

In view of all these circumstances and to make the prize award of more permanent value, James Rawle, president, The J. G. Brill Company, announces that the first prize will be accompanied by a gold medal in memory of John A. Brill, former vice-president of the Brill company.

It is the present intention of The J. G. Brill Company to offer annually prizes for essays of merit by senior students of the technical schools of the United States on subjects connected with electric railway work, and it has been thought fitting that Mr. Brill's mechanical ability and memory should be commemorated by a medal of permanent value which would be a source of inspiration to those upon whom the future development of electric railways may depend.

DISCUSSION ON SIDE-DOOR SUBWAY CARS IN NEW YORK

Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, has filed with the Public Service Commission a statement of objections to the double end side door design of car recommended by Mr. Arnold. This statement is based on the performance of this car during the time that it was in use during February. Mr. Hedley says in part:

MR. HEDLEY'S STATEMENT

In Mr. Arnold's report on "The Subway Car," dated Feb. 18, 1908, he recommends that every car used in regular passenger service in the subway be provided with two additional side doors located near the ends, and gives the following reasons therefor:

First—The double door space at each end of the car will greatly reduce the present waits.

Second—The separate exits and entrances will remove the present uncomfortable conflict at the car doors.

Third—The present cars can be altered into this type of car without detracting from their structural strength or materially altering the present seating arrangement.

Fourth—The result in increased carrying capacity due to the changes will abundantly justify the investment.

Fifth—This is the only type of car with additional doors that will not materially increase the present trouble due to curved platforms.

As regards his first conclusion, a check covering the last eight days that this car was in service, and not taking into consideration the first four days so as to avoid the question of unfamiliarity of employees and passengers with this scheme, show that the average length of the station stop at the five limiting points on the line is greater with the side door train than with that of its leader or follower on practically even intervals. This, too, in spite of the fact that the side-door train is equipped with a buzzer that automatically indicates to the motorman when all car doors are closed. In the report mentioned above Mr. Arnold gives it as his opinion that a saving of five seconds per station stop could be effected by the introduction of this buzzer. Therefore, if the five seconds thus saved by the buzzer are added to the station stops of this train, the comparison with its leader and follower would be on a fair basis, and would show that the experiment not only disproved Mr. Arnold's conclusions, but that the station stops were materially longer.

Second—No fair-minded person could truthfully say, after riding on the side-door train during any one of the rush trips during the 12 days it was in service, that the conflict at the car doors was removed or materially lessened. In fact, there are points on the line, and limiting points, too, where there is practically no conflict, because the traffic is all embarking. At these points the new design does not increase the loading or unloading facilities at all; consequently, does not affect the length of the station wait.

Third—While the present cars may be altered to embody the changes recommended without detracting from their structural strength, they cannot be so altered except by the expenditure of a vast sum of money. What in the mind of the expert constitutes a material alteration of the seating arrangement is not known, but to my mind any change that will make it necessary to run 18 per cent more service during the non-rush hours and over 30 per cent more service during the rush hours to afford the same number of seats as is provided for by the present equipment is a material alteration, and should be seriously considered.

Fourth—This conclusion depends upon the accuracy of reason No. 1, and inasmuch as the experiment has conclusively shown that the results claimed for it were not borne out in practice, if No. 1 reason is wrong, No. 4 must necessarily be wrong also. Furthermore, for the sake of the argument, if it be granted that the results claimed in No. 1 could be obtained, Mr. Arnold, in reasoning that the alleged increased carrying capacity due to the recommended changes would justify the investment is based on the assumption that no additional men would be required for the operation of these additional doors. Frof Mr. Arnold's last report, received yesterday, advocating that handles be

placed on the outside of these doors, it is apparent that he has changed his opinion in this particular, and now considers it necessary that these car doors be operated by men on the station platform, which means a decided increase in the operating expenses. Further, Mr. Arnold states in his report that 90 seconds headway is the maximum rate at which the signal system between stations will allow trains to pass, and admits that with the present style of door we can and do maintain an average of 50 seconds as the maximum station stop. While our records show that our station stops average less than 50 seconds, using Mr. Arnold's figures for the sake of argument, and accepting his conclusions that the introduction of a buzzer would save five seconds per stop, this brings the station stop to 45 seconds. With the introduction of the speed control signal the time to enter and depart from a station is reduced to 45 seconds. This, added to the station wait of 45 seconds, gives a total of 90 seconds, or 1½ minutes, which is the closest headway, according to Mr. Arnold's testimony, that can be run with safety if the present high speed schedule is maintained.

Fifth—Failure to prove the advantages or the necessity of this special side-door car makes it unnecessary to consider the fifth reason, as Mr. Arnold admits that his car does increase the liability to accident at curved stations over the present type, but does not increase it as much as it is possible to do.

LENGTH OF STATION STOPS AND NUMBER OF ACCIDENTS

Mr. Hedley also filed with the commission a statement of the length of station stops made by this train from Feb. 20 to Feb. 27, inclusive, and the stops made by the train immediately preceding and following it. The comparison is shown in the table below, in which the special train is marked "special," the preceding train "leader," and the following train "follower." The figures given are the average length of stop in seconds during the 20 hours' run per day of each train, and are divided into north and southbound stops.

	Leader		Special		Follower	
	S.B.	N.B.	S.B.	N.B.	S.B.	N.B.
Feb. 20	31	30	37	37	32	24
Feb. 21	31	30	27	32	28	28
Feb. 22	27	31	34	34	32	36
Feb. 23	29	29	40	36	31	32
Feb. 24	30	32	33	31	31	29
Feb. 25	28	29	32	36*	28	30
Feb. 26	33	29	31	31	28	29
Feb. 27	33	* 34	36	34	31	29

A statement was also filed showing the time lost by the special train and its leader and follower from Feb. 16 to 27, inclusive. This statement showed that the average time lost per trip by the special train over the leader was two seconds, and over the follower was 1 2/12 seconds. The following statement was also filed of the accidents and unusual occurrences on this train during the time that it was in use:

During the 12 days that the side-door train was in operation, making 85 round trips or 170 single trips, an equivalent to 1360 car trips, a total of 28 accidents and unusual occurrences were observed. Our schedule calls for an average of about 10,500 car trips daily, and on this basis, if the same percentage of accidents held true, and if all our cars were equipped with side doors, we would have over 210 accidents and unusual occurrences per day, instead of six or seven as at present.

POSITION OF PRESIDENT SHONTS

The position of the Interborough Rapid Transit Company in regard to the side doors has been outlined by President Shonts in an interview early this week, as follows:

During the construction of New York subway, and when it was nearing completion, ready for operation, it was the only subway anywhere in the world that would have the density of traffic that has since been noted on the New York subway, and the Interborough Company employed engineers for the purpose of designing its equipment. At the time the equipment was designed and placed in operation it was supposed to be the most up-to-date development in the world in the art of car building. The complete designs were submitted to the engineers of the Rapid Transit Commission and approved by them. The passenger business in the New York subway increased so rapidly immediately after the road was placed in operation that there was considerable unpleasant conflict between passengers boarding and alighting from the cars. As soon as this was apparent the Interborough Company proceeded immediately to make the doors in the end of the cars much larger, and on 500 of its cars it removed entirely the bulkhead doors, in order to make ingress and egress more convenient.

I never have been opposed to some kind of a side-door car for subway work, and in this opinion I find the officers of the operating department concur. However, it is unfortunate that New York subway was built with so many of its passenger stations on bad curves. This is especially the case with the local tracks.

I am of the opinion, and it is still the opinion of our operating department, that center side doors can be operated on the express tracks in New York subway. In fact, prior to the present law which created the Public Service Commission, our operating department requested authority from the company's board of directors to construct 50 cars in such a way so that center side doors could be readily installed. These 50 cars were constructed, but the side doors were not installed, because during the construction of these cars the present Public Service Commission had been created by law and taken office, and had taken up the question of installing side doors in the subway cars. The commission employed Bion J. Arnold as its special consulting engineer, to make a report on side-door cars for the city's subway. Mr. Arnold filed his report under date of Feb. 18, 1908. In this report he describes several types of cars with side doors, among them the center side-door cars, and gives the reasons why, in his opinion, a car of this design for the present subway would be impracticable.

Shortly after Mr. Arnold made his report to the commission, which is above referred to, the latter commenced to hold public hearings. In the conclusions of the report, Mr. Arnold recommended only one type of car for the subway service, and this was a type of car with two extra side doors in each side of each car, near the end. Our operating department very thoroughly studied this type of car, and, as a matter of fact, it was presented to them prior to Mr. Arnold's being appointed by the commission—in fact, before the Public Service Commission was created by law. And, as a matter of fact, the design for the type of car recommended by Mr. Arnold and ordered tried by the Public Service Commission was designed and patented by one of this company's engineers a year or more before the Public Service Commission was created by law. This particular type of car, with two end side doors, was not considered by the operating department of this company as an improvement.

Mr. Arnold, in his report to the commission, stated that the center side-door car would be impracticable for the New York subway, and in this opinion our operating department concur; but our operating department is still of the opinion that this center side-door car will be an improvement on the express tracks of the city's subway only.

The public hearings by the Public Service Commission on side doors in subway cars were held, I think, during the financial panic, and it was a financial impossibility for this company at that time to make any large expenditures on this equipment or otherwise, However, we were ordered by the Public Service Commission to build 16 of our subway cars with end doors, and the commission later agreed that we could build eight of these cars first. This has been done, and the cars have been given a practical test in the subway. From the records, which were made by representatives of Mr. Arnold to the Public Service Commission, copies of which were obtained by this company last Friday, it is proved conclusively that, according to Mr. Arnold and the figures obtained by the commission, the car is a failure and does not possess the ability to get over the road as rapidly as our present standard equipment. Mr. Arnold, three days after this train was placed in operation, wrote to our operating department a letter suggesting several changes, which he termed "improvements or betterments." Some of the changes referred to by Mr. Arnold our oper-

ating department declined to make, because it would introduce positive dangers, which certainly would involve personal injuries to the traveling public. When these points were pointed out to Mr. Arnold, he concurred with our operating department, that some of them could not be made. However, the changes that Mr. Arnold agreed with our operating department should be made were made, and the cars are now standing in the yard awaiting the orders of the Public Service Commission. Our operating department has already advised the Public Service Commission that they will not restore the cars to the service without a direct order from the commission, because it is their opinion that the public of New York are much safer with that particular train lying idle in the shops than they are when it is on the road.

The financial panic has blown over, and the Interborough Company now has in its shops eight of the 50 steel cars above referred to, which were constructed so that center side doors could be installed, and these center side doors are now being installed in these cars. Our operating department has notified the commission that this is being done. These cars will be ready for practical test on the road in about two weeks, and provided the operating department is permitted to operate them in the best possible manner in order to obtain the maximum efficiency from them, it is of the opinion that these center side doors on the express tracks will be an improvement over our present equipment.

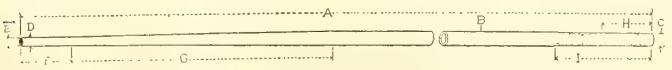
Of course, the degree of improvement is yet to be determined. They may, and we believe they will, be a slight improvement, but whether they will be a sufficient improvement to warrant the Interborough Company in making the financial outlay that it will have to make in order to put in these center side doors can only be determined after a practical test has been made.

THE POSITION OF THE COMMISSION

The position of the commission, as indicated at a hearing held April 6, is that it is anxious to have the question of side doors settled soon, because, owing to the changes to be made in the subway under the direction of the commission, its capacity will be considerably increased. This will require additional cars, if the subway is to be utilized to its maximum capacity in the fall, when the usual increase in traffic occurs. According to testimony given by officials of the company, it will take four months after these cars are ordered before they will be delivered, and if the cars are to be ready by Sept. 15 it is very important to determine the proper type of car by May 15. In consequence, the commission has declined the application of the Interborough Rapid Transit Company for a 60 days' extension from April 5 of the order requiring the company to build over the second train so as to furnish side doors near the end of the car, and has limited the extension to 30 days.

REINFORCED TROLLEY POLES

The point of greatest bending strain in a trolley pole is just outside the socket of the trolley base. The Pittsburgh Pole & Forge Company, Pittsburgh, Pa., has recently put on the market a design of pole heavily reinforced at this point by the insertion of a section of tubing of the same gage as the pole itself and 20 in. to 30 in. long, which is swedged into the pole at the bottom so as to form prac-



Proportions of Reinforced Trolley Pole

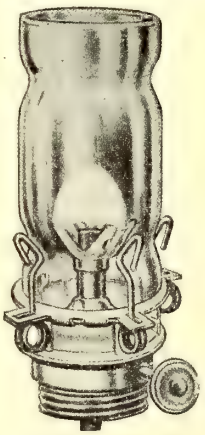
tically a weld. Comparative tests with 14-ft. plain and reinforced poles made of butt welded tubing 1.66 in. outside diameter held at the bottom end and weighted at the harp end show a large increase in bending strength in favor of the reinforced design. The maximum weight applied to the plain pole without permanent set was 50 lb., with a total deflection of 16 in. The reinforced pole under a weight of 55 lb. deflected only 14 in. The weight of a pole reinforced in this manner is only 1 lb. more than a plain pole. The dimensions of a 14-ft. pole as shown by the accompanying drawing are as follows: *A*, 14 ft.; *B*, 1.66 in.; *C*, 1½ in.; *D*, 1 in.; *E*, 49/64 in.; *F*, 6 in.; *G*, 30 in.; *H*, 12 in.; *I*, 24 in. The poles are made in lengths varying by 6 in. from 12 ft. to 15 ft.

WARNER TRUCKS IN THIS COUNTRY

H. F. Vogel, of the St. Louis Car Company, has been appointed United States agent for the Warner Engineering Company, Ltd., of London, and has just completed arrangements by which the St. Louis Car Company will be the sole licensee for the manufacture of trucks built according to the Warner trajectory system, using non-parallel axles. Warner trucks are in successful use on a number of lines in Great Britain and on the Continent of Europe, and differ in principle from the so-called radial trucks. Among the advantages claimed for them are that they reduce the wear on the rails and wheels; they give greater comfort in riding, and that on both straight track and curves the direction of movement of the car much more closely approximates the ideal line than in the case of a car mounted on trucks with rigidly parallel axles.

FLAT FLAME SIGNAL LAMP

The Adams & Westlake Company, pioneer manufacturer of long-time burners for switch and semaphore signal lamps, has recently placed on the market an improved long-time burner lamp of the non-sweating balanced-draught type which has a flat flame and is known as No. 51. This lamp was designed to meet the demand for a long-time burner with a flame which would give a greater diffusion to the projected signals than the round-flame burner which has been in general use. The spread of the flame is approximately 9/16 in., and it burns with an intense whiteness, so that excellent results are obtained and at the same time the increased oil consumption, due to the larger flame, is not sufficient to cause any change in the method or routine of filling and tending lamps. This new burner, combined with a center core wick, insures satisfactory service.



Flat Flame Signal Lamp

THE PHILADELPHIA RAIL CORRUGATION GRINDER

Announcement is made by William D. Gherky, of Philadelphia, that he is prepared to contract for the removal of rail corrugations on any system by means of the Nichols rail corrugation grinder, described in the April 3 issue of the Electric Railway Journal. For this purpose he will have available the necessary number of machines and workmen to carry out a contract as quickly as possible. By this method the street railway companies will be spared the expense and annoyance of purchasing and handling unfamiliar machinery, as the work will be done entirely by specialists under conditions as prescribed by the customer. Mr. Gherky now has six machines nearing completion.

News of Electric Railways

Plans for Interurban Station and New Franchise at Columbus, Ohio

With the introduction of four ordinances in the City Council of Columbus, Ohio, last week, the plans of the Ohio Electric Railway for a new interurban station in that city are disclosed. They are much more extensive than was at first reported, and include a freight station and a union interurban station for both freight and passenger purposes to cost with the necessary sidings, spurs and additional track more than $400,000.

The proposal of the company is based on concessions asked from the city, viz., that the company be allowed to abandon the present interurban loop which requires about 30 minutes to traverse, and that it be given permission to lay T-rails within the city. Under a suspension of rules the ordinances were given their second reading and then referred to the committee on railroads and viaducts, where they will remain pending a public meeting to be called to learn the sentiment of the people.

The first ordinance provides for the grant of a blanket franchise that will substitute the franchises under which the four separate lines constituting the Ohio Electric Railway in Columbus now operate, and extend the life of these franchises seven years. The blanket franchise is for 25 years and provides for the construction and operation of new lines on streets not now occupied. The four individual lines covered by the ordinance are: The Columbus, London & Springfield Railway, the Columbus, Grove City & Southwestern Railway, the Columbus, Buckeye Lake & Newark Traction Company, and the Columbus, Newark & Zanesville Electric Railway. The first ordinance further provides that an interurban station to cost not less than $300,000 shall be built on South Third Street, extending from Town Street to Rich Street, west on Town Street 171.87 ft. and west on Rich Street 212.5 ft. The station and tracks are to be completed within three years after the granting of the franchises. The company is not to be required to operate over the present loop and is to be allowed to lay 7-in. T-rails weighing 90 lb. The franchise also provides for 5-cent cash fares within the city and for seven tickets for 25 cents. Two per cent of the earnings from city fares is to be paid the city and the city auditor is to have access to the company's books. Should the company be required at any time to sell eight tickets for 25 cents, it is to discontinue the payment of the 2 per cent to the city. Provision is made for the use of the interurban station by other companies on terms to be mutually agreed upon or submitted to arbitration. The cars are to be limited to a maximum speed of 12 miles per hour within the city limits and the company is to grade unimproved streets.

The second ordinance provides for the laying of tracks by the company on Town Street from Scioto Street, where the cars of the Columbus, London & Springfield Railway enter the loop to Third Street or the north end of the proposed station. This is to be a cut-off and will enable the company to secure entrance to the city without passing around the long loop.

The third ordinance provides for the vacation of a portion of Walnut Street over which the proposed station is to be built, and the fourth ordinance gives the company the right to construct a spur from Rich Street along the west side of the station site for the handling of material.

The foundation of the new station is to be so constructed as to accommodate seven stories, although at the present time it is the intention to build only two stories. The structure proper is to be of brick and stone.

Extension of Hudson & Manhattan Railroad Approved

The Public Service Commission of the First District of New York approved the proposal on April 1 of the Hudson & Manhattan Railroad, which operates under the Hudson River between New Jersey and New York, to extend its line from Thirty-third Street and Broadway, New York, to the Grand Central Station. The commission received from a sub-committee, consisting of Chairman Willcox and Commissioner Maltbie, a report on the character and location of the route and directed its counsel to prepare a certificate and order of notice for a hearing on April 21, at which the matter will be finally adopted. The report of the sub-committee declares that as the result of conferences with the engineers of the Hudson & Manhattan Railroad it is convinced that the proposed route can be constructed so as not to interfere with any tunnels that may be built in the future. The report of the sub-committee outlines the course of the Hudson & Manhattan Railroad extension—from Thirty-third Street and Broadway up Sixth Avenue and around into Forty-second Street, with an easy curve under Bryant Park, so as to take an easterly direction at a point midway between Sixth and Fifth Avenues. The Hudson & Manhattan Railroad, with two tracks, will be located on the south side of Forty-second Street, passing under Fifth and Madison Avenues on the third level, or two levels below the present subway, and then coming into its terminal station at Grand Central on the level below the present subway and between it and the station of the Steinway tunnel to Long Island City. The station of the Hudson & Manhattan Railroad will extend from the westerly side of Park Avenue to the westerly side of Lexington Avenue, and will afford connections with the present subway, the Steinway tunnel and the Grand Central Station. The route is planned so as to have stations at Forty-second Street and Fifth Avenue and at Thirty-ninth Street and Sixth Avenue. In conclusion the report says that the committee considers the plan of the Hudson & Manhattan Railroad desirable for the reason that it will afford connections from the Grand Central Station, the proposed Broadway-Lexington Avenue Subway, the present subway, and the Steinway tunnel with all parts of Sixth Avenue and with all of the New Jersey terminals of steam roads.

Discussion on Depreciation in Report of Philadelphia Committee

The report of the special committee of Councils of Philadelphia, which investigated the street railway situation in various large cities, contains a short discussion regarding depreciation and amortization by F. W. Brooks, general manager, Detroit United Railway. The discussion in the report regarding the abuse of transfers was published in the Electric Railway Journal of April 3, 1909, page 663.

One of the formal questions submitted by the committee was as follows:

"What would you consider a fair proportion of the actual replacement cost of the system; that is to say, of the track, overhead work, rolling stock, power plants and appurtenances, to be set aside each year in addition to ordinary expenses for maintenance, in order to provide a fund for replacing the system when it became worn out or antiquated, in case no new capital was available for those requirements?" The report adds:

"None of the companies answered this question specifically. Mr. Brooks, of Detroit, discussed the question at some length, and in the course of his discussion said: 'It is a great big question. I can see that if any city in America had required its transportation company to earn sufficient money within its life as determined by these franchises, then certainly the people of that city would have an enormous burden to bear; and whether it is proper to say that these properties shall be corrected and shall earn that cost and their replacement out of the pockets of one generation or several generations is a problem that the wisest men have stumbled over.'

"In speaking of the practice of his company, Mr. Brooks said: 'We are charging off every year to depreciation something like $250,000. We are doing it on the theory that the entire property will not have to be reproduced at one time; we had hoped to meet any reasonable situation, replacing any cars that got out of condition each year, more as a matter of maintenance and replacement than as a matter of reproduction. Now, the thought in my mind was that if you say to a transportation company in the city, "You construct this plant and operate it for 30 years, and at the end of 30 years there shall not be one dollar owed by this company, discharge all bonds, mortgages, etc.," then I say that you have done a thing that amounts to confiscation so far as the public at large is concerned.'"

Illinois Central Railroad Electrification

Edward H. Harriman passed through Chicago on March 31 on his way from California to New York on business. Although he was in Chicago only a short while, Mr. Harriman consented to be interviewed. He is quoted as saying that the talk about his retiring is not worth denying. Mr. Harriman discussed the railroad situation in general. He said he had been misquoted in Denver, and carefully explained his attitude toward consolidations. He said that

business in the West is improving steadily. Regarding the local situation at Chicago, Mr. Harriman was quoted as saying:

"I have just had a long talk with J. T. Harahan, president of the Illinois Central Railroad, and from the preliminary reports I should say that if the city would pay half the cost of electrification we might want to do it, but we do not want to 'bust' the Illinois Central Railroad. We have only the preliminary reports here, but has the electrification of the New York Central & Hudson River Railroad proved a complete success? That is not finished by a good deal, and the situation there is different. The company had to electrify on account of the tunnel, but there is no tunnel in Chicago. I do not want to talk against electrification. Luxuries come high, but I suppose we will have to have them."

President Harahan is reported to have made the following statement regarding electrification at a subsequent conference with the city authorities: "It is a gigantic undertaking and we are still making a study of the question. When conclusions will be reached cannot be forecast at this time, but electrification of the company's tracks along the lake front, it would appear, will eventually be carried out. We had to make a beginning somewhere, so numerous plans have been drawn for the electrification of the tracks used by the company for Chicago suburban service. The estimated cost is $8,000,000. Several times that amount will be needed for electrifying all the lake-front tracks. All details must be carefully considered before any electrification work is begun."

The plans now being discussed provide for placing all suburban track in one section of the right of way along the lake front where there will be no interference from through trains. It is estimated that the track changes alone will cost $1,500,000. A report that the Illinois Central Railroad would request permission to build a subway loop through the business district of Chicago for the accommodation of trains of its own electrified divisions and trains of other electrified steam railroads is said to have been a misstatement. It is learned that the Illinois Central Railroad merely asked permission to use part or all of the city's proposed subway as the downtown terminal of its electrified suburban service if a subway system is built in Chicago.

Joint Meeting of Western Associations

A joint meeting of the Wisconsin Electric & Interurban Railway Association, the Fox River Valley Gas & Electric Association and the Northwestern Electrical Association will be held in the Hotel Foeste, Sheboygan, Wis., on April 12 and 13. This meeting will be devoted to the consideration and discussion of the new accounting system prescribed by the Railroad Commission of Wisconsin. The program as announced follows:

MONDAY, APRIL 12.

Meeting called to order at 1:30 p. m.

Opening remarks by Clement C. Smith, president Wisconsin Electric & Interurban Railway Association.

Remarks by Ernest Gonzenbach, president Northwestern Electrical Association.

Paper, "The New Accounting System," by Halford Erickson or William J. Hagenah, of the Wisconsin Railroad Commission.

Paper, "The Practical Application of the New Accounting System," by George Allison, Wisconsin Electric Railway and Eastern Wisconsin Railway & Light Company.

Paper, "Methods of Changing from the Old to the New," by B. G. Broad, Milwaukee Northern Railway.

7:00—Dutch supper.

TUESDAY, APRIL 13.

Visit to the power station of the Sheboygan Light, Power & Railway Company.

Visit to the loading and sorting docks of the C. Reiss Coal Company.

Visit to Born's natural mineral water baths.

Adjournment at 12:00 noon.

Municipal Ownership Recommended at Middletown, Ohio.—The Business Men's Club of Middletown, Ohio, has recommended that the town purchase the horse car line, which is owned by the Cincinnati, Hamilton & Dayton Railroad, and equip it for operation by electricity.

New York, New Haven & Hartford Railroad to Extend Electric Lines.—It is reported that the New York, New Haven & Hartford Railroad has had preliminary plans drawn for the electrification of that division of the road between Stamford and New Haven, Conn., and the construction of an additional power house at Naugatuck Junction, where a site has been secured. At the offices of Westinghouse, Church, Kerr & Company, the engineers who constructed the power house at Cos Cob, Conn., it was said that no instructions to prepare plans had been given that firm by tthe railroad company.

Annual Banquet of Boston Suburban Railway Club.—The annual early morning meeting of the Boston Suburban Railway Club was held in Endicott Hall, Waltham, on March 30. A banquet was served at 1:30 a. m., followed by a varied entertainment. Employees of the street railways centering in the Waltham and Newton districts attended. William Scamman, president of the club, was in the chair. Among the guests were Mayor Walker, of Waltham; M. C. Brush, vice-president and general manager of the Boston Suburban Electric Companies; C. A. Sylvester, assistant general manager of the Boston Suburban Electric Companies, and Carl Alberte, manager of Norumbega Park.

Plans for Lengthening Subway Stations in New York.—The Public Service Commission of the First District of New York has referred to its chief engineer, the plans submitted by the Interborough Rapid Transit Company for lengthening the platforms of the stations in the New York subway. The company suggested that the service in the subway could be increased 25 per cent if the express platforms were lengthened so as to accommodate 10-car trains and the local platforms lengthened to accommodate 6-car trains. This was made a part of the proposition for the extension of the subway north on the east side and south on the west side, but the commission, without passing upon these extensions, suggested that the stations might be lengthened at once. The cost of lengthening the platforms, which would be paid by the city, is estimated at about $1,000,000.

Cambridge Subway Station Plans Finally Approved.—Walter C. Wardwell, Mayor of Cambridge, Mass., has approved the plans of the Boston Elevated Railway for the stations to be built in the new Cambridge subway by the company at Central Square and Kendall Square. The Harvard Square plans were recently approved by the Massachusetts Railroad Commission. The Boston Elevated Railway has modified the plan of the Central Square station in accordance with the suggestions of the commission, and there will be no structures in the highway there, the approaches and exits being on the sidewalk. All the entrances and exits will accommodate passengers in either direction who desire to transfer between the subway trains and the surface line connecting with them. The station planned at Sixth Street has been eliminated and instead, a station has been laid out for Kendall Square, with hood entrances and exits. A surface car loop will be installed there connecting with the station. It is expected that the Boston Elevated Railway will ask for bids for the construction of the subway in the near future.

Southwestern Electrical & Gas Association.—A meeting of the executive committee of the Southwestern Electrical & Gas Association was held at Dallas, Tex., on March 16. The following members were present: R. B. Stitcher, Dallas; W. B. Tuttle, San Antonio; A. E. Judge, Tyler; N. B. Head, Stephenville; H. T. Edgar, Fort Worth, and E. L. Wells, Jr., Marshall. Applications for membership in the association were received from the following companies and approved by the executive committee, subject to election at the next meeting of the association: Active members: Commerce (Tex.) Electric Light Company; Texas Traction Company, Dallas, Tex.; Gainesville Gas & Electric Company, Gainesville, Tex.; San Antonio (Tex.) Traction Company; Abilene Gas Light, Fuel & Power Company, Abilene, Tex.; Texarkana Gas & Electric Company, Texarkana, Tex.; Stephenville Light & Water Company, Stephenville, Tex.; Alvarado Water, Light & Power Company, Alvarado, Tex. Associate members: Houston (Tex.) Armature Works; Texas Company (Natl. Gas Dept.), Fort Worth, Tex.; The Emerson Electric Manufacturing Company, St. Louis, Mo.; Cutler-Hammer Manufacturing Company, Milwaukee, Wis.; Detroit Stove Works, Chicago, Ill.; Milton Mills, St. Louis, Mo. The office of secretary of the association was declared vacant. It was decided to include advance copies of the question box in the souvenir program of the association and to print a sufficient number of copies of the question box to bind them with the proceedings of the 1909 convention, the date of which is set for May 20, 21 and 22 at Dallas. It was decided to notify the Electrical Contractors' Association of Texas that the by-laws of the Southwestern Electrical & Gas Association would not admit the association to issue one membership in the Southwestern Association to any other association, but that applications would be received separately and the Southwestern Association would be glad to have the Electrical Contractors' Association meet at the same time as the Southwestern Association and in the same city. The report of A. E. Judge, treasurer of the association, showed receipts of $3,170.41 and disbursements of $1,993.29, leaving a balance of $1,177.12.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Massachusetts.—The committee on metropolitan affairs has voted in executive session to report that all the bills providing for an extension of the subway and tunnel systems of the Boston Elevated Railway shall be referred to the Boston Transit Commission and the Massachusetts Railroad Commission sitting jointly. The principal measures included in this vote are the bill for a subway from Tremont and Park Streets to Milton Lower Mills; a bill for a tunnel between Sullivan Square and the North Station; a bill for a tunnel between Boston and Chelsea; a bill for rapid transit in Boston by a crosstown tunnel; a bill to discontinue the elevated structure in Washington Street and extend the Washington Street tunnel to Dudley Street, and a bill for a subway to South Boston. The same committee has reported leave to withdraw on the bill accompanying the petition of John D. Bryant and others to provide that the Boston terminus of the Cambridge subway shall be in Scollay Square. The House has adopted an order providing for an investigation by the Boston Transit Commission and the Massachusetts Railroad Commission and a report before May 1 on the advisability of granting the petition for legislation to authorize the Boston & Eastern Electric Railroad to construct a tunnel under Boston Harbor and connect it with the existing tunnel system in Boston. The Boston & Eastern Electric Railroad has submitted a new bill which provides that the city of Boston may purchase the tunnel on completion at cost, or, if it prefers, it may receive the tunnel free of cost at the end of 40 years, through the establishment of a sinking fund by the company. The committee on taxation has reported leave to withdraw on the Dean bill, providing that the poles and wires of any corporation located in the public streets might be taxed in the city or town where located, by the local assessors, the tax being deducted from the franchise tax levied by the tax commissioner for the State. The Haigis bill relative to the distribution of the franchise taxes of public service corporations has been referred to the next Legislature.

Minnesota.—The House committee of the whole recently recommended for passage the Nolan bill placing the street railways under the jurisdiction of the Railroad and Warehouse Commission. Subsequently the House referred the bill to the judiciary committee, with orders to give hearings and amend the bill if necessary, and to express an opinion as to whether it abridges the authority of cities over the companies. The measure was to have been reported back to the House on March 20, but there was no session on that date. At first the committee agreed on a compromise, which would leave primary jurisdiction with the cities and gave a right of appeal to the Railroad and Warehouse Commission. But in going over the constitution and court decisions so many legal entanglements were found that the committee was unable to draw a measure that would be constitutional. A bill somewhat similar to the Nolan measure has been introduced in the House by W. D. Washburn, Minneapolis. It places the supervision of suburban and interurban electric railways under the Railroad and Warehouse Commission and gives the commission power to order connections to be made between suburban and city railways or to provide for the transfer of passengers between such lines. The bill providing that cities of not less than 10,000 inhabitants and not more than 20,000 inhabitants shall be governed by commission has been received favorably, and the Senate and the House recently concurred in extending invitations to several members of the City Commission of Des Moines, Ia., to address them on the results attained under commission government in Des Moines. March 31 was the last day for the introduction of new measures in the House, and at the close of the session for that day the measures presented totaled 1173. One of the last measures presented gives the Governor power to appoint members of the Railroad and Warehouse Commission.

New York.—The prospects are that the Legislature will adjourn sine die on April 30, and that an extraordinary session will be called in May. There was another conference in New York on April 1 between the Governor and members of the Public Service Commission of the First District, but other than to admit, as they did in the case of the previous conference, that rapid transit legislation was discussed, the parties to the conference refused to be interviewed or quoted. The Public Service Commission for the First District has transmitted to the Assembly its report upon the Eleventh Avenue franchise of the New York Central & Hudson River Railroad in New York City. Beyond developing the fact that the company's legal rights to occupy the premises are apparently in some respects subject to question, the commission does not attempt to pass judgment upon them, nor does it suggest any plan of action looking to the forfeiture thereof. The commission cites the declaration of the company that public safety and convenience require the removal of the tracks from grade, and declares that the solution of the west side track problem must have a relation to the general betterment of freight distribution in the entire city, and especially in the Borough of Manhattan. Whatever the plan adopted, it appears probable to the commission that it must be carried out with private capital. Senator Grady subsequently introduced a bill granting the New York Central & Hudson River Railroad a franchise in perpetuity for an elevated structure south of Fifty-ninth Street, either in Eleventh Avenue or some other location. On April 5 Senator Brough introduced a bill regarding the line in Eleventh Avenue, New York. His measure proposes that the New York Central & Hudson River Railroad shall place its tracks now on that street in a subway, and gives the Public Service Commission authority to require the removal of condemned tracks. Assemblyman Bohan introduced the measure in the Assembly. The railroad committee of the Assembly has reported favorably the resolution introduced by Assemblyman Toombs, calling upon the Public Service Commission of the First District to order the building of a subway station at Columbus Avenue and 104th Street. A rapid transit measure affecting New York City was introduced concurrently in the Assembly and the Senate on April 7, which is understood to have been drawn in accordance with the wishes of the Public Service Commission of the First District and to meet objections which caused the Governor to veto a similar measure last year. The bill provides that private capital may construct, own and operate subways in New York, but that the profits shall be divided with the city, share and share alike, and that the city shall ultimately own the line without payment after a period suitable for realization of the cost. It is further provided that the city can at any time terminate any franchise or operating contract by making fair payment exclusive of franchise value. The bill also makes provision for the construction of rapid transit lines in the outlying districts, with the payment of at least a portion of the cost by local assessment upon the area benefited, and permits the construction, ownership and operation by private parties of extensions of established lines, these extensions to be subject to purchase by the city at any time after 10 years. Construction contracts may be made on the unit system and the section system. The bill has been referred to the cities committee in the Senate.

Pennsylvania.—The House has passed finally the measure introduced by Mr. Reynolds, empowering Philadelphia to borrow money for the construction of subways. The Senate has concurred in the House action, and it is believed that the Governor will approve the resolution. By the provision of this amendment the city will be empowered to issue bonds for the construction of a subway on Broad Street, and possibly other lines on Ridge Avenue and Front Street, which can be utilized by the Philadelphia Rapid Transit Company. The lease charges must be sufficient to pay the interest upon the bonds and to provide a sinking fund for the ultimate cancellation of the indebtedness. Philadelphia is the only city in which private interests have built a subway without aid from the city, and the purpose of the Reynolds constitutional amendment is to extend the service to North and South Philadelphia, Manayunk and Frankford. The amendment will have to be passed at two sessions of the Legislature and then submitted to a popular vote before it becomes effective. This will require at least three years. Following an agreement between Pittsburgh city officials and leaders of the Senate the Murphy bill, which permits the interchange of cars between steam and electric railways, has been amended in the Senate to prohibit the use of steam locomotives upon electric railways in such interchange of cars. The Shields bill, the companion measure, will also be amended to conform to the wishes of the Pittsburgh authorities. These bills were up for final passage in the Senate on March 25. The Shields bill authorizes the transportation of all kinds of freight by any power over electric railways. This legislation is said to be desired by the Philadelphia Rapid Transit Company, which plans to haul freight over its subway line. It was stated by Senator Vare that the hauling of ashes by trolley in Philadelphia had proved so satisfactory that the capacity of the ash cars would be increased shortly. Mayor Guthrie's principal objection to the bill as affecting Pittsburgh was that the amendment empowering Councils to sanction the connection of steam and electric railways did not fully protect the city's interests. The Shields bill is favored by the Pennsylvania Street Railway Association. It places the hauling of freight on electric railways under local regulation. The House has passed finally the Senate bill authorizing the acquisition by the State for the use of counties of bridges more than 1000 ft. long which are erected over creeks and streams by companies and the bill requiring street railways to carry United States mail upon demand.

Financial and Corporate

New York Stock and Money Markets

April 6, 1909.

Following a week of buoyancy and advancing prices the Wall Street market to-day had a slight reaction, which has been attributed entirely to profit taking on the part of small traders. Like so many of the recent movements on the Stock Exchange, the selling was commenced in London. The recent upward trend was started by the buying of the foreigners when prices seemed low, and the first pause was caused by foreign profit taking. The traction stocks during the last week have continued to be unusually active and substantial gains have been recorded.

The bond market continues to be firm, with plenty of investment buyers always ready to take well-secured issues. Money remains very cheap and plentiful. Rates to-day were: Call loans, 1½ to 2 per cent; 90-day loans, 2½ per cent.

Other Markets

Traction shares continued to be among the active features of the Philadelphia market, with Rapid Transit and Union Traction the leaders in popularity. The former was especially active and the price has been worked upward steadily until sales were made at 30¼. Union Traction, too, advanced steadily and touched 55¾, the highest figure since last spring.

In the Chicago market little interest has been shown in traction securities. City Railways, Series 2, is the only issue of that company that has been in the market, and this only to a limited extent. Subway has been less active, but quotations have not receded.

A trifle more interest has been shown in traction securities in the Boston market during the last week. Boston Elevated, Boston Suburban preferred and Massachusetts Electric have all been more active and prices have advanced somewhat.

In Baltimore, the bonds of the United Railways Company continued to be in demand. Prices were about stationary; incomes, 54¾ and funding 5s, 79⅝.

	Mar. 30.	Apr. 6.
American Railways Company	*45¼	*45¼
Aurora, Elgin & Chicago Railroad (common)		a37½
Aurora, Elgin & Chicago Railroad (preferred)	—	a88¼
Boston Elevated Railway	129	130½
Boston & Suburban Electric Companies (common)	—	*10
Boston & Suburban Electric Companies (preferred)		*70¼
Boston & Worcester Electric Companies (common)	—	*a11½
Boston & Worcester Electric Companies (preferred)	—	*a56
Brooklyn Rapid Transit Company	76¼	76½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	—	85
Capital Traction Company, Washington	—	*a133⅛
Chicago City Railway	*185	*a185
Chicago & Oak Park Elevated Railroad (common)	—	*a4½
Chicago & Oak Park Elevated Railroad (preferred)	—	*a11
Chicago Railways, ptcptg. ctf. 1	—	*a112
Chicago Railways, ptcptg. ctf. 2	—	*a41
Chicago Railways, ptcptg. ctf. 3	—	*a29
Chicago Railways, ptcptg. ctf. 4	—	*a11½
Consolidated Traction Company of New Jersey	a77½	a67½
Consolidated Traction Company of New Jersey, 5 per cent bonds	a106	a106
Detroit United Railway	*61	58½
General Electric Company	—	158¾
Georgia Railway & Electric Company (common)	—	*80⅜
Georgia Railway & Electric Company (preferred)	—	*85
Interborough-Metropolitan Company (common)	12⅞	14½
Interborough-Metropolitan Company (preferred)	38	42½
Interborough-Metropolitan Company, col. 4½s	—	78⅛
Kansas City Railway & Light Company (common)	—	*a42½
Kansas City Railway & Light Company (preferred)	—	*a82
Manhattan Railway	*143	*143
Massachusetts Electric Companies (common)	14½	*14½
Massachusetts Electric Companies (preferred)	72	72½
Metropolitan West Side Elevated Railway, Chicago (common)	*10	*a18
Metropolitan West Side Elevated Railway, Chicago (preferred)	18	*52
Metropolitan Street Railway	23	*23
North American Company	79⅜	80½
Northwestern Elevated Railroad (common)	—	*a22½
Northwestern Elevated Railroad (preferred)	—	*a68½
Philadelphia Company, Pittsburg (common)	42⅛	42¼
Philadelphia Company, Pittsburg (preferred)	42⅛	43
Philadelphia Rapid Transit Company	28⅞	30
Philadelphia Traction Company	93	92½
Public Service Corporation, 5 per cent col. notes	a100½	a100½
Public Service Corporation, ctfs.	a82	a82½
Seattle Electric Company (common)	—	a91½
Seattle Electric Company (preferred)	—	a98
South Side Elevated Railroad, Chicago	—	*a60
Toledo Railways & Light Company	—	12⅞
Third Avenue Railroad, New York	—	28½
Twin City Rapid Transit Company, Minneapolis (common)	104½	a104½
Union Traction Company, Philadelphia	55	55⅜
United Railways & Electric Company, Baltimore	—	11½
United Railways Investment Company, San Francisco (common)	—	*a35
United Railways Investment Company, San Francisco (preferred)	—	*a54
Washington Railway & Electric Company (common)	—	*a44
Washington Railway & Electric Company (preferred)	—	*a91¼
West End Street Railway, Boston (common)	—	96¾
West End Street Railway (preferred)	—	*110½
Westinghouse Electric & Manufacturing Company, 1st pfd.	—	117

a Asked. * Last sale.

Report of Nashville Railway & Light Company

The Nashville Railway & Light Company, Nashville, Tenn., has recently made public the following comparative statement of earnings for 1908 and 1907:

	1908.	1907.
Earnings from operating and other sources	$1,597,029	$1,578,207
Operating expenses and taxes	954,296	969,105
Earnings, less operating expenses and taxes	$642,733	$609,102
Interest on funded debt and current liabilities	393,099	354,902
Net income	$249,633	$254,200
Reserve miscellaneous, including depreciation	47,742	37,710
Net income	$201,891	$216,490
Reserve miscellaneous transferred to profit and loss	45,000	30,249
Net income	$246,891	$246,740
Dividend on preferred stock, 5 per cent	123,445	123,445
Net income to profit and loss	$123,446	$123,295

Special Franchise Assessments in New York City

The State Board of Tax Commissioners has completed its special franchise tax assessments for New York City. The final assessments of the electric railway companies for 1909 compared with 1908 follow:

	1909.	1908.
Brooklyn City & Newtown Railroad	$2,425,000	$3,000,000
Brooklyn Rapid Transit system	55,252,700	55,437,900
Coney Island & Brooklyn Railroad	2,543,000	2,750,000
Hudson & Manhattan Railroad	8,000,000	6,900,000
Long Island Electric Railway	425,000	475,000
Manhattan Railway	78,500,000	78,500,000
New York & Long Island Railroad	4,850,000	4,850,000
New York & Queens County Railroad	2,275,000	2,386,200
Pennsylvania Tunnel & Terminal	15,600,000	6,316,300
Richmond Light & Railroad Company	534,900	500,000
Interborough Rapid Transit Company	24,012,000	24,012,000
Metropolitan Street Railway	65,656,000	68,303,000
Third Avenue Railroad	19,057,000	19,562,000

Angelo Power & Traction Company, San Angelo, Cal.—A. J. Baker has been appointed receiver of the Angelo Power & Traction Company.

Ardmore (Pa.) Street Railway.—The Safe Deposit & Trust Company and Robinson Brothers, Pittsburg, and Newburger, Henderson & Loeb, Philadelphia and New York, are offering for subscription at 99½ and interest the unsold portion of $500,000 first mortgage 5 per cent gold bonds, of the Ardmore Street Railway, unconditionally guaranteed as to principal and interest by the Consolidated Traction Company, which owns the entire stock of the Ardmore Street Railway. The bonds are dated 1908, and are due April 1, 1958, but are subject to call at 105 and interest. The interest is payable April and October. The authorized issue is $1,250,000. Of this amount $1,000,000 is outstanding and $250,000 is reserved for extensions, etc.

Atlantic & Suburban Railway, Pleasantville, N. J.—John L. Clawson has secured his discharge as receiver of the Atlantic City & Suburban Traction Company, which has been succeeded by the Atlantic & Suburban Railway. The reorganization was arranged by the first mortgage bondholders. It eliminated the old $250,000 second mortgage bonds, the $750,000 of stock and the company's outstanding debts, which were between $125,000 and $150,000. The Atlantic & Suburban Railway has $650,000 of stock and $650,000 of first mortgage 4 per cent bonds. The $500,000 of first mortgage 5 per cent bonds of the Atlantic City & Suburban Traction Company have been exchanged for $500,000 of the new 4 per cent bonds. Practically all of the remaining $150,000 bonds have been sold to provide new equipment and working capital.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—A committee of the bondholders of the Illinois division of the Chicago & Milwaukee Electric Railroad is said to be considering plans to secure $500,000 for improvements. The plan that is most favored is said to provide for the retirement of the existing $5,000,000 bonds by an issue of preferred stock and placing only a $700,000 mortgage on the property. Holders of bonds due in 1919 and 1922 would get the first preferred stock at the present market values of their holdings, 84 and 60 respectively, and the balance of the face value in second preferred stock. Common stock to the amount of $5,000,000 without voting power, but with power to retire the preferred at par and accrued dividends, would be issued for the present stock on a basis of 1 to 5 for the preferred at 1 to 3 for the common.

Denver (Col.) City Tramway.—Clark, Dodge & Company, New York; International Trust Company, Denver, and E. W. Clark & Company, Philadelphia, recently offered for subscription at 95 and interest $1,848,000 of 5 per cent first and refunding sinking fund mortgage bonds of the Denver City Tramway, due Nov. 1, 1933. There is an annual cumulative

sinking fund of 1 per cent of the par value of bonds outstanding from November, 1914, to November, 1923, and 2 per cent of the par value of bonds outstanding thereafter. The bonds are callable as a whole, but not in part (except for the sinking fund) at 105 on any interest day from May, 1914, to November, 1923, and at 102½ on any interest day thereafter.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—The Public Service Commission of the Second District of New York has granted the application of the Fonda, Johnstown & Gloversville Railroad for permission to increase its capital stock from $2,500,000 to $3,500,000, but has authorized the company to issue only $500,000 of the $1,000,000 of additional capital at this time. The new issue is to be 6 per cent preferred stock. J. Ledlie Hees, president of the company, in a circular dated March 30, offers to the holders of the $2,500,000 outstanding common stock the right to subscribe at par ($100 per share) for $500,000 of the $1,000,000 6 per cent cumulative preferred stock recently authorized by the stockholders to the extent of 20 per cent of their holdings. A syndicate has agreed to take at par all the stock not otherwise subscribed for. Mr. Hees in his letter to the stockholders says in part: "Stockholders desiring to subscribe may do so on or before April 15 by forwarding their subscription to G. M. Place, treasurer, Gloversville, N. Y., accompanied by a remittance for 10 per cent of the same. The remainder will be payable April 30 and dividends will accrue from that date. The consent of the Public Service Commission of the Second District of New York has been received to the issue of the $500,000 stock offered for the payment of indebtedness incurred on account of new construction. The remaining $500,000 is reserved for future betterments and can only be issued upon further authority of the commission. Dividends on the new stock are payable quarterly on the 15th days of March, June, September and December out of surplus profits. The dividends on the proposed issue will amount to $30,000 a year, and through the payment of loans will reduce interest charges by practically an equal amount."

Louisville (Ky.) Railway.—The Louisville Railway has recently sold $1,000,000 of 40-year 4½ per cent second mortgage bonds to the Fidelity Trust Company, Louisville, Ky., for betterments and to acquire obligations against, and securities of, the Louisville & Eastern Railroad, which is in the hands of a receiver. The bonds just sold are part of an issue of $2,000,000, of which $1,000.000 had been sold previously.

Mansfield Railway, Light & Power Company, Mansfield, Ohio.—John C. Carpenter, A. A. Cornell, F. A. Durbin, S. E. Findley, Leopold Kleybolte, H. M. Byllesby and other stockholders of the Mansfield Railway, Light & Power Company have asked for the appointment of a receiver for the company and that the property be sold and the proceeds turned over to the stockholders. The Cleveland, Southwestern & Columbus Railway owns a controlling interest in the Mansfield Railway, Light & Power Company.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Traction & Light Company has authorized an issue of $1,000,000 of 6 per cent collateral trust notes, to be dated May 1, 1909, and to mature in annual installments on Nov. 1, from 1911 to 1918. The notes will be secured by the deposit of $1,000,000 of 4 per cent bonds of the Northern Ohio Traction & Light Company; $700,000 of 5 per cent bonds of the Canton-Akron Railway, and $200,000 of 5 per cent bonds of the Akron, Wadsworth & Western Railway. The proceeds of the notes will be used to take up $600.000 of 6 per cent collateral trust notes of the Northern Ohio Traction & Light Company, due Sept. 1, 1909; $300,000 of 5 per cent second mortgage bonds of the Canton-Akron Railway due May 1, 1909, and $100,000 of 5 per cent first mortgage bonds of the Tuscarawas Electric Company.

Philadelphia, Bristol & Trenton Street Railway, Philadelphia, Pa.—The Union Trust Company, Baltimore, Md., trustee of a mortgage for $650,000 given by the Philadelphia, Bristol & Trenton Street Railway, has applied for the appointment of a receiver for the company, which has defaulted in the payment of interest on the bonds secured by the mortgage.

Southwestern Traction Company, London, Ont.—The London & Southwestern Trust Company has been appointed temporary receiver for the Southwestern Traction Company.

Union Street Railway, New Bedford, Mass.—The Union Street Railway has applied to the Railroad Commission for permission to issue additional stock at $140 a share to realize $225,000 and $100,000 of additional bonds, to pay floating debt and for improvements and extensions.

Traffic and Transportation

T. P. Shonts on Earnings and Operation of New York Subway

T. P. Shonts, president of the Interborough Rapid Transit Company, New York, in an interview in the New York *American* of April 4, answered various questions.

Referring to the earnings of the subway, Mr. Shonts said:

"The existing subway does not pay 9 per cent on its original capital, but in fact earns less than 6 per cent on its actual cash cost. The existing subway was built under a form of laws which removed all taxation, and when constructed the city did not impose any limitation or restrictions upon the builders with reference to open cuts and character of construction, which, in the minds of the builders and engineers, would lead to the completion of the system at the earliest possible date and with minimum expense.

"Even in the face of this most favorable method of construction the consulting engineer of the Public Service Commission, in a recent official report, said that a substantial percentage of the 9 per cent dividend on the Interborough Rapid Transit Company stock is earned through the lease of the elevated system.

"The actual rtturns from passenger traffic, in the existing subway, for the year ended June 30, 1908, after deducting operating expenses, reasonable maintenance charges, and no taxes except on real estate and the excess dividend taxes, which were nominal, amounted to but 5.95 per cent on the actual cash investment. It is not to be expected that a new subway would accommodate a greater density of traffic, nor could a new subway be built at a less cost per mile. Therefore, it is not reasonable to expect that any new subways, except for strictly short-haul business, could do as well as the present subway has done, with a result of less than 6 per cent return, as shown above."

On the subject of separate cars for women or for smokers, Mr. Shonts stated:

"Owing to the density of traffic in the subway, if the rear car of each train is devoted to the use of women only we believe it will not be a success and will interfere to such a degree that it will decrease the present efficiency of the subway. However, if it is the opinion of the Public Service Commission that we should devote the rear car exclusively to women, we will make the experiment, although our operating officers do not believe it will prove a success.

"As to using the forward car of each train as a smoking car, the lease of the operaing company of the present subway provides that smoking cars can be used on the subway if the operating company desires. But since the lease was executed, a resolution has been adopted by the Board of Health prohibiting smoking in the subway, and the operating officers believe that the smoking car should not be installed for the reason that it would tend to interfere with the efficiency of the system and would also prove objectionable from a sanitary standpoint. Experience has told the operating officers that it is practically impossible to keep even elevated cars clean and in a sanitary condition when smoking is permitted."

All future subway cars ordered will be of steel, Mr. Shonts stated.

The increase in traffic is shown by the following figures given by Mr. Shonts:

"During the fiscal year ending June 30, 1905, the subway having been operated only for the period from Oct. 27, 1904, to June 30, 1905, the traffic was 72,722,890 passengers. The following year passenger traffic in the subway grew to 137,919,632, an increase of 89.65 per cent. During the year ending June 30, 1907, the number of passengers carried was 166.363.611, an increase over the previous year of 20.62 per cent, and for the year ended June 30, 1908, the traffic was 200.439.776 passengers, or an increase of 20.48 per cent over the preceding year."

The Experiment with Exclusive Cars for Women

In accordance with its published announcement, the Hudson & Manhattan Railroad, which operates the tunnel under the Hudson River between New York and New Jersey, began on March 31 to reserve the rear car of every train leaving Hoboken for New York between 7 a. m. and 9 a. m. and leaving Twenty-third Street and Sixth Avenue, New York, between 4:30 p. m. and 7 p. m. for the exclusive use of women. Uniformed porters wearing red caps are stationed on the platforms at Hoboken and at Twenty-third Street and Sixth Avenue to direct the women, and the rear car of each train carries a large sign which reads: "Rear

car reserved exclusively for women." At first there was some confusion, but very little trouble is experienced now, and the exclusive cars for women will be given a thorough trial by the company.

In reply to the complaint order of the Public Service Commission of the First District of New York asking it to show cause why the rear car of each express train in the New York Subway should not be reserved for women, the Interborough Rapid Transit Company has addressed a letter to the commission over the signature of Frank Hedley, vice-president and general manager, in which it says:

"The Interborough Rapid Transit Company has always been ready to do anything to ameliorate the conditions in the subway, and the officers have often discussed the feasibility of setting aside a separate car for women and children, but the density of the traffic is so great that the conclusion has always been that the experiment would not prove successful. If, in the judgment of your honorable body, you think that the suggestion of setting aside the rear car of express trains for the use of women and children is worth the experiment, this company is perfectly willing to try it upon receipt of advice to do so."

Hearing to Be Held on the Question of Waiting Rooms at Worcester.—The Board of Aldermen of Worcester has petitioned the Massachusetts Railroad Commission to give a hearing on the waiting-room and station accommodations furnished by the Worcester (Mass.) Consolidated Street Railway.

Texas Company Increases Fare.—The Belton & Temple Traction Company, operating in Temple and between Temple and Belton, has given notice of its intention to discontinue the sale of six tickets for 25 cents in Temple and to charge a straight 5-cent fare in Temple hereafter. The rate of fare between Belton and Temple will remain as at present.

Express Franchise Granted in Massachusetts.—The Selectmen of Monson, Mass., have passed an ordinance granting the Springfield & Eastern Street Railway, Palmer, Mass., permission to carry express in Monson. The company is to deliver goods by team until June 1, after which the terms of the grant to the company provide that stations shall be established.

Conductor Sentenced for Stealing Fares.—Louis Finstein, a conductor in the employ of the Boston (Mass.) Elevated Railway, was recently found guilty of stealing fares from the company by Judge Almy in the Cambridge District and was sentenced to serve 30 days in the House of Correction. A plea by Finstein's lawyer to file the case failed, Judge Almy remarking that he owed it to the community and to the other conductors of the company to pass sentence on Finstein.

Ferry Lease Not Renewed.—The Norfolk & Portsmouth Traction Company, Norfolk, Va., which has operated the Norfolk County Ferries under lease for 10 years, has not renewed its operating agreement with the ferry company. Reid & Company have leased the ferry property at $135,200 per annum. The Norfolk & Portsmouth Traction Company has a claim against the Norfolk County Ferries for $190,000 for improvements and betterments to the property, and appraisers are now at work upon the award to be made under this claim.

Finding of Commission in Massachusetts Accident.—The Massachusetts Railroad Commission attributes the collision between surface cars on the Boston Elevated Railway on Blue Hill Avenue, Boston, on March 3, to the failure of the employees to understand and observe the rules requiring a speed reduction to test the working of the brakes before taking a heavy descending grade and calling for a stop at certain specified crossings. Strict discipline in regard to such rules is emphasized by the board as necessary in its findings.

Transportation Committee Appointed for New England.—A committee of transportation and business men has been formed in Boston for the purpose of working out an intelligent system of transportation for Boston, the State of Massachusetts, and New England as a whole, covering steam and electric freight, passenger and express traffic and facilities. Among the members of the committee are: General William A. Bancroft, president of the Boston Elevated Railway; Robert Winsor, of the executive committee of the Boston Elevated Railway; C. S. Mellen, president of the New York, New Haven & Hartford Railroad; Lucius Tuttle, president of the Boston & Maine Railroad, and J. H. Hustis, assistant general manager of the Boston & Albany Railroad. Definite organization will soon be effected.

Brooklyn Veteran Honored.—William Shore, who for 50 years has been a horse-car driver and motorman for the Brooklyn City Railroad and the Brooklyn Rapid Transit Company, was the principal guest at a dinner given recently by the officers of the company in recognition of his long service and honorable record. At the table were Thomas Doran, John Boschen, Frederick Goebel, Peter Peppard and Thomas MacAleen, each of whom has served more than 40 years in the Brooklyn system. Others at the dinner were A. N. Dutton, superintendent of transportation; William Seibert, general superintendent of surface lines; Frank C. O'Keefe, superintendent at East New York; George W. Edwards, secretary of the B. R. T. Employees' Association, and John Stoll and Henry Heithass, representing the employees' association.

Inland Empire System Extends Parlor Car Service.—The parlor car service which was inaugurated on the Cœur d'Alene division of the Inland Empire System, Spokane, Wash., three years ago, has proved such a success that Waldo G. Paine, traffic manager of the system, has installed a similar service on the Inland division, which extends south from Spokane for a distance of 40 miles to Spring Valley Junction, at which point it diverges, the western branch running to Colfax, and the eastern to Moscow. Trains of four cars are run to Spring Valley Junction, where they are divided, two cars going south to Colfax and two to Moscow. The Moscow train is made up of a combined baggage, express and smoking car and a regular passenger car with a parlor compartment in the rear with wicker chairs, upholstered in plush, and at the extreme rear an observation smoking compartment. It is announced that as soon as the cars under construction at the shops of the Inland Empire System are finished, a similar parlor car service will be installed on the Spokane-Colfax division.

Self-Propelled Cars for New York Crosstown Lines.—Frederick W. Whitridge, receiver of the Third Avenue Railroad, New York, has made arrangements for testing one storage-battery car and one gasoline-electric car on St. Nicholas Avenue, New York. The run is about 1½ miles long, and will afford an excellent route for determining the possibility of substituting either type of self-propelled cars for the present horse cars. It is expected that the storage-battery car will be ready by May 15 and the gasoline-electric car by June 1. Both cars will be 22 ft. long, with 4-ft. platforms, and the bodies will be carried on single trucks. The seating capacity of each car will be 28 passengers. The equipment of the storage-battery car, which is under construction by The J. G. Brill Company, will consist of 200 to 225 cells of the new Edison nickel storage battery and two 35-hp GE motors of special design. At first the batteries will be carried under the seats, but later it is intended to carry them below the car and between the wheels; the motors will be carried outside of the wheels. The batteries will be charged for a run of 70 miles, which is ample to insure service for a day without recharging. The gasoline-electric car, which is under construction by the General Electric Company, will be equipped with a standard 500-volt GE railway motor of 40 hp to 50 hp, and a gasoline-electric generating-set mounted in a cab. These statements regarding the apparatus are somewhat tentative, as all of the details have not yet been decided.

Directory of Chicago Elevated Railways.—A directory of authorized and concise information about the elevated railways in Chicago has been published by J. B. McComber, of the South Side Elevated Railroad. Each page has eight columns headed: Street, street number, location, elevated, division, station, blocks and direction. Given the street number of a house or building within walking distance of any branch of any of the elevated railways in Chicago, one can learn how to reach the address by consulting the directory. In the first column the streets can be found alphabetically listed; in the second column the numbers near the elevated stations along those streets; in the third column the division of the city—north, east, south or west side; in the fourth column the name of the elevated railway serving the street referred to; in the fifth column the name of the division of the elevated railway, and in the next column the station nearest the street and number required. The last two columns show the number of blocks necessary to walk and the direction after leaving the elevated station. Other information of interest similarly compiled includes directions for reaching hotels, banks, theaters, clubs, hospitals, public buildings and city departments. The publication also contains a list of the suburban towns and villages reached by outlying electric railways, simple instruction as to how to reach the terminals of the lines by means of the elevated railways and maps and complete timetables of all the elevated railways in Chicago and of the suburban electric railways.

Personal Mention

Mr. W. R. Taylor has resigned as manager of the Hull Electric Company, Aylmer, Que.

Mr. G. Gordon Gale has been appointed acting general superintendent of the Hull Electric Company, Aylmer, Que.

Mr. C. B. Keiser, formerly assistant electrical engineer of the West Jersey & Seashore Railroad, has been appointed master mechanic of the Pennsylvania Tunnel & Terminal Railroad Company, with office at 315 Fifth Avenue, New York.

Mr. D. S. Josslyn, president of the Portland Railway, Light & Power Company, Portland, Ore., was one of the principal speakers at a banquet given in Portland of 350 business men on March 23. Mr. Josslyn spoke on the transportation service for a half-million city, which Portland expects to be before long.

Mr. Edwin Hawley has been elected a director of the Interborough-Metropolitan Company, New York. Within the last two years Mr. H. M. Fisher, Mr. W. Leon Pepperman, Mr. W. G. Roelker, Mr. R. R. Govin and Mr. August Belmont, Jr., have been elected directors of the company, and Mr. Paul D. Cravath, Mr. J. S. Auerbach, Mr. John D. Crimmins, Mr. J. B. McDonald, Mr. De Lancey Nicoll, Mr. Geo. W. Wickersham and Mr. W. G. Oakman have all retired as directors.

Mr. K. McCaskill, who has been connected with the electrical engineering department of the New York Central & Hudson River Railroad for the last two years in the electrification of the terminal in and about New York City, has entered the employ of the Southern Pacific Railroad in connection with the electrification of its suburban branches in Oakland, Alameda and Berkeley. Mr. McCaskill's work will be chiefly in connection with transmission, distribution and catenary construction.

Prof. H. H. Norris, professor of electrical engineering, Cornell University, Ithaca, N. Y., who has been acting head of the electrical department of the university for the past four years, was elected to permanently fill that position last week. This is the office formerly occupied by Professor Ryan. Professor Norris is chairman of the committee on education of the American Street & Interurban Railway Association and also of the corresponding committee of the American Institute of Electrical Engineers. He has presented a number of papers before both bodies, and also drafted the present constitution and by-laws of the American Street & Interurban Railway Association.

Mr. Theodore Stebbins, who has recently resigned as general manager of the Texas Traction Company, Dallas, was the principal speaker at a meeting and entertainment given last month to ex-President Charles W. Eliot, of Harvard University, at the Agricultural and Mechanical College of Texas. The topic of Mr. Stebbins' address was "Electric Railways." He gave statistics of the development of electric roads in this country and compared the conditions in Texas and Ohio, saying the former has six times the area, three-quarters the population and one-twentieth the interurban mileage of the latter. He said experience had shown that farm lands had increased $100 in value for every dollar made (or lost) in the operation of interurban electric lines.

Mr. J. R. Harrigan has been appointed general superintendent of the Columbus, Delaware & Marion Railway, Marion, Ohio, in complete charge of the operation. Mr. Geo. Whysall, general manager of the company, will hereafter give his attention to extensions and other work. Mr. Harrigan was manager of the Columbus, Buckeye Lake & Newark Traction Company and the Columbus, Newark & Zanesville Electric Railway before they were taken over by the Ohio Electric Railway. He was formerly with the Canton-Akron lines and after the Northern Ohio Traction & Light Company was organized, Mr. Harrigan became connected with an electric railway near Buffalo. The new appointment dates from April 15. Mr. Harrigan's headquarters will be in Columbus.

Mr. S. B. Thompson, who recently resigned as mechanical engineer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has re-entered the employ of Sanderson & Porter, New York, with whom he was formerly associated for several years, representing them in various classes of construction work done under their direction in connection with the railway and lighting properties of Youngstown. Some time this month Mr. Thompson expects to sail for Europe to spend three or four months studying the transportation problems in the different continental countries, in order to compare results with conditions in the United States, but more particularly to investigate the circumstances governing the use of alternating current for street railway work and the possibilities of alternating current for steam railroad service. Mr. Thompson will probably return to the United States before Sept. 1 to continue his duties with Sanderson & Porter and will most likely spend considerable time in the West after his return.

Mr. G. K. Jeffries, who was recently appointed superintendent of the Brazil and Danville lines of the Terre Haute, Indianapolis & Eastern Traction Company, with headquarters in Greenfield, in addition to superintendent of the Eastern Division of the company, was born in Indianapolis on July 9, 1866. In 1883, when he was 17 years old, Mr. Jeffries entered the service of the Cleveland, Cincinnati, Chicago & St. Louis Railroad as telegraph operator and in 1886 he was promoted to the position of train dispatcher. In 1889 Mr. Jeffries resigned from the Cleveland, Cincinnati, Chicago & St. Louis Railroad to enter the employ of the Erie Railroad as chief train dispatcher and train master, a position he filled for nine years. In 1903 Mr. Jeffries began his electric railway career as superintendent of the Indianapolis & Northwestern Traction Company's line between Indianapolis and Lafayette, and in 1906 he resigned from the Indianapolis & Northwestern Traction Company to become superintendent of the Terre Haute, Indianapolis & Eastern Traction Company's line between Indianapolis and Richmond. Many improvements in the physical property of the Terre Haute, Indianapolis & Eastern Traction Company have been made under the direction of Mr. Jeffries and he was largely responsible for the amicable settlement of a local controversy over rights of the company in Richmond.

OBITUARY

Henry A. Griswold, former president of the Anacostia & Potomac Railroad, now part of the system of the Washington Railway & Electric Company, Washington, D. C., died at Washington on March 30.

Edgar A. Keeler, one of the organizers of the Denver (Col.) Tramway, is dead. Mr. Keeler was born in Union, N. Y., in 1843, and went to Denver in 1883. He assisted in organizing the first horse railways and continued actively in street railway work until after the electrification of the Denver lines. Mr. Keeler was also interested in real estate.

NEW PUBLICATIONS

Alternating-Current Machines. By Samuel Sheldon, Hobart Mason and Erich Hansmann. New York: D. Van Nostrand Company, 1908; 353 pages (5¼ in. x 7¾ in.) including index; completely revised and illustrated. Price, $2.50 net.

Perhaps the only introduction this book needs is to mention the fact that it has now entered its seventh edition. Its special field is in technical schools, but it has also been found useful to independent students who have some familiarity with the integral calculus. Aside from the mathematical deductions, the text will be found interesting, especially those sections relating to the recent types of single-phase railway motors.

Elektrotechnische Jahrbuch (Electrotechnical Annual). Published by Siegfried Herzog, Engineer Union Deutsche Verlagsgesellschaft, Stuttgart, Berlin, Leipzig; 1909; 298 pages (6½ in. x 9¾ in.). Subscription price, 9 marks, payable in advance each year.

This electrotechnical annual is in the form of a progressive dictionary chronicling under separate headings the latest developments in each important branch of the electrical art. The chapter on railways, for instance, describes the Prussian State Railway's accumulator cars, cost of prominent single-phase and d.c. railway operation under specified conditions, trackless trolleys, etc. An important feature is the system of references to more extended descriptions in other publications.

Dean Herman Schneider, of the University of Cincinnati, will deliver a paper at the New York meeting of the A. I. E. E. on April 16, on Fundamental Principles of Industrial Education. This is one of the papers arranged by the educational committee in its plans to lay before the Institute members the problems of industrial and technical education. Last year the committee devoted its time to problems of technical education, and it has been deemed wise this year to present some phases of a more elementary industrial training. Dean Schneider believes that the co-operative principle applies to industrial and technical training, and his paper outlines the system which he has been successfully following.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Elgin & Sycamore Railway, Elgin, Ill.**—This company has been incorporated in Illinois for the purpose of constructing an electric railway through Elgin to Sycamore and thence through De Kalb to Dixon and to Aurora. Capital stock, $100,000. Directors: B. C. Payne, F. N. Rogers, E. S. Bailey, F. J. Hohling, F. W. Merrick and F. N. Rogers, all of Elgin.

***Elgin & Evanston Railway, Berwyn, Ill.**—This company has been incorporated to construct an electric railway from Elgin through Desplaines to Evanston. Capital stock, $2,500. Incorporators: C. A. Sayer, J. A. Hessler, A. W. Hellis, E. F. Reynolds and G. H. Norton, all of Berwyn.

Anoka-Minneapolis Suburban Railway Promotion Company, Minneapolis, Minn.—This company has been incorporated to construct an electric railway between Anoka and Minneapolis. Capital stock, $50,000. Incorporators: H. L. Patthey, Minneapolis; A. E. Giddings, L. J. Greenwold, C. N. Ball, R. W. Akin and A. R. Pratt, Anoka, and C. J. Swanson and C. A. Nelson, Fridley. [E. R. J., March 20, '09.]

***International Power Company, Milltown, N. B.**—Application has been made to the Dominion and Provincial governments for a charter, giving the International Power Company the right to build an electric railway from St. Stephens to Sprague's Falls. The company also asks for permission to erect a dam at a point on the St. Croix River, between Sprague's Falls and Baring. George A. Curran, Calais, Maine, and Irving G. Todd, Milltown, are interested in the proposed railway.

***Ohio Northern Electric Railway, Tiffin, Ohio.**—This company has been incorporated in Ohio to construct an electric railway from Bucyrus to Tiffin. It is stated that eventually it will be extended to Toledo. Incorporators: George W. Stewart, James S. Gray, B. F. Whitney, K. Feickert and E. A. Whiting. Capital stock, $50,000. Headquarters, Tiffin.

Rapid Transit Railway & Tunnel Company, Wheeling, W. Va.—Application has been made by this company for a charter to construct an electric railway from Wheeling to Pittsburgh, Pa. Among the applicants for the charter are: Albert M. Schenk, E. W. Stifel, D. L. Merriman and Ambrose S. List, Wheeling, and J. R. Kommer, Pittsburgh, Pa. [E. R. J., April 3, '09.]

FRANCHISES

***Los Angeles, Cal.**—The City Council has passed an ordinance granting to W. H. Workman a franchise for an electric street railway along Boyle Avenue from Seventh Street to Stephenson Avenue.

Sacramento, Cal.—The Central California Traction Company has applied to the Board of Supervisors for a franchise for an extension of its railway which is to traverse Sacramento Street in Oak Park from Thirty-first and Y to Magnolia Avenue, on Magnolia Avenue east to the Upper Stockton Road, and south on the Upper Stockton Road a distance of about 1½ miles.

***San Mateo, Cal.**—A petition has been presented to the City Trustees by Messrs. Obear and Ames for a franchise to construct an electric belt railway in San Mateo.

***Twin Falls, Idaho.**—It is stated that I. B. Perrine will, within a week or two, apply to the City Council for a franchise to construct and operate an electric street railway in Twin Falls.

Chicago, Ill.—The City Council has granted a franchise to the Kensington & Eastern Railroad. The railway is a feeder for the Illinois Central Railroad, by which it secures a freight inlet to Gary, and is also to be used by the interurban lines of northern Indiana and Ohio as an entrance to Chicago. [E. R. J., March 20, '09.]

Newcastle, Ind.—The City Council has granted an extension of the provisions in the franchise held by the Indianapolis, New Castle & Toledo Traction Company for a new line between New Castle and Muncie. It now provides that work shall begin Jan. 1, 1911.

Mounds, Ill.—The City Council has passed an ordinance granting a franchise to the Cairo & St. Louis Interurban Railway, Cairo. The company proposes to build an electric railway from Cairo to East St. Louis. [E. R. J., Dec. 12, '09.]

Independence, Mo.—The County Court has granted to Samuel T. McDermott, who is said to represent the Blue Valley Railway, permission to cross county roads in constructing an electric railway from Kansas City to East Swope Park Highlands. The southern terminus is to be at Sixty-seventh Street and Cambridge Avenue, and the Kansas City terminus at Seventeenth Street and Manchester Road. The grant covers about 8.5 miles. [E. R. J., July 11, '08.]

New York, N. Y.—The New York & North Shore Traction Company, Mineola, N. Y., has obtained from the Board of Estimate and Apportionment a franchise to construct and operate a double-track street railway from the intersection of proposed tracks on Chestnut Street, Murray Hill, Queens, to Whitestone. This line will be a spur of the railway to be constructed from Little Neck to Flushing.

***Riverhead, N. Y.**—Application for a franchise to build an electric railway in Riverhead has been made to the Town Board by John E. Root, New York; George W. Reeves and Frederic M. Lewis, and J. Madison Wells, Greenport, and George F. Stackpole, Riverhead. It is proposed to build and operate an electric railway from the Riverhead depot to Orient Point.

Syracuse, N. Y.—The Public Service Commission of the Second District has granted the application of the Rochester, Syracuse & Eastern Railroad to change its route from Port Byron to Syracuse. The application asked for permission to change the route in the vicinity of Peru, so that instead of following to the south of the New York Central Railroad tracks the railway would cross over the tracks to Memphis and proceed along the north side until a junction with the Lakeshore Railroad was effected near the State Fair Grounds.

Utica, N. Y.—The Utica & Mohawk Valley Railway has applied to the City Council for two franchises for extensions on Mohawk Street and Whitesboro Street, to take the place of those which the company last year forfeited by reason of its non-compliance with the terms on which they were granted.

***Cleveland, Ohio.**—Application has been made to the City Council by H. Schmidt, for permission to construct and operate a double-track street railroad upon the following streets in Cleveland: Beginning at the intersection of Abbey Avenue S. W. and West Fourteenth Street, thence in, through and along Abbey Avenue S. W. and Lorain Avenue to West Twenty-fifth Street.

***Coquille, Ore.**—The City Council has granted a 20-year franchise to the Coquille Mill & Mercantile Company to build an electric street railway and power plant in Coquille.

Carlisle, Pa.—The Town Council has passed an ordinance granting the Cumberland Railway a franchise to construct its proposed street railway over certain streets of Carlisle. [E. R. J., March 20, '09.]

TRACK AND ROADWAY

***Rogers, Pea Ridge & Northern Interurban Railway, Rogers, Ark.**—This company is reported to have been organized at Rogers for the purpose of building an electric railway 20 miles in length. W. T. Patterson, engineer for the company, is said to have completed the survey and is now preparing drawings and blue prints which will be submitted. Officers: A. P. Potter, president; J. F. Walker, vice-president; W. T. Patterson, second vice-president; Bryan Snyder, secretary, and J. J. Putman, treasurer. Headquarters, First National Bank Building, Rogers.

San Jose (Cal.) Railway.—G. L. Baker, manager, writes that this company expects to rebuild its entire street railway. The line will be changed from narrow to standard gage. The system comprises about 15.5 miles of track.

***Santa Barbara, Cal.**—The Pacific Improvement Company has petitioned the City Council for the right to construct a power line to the Hope Ranch, 4 miles west of Santa Barbara. The company announced its intention of installing a trackless trolley to the ranch.

Denver, Colorado Springs & Pueblo Interurban Electric Railroad, Denver, Colo.—This company advises that it expects to have all preliminary arrangements completed so that it will be possible to award contracts on or about June 1. The electric railway which this company proposes to build will extend from Denver to Colorado Springs and Pueblo, a distance of 120 miles. The power station and repair shops will be located in Denver. Headquarters, Cooper Building, Denver. Capital stock authorized, $1,500,000; bonds authorized, $3,000,000. Officers: Louis M. Pfeiffer, president and general manager; W. T. Beriford, vice-president; Arthur E. Van Deusen, secretary and acting treasurer; W. H. Roberts, engineer, all of Denver. [E. R. J., Feb. 27, '09.]

Washington, Spa Springs & Gretta Railroad, Washington, D. C.—This company has filed a mortgage on all its

property to secure an issue of bonds to the extent of $500,000, payable in 20 years, with interest at 5 per cent. The company is about to begin the construction of its proposed electric railway, which is to extend from Fifteenth and H Streets northeast along the Bladensburg Road to the district line, thence by way of Bladensburg and Berwyn Heights to Laurel, Md., about 18 miles. [S. R. J., Jan. 25, '08.]

Fitzgerald & Ocilla Electric Railway & Power Company, Fitzgerald, Ga.—C. A. Holtzendorf advises that this company has completed all preliminary work, surveys, etc., for its proposed 12-mile electric railway between Fitzgerald and Ocilla. It is probable that the company will be ready to award contracts by May 31. The company expects to operate from 4 to 6 cars. A power station will be built on Lake Beatrice midway between Fitzgerald and Ocilla. The repair shops will be erected near the power plant. Power will be supplied for lighting. Capital stock, authorized, $100,000, of which about two-thirds has already been issued. Bonds authorized, $250,000. Headquarters, Fitzgerald. New York office, 61 Fifth Avenue. Officers: S. Tilden Holtzendorf, New York, N. Y., president; Judge D. B. Joy, Fitzgerald, vice-president; C. A. Holtzendorf, Fitzgerald, secretary-treasurer and general manager. General Engineering & Contracting Company, New York, N. Y., engineers. [S. R. J., Feb. 1, '08.]

Woodstock-Sycamore Traction Company, Chicago, Ill.—An officer writes that this company has completed 14 miles of grading and fences for its proposed gasoline motor railway from Woodstock to Franklinville, Marengo, Geneva and Sycamore, 36 miles. Contracts have been recently placed for 65,000 ties, some of which are now being delivered and distributed along the route. A repair shop will be built in Marengo. Capital stock authorized, $1,000,000; bonds authorized, $700,000. Headquarters, 711 Tacoma Building, Chicago. Officers: C. G. Lumley, president; W. L. Abbott, vice-president; Charles A. Spenny, secretary; I. D. Stevens, treasurer, all of Chicago. [E. R. J., Jan. 30, '09.]

Springfield & Jacksonville Electric Railway, Springfield, Ill.—It is officially announced that this company has completed the final surveys and secured the rights-of-way for the electric railway which it proposes to build from Springfield to Jacksonville, via Berlin, a distance of nearly 33 miles. It is the intention to begin construction work about May 15. The company plans to build its own power station, but a site has not yet been secured for it. Capital stock, authorized, $100,000. Bonds, authorized, $800,000. Headquarters, 500 Myer Building, Springfield. Officers: O. J. Lucas, Latham; D. H. Sims, vice-president and treasurer; D. B. Sims, secretary, Mt. Pulaski; John Melick, Springfield, chief engineer. [E. R. J., Nov. 7, '08.]

Gary & Southern Traction Company, Crown Point, Ind.—H. W. Seaman writes that this company is just closing up its right-of-way and financial matters and expects to be prepared to go on with construction work on its proposed electric railway within the next 60 days. The railway will extend from Gary to Crown Point, a distance of about 12 miles. The location of the power plant and repair shops has not yet been definitely decided upon. Capital stock, authorized, $10,000. Officers: H. W. Seaman, president, and F. M. Clark, secretary, The Rookery, Chicago, Ill. [E. R. J., June 6, '08.]

***Kingman, Ind.**—It is stated that J. J. Burns & Company, Chicago, Ill., have presented a proposition to the people of Kingman for the construction of an electric railway to connect Kingman with Crawfordsville and Covington.

Sioux City, Crystal Lake & Homer Railway, Sioux City, Ia.—This company announces that it expects to place contracts within a few days for the electrification of about 1 mile of track. The company at present operates gasoline electric cars. J. A. Foye, Jr., superintendent.

***Sioux City, Ia.**—It is said that preliminary steps for the building of an electric interurban railway line between Sioux City and Hartington, Neb., have been taken by Sioux City and Nebraska business men. A conference at which the project was launched was recently held in Sioux City. Among those interested are C. T. Johnson, Martinsburg; James F. Toy, J. M. Lynch and J. N. Wood, Sioux City.

Kansas Union Traction Company, Altamont, Kan.—This company has closed a contract with Archer & Rollins, Kansas City, Mo., for the preliminary survey and report on the proposed railway between Parsons and Coffeyville, via Altamont and Edna. The engineers are arranging to begin this work within a few days.

Interstate Railway & Power Company, Kansas City, Mo.—R. C. Rawlings, president of this company, which is the successor to the Southern Kansas Railway, Light & Power Company, Chanute, Kan., writes that construction work will be begun during May on the Iola-Chanute, Kan., division and also the Lawrence, Kan., to Kansas City, Mo., section of this proposed electric railway system which when completed will be about 300 miles in length. It will be an overhead, single-phase line and will connect the following cities: Kansas City, Mo., Lawrence, Topeka, Baldwin, De Soto, Ottawa, Garnett, Iola, Humboldt, Chanute, Thayer, Parsons, Cherryvale, Independence and Coffeyville. A considerable amount of track has already been laid at Coffeyville. It is proposed to operate 22 city, 100 interurban, 12 express and 150 freight cars, also 67 50-ton locomotives. The plan of the company calls for the construction of two power stations, the main plant to be located at Chanute and a smaller one at Lawrence, Kan. The proposed railway will reach several amusement parks, some of which will be operated by the company. It has been decided to furnish power for lighting and other purposes. Capital stock, authorized, $4,000,000. Bonds, authorized, $11,000,000. Headquarters, 607 Bryant Building, Kansas City, Mo. Officers: R. C. Rawlings, Kansas City, Mo., president, general manager and purchasing agent; Charles E. Sutton, Lawrence, Kan., vice-president; F. C. Dixon, Chanute, Kan., secretary; L. Rosenthal, Chanute, Kan., treasurer; E. H. Abadie, St. Louis, Mo., electrical engineer; J. W. T. Stephens, New Orleans, La., chief engineer. E. R. J., Sept. 19, '09.]

Licking, Mo.—E. E. Young, Licking, Mo., and his associates are arranging to organize a company to construct a standard gage electric railway from Cabool, Texas County, Mo., to Rolla, Phelps County, a distance of 75 miles. Mr. Young would like to correspond with engineers and contractors to whom the line that he and his associates contemplate would appeal, with a view to their assisting in financing the railway and building it. [E. R. J., March 27, '09.]

***Moberly, Mo.**—It is reported that the people of Moberly and Huntsville have accepted a proposition made by Messrs. Manning and Wellman, Ottumwa, Ia., to construct an electric street railway in Moberly, and an interurban railway between Moberly and Huntsville.

Great Falls, Mont.—A meeting was recently held in Choteau in the interest of the proposed Great Falls & Choteau, which is being promoted by Dr. A. F. Longeway. It was decided to form a permanent organization in order to secure the necessary bonus for the company, and T. O. Larson was elected president of the proposed organization and he was given power to appoint executive and financial committees which will take up the matter of organization and the selecting of a secretary whose duty it shall be to circulate the bonus agreements. [E. R. J., Feb. 27, '09.]

Rockland Railroad, Nyack, N. Y.—This company has certified to the Secretary of State that it proposes to extend its railway from Nyack to Stony Point, Congers to Rockland Lake, West Nyack to Suffern, Nanuet to Pearl River, Sparkhill to State line, between New York and New Jersey. Benjamin A. Hegeman, Jr., president; Arthur C. Miller, second vice-president.

***Bradford County Traction Company, Towanda, N. Y.**—This company has been organized for the purpose of building a railway, to be operated by any other motive power than steam, in Towanda Borough. A franchise has already been granted the new company for lines in Towanda Borough and more or less right-of-way has been secured toward Athens and also toward Troy. Among the applicants who applied for a charter are: Edward Whalen, E. F. Kizer and George W. Kipp, Towanda; O. L. Haverly and George R. Hill, Athens.

Cleveland, Brooklyn & Elyria Railway, Cleveland, Ohio.—A meeting of the directors of this company has been called for April 20, when it is stated that action will be taken to increase the capital stock from $100,000 to $6,000,000, and other preparations will be made to begin the construction of the electric railway which is planned to connect Cleveland and Zanesville, Ohio. Another matter in contemplation is the change of name to the Cleveland, Barberton, Coshocton & Zanesville Railway. The proposed railway will touch Parma, Strongsville, Elyria, North Royalton, West Richfield, Ghent, Montrose, Copley, Royal Oak, Barberton, Doylestown, Orrville, Millersburg, Coshocton and Zanesville. J. Harry Knisely, Jr., secretary. Headquarters, 319 Citizens' Building, Cleveland. [E. R. J., Jan. 9, '09.]

***Durant, Okla.**—It is stated that Dr. S. W. Skillern, Tishomingo, is endeavoring to interest the business men of Durant in the organization of a company to construct an electric interurban railway from Oklahoma City to Denison, Tex.

Oklahoma City (Okla.) Railway.—It is announced that this company will begin within a few days the construction of 3½ miles of new track and the double tracking of 4

miles of track. The new extensions will be built to Lincoln Park; to the north side of University addition and Guernsey addition, and to the Jefferson Park addition.

Toronto & York Radial Railway, Toronto, Ont.—It is announced that this company will build about 15 miles of new track this year, having agreed to construct certain extensions asked for by the City Council in return for permission to construct down-town loops.

People's Railway, Toronto, Ont.—A by-law has been passed in New Hamburg by a vote of 135 to 99 to purchase $20,000 worth of preferred stock in the People's Railway. The company plans to build an electric railway, 88 miles in length, to connect Stratford, Berlin, Guelph and Woodstock, by way of New Hamburg, Berlin, Fergus and Eldora. [E. R. J., Feb. 13, '09.]

***Portland, Ore.**—In order to transport its employees between Kenton and the new Swift packing plant on Columbia Slough it is reported that the Union Meat Company will begin at once the construction of an electric railway 2½ miles long between Kenton and the plant. Bids have already been asked for the laying of steel and the overhead wiring. The right-of-way is to be along the new county road and trestle built by the company between the plant and the townsite, and power is to be secured from the mill of the Monarch Lumber Company.

Montgomery & Chester Electric Railway, Phoenixville, Pa.—This company expects to add about one-half mile of track to its railway. E. N. Corbin, superintendent.

***Pierre, S. D.**—Farmers in Union and Clay County are said to be working on a proposition for an electric interurban railway from Sioux City to Centerville, S. D. The proposed railway would be about 50 miles in length. A meeting was held at Alsen a few days ago, where the project was discussed. The meeting appointed Fred Heglin and John Norin, Dalesburg, and A. S. Anderson, Alsen, to look into the matter of organization.

El Paso & Fort Hancock Electric Railway, El Paso, Tex.—This company, which proposes to build an electric railway from El Paso to Fabens, has awarded a contract to Richard Caples for the first part of the work between El Paso and Ysleta. [E. R. J., Oct. 31, '08.]

San Antonio (Tex.) Traction Company.—This company advises that it will place contracts during the next two weeks for the construction of a 4-mile extension to Palm Garden.

Ogden (Utah) Rapid Transit Company.—This company announces that it has placed the following contracts during the past month for the construction of 15 miles of new track: John Roebling's Sons Company, 85,000 lb. wire, Colorado Fuel & Iron Company, 3 miles of 48-lb. rail, 2 miles of 40-lb. rail and 10 miles of 45-lb. rail; Ohio Brass Company, line material and rail bonds.

Norfolk City & Suburban Railway, Norfolk, Va.—J. M. Williams, general superintendent, advises that this company expects to place contracts during the next six weeks for the construction of about a mile of new track. The following material will be needed: 58-lb. rails, cross-overs, switches, Weber rail joints, 2-0 trolley wire, span wire, 30-ft. juniper poles and line material.

Walla Walla & Columbia Traction Company, Walla Walla, Wash.—W. S. Matthias, general manager of this company which has projected an electric railway from Dayton through Walla Walla to Wallula, has announced that the contract for the construction of the entire railway had been awarded McLeod & Dusseurt. [E. R. J., March 27, '09.]

SHOPS AND BUILDINGS

San José (Cal.) Railway.—This company announces that it is planning to build a car house and offices in San José. G. L. Barker, manager.

Toledo & Indiana Railway, Toledo, Ohio.—This company is said to have purchased property at Swanton, where it will erect a freight and passenger station.

POWER HOUSES AND SUBSTATIONS

Tide Water Power Company, Wilmington, N. C.—This company has recently placed an order for one 1000-kw Westinghouse-Parsons turbo-generator and one Alberger barometric condenser.

Everett Railway, Light & Water Company, Everett, Wash.—This company has placed a contract with the Stone & Webster Engineering Corporation for the construction of a substation which will be equipped with one 500-kw motor generator, switchboard and transformers.

City & Elm Grove Railroad, Wheeling, W. Va.—It is announced that this company is preparing plans for an addition to its power station.

Manufactures & Supplies

ROLLING STOCK

Newton Street Railway, Newtonville, Mass., will purchase 36 motors immediately.

Shreveport (La.) Traction Company has purchased 24 GE-89 motors to replace GE-1000 motors.

Columbus Railway & Light Company, Columbus, Ohio, is reported to be considering the purchase of 20 city cars.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, it is reported, will purchase seven passenger cars.

Pittsburg (Pa.) Railways is reported to be in the market for cars. They will undoubtedly be of some prepayment type.

Atchison, Topeka & Santa Fé Railway, Chicago, Ill., has ordered 2 all-steel gasoline motor cars from the McKeen Motor Car Company, Omaha, Neb.

Corning & Painted Post Street Railway, Corning, N. Y., will purchase three GE-800 motor equipments and two Brill 21-C trucks in the course of a few weeks.

Winona Railway & Light Company, Winona, Minn., has purchased four second-hand open and two closed cars from the Dorner Railway Equipment Company, Chicago, Ill.

Monmouth County Electric Company, Red Bank, N. J., purchased eight sets of trucks from the New York Car & Truck Company, Kingston, N. Y., to replace old equipment.

Sioux City (Ia.) Traction Company, mentioned in the Electric Railway Journal of March 27, 1909, as contemplating the purchase of six cars, denies that it intends buying or building any cars.

Buffalo Southern Railway, Gardensville, N. Y., is in the market for four sets of four-motor equipments which, it is reported, will be used on some second-hand cars the company intends purchasing.

Pittsburg, Harmony, Butler & New Castle Railway, Pittsburg, Pa., is reported to have placed an order for four interurban cars with the St. Louis Car Company. Peter Smith Company's No. 2 heaters are specified for these cars.

Atlantic & Suburban Traction Company, Pleasantville, N. J., mentioned in the Electric Railway Journal of Jan. 23, 1909, as contemplating the purchase of five cars, has ordered three double-truck cars from The J. G. Brill Company.

Grand Rapids (Mich.) Railway, mentioned in the Electric Railway Journal of March 27, 1909, as having ordered 12 cars from the St. Louis Car Company, advises that the American Car Company will build these 12 cars and that they will be of the pay-as-you-enter type.

Ithaca (N. Y.) Street Railway, mentioned in the Electric Railway Journal of March 20, 1909, as having purchased two double-truck pay-as-you-enter cars from The J. G. Brill Company, expects to purchase 10 more cars after trying out the two new cars under local conditions.

Saginaw & Flint Railway, Detroit, Mich., has ordered two cars from the Niles Car & Manufacturing Company, Niles, Ohio. These cars are to be similar in construction to the cars ordered from the same builders in November, 1908. They are to have an over-all length of 51 ft. and a seating capacity of 50.

Bakersfield & Ventura Railroad, Oxnard, Cal., mentioned in the Electric Railway Journal of Dec. 5, 1908, as contemplating the purchase of one gasoline motor car for interurban service on a proposed line, has ordered this car from Fairbanks, Morse & Company, Chicago, Ill. The car will seat 40, will weigh 10,000 lb., and will have a body length of 25 ft.

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass., mentioned in the Electric Railway Journal of Feb. 27, 1909, as being in the market for a combination car equipment for hauling freight cars, has ordered one combination car from the Wason Manufacturing Company. The car will weigh 28 tons, be 34 ft. 4 in. long over all, 8 ft. 6 in. wide over all, have a 6-ft. wheel base, will seat 16 and will be equipped with Allis-Chalmers air brakes, M. C. B. couplers, Taylor (M. C. B.) trucks and four Allis-Chalmers type R-35 motors.

Lowell & Fitchburg Street Railway, Ayer, Mass., mentioned in the Electric Railway Journal of April 3, 1909, as having lost three large cars and a snow plow by fire, advises that two of the cars were of the semi-convertible type built by the John Stephenson Company, and equipped with four 93-A Westinghouse motors and Westinghouse

brakes; one was a large box car with four GE-1000 motors, K-12 controllers and National air brakes, and the plow was a double-truck Smith & Wallace nose plow with Westinghouse equipments. The company expects to replace the rolling stock destroyed.

Syracuse Suburban Railway, Syracuse, N. Y., reported in the ELECTRIC RAILWAY JOURNAL of March 27, 1909, as being in the market for three interurban cars, has purchased three semi-convertible passenger cars with smoking compartment from the G. C. Kuhlman Car Company. Brill 27-E trucks were specified. The cars will be 43 ft. 9 in. over crown pieces, 34 ft. 4 in. over end posts, and will seat 48. Forsyth curtain fixtures, Dedenda gongs, Retriever signal bells, Brill automatic doors, angle-iron bumpers, ratchet brake handles, Hovey draw-bars, Dumpit sand boxes and Brill Winner seats will be installed.

Omaha & Council Bluffs Street Railway, Omaha, Neb., mentioned in the ELECTRIC RAILWAY JOURNAL of March 20, 1909, as having ordered 10 cars from the American Car Company, has specified that the cars be of the pay-as-you-enter type, have a length of 41 ft. 4 in. over bumpers, a body length of 29 ft. 4 in., and a length over vestibule of 40 ft. 4 in. Other details of interest follow: Width over all, 8 ft. 7 in.; height inside, 8 ft.; sill to trolley base, 8 ft. 11¾ in.; ceilings, Agosote; curtain fixtures, Acme, Hartshorn rollers; curtain material, Pantasote; destination signs, Hunter; draw-bars, Tomlinson; headlights, Kirby-Neal; paint (manufacturer) Valentine; sanders, Nichols-Lintern; step treads, Mason Safety; varnish (manufacturer) Chicago Varnish Company.

Salt Lake & Ogden Railroad, Salt Lake City, Utah, has just sent out specifications for the 12 motor cars and trucks which it will purchase, as reported in the ELECTRIC RAILWAY JOURNAL of March 6, 1909. Bids are returnable for the cars April 10, and for the trucks April 12, 1909. The specifications state that the cars are to be of the three-compartment type, are to have an over-all length of 56 ft. and a seating capacity of 60 passengers. They are to have double-end control, two vestibules, monitor roofs, interior finish of solid mahogany with a general green and gold tone and hot-water heaters. The trucks are to be all steel and of the M.C.B. interurban type mounted on rolled forged-steel wheels. Each car is to be equipped with air brakes and four inside-hung 100-hp d. c. motors.

Long Island Railroad, Long Island City, N. Y., mentioned in the ELECTRIC RAILWAY JOURNAL of April 3, 1909, as being in the market for 120 steel passenger motor cars, advises that these cars will be 53 ft. long, will have transverse seats in the center, longitudinal seats at both ends, and be similar in every respect to the 50 trail cars now in service, built by the American Car & Foundry Company. The new cars will be equipped with Westinghouse Electric & Manufacturing Company's motors and Westinghouse Traction Brake Company's air brakes. The electrical and brake equipment for these cars was included in the contract made last fall by the Pennsylvania Tunnel & Terminal Railroad with the Westinghouse Companies for all apparatus required to complete the electrification of the Long Island Railroad and the tunnels under New York City.

Hull Electric Company, Aylmer, Que., mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1908, as being in the market for four closed cars and one snow sweeper, has just placed an order for June delivery with the Ottawa Car Company, Ottawa, Ont., for two single-truck, drop-sash closed cars, with a length over all of 30 ft., a seating capacity of 28 and equipped with Coleman fare boxes. Other details of interest follow:

Weight of car body.13,000 lb.
Wheel base .....8 ft.
Length of body.....21 ft.
Over vestibule .....29 ft.
Width inside.....6 ft. 2 in.
Over all.....7 ft. 6 in.
Height inside .....8 ft. 2 in.
Height from top of rail to floor .....38 in.
Underframe ... Combination
Axles ..... Brill
Brakes ..... Peacock
Car trimmings .....Forsyth
Control system..... GE
Couplers...Ottawa Standard
Curtain fixtures..Hartshorn rollers.
Curtain material...Pantasote
Destination signs ....Ottawa
Fenders ..... Providence
Gears and pinions..Westinghouse.
Heating system.Consolidated
Headlights .. Crouse-Hinds
Journal boxes ..... Brill
Motors, type and number, West. 101-B-2, two.
Sanders ..... Ottawa
Sash fixtures.....Ottawa
Seats...Longitudinal, Wilton carpet.
Steps ..... Stanwood
Trolley poles and attachments ..... Shelby poles
Trucks, type and make, 21-E Brill.
Special devices, Root snow scrapers.

Union Traction Company, Sistersville, W. Va., mentioned in the ELECTRIC RAILWAY JOURNAL of April 3, 1909, as having purchased two 45-ft. closed cars and one 15-bench open car from the Cincinnati Car Company, has specified the two closed cars to be of the semi-convertible type to seat 48. Other details follow:

Weight ..... 20,000 lb.
Wheel base .....4 ft. 6 in.
Length of body...33 ft. 4 in.
Over vestibule....44 ft. 4 in.
Width over all...8 ft. 6½ in.
Height, sill to base.....9 ft.
Body,.....wood and steel
Underframe..wood and steel
Air brakes.....Westinghouse semi-automatic.
Bolsters, body, steel built-up type.
Control system .....K-type
Couplers ..... Cincinnati
Curtain fixtures..Forsyth, 88
Curtain material..Crown, 580
Gears and pinions....Nuttall
Hand brakes ..... Peacock
Heating system.Consolidated
Motors..West. No. 306, four
Sanders...Cincinnati Car Co.
Seats.....Hale & Kilburn "Walkover," leather covered.
Trolley poles and attachments, U. S. Standard.
Trucks .....Standard O-50
Vestibule each end, with folding door.
Special devices..Push button system.
Interior finish of mahogany, bird's-eye maple ceilings.

The one open car will be 42 ft. 2 in. long over all and will have a seating capacity of 75. The details are the same as the two mentioned above except for the following:

Weight .....15,000 lb.
Length of body..33 ft. 6½ in.
Width over all.....8 ft. 3 in.
Height, sill to trolley base, 8 ft. 9¼ in.
Body..Mal. iron, side panels
Curtain fixtures .....Climax
Curtain material..... Duck
Roofs ..Monitor, detachable type hood.
Seats....Slat cross seats, reversible backs.

San Francisco, Vallejo & Napa Valley Railway, Napa, Cal., mentioned in the ELECTRIC RAILWAY JOURNAL of June 27, 1908, as contemplating the purchase of some new cars, has ordered two combination cars from the Niles Car & Manufacturing Company, of Niles, Ohio. The cars have an over-all length of 56 ft., weigh 33,600 lb. and seat 54. Other details of interest follow:

Length of body...44 ft. 8 in.
Over vestibule....54 ft. 8 in.
Width inside.....8 ft. 2½ in.
Over all.....9 ft.
Height, sill to trolley base, 9 ft. 6 in.
Height from top of rail to sills .....3 ft. 5 in.
Body ..... wood
Underframe, steel I-beam, wood side sills
Air brakes, Westinghouse AMM.
Car trimmings, bronze, Am. Car & Ship Hdw. Co.
Control system, Westinghouse unit switch
Couplers .... Gould M. C. B.
Curtain fixtures, Hartshorn spring rollers
Curtain material.. Pantasote
Gears and pinions...Nuttall
Gongs, 14-in. Niles Car & Mfg. Co.
Hand brakes, Peacock, bronze ratchet
Heating system, Johns-Manville Elec.
Headlights, Westinghouse 25 cycle
Journal boxes.....Symington
Lavatory fittings.....Niles
Markers ..... Armspear
Motors, type and number, 132A a. c. Westinghouse
Registers ..... Ohmer
Roofs, monitor deck, No. 8 duck cover
Sanders, Electric Heated Sand Box Co.
Sash fixtures, Am. Car & Ship Hdw. Co.
Seats, Hale & Kilburn white woven rattan
Side bearings...Perry roller
Springs .....Triple elliptic
Step treads, corrugated rubber
Trucks, type and make, Baldwin,, No. 315

TRADE NOTES

Standard Underground Cable Company, New York, N. Y., has removed its New York office to 50 Church Street, Hudson Terminal Building.

National Lock Washer Company, Newark, N. J., advises that the Oakland Traction Company, Oakland, Cal., has ordered National car curtains and curtain fixtures for the 20 cars it is building.

Wagner Electric Manufacturing Company, St. Louis, Mo., announces that J. F. Jones, formerly of the transformer department of the Fort Wayne Electric Company, has accepted a position in its transformer sales department.

Perry Ventilator Corporation, New Bedford, Mass., advises that it has received an order from the Pressed Steel Car Company to equip with its ventilators the 90 new cars recently ordered by the Hudson & Manhattan Railroad Company.

J. G. White & Company, Inc., New York, have opened a branch office in the Alaska-Commercial Building, San Francisco, Cal. Henry A. Lardner, who has been prominently connected with this company for many years, will be in charge as manager.

Jordan Brothers, Inc., New York, N. Y., recently received an order from the Public Service Corporation of New Jersey for a G.E. type H-C, Class 6, 500-500 form M rotary converter, 500 r.p.m. continuous current, 834 amp., 600 volts a.c., 25 cycles, for the Montclair substation.

Crocker-Wheeler Company, Ampere, N. J., reports that business booked during March showed improvement over February. The greatest improvement was shown in motors for the printing trade and the steel industry, although all classes of business manifest some betterment.

The J. G. Brill Company, Philadelphia, Pa., is reported to have increased the working force at its Philadelphia plant to 1800 men as a result of increased orders from home and foreign companies. Other plants of the company are said to have enough work on hand to employ about 50 per cent of the maximum forces.

Baldwin Locomotive Works (Burnham, Williams & Company) and the Standard Steel Works Company, Philadeplhia, Pa., have moved their New York offices to No. 1982 Hudson Terminal Building at 50 Church Street. The New York representatives of both companies are Harry W. Sheldon and Frederick W. Weston.

Mica Insulator Company, 68 Church Street, New York, advises that its business has improved considerably during the last few months. The demand for insulation is increasing and several large electric railways are purchasing in quantities. The company recently received several orders for its products from electric railways.

Robins New Conveyor Company, New York, N. Y., has leased 72 Front Street, New York, and on April 1 removed its offices from 38 Wall Street to this new location. The machinery of the factory is now being removed into the new quarters as rapidly as possible. Greatly increased facilities are provided, particularly for the manufacture of laminated leather belting and Balata belting.

Champion Oil Company, Chicago, Ill., announces that L. C. Almy, who has had an extensive experience in the electric railway field, has been appointed special demonstrator for the company. For the past 18 months Mr. Almy has been master mechanic of the Elgin & Belvidere Electric Company, at Marengo, Ill. Previously he was employed as superintendent of rolling stock by the Philadelphia Rapid Transit Company and for five years was associated with the Metropolitan West Side Elevated Railway in Chicago.

General Railway Equipment Company, 1535 Old Colony Building, Chicago, Ill., is a company recently organized to sell new and second-hand railway rolling stock for use in the construction and operation of steam and electric railways. The company has a capitalization of $100,000. I. J. Kusel, formerly vice-president and general manager of the American Car & Equipment Company, is president and general manager; T. C. McCalla is secretary and treasurer, and W. A. Campbell, formerly in the sales department of the Hicks Locomotive Works, is sales manager of the company.

Dossert & Company, Inc., 242 West Forty-first Street, New York, received an order from the Central Electric Company of Chicago, Ill., for 1000 Dossert solderless lugs. The order also includes about 100 Dossert solderless cable taps. Orders have also been received from the San Francisco representative of Dossert & Company for large cable taps and lugs for use on the heavy cables of the Great Western Power Company in California, and from the Illinois Tunnel Company for 1000 cable taps, reducers and special terminals for the wiring of the signal service in the Chicago subway.

National Brake Company, Buffalo, N. Y., announces the establishment of agreements with the following foreign agencies for the sale of the Ackley adjustable brake: Albanese & Reiss, 85, rue St. Lazare, Paris, France, for France, French colonies, Spain, Portugal, Egypt and Greece; Schmassman & Company, 110 Bahnhofstrasse, Zurich, Switzerland, for Switzerland and Italy; Kontinentale Bremsen-Gesellschaft m. b. h. (vorm Bockerbremsen) 31 Charlottenstrasse, Lankwitz, Germany, for Germany, Austria and Russia; C. Dubbelman, 45 rue de la Caserne, Brussels, for Belgium, Holland, Denmark, Norway and Sweden; The Equipment & Engineering Company, Northampton Park, Canonbury, London, N. E., for England, Ireland, Scotland and Wales.

E. H. Stevens has resigned as general superintendent of plants of the Public Service Corporation of New Jersey, to become vice-president and general manager of the Bird-Archer Company, 90 West Street, New York. During his 15-years' experience in power-plant operation, costs and management, Mr. Stevens has had complete charge of plants aggregating several hundred thousand horse-power, and is therefore exceptionally well prepared to deal with questions about feed-water treatment. Mr. Stevens' genial disposition, courtesy and engineering ability have won for him the respect and esteem of all with whom he has come in contact, and his many friends wish him all success in his new work. During the past five years Mr. Stevens has used the Bird-Archer Company's compounds exclusively in the plants of the Public Service Corporation and is well informed as to the results that can be secured by using boiler compounds. Mr. Stevens will have complete charge of sales, and will give his personal attention to inquiries from large plants which have heretofore shown serious economy losses and high operating costs on account of the scale, oil deposits and other troubles caused by bad feed-water.

ADVERTISING LITERATURE

Darley Engineering Company, New York, announces Bulletin No. 2, on suction conveyors.

Sellers Manufacturing Company, Chicago, Ill., has printed a booklet on tie-plates and angle bars.

American Blower Company, Detroit, Mich., has issued an illustrated booklet with tables on the Sirocco fans.

American Railway Supply Company, New York, N. Y., has issued a little folder entitled "Time Checks and their Use."

Dean Brothers Steam Pump Works, Indianapolis, Ind., have issued catalog No. 72, listing and illustrating their hydraulic-pressure pumps.

F. Bissell Company, Toledo, Ohio, bears on its April calendar card a miniature closepin to signify the company's hold on its patrons by the prompt supply of good material at right prices.

Poole Brothers, Chicago, Ill., have just issued their 1909 illustrated catalog of ticket cases, dating stamps, conductors' punches and other light railway supplies used by electric and steam railways.

Joseph T. Ryerson & Son, Chicago, Ill., have issued an illustrated description of their iron and steel warehouses, showing their facilities for handling sheet steel, plate, bars, rivets, steel working machinery, etc.

N. W. Halsey & Company, New York, N. Y., are distributing a small circular, "Municipal Bonds," in which the evolution of municipal indebtedness and the safety and market for municipal bonds are considered.

Goldschmidt Thermit Company, New York, is distributing a booklet on thermit welding of castings and forgings. Among the applications shown are the welding of motor castings, truck frames and armature shafts.

Niles-Bement-Pond Company, New York, has printed a large catalog on heavy milling machines. The company has also published a large illustrated catalog on various forms of single and double-frame power hammers.

Jeffrey Manufacturing Company, Columbus, Ohio, has printed a catalog describing the lock-jaw track wrenches made by its forge and foundries department which was recently organized to make specialties of this kind.

Percival Wood Preserving Company, Houston, Tex., has printed an interesting pamphlet on its air-seasoned, open-vat method of treating timber for railway and other purposes. The pamphlet contains a number of large illustrations and commendatory letters from users of timber treated by this company's methods.

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., announces the following bulletins: No. 1160, Multiple Tungsten Lamps for A.C. or D.C. Circuits, and No. 1164, on Type M.S. Mill Motors for Polyphase Circuits. It has also prepared a booklet called "Motor Talks No. 4," which contains a table for finding current in a three-phase circuit.

General Electric Company, Schenectady, N. Y., is distributing Bulletin No. 4653, describing in detail the latest forms of the Curtis steam turbo-generator. It is also distributing a small pamphlet, No. 3768, listing motor-starting and speed-controlling devices. It has also recently issued the following publications: Bulletin No. 4654 on section switches and Bulletin No. 4655 on electric hardening switches, together with pamphlets on bell-ringing transformers, tantalum lamps for train lighting and extension diffusers.

McGuire-Cummings Manufacturing Company, Chicago, Ill., has just issued a catalog descriptive of the various electric railway sprinkling cars made by the company. These include the pneumatic, which can be used for sprinkling or flushing streets and for fire protection purposes; the turbine sprinkler, which supplies water through the medium of a centrifugal pump which is driven by a direct-connected motor, and the gravity sprinkler, which depends upon gravity entirely for its distributing power and is recommended for use where it is desired to sprinkle a distance of 9 ft. each side of the center line of the track.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, APRIL 17, 1909 No. 16

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Subway Proposition Stated in New York

The Interborough Rapid Transit Company's proposal for improved transit conditions in New York was plainly stated in a large advertisement in all of the metropolitan papers, April 13. This is the first time, we believe, that the company has taken this means, on so large a scale, to state its proposition to the public. The company asks for the right to build a subway on the east side from Forty-second Street to the Bronx and on the west side from Forty-second Street to the Battery, and to install an express track on both the Second and Third Avenue elevated lines. These changes will afford the quickest relief of present conditions possible with the existing Interborough system, and the requests should be granted as soon as the necessary legislation can be passed. We do not see that these betterments will interfere with the proposed extension of the Hudson & Manhattan Railroad which has been approved by the commission.

Danger of Trespassing on Railway Tracks

The Railroad Commission of Indiana continues to exercise its good offices in directing forcible attention to the large number of accidents due to trespass on railway tracks. A circular which has just been issued by this commission, stating that 214 trespassers were killed or injured on railway tracks in Indiana during 1908, and that "most, if not all, of these casualties were avoidable," seeks the cooperation of mayors and city councils in its movement to "reduce this appalling and unnecessary loss of life." Although the railway constructed on private right of way was never intended for use as a public highway, the number of accidents resulting from its illegitimate employment in this manner must continue in some relative proportion to the large totals of foot passengers who, despite warnings and counsel, will use the dangerous path provided by the railway track. The remedy proposed by the Indiana commission, if adopted, will reach only part of the trespassers, but if any are compelled or influenced to avoid the risk of walking where trains are operated it will help to lessen the problem. If the mayors and city councils who are thus petitioned will pass the ordinance submitted, providing a fine of not exceeding $100, together with costs of prosecution, for trespass of this nature, except where tracks may be laid across streets, alleys or station grounds, it will help to preserve lives and limbs. The publicity which has been given to the campaign conducted by the commission is in itself an important deterrent to public negligence in this matter, and the support of city authorities, if given freely, will aid still further in impressing the necessary lesson.

Economy of Old and Modern Steam Plants

An English contemporary has recently drawn attention to the better economy in steam practice which obtains generally in Europe than in Great Britain, and more particularly cites certain power stations in Holland which obtain what are described as wonderfully good results from machinery that would be regarded as obsolete in Great Britain or in America. One of the explanations of the good results is the general cleanliness of the plants. Cleanliness is no reason for economy, it is true, but it may very well be accepted as an outward and visible sign of an inward excellence of maintenance of working parts. Poor attention to an engine internally is hardly likely to be con-

comitant with external cleanliness, and many engineers who have visited Continental power houses must have been struck by the higher order of care and cleanliness. There is an appearance about them which tells the observer that bad joints, dirty oil drips or a throw of oil are not allowed to continue until there is a good opportunity to effect a remedy. The remedy is applied at once. The same principles, when applied throughout the station, cannot fail to show their effect in the coal consumption.

Too often there is a serious want of proportion or lack of good judgment between the system of manufacturing steam and that of using it. In a station where the steam engine is of the best, fully equal to the use of high-pressure steam at a temperature of considerable superheat, a cold feed of dirty water may be flowing to the boiler, which at once becomes feed heater, water purifier and steam generator in one. Naturally, this boiler turns out very wet steam, the most unfit fluid to work in a steam cylinder. The boiler should be confined solely to changing water into steam. We do not mean that an old station can be made to work with the economy of a good modern station, but we do say that the care that is demanded of a modern plant, with its high pressures and high-speed machinery, is so much greater than that needed by the plants of older forms that the latter will often come first by strict adherence to correct methods of working and by a stricter attention to small details that make for waste.

The importance of heating by stages in the process of steam formation is very great. Let an engineer pay but scant attention to the feed-heating stage, allowing the heating pipes to become encrusted with scale and throwing the duty of feed heating upon the boiler, and great detriment to the efficiency of the latter as an evaporator will follow.

Storage Battery Cars in New York

Those who are familiar with the history of storage battery cars must have read with some astonishment of the coming trial to be made with an accumulator car by the Third Avenue Railroad Company, of New York, as it is now seven years since cars of this type have been used in the metropolis. But the times change and batteries change with them. It is yet too early to state to what extent the Edison nickel-iron batteries will minimize or eliminate the objections which the old batteries presented, particularly on account of their high maintenance cost. It is not to be expected that a storage-battery car can be operated for the same cost as a trolley car where the service is at all frequent. In New York, however, there is no hope for the electrification of the horse-car lines to any but the costly conduit system, so that self-propelled cars offer the only modern substitute for animal traction. Practically all of the long north and south lines are electrically operated, and in general the self-contained motor cars would find their widest application on crosstown lines. On the experimental line, for instance, the total run will be only about 3 miles. As in the older accumulator cars, the batteries are to be placed under the seats at first. Later, they will be carried under the car, so that the passengers will not be annoyed even if the batteries do give off some fumes. The maximum number of storage-battery cars is not likely to exceed 5 per cent of all rolling stock, and as they will charged at night, during the light-load period, the cost of fuel and electrical efficiency will be of secondary importance. The real problem is that of maintenance. If the Edison battery fulfills the expectations regarding its ruggedness, there is good reason to believe that it will drive the ancient horse car from its last ditch. The storage-battery car, however, will not have the field to itself in the coming test, but must prove its superiority to a gasoline-electric vehicle tried under the same operating conditions. Of course, the problem before the Third Avenue Railroad Company is really special, yet it is to be hoped that its experiments with the very latest designs of self-propelled cars will bring forth valuable data applicable to other localities, particularly those of scant traffic.

Three-Phase Generators for Single-Phase Transmission

The power-generating and transmission system of the Chicago, Lake Shore & South Bend, which is described elsewhere in this issue, is a particularly interesting installation. It involves the use of three-phase generators operating normally as single-phase machines; the trolley is fed at the power house direct from one phase at the generator voltage of 6600; two substations, 24 miles each side of the power station, are supplied with 33,000-volt current from the same phase, and the station lighting and power load are connected three-phase to the generator buses. At first glance, the transmission scheme adopted would seem to lend itself perfectly to a balanced three-phase system of generation and distribution feeding direct to the trolley on one phase and to each of the outlying substations on the other two phases. When operating single-phase the capacity of the generating units is reduced from a three-phase rating of about 2000 kw to a single-phase rating of 1500 kw. As yet no very large commercial light and power load has been connected to the station, and two of the generator phases are dormant. On the other hand, the plan adopted reduces the number of transformers required in the power house and insures continuity of transmission to both substations, even though one of the three step-up transformers inserted between the generator buses and the transmission buses should fail. Two transformers alone have ample capacity to carry the transmission line load.

Except for the fact that the transmission line carries high-tension current and step-up transformers are used, the installation is very similar to that in the Cos Cob power station of the New York, New Haven & Hartford Railroad. This road adopted three-phase generators because it anticipated connecting up a large power and lighting load in the numerous cities and towns between Mt. Vernon and Bridgeport. Its generator voltage is higher and the transmission distances are shorter, so that the additional complication of step-up transformers and substations was not necessary for economy. The experience gained in the New Haven installation with the operation of star-wound three-phase generators delivering single-phase current has evidently satisfied the manufacturers that this type of apparatus can be successfully operated in other places under similar conditions. The use of an auxiliary short-circuited coil inserted in the rotor to control the fluctuations in the magnetism of the generator fields and overcome local heat-

ing has been entirely successful. Means for controlling the violent surges of current following short-circuits on the line by inserting impedance coils on the trolley side of each generator have been also applied in the case of the New Haven installation, and presumably these same precautions have been taken in the South Bend power station.

One feature of the operation of cars on the Chicago, Lake Shore & South Bend is, we believe, a departure from previous practice on single-phase lines, most of which are equipped with combined a.c.-d.c. apparatus on the cars. This is the provision for sectionalizing the trolley where it passes through towns and cities and impressing upon it current at a potential of only 700 volts instead of 6600 volts, which is used in the long stretches through the country. This requires the use of auto-transformers at the section breaks, taking current on one side from the trolley and stepping it down in the ratio of 10 to 1, and on the cars connecting the wheel trolley to the primary coil of the car transformer so as to impress on the secondary coil exactly the same motor voltage as it delivers when taking 6600-volt current from the trolley wire through the sliding pantograph trolley.

Railway Depression in England

Statistics have been published so often showing the disproportionately small amount of electric railway trackage and equipment in Great Britain, compared with that in this country, that the facts are familiar to readers of this paper. Perhaps no one thing during a visit to England makes such an impression upon an American who is familiar with electric railway methods in his own country as the paucity of electric transportation lines in England. London, it is true, is well supplied with underground railways, but the surface electric transportation facilities are extremely meager in proportion to the population. This condition is even more strikingly evident when one inspects the cities outside of the metropolis. The equipment for the most part is modern, but the number of miles of track in each city would hardly seem ample for an American community of one-third or one-fourth of the size, and although many cities are located close together, interurban lines are practically non-existent.

This condition has given rise to assumptions, less frequently made during the last few years than previous to that time, that many of the lines in the cities would soon be joined by interurban connections, and that the possibilities and future of electric railway development in England were enormous. But although the field seems thus to lie fallow for the railway constructor, the situation has practically remained unchanged for the last 15 years, or since the commercial possibilities of the electric suburban and interurban railway were demonstrated in America.

According to the English papers, this situation and other conditions which indicate a retardation of the electrical industry in England are causing considerable concern to many of the manufacturers who had prepared to undertake the work which has never come, and steps are being taken to determine the cause or causes, and if possible reduce their effect. Meetings have been held for the purpose of agitating in some way for a change, but the difficulties in the way seem enormous. The subject is broader than the electrical industry only. Moreover, the questions involved are largely of a political character, and some of them are bound up with policies to which one or the other of the two great political parties of Great Britain stand committed. Without attempting at this distance to determine the correctness of the analysis of the situation which has been reached by the new "Electrical League," being formed by a number of representative manufacturers, railway owners and others connected with the electrical interests in Great Britain, it is instructive to consider what are claimed by some members of this league to be the causes for a condition which is undeniable.

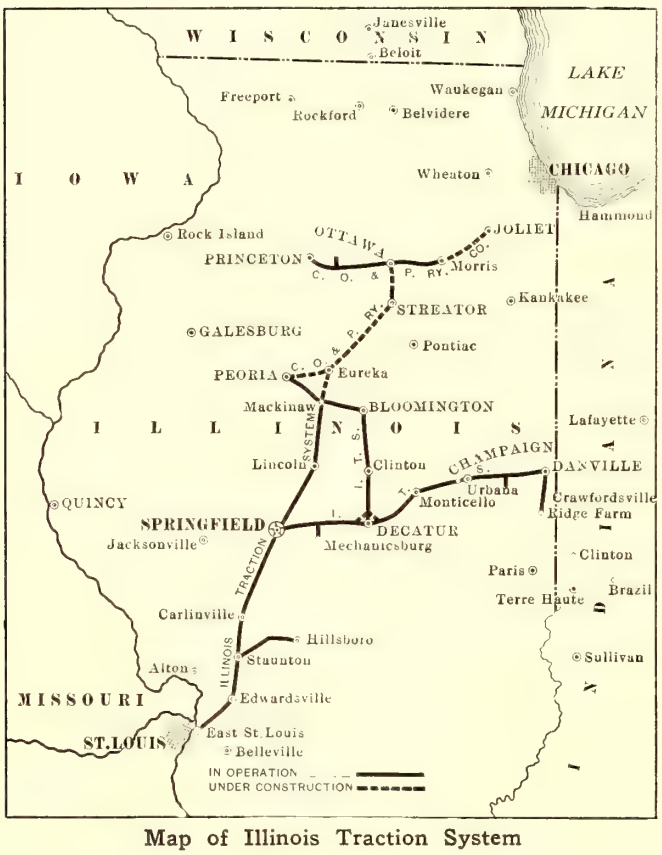
The first reason for the lack of electrical development in Great Britain is alleged to be the ownership and operation of a large number of the tramway systems in England and Scotland by the municipalities. Independent of whether municipal administration of these tramway systems has been wasteful or economical, and whether it has resulted in lower fares and greater returns to the city treasury or not, municipalization is a policy which involves separate and local ownership of the tramways in neighboring communities and an ownership which, at least theoretically, should stop at the boundaries of each municipality. At all events a consolidation of the ownership of the tramways in adjoining towns is impossible, and one great incentive to interconnect systems and operate through cars is lacking. The second condition for industrial depression in the electrical business in Great Britain, according to the league, is the fact that in the case of a number of large contracts recently awarded, outside manufacturers, particularly the Germans, have been able to underbid the local manufacturers and thus secure the order. Another alleged cause for the stagnant condition not only of the electrical industry, but of all industrial affairs in England, is the action of the labor unions and the labor element in promoting through Parliament various bills detrimental to the manufacturing interests. Particular stress is laid upon recent legislation reducing the hours of labor, in which the unions were particularly active, the employers' liability bill and the old age pension bill, and it is charged that the cost of the greater part of this legislation, particularly of the first two, is saddled upon the employer, and hence upon the productive energies of the country, which are already overloaded.

Relief can come only through remedial legislation backed by popular sentiment, and to this cause some of the leading Conservative papers are lending their influence. Whether the diagnosis and treatment recommended are correct or not, it would seem as if there was some relation between the problem of the unemployed in Great Britain and the absence of electric railway development, if we assume that the latter typifies a general industrial condition. Coincident with the agitation outlined above, and undoubtedly related to the causes of which it is the effect, is the statement that British funds for investment are seeking foreign fields to a far greater extent than ever before, and that of the total amount of British capital abroad about one-third has been invested during the last six or seven years. The situation is undeniably a serious one, and even if it has been somewhat overdrawn by those anxious for a change, it should not be without its lesson to this country.

MAINTENANCE AND IMPROVEMENTS ON THE ILLINOIS TRACTION SYSTEM

The Electric Railway Journal of April 3 contained an illustrated description of the new Decatur shops of the Illinois Traction System, which also outlined the improvements and standardization now being made in the company's rolling-stock equipment. Other features of the company's maintenance methods, organization, traffic and extensions of lines are treated in the following pages:

The Illinois Traction System operates 425 miles of main-line interurban track, exclusive of its trackage rights in cities and local street railway systems. Its longest direct line is from Danville, Ill., near the Indiana-Illinois border line, to East St. Louis, 227 miles. The interurban system is shown on the accompanying map and it will be noted that near the center point of the system there are two lines extending to the north. The eastern one of these two lines connects Decatur on the Danville-St. Louis route with Bloomington, 45.4 miles north. The other line extends from Springfield north 57.2 miles to Mackinaw Junction, where it connects with the Bloomington-Peoria



Map of Illinois Traction System

division, which is 37.4 miles long. The latter two lines are now operated with single-phase alternating current.

Plans are well advanced toward the construction of a line from Peoria to Joliet, to be known as the Chicago, Ottawa & Peoria Railway. The southern end of this new division will connect with the present lines at Peoria and at Mackinaw. The northern end will connect at Ottawa with the Illinois Valley Railway operated under the same management, and will afford a direct route from St. Louis to Ottawa and thence to Joliet and Chicago. Terminal arrangements have been made for an entrance to Joliet over the tracks of the Joliet & Southern Traction Company. On this new northern connection work is under way between Streator and Ottawa and Seneca and Joliet. The section from Ottawa to Seneca, a part of the Illinois Valley Railway, has been in operation for several years. With the completion of the Chicago, Ottawa & Peoria Railway electric service will be possible between Chicago and St. Louis over tracks that are well built and well maintained.

The three principal branches of the Illinois Traction System—Peoria to Springfield, 74.7 miles; Danville to Springfield, 130.7 miles, and East St. Louis to Springfield, 96.6 miles, as well as the Bloomington-Decatur division, 45.4 miles—are each served with limited trains operating at high speeds on two-hour headway. The schedules of the limited trains are so arranged that the cars meet at Springfield for through transfer of passengers. A passenger may ride by limited train from Danville to East St. Louis, 227 miles, on any of six trains a day, which make the run in 9 hours and 40 minutes. The present running time for the 96.6-mile division between Springfield and East St. Louis is 3 hours and 40 minutes, but it is planned to shorten this run to three hours within the next few weeks. A limited train leaving Danville each day at 6 p. m. reaches Springfield at 10:55, where connection is made with a sleeping car, which arrives in St. Louis at 4:10 a. m. The limited trains between Danville and East St. Louis make 40 regular stops. In this service special equipment is used and plans are now made for improving and increasing the rolling stock available.

Some of the special equipments mentioned were described in the Electric Railway Journal of April 3, page 635.

The tracks of the Illinois Traction System for most of the distance parallel long-established steam railroad lines serving a territory supported by agricultural and mining industries. There are seven coal mines along the route which have no other outlet than by electric tracks; and on the parallel steam roads are 100 coal mines which also are served by the traction system. The coal traffic on the electric road is heaviest during the five winter months, when an average of about 1000 carloads of 30 tons each of commercial coal is handled each month. It is the policy of the traffic department to arrange shipments so far as possible so that each group of mines will supply coal for its own district, thus keeping the car-mileage as low as possible. The three mining districts within which coal traffic originates are Danville to Champaign, Springfield to Peoria and from Staunton to near Springfield. The average revenue for handling coal per ton-mile by the electric road is about 1.2 cents, while the similar charge on the steam lines for longer hauls is about 0.5 cent per ton-mile. The company has in operation 365 coal cars, many of which are used to deliver coal to dealers in the towns along the right of way. These dealers unload direct from the company's coal cars to wagons for house and factory distribution. Special sidings are built for each coal dealer. The coal and other freight and express traffic is handled largely at night so that it will not interfere with the passenger service.

In the freight and express service 15 motor cars, 40 trailers and 25 80,000-lb. capacity grain cars are regularly used. The longest through-car express run is between Peoria and St. Louis, 171.3 miles. Trains are operated daily each way over this route, leaving one terminal at 10 p. m. and arriving at the other at 7 a. m. During the past year the freight and express traffic of the Illinois Traction System has increased so largely that plans are being made for improvement in this service by the construction of belt lines around the larger cities, the extension and addition of siding tracks and boosting the trolley voltage.

ORGANIZATION

The northern Illinois lines of the McKinley syndicate connecting La Salle, Ottawa and Seneca, the Galesburg Railway & Light Company, the Quincy Horse Railway & Carrying Company, the Wichita Railroad & Light Company and the street railway lines and gas, electric and heating utilities in practically all of the towns served by the interurban lines of the Illinois Traction System are all under the management of H. E. Chubbuck, with headquarters at Peoria. The departments of claims and real estate also have their headquarters at Peoria, but the other department heads have their offices located as follows: George M. Mattis, vice-president and assistant treasurer, and B. E. Bramble, auditor, Champaign; B. R. Stephens, general traffic manager; C. F. Handshey, general superintendent of transportation, and A. C. Murray, supervisor of expenditures, Springfield; H. C. Hoagland, electrical and mechanical engineer; J. M. Bosenbury, superintendent motive power and equipment; L. B. Martin, engineer maintenance of way, and H. D. Perkins, engineer of bridges and buildings, Decatur. Local superintendents are held responsible for the operation of the interurban divisions and the local railways and public utilities, all reporting through the proper channels to the general manager.

IMPROVEMENTS CONTEMPLATED

The development of the Illinois Traction System, so far as the interurban lines are concerned, has been largely the result of rapid extension by construction rather than absorption of properties already built. The company has its own construction forces and executes all of its own engineering work. Because of the rapidity of extension and the considerable improvement in standards since inception, it is now found advisable to devote considerable attention to maintenance and local development. Plans recently have been consummated for a wide variety of improvements, all of which will tend toward the bettering of the service and the reduction of operating costs. Among these improvements, some of which will be described, are the following: Freight belt lines around the cities of Decatur, Springfield and Edwardsville; right-of-way improvements, such as placing standard signs, cattle guards, wing fences, station buildings, etc.; installation of complete signal system; elimination of grade crossings on passenger tracks; construction of steam railroad freight connections; power improvements to afford a higher average trolley voltage; faster schedules with through trains; new rolling-stock equipment; improved shop facilities; the unification of distribution systems comprising changing the present a.c. lines to d.c. lines; construction of a $3,000,000 bridge across the Mississippi River at St. Louis to connect with passenger and freight terminals owned in Missouri, and the general improvement of the facilities for loading and unloading freight. The present article is largely devoted to a description of such of these improvements as are now under way.

MAINTENANCE OF WAY

The engineer of maintenance of way has department headquarters at Decatur. This engineer has a principal assistant with a corps averaging about eight men, which includes two draftsmen and two transitmen. For maintenance purposes the track is divided into four divisions of approximately 110 miles each with one roadmaster in charge of each division. There are 54 sections, each with a foreman reporting to one of the roadmasters. The section gangs comprise five or six men each in the summer and only the section foremen in the winter. Each foreman inspects his entire section each day.

The engineer of maintenance of way is advised of the work on the subdivisions of the road by means of a system of daily reports. Each foreman sends in a formal report to his roadmaster each day and the roadmaster condenses these to make a weekly report to the engineer of maintenance of way. Once each month the engineer of maintenance of way abstracts the reports of his subordinates and advises the general manager by letter of the progress of the work of his department.

The form of report used by the section foremen is of particular interest because of its completeness. These reports comprise eight pages 8 in. x 8 in. in size bound in heavy manila covers and ruled to present a daily record of time worked on one section for a month, the distribution of labor in regular maintenance work and a description of and distribution of labor for special work. Two pages of the foreman's report are arranged to show in detail the distribution of labor into hours' work per class of work. On the first page of one of these section foremen's reports the following instructions are presented:

INSTRUCTIONS.

GENERAL:

1. Foreman must enter the information daily.
2. Time must be shown on the dates the labor was actually performed. Foreman must return no time except for labor actually performed under his supervision.
3. The instructions on Page 2 must be carefully read and followed.
4. On the 15th and close of the month the Foreman must personally sign book, forward to the roadmaster, who will also sign personally and forward to the Engineer Maintenance of Way.

RELATING TO DAILY RECORDS ON PAGES 4 AND 5:

5. Separate items should be made of all labor on private tracks, joint tracks, new tracks laid, old tracks taken up, or on new and special work of any kind. The name and location of such track should be given, and the new or special work should be fully described and located.
6. If a gang works on more than one section, separate items should be made of the work on each, and the number of the section noted opposite each item. This rule also applies where regular section gangs help other sections.
7. Separate items should be made of all labor performed on bridges, buildings or other structures, sufficient information being given to identify such structures.
8. When reporting the unloading or handling of cinders, screenings and similar materials, state for what purpose they are to be used.
9. In reporting labor at wrecks, give location and car numbers; transferring cars, give location, car numbers and cause; repairing cars, give locations, numbers and cause.
10. If any labor is performed which is not fully covered by the printed description of work, a full description must be given on the blank lines at the bottom of Page 4 and on Page 6.

I hereby certify to the correctness of the returns made in this book.

..... Foreman.

Examined and approved:

..... Roadmaster.

As the reports of the section foremen are received in the office of the engineer of maintenance of way they are inspected and the accounts numbered for distribution and entered opposite the time as reported by the foremen. In this way the distribution of the maintenance-of-way labor account is made twice each month.

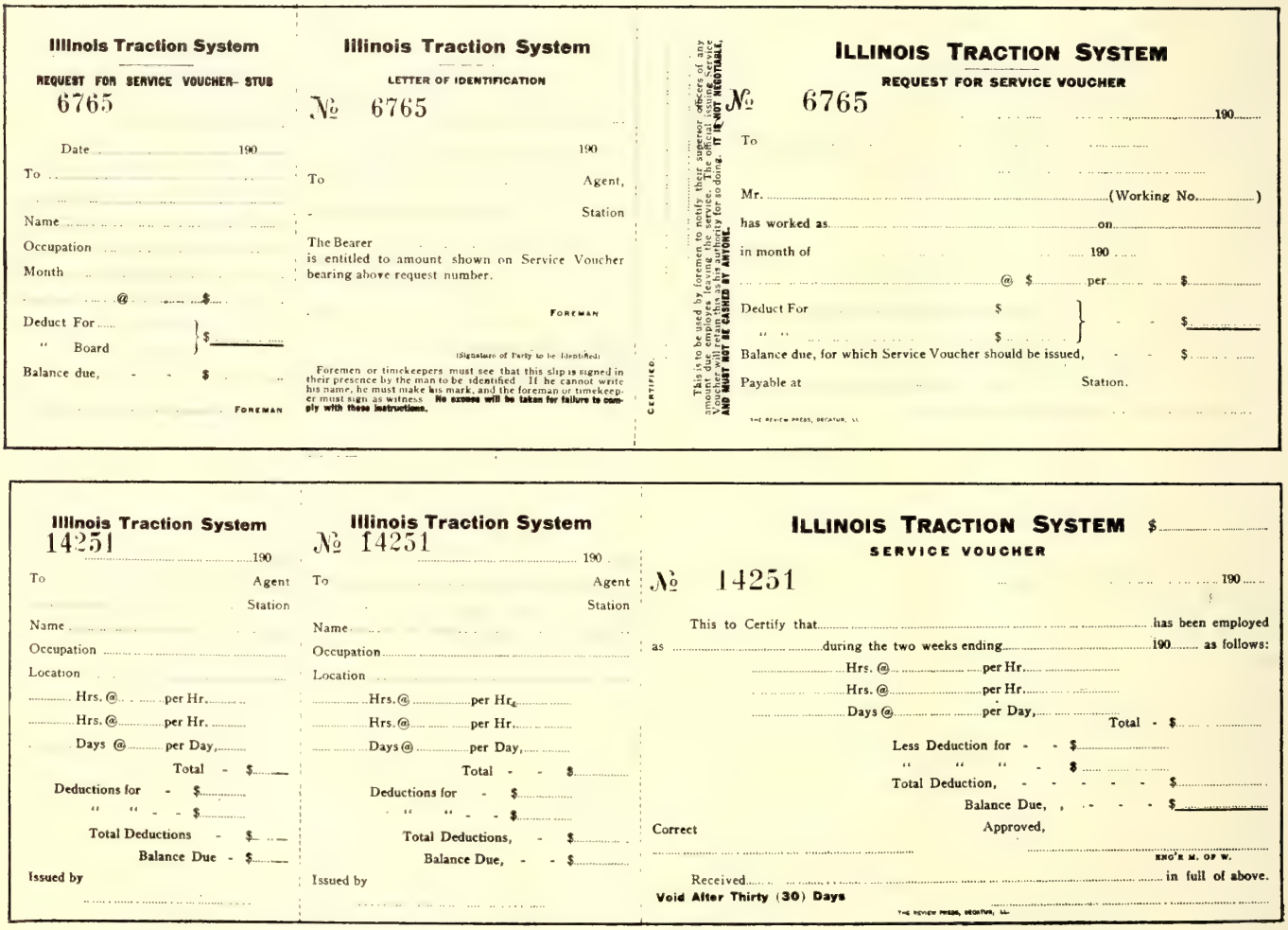
The laborers in the maintenance-of-way and bridges and buildings departments are paid each week. Whenever a man is released from work he is given a "service voucher," which, when properly filled out and used in connection with an identification stub, will be honored for payment by the nearest station agent. Copies of the blank forms used in connection with payment by service voucher are presented herewith. Referring to the blank form numbered 6765, that portion at the left is the foreman's stub made out when a man is released. The middle section of this form is the so-called letter of identification, also made out by the foreman and signed by him and by the laborer who is to be paid. This identification slip is given to the laborer to present to the station agent when asking for pay. At the same time that the laborer is given his letter of identification the foreman makes out the right-hand blank and

forwards it to the office of the engineer of maintenance of way. This office then fills out the three blanks numbered 14251. The blank at the right is the service voucher which is sent to the station agent, to whom the identification slip already has been addressed, and handed to the laborer. When this voucher has been paid by the agent, the corresponding letter of identification is forwarded by the agent to the engineer of maintenance of way. The two smaller stubs are for the records of the maintenance-of-way office (left) and the auditor's office (center). By means of this system of service vouchers double advice of all payments is given to those responsible for the disbursement.

During the past season the maintenance-of-way department reballasted 50 miles of main-line track with gravel and 20 miles with chats. Very satisfactory results are obtained by the use of chats for ballast. This material is

In addition to its regular work the maintenance-of-way department is locating and constructing the belt tracks earlier mentioned as having been made necessary by the great increase in freight traffic. Each of these belt lines will be a substantially built track laid on a private right of way located on the outskirts of the cities where there will be no objection to the movement of heavy trains of coal cars and other standard steam-road equipment. The exact location of the belt tracks is largely governed by the possibility of connecting with sources of profitable freight traffic, such as grain elevators, lumber and coal yards and industrial plants.

Three of these belt lines are soon to be built. In Decatur the belt line will leave the main track near the railway company's shops east of the city, pass in a westerly direction to connect with the Bloomington division and



Illinois Traction System Improvements—Blank Forms Used in Paying by Service Voucher

received from the zinc mines at Joplin, Mo., and is delivered at the interurban terminals at 80 cents per cubic yard. It is a material that can be worked easily and it runs well so that the labor cost for placing it under the ties is but slightly greater than that for clean gravel. The ballast is handled with electric locomotives pulling Rodger ballast cars in trains at night. Distribution is made both day and night, but the surfacing gangs work only by day. On the northern division the gravel used for ballast is purchased from a gravel-handling company which contracts to place the gravel on the track. Payment is made according to yardage. During the winter months the necessary surfacing work is done with cinders from the power plants. Cinders also are used in widening the banks and in building platforms.

thence extend south along and across the competing steam roads, again to connect with the Decatur-Springfield division of the electric railway west of the city. This belt is now under construction and will include 4.25 miles of new track.

The Springfield belt will be 5.6 miles long. In Springfield the Illinois Traction System operates over rented tracks and a belt line will be of value in reducing the cost for handling through traffic. The line around the southeastern edge of the city will afford freight connections with several steam roads and also will shorten the route for through traffic to and from St. Louis as well as relieve the city tracks of considerable heavy traffic. Right of way for the Springfield belt has been purchased and it is expected that the track can be laid this summer. The Ed-

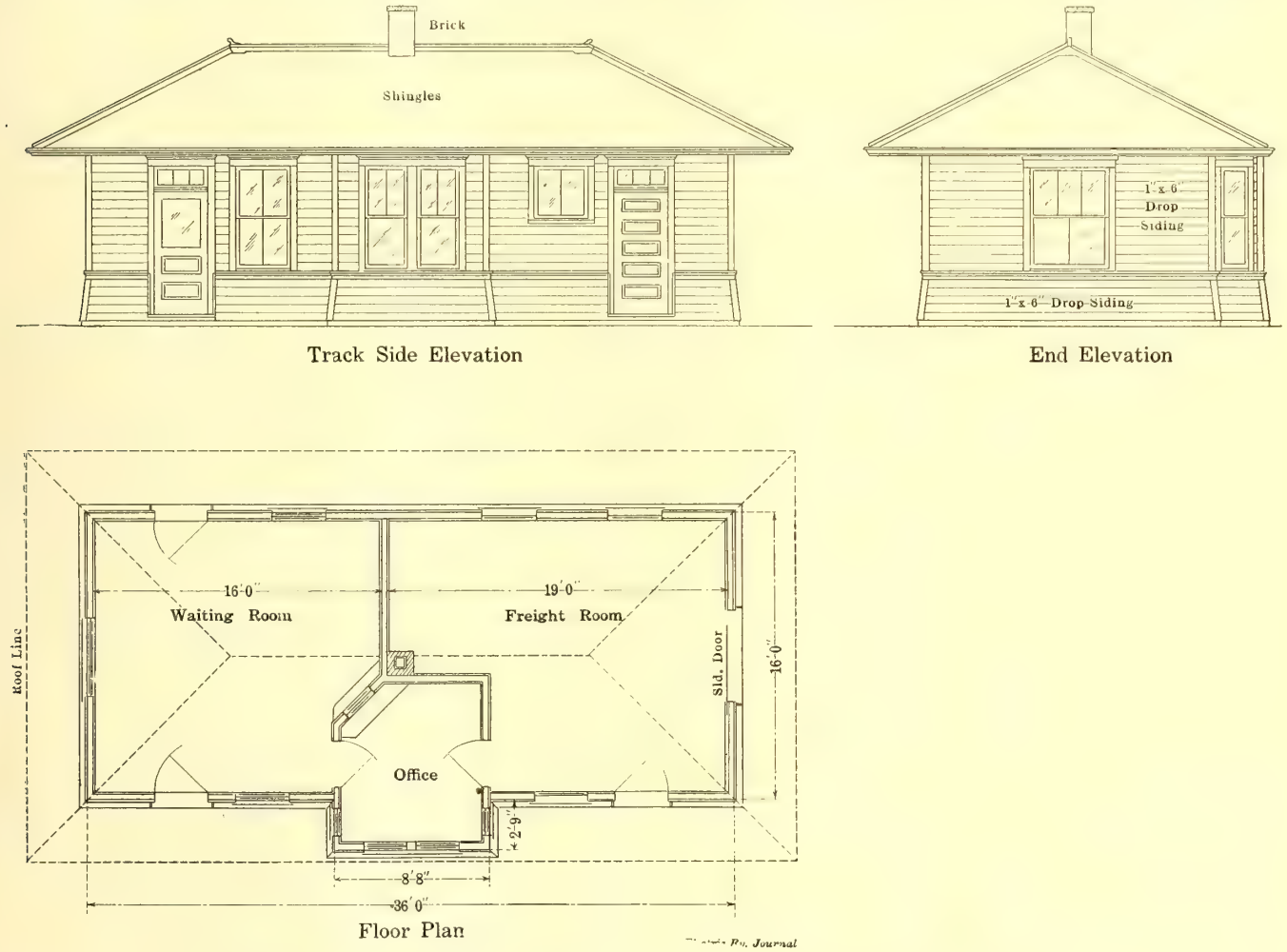
wardsville belt will be 1.5 miles long and will offer improved facilities for handling heavy trains through that city.

MAINTENANCE-OF-WAY RECORDS

The maintenance-of-way department is doing considerable work of permanent value to this and other departments. So-called "mileage" books in blueprint form are being made and distributed to all department heads. The pages of one of these books form a continuous map of the track shown as a straight line. Indicated on the map with the exact distance from one terminus are the locations of all stations, stops, bridges, railways, sidings, etc. Another book which this department is preparing is a "siding" book. The company has about 200 sidings which will each hold 10 freight cars in the clear. The new book will comprise blueprint pages 4½ in. x 10 in. in size, each presenting a simple map of the track layout at one station. These maps will also show the connecting steam lines and the lengths of all electric siding tracks.

A complete resurvey of all the interurban lines is being made by the maintenance-of-way department, the results of which survey are being plotted on tracing cloth to a scale of 400 ft. to 1 in. The sheets of these right-of-way maps are 24 in. x 36 in. in size and the structures on each side of the right-of-way for ¾ mile are shown. The maps present all details of right-of-way location, such as cornerstones, bench marks, etc., as well as track details, including measurements, curves, stations, sidings, etc. Prints of these maps are made and filed with the Recorder of Deeds in the proper counties. Copies also are made for the company, the land commissioner and the treasurer.

The headquarters of the maintenance-of-way department at Decatur is provided with a well-lighted drawing-room and a fireproof vault for the storage of maps and other records. A simple system has been developed for filing and indexing all right-of-way drawings. A sectional case has been built comprising 10 horizontal rows of pigeon holes with five holes in each row. The rows are numbered from 1 to 10, beginning at the top, and the pigeon holes from 1 to 5 beginning at the left. Thus two numbers combined serve to locate definitely any single hole. For example, "3-5" would indicate the fifth hole from the left in the third row from the top of the case. The drawings in each hole are numbered and on the ends of the pasteboard tubes around which the drawings are rolled the location number of each is given; thus, 3-5-2 would indicate drawing No. 2 in the hole located as earlier described. All drawings are indexed according to the name of the nearest railway station and one of the 1-in. x 42-in. tubes is provided for each tracing and its prints. Thus kept, the drawings are easily found and are not mutilated in filing.



Track Side Elevation

End Elevation

Floor Plan

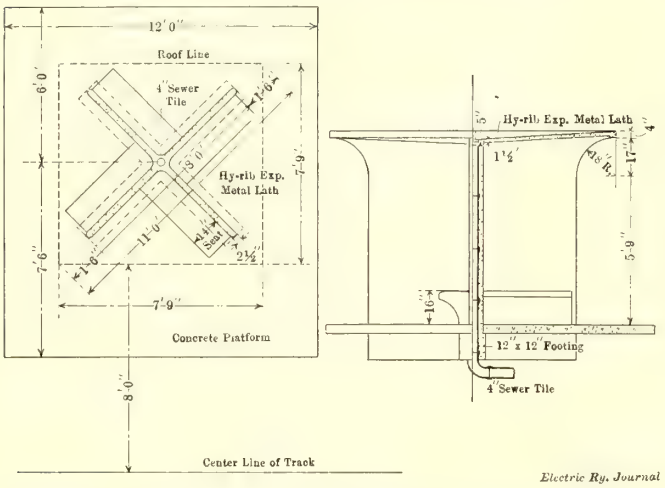
Illinois Traction System Improvements—Standard Depot for Small Town

DEPARTMENT OF BRIDGES AND BUILDINGS

The department of bridges and buildings is in charge of a superintendent with office at Decatur. Reporting to the superintendent are six foremen of bridges and buildings, one foreman bridge painter and one foreman building painter. In general the system of reports is similar to that followed by the maintenance-of-way department. Each day the foremen send a report to the superintendent of the department and the superintendent reports weekly progress by letter to the general manager. The daily reports used by the foremen are in the form of large postal cards

properly addressed on one side and having ruled spaces for the report on the reverse side. Space is indicated for reporting the number of men working and the total hours worked during the day. These postal-card reports are forwarded on the company cars as railroad business at the close of each day's work.

The department now has in hand considerable construction work of an interesting character. Many new stations are being built at the smaller towns, right-of-way fixtures



Illinois Traction System—Reinforced Concrete Shelter Shed

are being standardized and erected and plans are being made for new rotary converter substations on the divisions now operated by alternating current.

STANDARD BUILDINGS

An illustration is presented showing the floor plan and elevation of a type of standard 36-ft. x 16-ft. depot just approved for small towns. These structures will be of frame resting on the best available foundations. The buildings will be simple and comfortable and the roof is given a wide overhang to afford shelter from storms. The sides are constructed of 1-in. x 6-in. creosoted drop siding on the outside and lath and plaster above a 3-ft. 6-in. wainscot inside. The ceilings are 10 ft. 3 in. high and are plastered. One-half of a depot will be set off for the office and waiting-room and the other half for the accommodation of the freight and express department. It is estimated that such depots will cost about $800 each. The ticket window design it is proposed to make standard for all offices where applicable. The design includes a drawer and money till to be built in as a part of the window structure.

The bridges and buildings department is just completing the construction of a brick substation building at Clinton, Ill., to cost $5,000. This structure is 88 ft. long by 40 ft. wide and is subdivided by brick walls into the following rooms: Substation, 36 ft. 10 in. x 32 ft. 8 in.; general waiting-room, 25 ft. x 26 ft.; ladies' waiting-room, 11 ft. 4 in. x 19 ft. The substation-room accommodates two 300-kw rotary converters. The long side of the building is adjacent to the track and the roof of the building projects over the landing platform. This extended roof is covered with ribbed glass so that the space below may be well lighted.

Standard substation design No. 2 is reproduced in elevation from the track side. Eight such substations are planned as a part of the change of the Peoria division from a.c. to d.c. operation. These buildings will accommodate passengers at one side of the center office and freight at the other, in front, and the substation wing will be in the rear. The structural materials will be mainly concrete for floors and foundations and wire-cut face bricks for the extension walls. The roof will be covered with tile.

A standard cement and plaster shelter shed, designed as shown in the accompanying illustration, is to be adopted for highway crossings between towns. This type of station resembles in general form, but not materials, that adopted by the Illinois Valley Railway Company as the result of a contest held about two years ago. It will be noted that the structure has two intersecting walls supporting a flat roof draining to the center. The roof line is beyond the extremities of the wings or partitions and therefore on account of the arrangement of the walls protection will always be afforded, even from a driving rain. The structures will be built of fireproof material. Concrete supported on Hy-rib lath will be used to form the partitions and the roof. The shelter will be surrounded by a concrete platform. In constructing one of these stations the steel lath will be assembled on the ground. The exterior of the lath will be plastered with cement and after this is set the center or core of each wall will be poured. The roof is designed to drain to a 4-in. sewer tile leading through the middle portion of the intersecting walls and under the platform a sufficient distance away from the track. One of the principal benefits of this center-draining roof other than its simple construction is that falling water will not drip from the eaves on waiting passengers.

The bridges and buildings department has developed standard designs for telephone booths, register booths and hose houses. Illustrations are presented showing the details of the telephone booth and hose house. These illustrations need no explanation. The design for the register booth is similar in form and material to that for the telephone booth, the only variation being in the size. The floor dimensions of the register booth are 3 ft. x 5 ft.



Illinois Traction System—Shelter Station Near Peoria

Mention has been made of the standard roadway signs which are being erected throughout the interurban system. Illustrations are presented showing the design and dimensions of some of these signs, all of which are made of cypress wood painted white with black letters. Signs are provided for the following indications: Fare limits; sidings; stations; bridges; no trespassing; section limits; boundary lines; subway; slow; railroad crossing; railroad,

highway and intersection stops; yard limits and mile markers.

ELECTRICAL AND MECHANICAL ENGINEERING DEPARTMENT

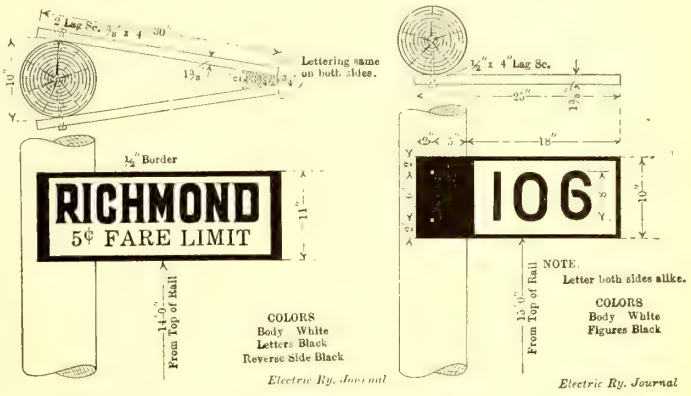
The power generation and distribution department is in charge of the electrical and mechanical engineer, who has reporting direct to him the chief engineers of the power stations, superintendent of overhead construction and the superintendent of substations. The superintendent of overhead construction has four line foremen with headquarters at Champaign, Decatur, Mackinaw and Staunton, who are in charge of the following territories respectively: Danville to Decatur; Decatur to Bloomington and Decatur to Springfield; Bloomington to Peoria and Springfield to Mackinaw; and all lines south of Springfield. Each foreman has two linemen and a motorman and conductor, who act as ground men. This organization is only for the maintenance work of the overhead, feeder and construction circuits. The subdivision of the telephone system is made according to similar territories and for each division in charge of a line foreman there is an additional lineman in charge of telephones, telephone lines and signal lines. The standard line car of the company is a 43-ft. flat car with a 20-ft. body, mounted on Brill trucks equipped with GE-57 motors. The relative sizes of the body and the platform leave available ample space for carrying materials and for mounting a tower.

All line foremen and telephone foremen report to the superintendent of overhead construction on the daily report blank illustrated on page 723. It will be noted that this blank presents a complete record of the performance of the crew and the car at their disposal. From such reports it is possible to check the trainmen's time and the trips of the car, as well as to note the character of the work performed and the materials used. The superintendent of overhead construction abstracts the reports of his foremen once each week to form the basis of a report to the general manager.

SIGNALS

During the past two years 60 Blake signals have been installed at sidings on the main line between Danville and East St. Louis. These signal blades are controlled from the dispatchers' offices at Danville and Springfield. On the a.c. division north of Springfield and connecting Peoria and Bloomington no signals have been installed except on a long grade near the entrance to the city of Peoria.

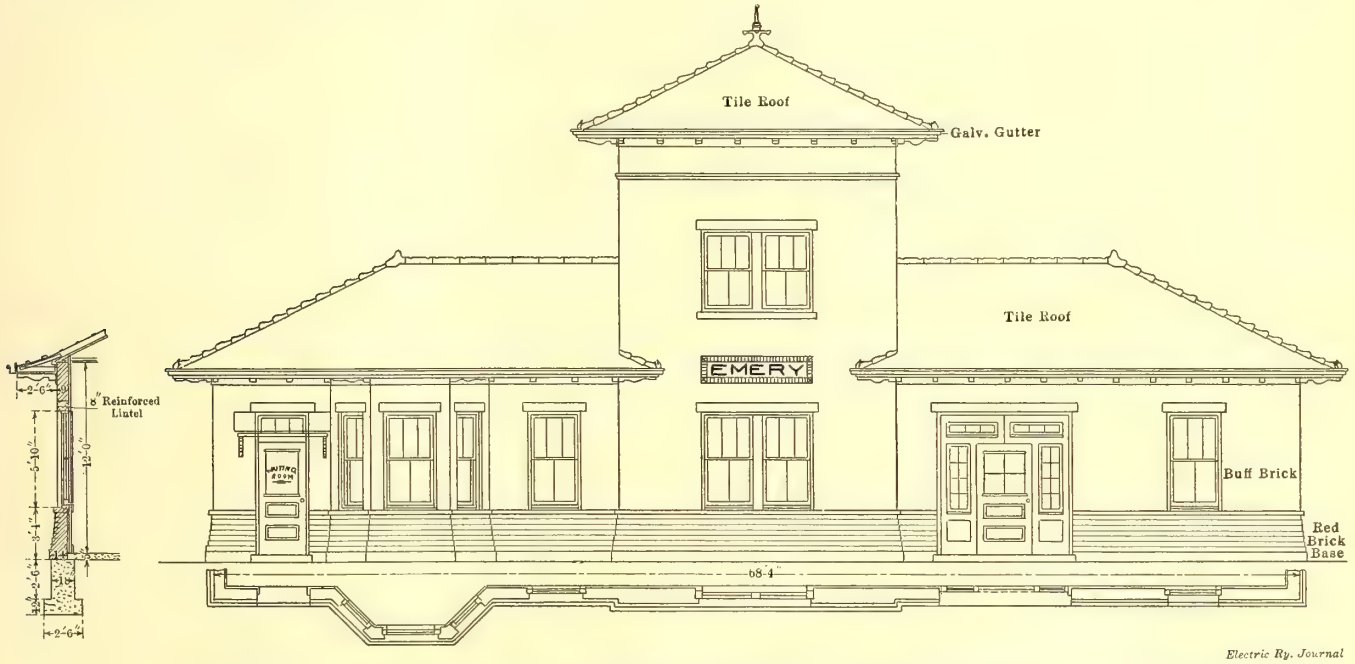
This signal installation has six blocks each about 1 mile long with equipment supplied by the McClintock Manufacturing Company. There are two signal posts with semaphores and lamps at the end of each block, as illustrated. A train entering a block causes large semaphore blades to fall to danger at both ends of the block and remain so while the train is within that block. There is one complete set of signals for operation in each direction. The signal circuits are carried on one track rail supplemented by three iron wires supported on cross-arms below the telephone line.



Illinois Traction System—Right-of-Way Signs

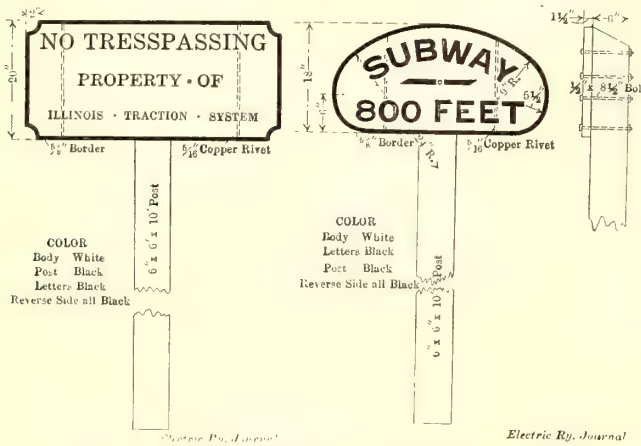
POWER TRANSMISSION

Practically all of the power used in operating the 425 miles of interurban line is generated in three stations located and having capacities as follows: Riverton, 4000 kw; Peoria, 4000 kw; Danville, 2000 kw. The transmission voltage between power houses and substations is 33,000, except on the Danville end, where from Danville to Champaign, 34.1 miles, the power is transmitted at 15,000 volts. The company also has a 500-kw generating station at Edwardsville on the southern end, which is connected with the transmission line so that it may be used to assist in handling heavy local loads. Each of the three main power stations is connected by a transmission line with a dispatching substation at Decatur. At this substation the



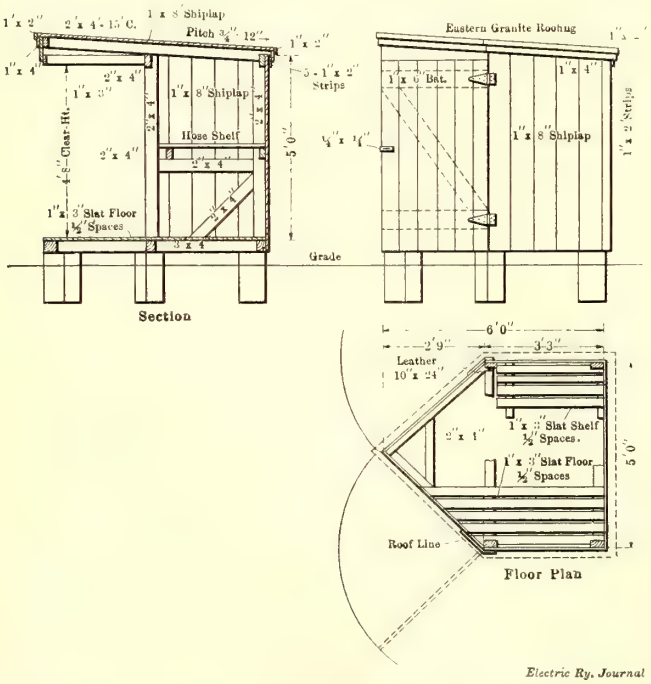
Illinois Traction System Improvements—Front Elevation of Standard Substation and Depot

operator synchronizes the three plants and dispatches the load according to the demands of the service. During 18 hours a day the Danville plant feeds the line for 40 miles west of Danville. From midnight until 6 o'clock the Danville plant is shut down and the local railway and lighting load, as well as the interurban load at and near Danville, is carried by the Riverton or the Peoria plant, as the case may be. The Riverton plant is located near Springfield, 130 miles distant from Danville, and the Peoria plant is near the center of that city, 173.8 miles distant from Dan-



Illinois Traction System—Right-of-Way Signs

ville. The capacities of the three generating stations are such that by means of the transmission lines mutually connecting at Decatur there is considerable flexibility in the way in which the load may be distributed to the various plants. It is stated that no difficulty has been experienced



Illinois Traction System—Standard Hose House

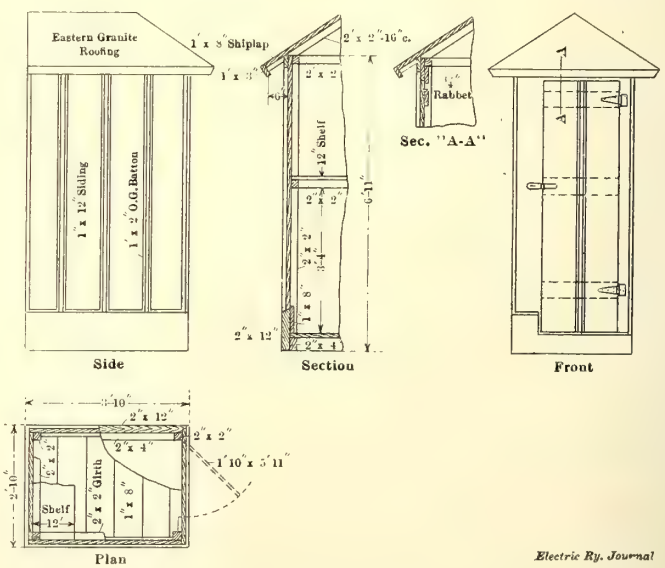
in synchronizing these generating stations located so far apart.

CHANGE FROM A.C. TO D.C. OPERATION

Some of the newer lines of the Illinois Traction System were built for and are now operated with 3300-volt single-phase current. The a.c. equipment includes the line connecting Peoria and Bloomington and a line from Mackinaw, the midpoint of the latter line, through Lincoln to Springfield. Inasmuch as only 15 per cent of the interurban mileage of the Illinois Traction System is now operated by a.c. motors there is considerable lack of flexibility in handling the equipment. While the a.c. cars are equipped to run on the d.c. system it would hardly be practicable to equip the far larger number of d.c. cars so that they could use single-phase current. Unless this is done in time of emergency it is impossible to shift the equipments to the best advantage of the service. Heretofore it has been found necessary to confine the a.c.-d.c. equipments entirely to the schedules of the a.c. lines. On account of the inflexibility of this arrangement, plans have been made and are now nearly completed for the re-equipment of the a.c. sections. New substations furnishing 650-volt direct current to the present catenary supported trolley wire will be built and new motor equipments for the cars will be purchased.

The catenary supported overhead construction which has been in service for more than a year on the a.c. lines is in excellent shape and will need no alteration. Since it has been installed there has been only one breakdown on the line and that was in the copper trolley wire and not in the steel messenger cable. This line has been subjected to extraordinarily severe sleet storms, one of which recently broke down copper and iron telegraph wires within a territory 40 miles wide. The sleet conditions at the time of this storm were such that the wires accumulated such heavy loads as to cause a break in every span for distances of from 2 miles to 3 miles. The parallel telephone and telegraph lines where a large number of wires were carried on one pole also were brought to the ground by the breaking of the poles due to the weighing down of the wires to the breaking point. The catenary, as earlier stated, withstood these severe weather conditions with but one break. This type of construction has three-point suspension and is supported by wooden poles.

In making the change from alternating current to direct

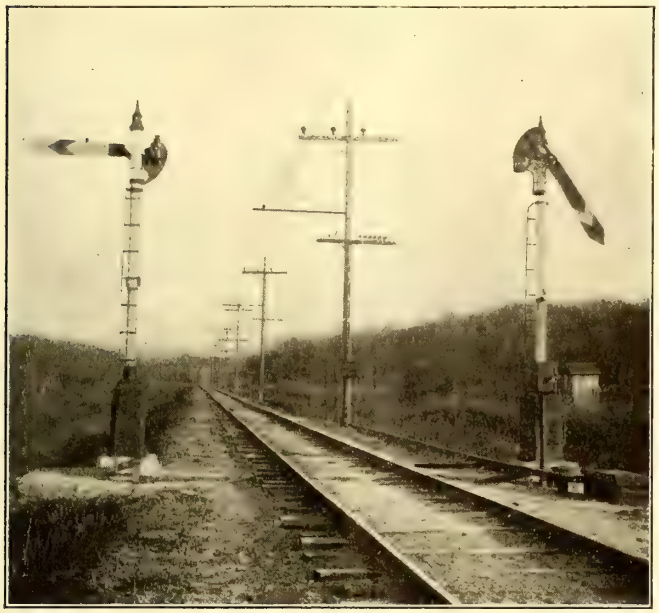


Illinois Traction System—Standard Telephone Booth

current the plan as now laid down contemplates doing the work in sections. The first change will be made from Springfield to Lincoln, then from Lincoln to Mackinaw and last from Peoria to Bloomington. When changing over one of these sections two portable substations will be installed to furnish 600-volt current until it has been possible to complete the permanent substation equipments. Then the portables will be moved to the next section to supply current. The power readjustment will call for the installation of eight substations, two of which will be

equipped with 500-kw rotaries and six with rotaries of 300 kw capacity.

The engineering department is now adding a third transmission wire on the same cross-arms with the two wires



Illinois Traction System—Block Signals on Peoria Hill

which now distribute the 33,000-volt current along the single-phase lines. Between the new substations and for the entire length of the re-equipped road between Peoria, Bloomington and Springfield a copper feeder of 317,000 circ. mils cross-section will be installed in addition to the present No. 000 trolley wire and its catenary messenger. A specially constructed derrick car is used for stringing the new transmission and feed wires. This car has a boom of such length that the wires may be placed directly on the cross-arms as the car moves forward without interfering with the other wires.

One of the most interesting features in connection with the change from alternating current to direct current is the plan which will be followed in obtaining a higher average voltage throughout the re-equipped lines and possibly throughout the entire system. It is planned to install enough copper and boosters to maintain midway between feeding points a normal voltage of 600 and a minimum voltage of not below 500. The substations will feed the trolley and d.c. feeders at 700 volts or the maximum of the rotary converters. Wherever there is a district between substations in which a reasonable amount of copper will not serve to hold the voltage to the required value a booster set and special booster feeder will be installed. The boosters will be of the series type and will be operated only when there is a demand on the trolley section which the rotaries cannot meet; as, for instance, when several extra heavy freight trains are pulling on one substation. The company is introducing interpole motor equipments in all of its car reconstruction work so that there may be the least possible commutation trouble on the high d.c. trolley voltage.

One of the refinements being introduced by the electrical engineering department is the strengthening of the transmission line at points where it crosses foreign wires. A drawing is presented showing the arrangement of wires and supporting cables at such an intersection. The transmission wire is supported not only by two insulators at each pole, but also it is supported at 5-ft. and 10-ft. intervals by vertical hangers supported from a single steel messenger wire.

Form 6 8-15-03 5M

ILLINOIS TRACTION SYSTEM

LINE FOREMAN'S HOURLY REPORT

Division_____ **Date**_____

Gang Reported at_____ **M.** **Train Crew Reported at**_____ **M.** **Line Car No.**_____

Hour	Left	Time	Arrived	Time	Nature of Work	Material Used
6 M.						
5 M.						

Work Done by Detached Men

Time Report

Name	Occupation	Hours

Material Received

Signed

Foreman

Illinois Traction System Improvements—Linemen's Daily Report Blank

POWER STATION OF THE CHICAGO, LAKE SHORE & SOUTH BEND RAILWAY

The constructional features of the Chicago, Lake Shore & South Bend Railway were described in the Electric Railway Journal of April 10, 1909, page 674. The power station of the company, which is described in the following pages, generates all the current used in operating this new road between Pullman, Ill., and Michigan City and South Bend, Ind. Single-phase current is distributed direct to the trolley at 6600 volts and to static transformer stations at 33,000 volts. The wiring diagram on page 728 illustrates the main connections between the generating and distributing system.

STATION BUILDING

The power station is located at Michigan City, Ind., at the head of the harbor connecting with Lake Michigan, and an ample supply of lake water is assured for all purposes. A direct connection with the Lake Erie & Western Railroad serves for coal supply. The site of the power station was originally a marsh, which was filled in by the United States War Department in dredging the harbor. While the



Chicago, Lake Shore & South Bend—Power Station at Michigan City, Ind.

surface soil was very light, careful soundings showed a good hard bottom for the power station foundation at from 35 ft. to 45 ft. below the surface. About 1100 oak piles were driven to support the building and machinery foundations. These piles were sawed off 3 ft. under low-water line and a concrete foundation mattress was built on them. About 100 piles were placed under the chimney alone. In the construction of the foundations and superstructure 5000 cu. yd. of concrete were used. The mixture was made up of Medusa Portland cement, crushed limestone and beach sand.

The general arrangement of the power station is shown in the plans and sections presented. The boiler and engine rooms are divided by a brick wall, and though under one roof are really separate buildings. The chimney is at the middle of the boiler room with two batteries of two boilers each at the west side, and one battery and space for another at the east side, extending lengthwise of the building.

In order to make the engine and boiler rooms of the same length the turbo-generators were set in two rows, staggered so that the steam pipes have a clear run to the proper boilers. The exciters are set in the middle of the turbine room in front of the operating switchboard and opposite the chimney. This arrangement was chosen so that the plant could be divided into a number of sections or panels, each of which would substantially be independent of the others, and the steam piping and electrical connections were laid out with that end in view. The boiler-room floor and the lower floor under the engine room are at ground level and the turbine floor is about 18 ft. higher. The turbo-generators are supported on concrete foundations with pile footings separate from the building foundations. The exciters are set on steel beams in the turbine-room floor. A large part of the space under the engine room is taken up by the high-tension room in which are placed the three 1000-kw step-up transformers and all the busbars, wiring, oil switches and lightning arresters.

The turbine room is spanned by a traveling crane which can reach all apparatus in that room directly. Over the 1000-kw transformers in the lower story are hatches behind the operating switchboard, through which the transformers may be lifted, and over all the larger pieces of apparatus in the lower story are small holes in the floor closed with steel covers when not in use, but through which wire lifting cables may be passed so that the large crane may be used in setting up or dismantling the apparatus.

The power-house building is 164 ft. long by 102 ft. wide. The outside walls are of concrete blocks made on the ground from lake gravel and cement. These blocks are of special shape designed so that they dovetail into each other leaving grooves which, as the courses were completed, were filled with grout. Reference to the illustration of the method of laying the blocks will show that the units were closely anchored to each other forming a uniformly solid wall. The facing of each concrete block was made of a special waterproof compound with narrow beveled edges. The joints were pointed with dark mortar. All lintels are of steel. The division walls are of sand-lime brick of local manufacture and the roof is made of 3-in. Georgia pine laid on steel trusses covered with Ludowici red tiling. The underside of the pine roofing was given three coats of asbestos paint.

Reinforced concrete was used for all floor construction and for the pilasters which support the crane columns. Notwithstanding the discouraging nature of the subsoil upon which the building was placed, no defect whatever has thus far developed after eight months of use.

BOILER AND COAL-HANDLING PLANT

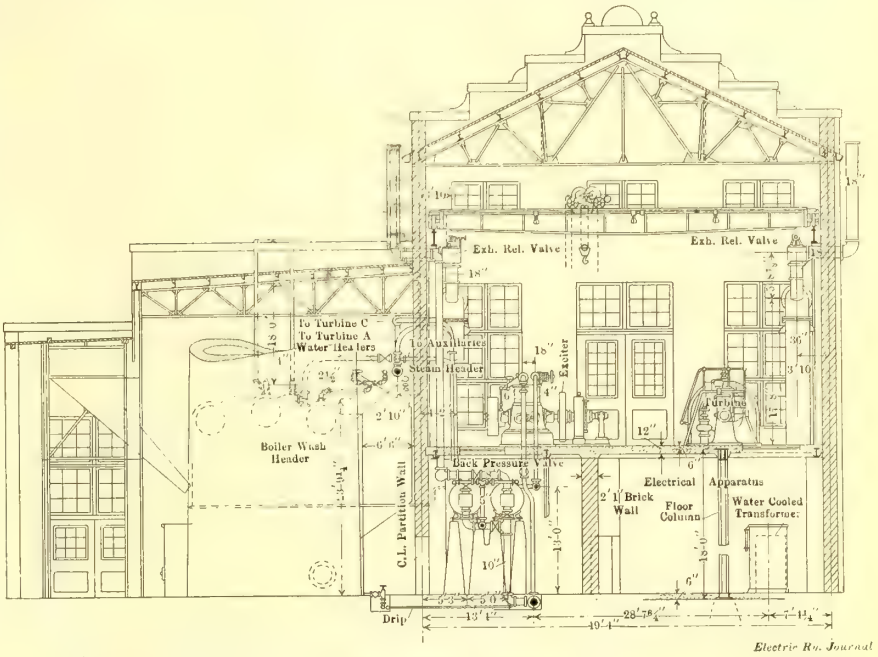
There are six Babcock & Wilcox Stirling boilers of 500-hp capacity each. These have 4-in. tubes and are designed for 200 lb. working pressure. Superheaters of the B. & W. U-tube type are built in each boiler. These have sufficient surface to add 90 deg. superheat to the steam at normal boiler capacity. The furnaces project in front of the boiler walls, thus allowing large combustion chambers. Coal is fed by steam-engine-driven Murphy stokers.

The fuel generally used is Indiana slack which averages about 9000 b.t.u. per pound, but varies considerably as received from different mines. Two parallel trestles are provided for coal storage and handling, one about 15 ft. higher than the other. The loaded coal cars are placed on the lower trestle and unloaded by a steam locomotive crane with a clam-shell bucket which discharges the coal into a weighing hopper and crusher mounted on a gantry crane running the entire length of the boiler room directly over the coal bunkers. The crusher is operated by a 30-hp,

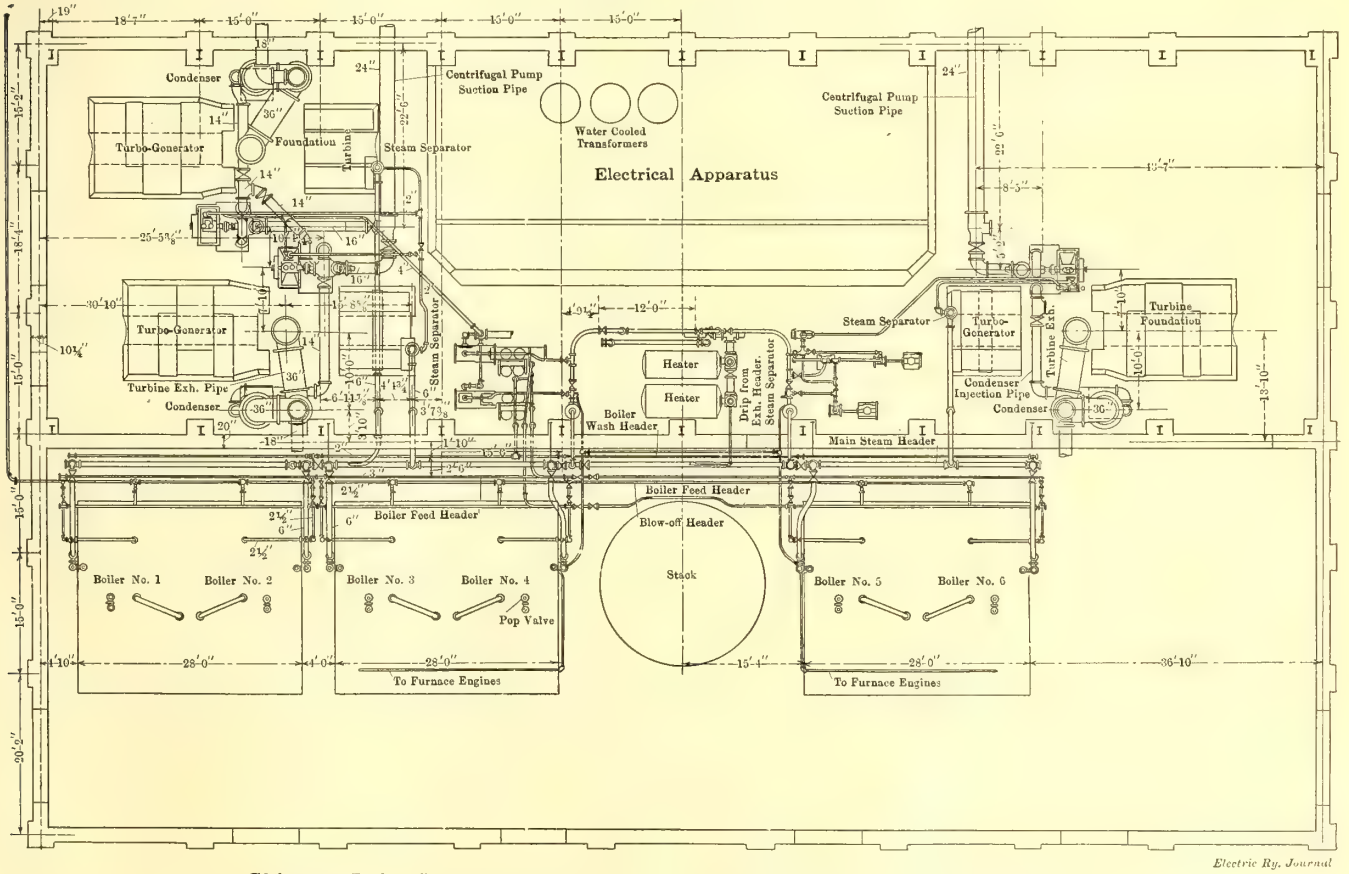
three-phase induction motor and the gantry by a 7½-hp, three-phase crane motor. When coal is received in hopper-bottom cars it is dumped directly under the trestle for storage or unloaded as described. Coal storage for at least 10,000 tons is provided. The high trestle is provided with an apron to cause all coal when dumped from the cars to slide outward and away from the power house so as to be within reach of the bucket of the hoisting engine. With these arrangements 160 tons of slack have been unloaded in 10 hours by three men. With two men a 40-ton capacity car of coal can be unloaded, crushed and placed in the bunkers in three hours. Steel bunkers over the boilers have a capacity of about 25 tons per boiler. The power house being at the water front, fuel can be delivered by boat if found advisable.

ASH-HANDLING APPARATUS

The vacuum method of removing the ashes from under the stokers and elevating them to the loading hopper which is used in this station is very similar to that employed for handling shavings in planing mills. Under the pits in front of the Murphy furnaces is run an 8-in. collecting pipe extending the whole length of the boiler room, and just in front of each ash door is inserted a T-fitting with a 6-in. opening. In the concrete floor a hopper about 1 ft. square and a few inches deep is formed above this opening. At the east end of the boiler room the 8-in. collecting pipe is carried up several feet above the floor and left open. At the west end the 8-in. pipe runs under the boiler-room floor and up to the top of the ash hopper, which is large enough to hold about a carload of ashes loosely piled. The top of the hopper is tightly sealed and over this is set a rotary fan driven by a 40-hp induction motor, which exhausts air from the hopper to a vacuum of about 1 lb. below atmosphere. Water from the tank overhead is sprayed into the top of the hopper to quench the hot ash as it comes in.



Chicago, Lake Shore & South Bend—Section Through Engine and Boiler Rooms

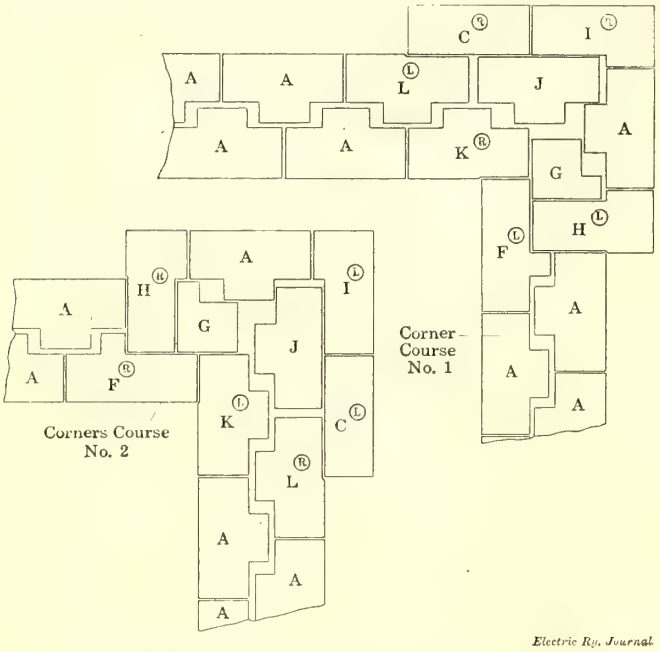


Chicago, Lake Shore & South Bend—Plan of Michigan City Power Station

When ash is being elevated all the openings of the 8-in. pipe in the ash pits are closed except the opening in the pit being emptied. There a man rakes the ashes from under the grate into the small hopper in the floor and the blast

of air coming through the open end of the pipe carries them along and deposits them in the hopper. With the full boiler-room capacity installed and in operation it is estimated that two men will be able to remove easily the ash as produced.

The maintenance of this equipment has not yet been determined, but it appears that there is considerable wear



Chicago, Lake Shore & South Bend—Details of Interlocking Concrete Blocks in Power Station Building Walls

wherever the direction of the ash pipe changes and any roughness in the pipe which produces a small change in direction or velocity causes local wear. Wet ashes seem to cause more wear than dry ashes. Elbows are provided with wearing pieces against which the stream of ash impinges. These can be renewed cheaply and all joints in straight pipe are made with the pipe ends faced true and screwed into a coupling till they butt. The pipe below the floor level is laid in a drained concrete-lined trench so that it can be renewed readily if necessary and so that water may not accumulate about the pipe. With these precautions the wear has been inconsiderable as yet. The ash-handling plant was installed by the Economic Engineering Company, of Chicago.

STACK

The stack of Custodis radial tile is supported on a concrete and pile foundation and is 210 ft. high above the grates. It has a 12-ft. internal diameter. With Indiana coal it has a capacity for about 6000 hp of boilers or double the present boiler installation. Lightning protection consisting of two No. 0000 copper conductors is provided. These conductors extend above the top of the stack about 5 ft. and are stapled to the top course in a substantial manner. They are grounded by means of soldered connections to the water-piping system and also to a large perforated copper plate sunk in the ground below the lake level. A special outside iron ladder is attached to the stack, the rungs of the ladder being of such a shape that a man when climbing will be inside the ladder with his back to the chimney.

WATER SUPPLY

The water for boilers and condensers is taken from a large concrete well just outside the building, which receives water from the harbor by gravity flow, and into which the pump suction pipes dip. The condenser hot wells are all connected together and discharge through a common overflow. A large creek empties into the harbor directly opposite the plant and both lake and creek water are available. The creek water carries little mineral but some vegetable matter and the latter appears to counteract the effect of the small amount of lime and magnesia found in the water from the lake.

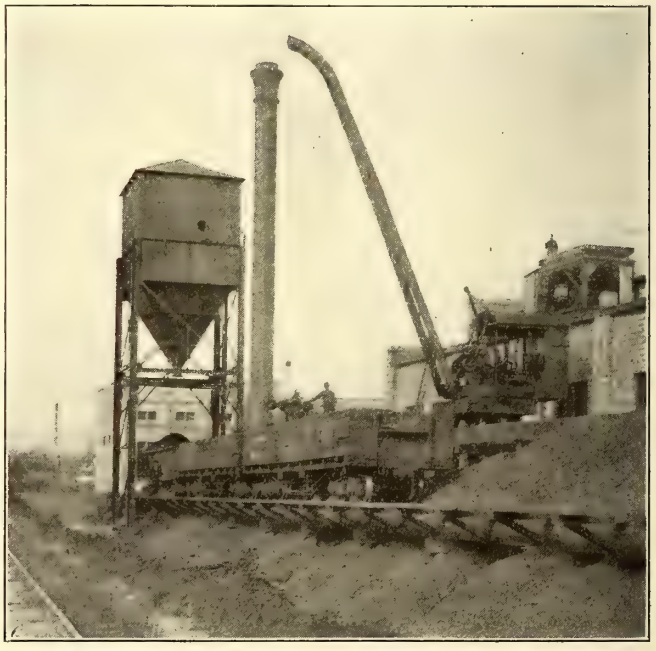
CONDENSERS

The condensers are of the barometric type furnished by the Fred M. Prescott Company, of Milwaukee, Wis. They have a double tail pipe which prevents an excessive supply of water from flooding the injection chamber. One tail or overflow pipe is placed inside the other, the inside pipe taking normal discharge. When the water rises to the danger point in the inside pipe the second or outer one disposes of the surplus. The injection water is furnished by single-stage centrifugal pumps with a 14-in. discharge, driven by simple vertical automatic engines at about 350 r.p.m. These pumps are primed by 2-in. ejectors connected into the top of the pump casing and into the discharge pipe just below the valve. Both connections were found necessary to start the pumps promptly. No foot valves are used on the suction pipes of these pumps, which are enlarged at the ends to about double area.

Each turbine has a separate condenser and injection pump and the injection pumps of the two turbines at the west end of the station are cross connected so that either pump may be used with either condenser and provision is made so that when the fourth turbine is installed the condensers of the two units at the east end will be similarly cross connected.

BOILER FEEDING AND WASHING

Boiler feed water is usually taken from one of the small hot wells into which each condenser tail pipe discharges, but may also be drawn from the large concrete well in front



Chicago, Lake Shore & South Bend—Coal and Ash Handling Apparatus at Power Station

of the building which communicates with the harbor and from which condensing water is drawn. There are three 8-in. and 12-in. x 12-in. single-cylinder piston pumps which deliver water from either of the wells described to the feed-water heaters. There are two Hoppes steel shell open heaters having 425 sq. ft. of tray surface each, which re-

ceive all the steam of the pumps and exciter engines. These heaters are connected to the exhaust riser of the auxiliaries through induction chambers, which are combined single-pipe connections and oil separators. There are also baffle oil separators inside the heaters. Both heater connections contain valves and there is an automatic back-pressure valve in the riser beyond the heaters and both heater shells are ventilated to the riser above the automatic valve. By this arrangement either or both heaters can be shut off for cleaning or repairs. The heaters are set above the floor on concrete pedestals so as to allow a fall of about 8 ft. to the suction openings of the boiler feed pumps and a gallery is built at the open ends of the heaters for convenience in removing the trays for cleaning.

so that either feed pump may be used for cleaning, while the other is feeding boilers.

One of the three boiler feed pumps is intended for building service and pumping water into the steel tank over the hopper which forms part of the pneumatic ash-handling outfit. From this tank water is distributed to the turbine bearings, transformer coils, etc., and is used for drenching ashes. These pumps are cross connected so that all three may pump into the heater or while one is supplying the heater and another the tank the third is held in reserve for either purpose.

As one boiler feed pump and one hot-well pump, at moderate piston speed, can supply the normal capacity of the station and one heater and one feed main are sufficient



Chicago, Lake Shore & South Bend—Interior of Power Station (Photograph Taken at Night by Light of Mercury Arc Lamps)

The boiler feed is supplied by two 18-in. and 10½-in. x 16-in. single-cylinder direct-acting steam pumps with outside end packed plungers and pot valves. From the pumps to the boiler connections the feed pipes are run in duplicate so that the mains form two loops, each supplying one-half the boiler room. The boiler connections are single pipes from cross connections between the mains and the feed pumps are cross connected. Either pump and either side of either loop may be cut out without disturbing operation. Both boiler feed pumps may also take water directly from the hot wells and both are connected into the boiler waste line which also runs the length of the boiler room

for operation without any serious inconvenience, this arrangement is flexible enough to meet any ordinary contingencies.

STEAM PIPING

The steam piping is laid out as a sectional system, each battery of two boilers supplying one turbine. The boiler-room main header receives all the boiler connections and the supply pipes to the several turbines are taken directly from it, while a smaller loop header to supply the steam-driven auxiliaries is connected into this main header at both ends.

The plant was laid out so that each turbine should be

supplied normally by the corresponding boiler battery and the turbine steam pipe is connected to the main header between the two boiler connections, so that no part of the header will normally be required to carry more than the steam supplied by one boiler. This header is really only an equalizer and could have been made very small. The header is 8 in. in diameter and the boiler and turbine connections are each 6 in. in diameter.

Valves are placed in the header between the boiler batteries and at each end of the auxiliary section, which is between batteries 2 and 3. The auxiliary section is also divided in the middle and valves are placed in the auxiliary header so that the loop may be supplied from either end. This divides the entire live-steam pipe system into three turbine sections which are quite independent, and two auxiliary sections from either one of which all the boiler feeders and hot-well pumps may be operated. All turns in the boiler and turbine leads are made with bent pipes.

Directly under the steam opening of each turbine is placed an angle type Hoppes steam separator of 15 cu. ft. volume with a straight 8-in. lead up to the turbine. In each end of the auxiliary loop header is a similar separator of 10 cu. ft. volume. The engines which drive the centrifugal condenser injection pumps are supplied with steam from the separators of their respective turbines and are cross-connected similar to the water piping.

The boiler pipes are connected with the header through angle-globe valves with horizontal stems which are extended through the wall into the turbine room, so that a damaged boiler or lead can be cut out with safety. In addition, there is an automatic non-return valve between the angle valve and the boiler. A gate valve is placed in each turbine lead just above the header with its stem also extended into the turbine room.

The intent was to sectionalize the large steam piping so that any broken portion could be isolated quickly and safely, and at the same time to keep the design as simple and inexpensive as practicable.

DRAINAGE SYSTEM

Under the main steam header and connected into it at each turbine tee is a drainage header which empties in two traps in parallel. The two smaller separators and the auxiliary steam piping also drain into them. These traps discharge into both heaters. Each turbine separator drains into a separate trap, all three of which discharge through common piping into both heaters. All the traps are Squires 2-in. and are by-passed and connected up exactly alike with flange couplings. One or more extra traps similarly equipped are held in reserve, ready for substitution for any trap that does not work properly.

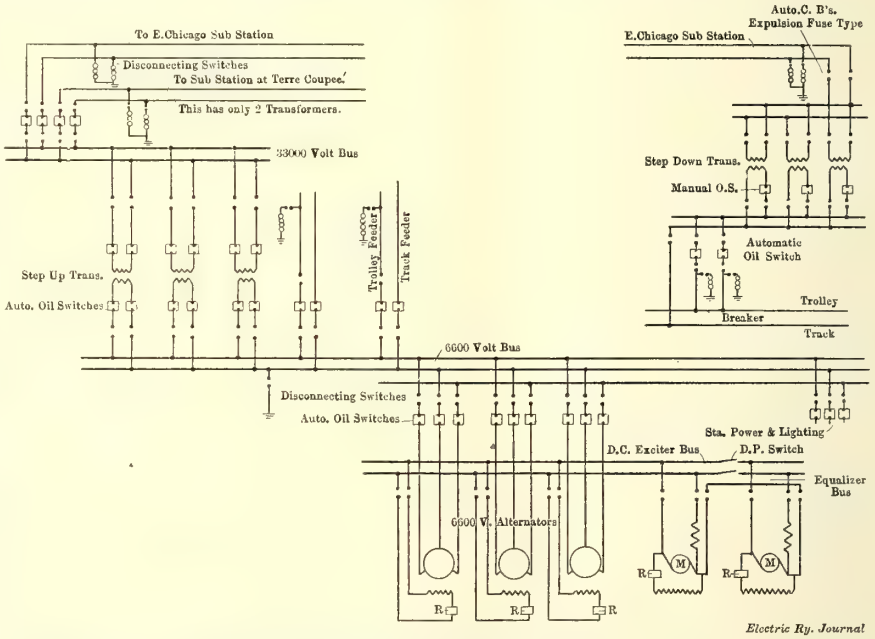
All piping exposed to boiler pressure is full-weight wrought iron and all flanges in it are of forged steel. Flanges of 4-in. pipe and larger are loose, with the pipe ends turned over to make the steam joint between the pipes themselves, while the smaller pipes have the flanges screwed and planed on. The valves and fittings are of extra heavy cast-iron except the small valves, which are brass. Substantially all piping is flanged, as nothing larger than 1¼-in. was permitted to have screw fittings, and this includes only a few small pump connections.

All the larger steam piping is covered with 1 in. of laminated asbestos and air-cell covering with 1 in. of 85 per cent sectional magnesia covering over that. Two-inch steam pipes and smaller and drips have only the laminated asbestos lagging. The entire feed system, including heaters, pumps and piping, is protected by sectional covering.

GENERATORS

The generating plant consists of three 1500-kw Westinghouse-Parsons steam turbines connected to three-phase, 25-cycle, a.c. generators. Each generator has a capacity of 1500 kw single-phase or about 2000 kw at the three-phase rating. The speed is 1500 r.p.m.

Three-phase units were chosen for the main generators to provide against the need of future long-distance transmissions and possible commercial power load. As the trolley line is supplied directly from one phase of the generator windings the possible effect of surges in the other generator phases was feared and the generators were required to be insulated to endure safely a high-potential trial of double voltage to ground for 30 minutes. All other electrical apparatus was required to endure the insulation trials recommended in the A. I. E. E. standardization rules.



Chicago, Lake Shore & South Bend—Wiring Diagram of Connections for Power Station and Distribution System

There are two 100-kw, 125-volt, d.c. exciters direct driven by Westinghouse compound engines. Variations of voltage are governed by a Tirrill regulator. A special synchroscope of large diameter with an illuminated dial is mounted on a pedestal so that it may be seen from all parts of the turbine room in addition to the usual synchroscope mounted on the switchboard.

SWITCHBOARD AND ELECTRICAL APPARATUS

The switchboard is of the standard Westinghouse type with electrically operated oil switches. The control circuits carry exciter voltage and no high-tension current is connected to the board. All 6600-volt and 33,000-volt apparatus is placed in a fireproof room directly under the switchboard. This apparatus includes busbars, oil switches, instrument transformers, oil-insulated choke coils, low-equivalent lightning arresters, three 1000-kw, single-phase, 6600-33,000-volt, oil-insulated, water-cooled, step-up transformers and transformers for lighting the station and operating the induction motors of the coal-handling machinery. Owing to the fact that the armature leads are connected

directly to the trolley without intervening transformers, extra lightning protection is now being installed in the shape of aluminum cell arresters.

All oil switches in the generating station and in the high- and low-tension substations are protected on both sides by lever-type disconnecting switches, so that they can be isolated for inspection or repair without shutting down any apparatus not directly controlled by that particular switch.

The leads from each generator to the 6600-volt busbars are single conductor cables insulated with varnished cambric and braided. They are drawn into fiber conduit ducts which are continuous without pull boxes from the generators and pass through the wall of the high-tension room in the lower story of the engine house. The ducts are supported in steel frames just below the turbine-room floor and are enclosed in a mass of concrete molded about them in place.

The high-tension room is divided lengthwise by a brick wall into which are built or attached the barriers and structures for the 6600-volt busbars, oil switches and connecting cables. All these barriers are concrete slabs reinforced with light expanded metal, molded separately and seasoned before being installed.

The larger division of the high-tension room contains the 33,000-volt busbars which are supported on line insulators on a steel frame without barriers. Directly under these busbars are the 33,000-volt oil switches and between these and the outer wall stand the 1000-kw, water-cooled, step-up transformers and the lightning arresters and choke coils. This part of the installation is made up of standard apparatus.

In molding the reinforced floor of the turbine room 7 in. of concrete was placed above the top of the steel floor beams and about 5 in. below. The lower stratum contains the reinforcement, consisting of twisted iron rods and welded mesh and was laid complete so as to offer a working floor during the installation of the electrical equipment. On top of this were laid the steel conduits for the control wiring of the oil switches, the field cables of the generators and the exciter leads and lighting circuits, after which the upper part of the floor was put in. By careful arrangement of work the delay in completing the floor was inconsiderable; in fact, the concrete men were able to work steadily, the conduit work being kept ahead. All the control conduits are continuous without junction boxes in the turbine floor.

The general illumination of the power plant is furnished by Cooper Hewitt lamps, the direct current for which is provided by a Lincoln induction motor-generator set. All incandescent lighting circuits are fed with 110-220-volt, 25-cycle, alternating current. The wiring is enclosed in steel conduits throughout.

The experiment made by the Liverpool Corporation Tramways of running first-class cars on which a higher rate of fare is charged has not proved successful. Some months ago the service was given on the line to Aigburth, one of the best residential quarters of the city, and cars de luxe, on which double the ordinary fare is charged, were run at frequent intervals. It appears that the average operating expenses per car-mile in Liverpool are 20.25 cents and the average earnings per car-mile on the entire system are 22.08 cents. The earnings per car-mile of the first-class cars, however, are only 11.4 cents, or half the average on other lines.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

Additional testimony in the case relating to the rates of fare charged by the Milwaukee Electric Railway & Light Company was presented before the Railroad Commission of Wisconsin at Milwaukee during the week beginning March 29. Part of the testimony offered, all of which was on behalf of the company, is published herewith:

TESTIMONY OF FRED G. SIMMONS

Fred G. Simmons, superintendent of construction and maintenance of way for the Milwaukee Electric Railway & Light Company, was presented as a witness on April 2. Mr. Simmons was examined by Edwin S. Mack, of counsel for the company, who stated that Prof. W. D. Pence, engineer for the Railroad Commission, had testified that in making his appraisal as between paving and track construction he included as track construction merely the concrete foundation of ties to the bottom of the ties. Mr. Simmons stated that the city paving did not extend to the bottom of the ties, but extended, on an average, about to the middle of the tie.

DEPRECIATION AND WEAR OF TRACK

Mr. Mack said that the engineering staff of the Railroad Commission had computed life curves based on the head-wear. Was the head-wear the only test of a track? The witness thought that corrugation, which could not properly be considered as head-wear, was another and an important element in limiting the life of rails. He believed that to take care of depreciation due to age and wear of track, ties and bonding on the lines of the company in Milwaukee, exclusive of any provision for obsolescence and inadequacy or public requirements, 7½ per cent per annum should be allowed. While this percentage might vary in some cases, it would be necessary in approximately 13 years to expend in replacements and renewals on any given piece of track, as an average, an amount equal to the original construction value of that track. At the end of that time the usable value of the track structure would be from 75 to 85 per cent of its original value. For depreciation due to age and wear of special work and the installation of special work, the witness would allow 12½ per cent. About eight years on the average was the life which would apply to special work of the character under consideration. Paving and grading the witness placed at 10 per cent, computing that in the course of 10 years he would have expended in replacements and renewals an amount equal to the original cost. Ballast was figured at 5 per cent. Tracks, ties, bonding, etc., were computed by the witness at 47½ per cent of the total. Applying an average "weight" of 47½ per cent to track depreciation, the witness multiplied the 7½ per cent annual appropriation for track, etc., by 47½ per cent, reaching 3.56 per cent. The following table was presented:

Kind of work	Annual allowance for depreciation Per cent	Multiplied by Per cent	Total Per cent
Tracks, ties, bonding, etc..	7½	47½	3.56
Special work.....	12	7½	.90
Paving	10	25	2.50
Ballast	5	20	1.00
Total	..	100	7.96

EXPENSES IN TRACK CONSTRUCTION

The cost of construction or reconstruction was increased when the work was done on a city street and one track had to be kept in service. Mr. Simmons had figured that the

additional expense caused by this requirement, based on the experience of the company for years past, as compared with construction where operation ceased, was approximately $882 for labor per mile of single track. The additional material used for the installation and maintenance of temporary cross-overs and additional protective devices amounted to about $50 per mile of track, and additional supervision with incidentals about $68, making a total of approximately $1,000 per mile of track additional on account of such a method of construction. That figure took into consideration solely the expense incident to operation of cars on the additional track.

W. J. Curtis, of counsel for the company, asked how much more it would cost to put in a piece of special work in some of the crowded parts of the city and provide for operation of the cars over the track than if the opportunity to lay the special work was unhampered by traffic. Mr. Simmons said the proportion would be approximately the same when taken in relation to the mileage cost of the special work, as the proportion would be in mileage of the straight track. As special work was usually done at night, the cost of labor and some small items of material, such as lighting, were undoubtedly somewhat larger; just how much larger the witness had not computed, because the difference in the labor cost was mainly due to the reduced efficiency of the men at night as compared with their efficiency in the daytime, and it would be difficult to figure the increased cost accurately.

Responding to a question from Mr. Curtis, Mr. Simmons said that without interruption or interference, the normal labor cost per mile of track would be somewhat over $2,200 per mile.

Mr. Mack stated that there was some evidence as to work done on the street or in connection with bridges or in similar ways that did not appear in the inventory, but was done by the company in the construction of tracks under the requirements of franchises. Mr. Simmons gave several instances showing expenditures of this nature. In one case the curbstone on each side of the street had to be set back, and this was done at considerable expense. In another case the company was required either to pay for or execute the entire excavation for a subway under the track of the Chicago & Northwestern Railway for the full width of the street, except just that portion across the Chicago & Northwestern right-of-way, and that occasioned a considerable delay. When the company, in another instance, was given the right to remove tracks from one street in connection with a grant of additional privileges, the entire street had to be filled and paved with crushed stone for the district, necessitating the use of about 10,000 cu. yd. of crushed stone. In another instance, when the company was granted a franchise to construct a track, the requirement was included that the street and sidewalk be graded to the full width of the street.

CONSTRUCTION REQUIRED BY CITY PAVING ORDERS

Mr. Mack said it had been stated that as a practical question the company must make its track reconstruction coincident with the city paving of streets. It had been suggested by the city attorney that the company made a saving on paving under these circumstances. Did tracks have to be taken up before the end of their useful life to an extent that caused a loss to the company exceeding any possible saving from the fact that the city did the paving?

There were a few cases where, in the opinion of the witness, the expense would be less to secure the remaining life of the rail and then pay for the taking up and replacement of the pavement. That occurred, however, only under certain favorable conditions. It was undoubtedly very much to the convenience of the public to have the street torn up only one time. The Board of Public Works had always insisted, so far as its authority extended, that the company make its work coincident with the city paving operations to the extent of sending notices when paving was contemplated and requesting the company to do its work at the time of the repaving.

A statement was presented by Mr. Simmons showing that from information obtained at the City Hall, resolutions had been recommended for passage for the year 1909 providing for the paving of 19.03 miles of single track. From 1901 to 1908 there had been reconstructed on account of city paving requirements the following miles of single track: 1901, 6.75 miles; 1902, 7.45 miles; 1903, 5.57 miles; 1904, 6.01 miles; 1905, 11.29 miles; 1906, 7.89 miles; 1907, 10.56 miles; 1908, 9.83 miles; total, 65.35 miles; average, 8.17 miles.

In the foregoing list there were some minor items, where the track had been reconstructed in dirt streets not coincident with city paving at the same time, but the great majority, probably over 90 per cent, was reconstruction which was carried on during the city's construction of pavements.

Mr. Simmons specified instances where the rail was good for a life of between three and five years, but at the request of the city, in order to comply with the requests for paving, the rail was relaid.

Mr. Mack asked if there had been cases where the company had had to relay its pavement and track foundation at its own expense because the city had changed the paving of the street. The witness said that the expense which the company had to assume in these cases was incident to placing cross-overs and taking care of the track during the period of reconstruction, and of operating the cars on one track while another track was undergoing construction. He had two instances where the company was ordered to make these changes and complied with the requirements, although the portion of the pavement for which the company was responsible was good for a considerably longer period.

To construct new track in paved streets with 7-in., 97-lb. rail, bringing the concrete to the point where the upper portion of the paving would be imposed upon it, cost $15,900 per mile, exclusive of any special work or overhead construction. This figure did not include allowance for interest during construction, accidents, contingencies or general office expense for labor, but did include an allowance for engineering and superintendence and general office expense in buying material. Such allowance as there might be for this latter item was comprised in the cost of the material. This figure was based on actual results based on actual cost of materials for allowance for contractors' profits. On a dirt road the expense would be less by the amount of concrete plus the expense for the ordinary gravel or cinder ballast. The cost would be approximately $12,500 per mile on the dirt road.

Answering an inquiry from Mr. Mack as to the number of yards of concrete in the cost as computed, Mr. Simmons stated that his estimate was based on bringing the concrete up ready for the imposition of the top layer of pavement, and 1500 cu. yd. of concrete at $3.60 per yard would be required. If carried only to the center of the tie, about 1000 yd. of concrete at the same price would be necessary. Answering an inquiry from Lester C. Manson, of counsel for the city, the witness stated that about 800 yd. of con-

crete would be required if it went to the bottom of the tie.

Mr. Simmons said that no portion of the general expense of the company was included in the figures. The company had exceptional appliances and facilities for doing concrete work. The witness did not believe the price of $3.60 per cubic yard could be secured by contract in the city of Milwaukee.

Mr. Mack stated that the figure used by Professor Pence was $5 per cubic yard, as he remembered it, and Mr. Simmons said that was an ordinary contractor's figure, as he remembered it, for concrete work of that character in Milwaukee. The exceptional advantages made possible by the company's arrangements resulted practically in the saving of $1.40 per cubic yard in the concrete cost. The cost was reduced by the fact that the company transported its material by utility equipment instead of by wagon.

CONTINGENCIES IN TRACK CONSTRUCTION

Testifying regarding the statement of Prof. M. E. Cooley as to the contingencies which were met in track construction, the witness said that he had had a great many experiences of the character mentioned; many in the city, but more on the outside lines. In citing difficulties met in the city, the witness stated that at one time, where the track was all ready for installation, an old brick sewer that had been built many years before by the city underneath the street gave way and all the underfilling was washed out and through the sewer about the time the concrete work was begun. The company then had to tear out what it had put in, fill up again, tamp it all down, and the city had to repair the sewer; then the company went ahead. The expense due to this contingency would have been impossible to foresee. In another instance, where the roadbed had been prepared for the construction of track, a roller was used to crush down the surface, and it developed that there was a layer of silt just below the ground, which had to be taken out. It had apparently been an old creek bottom, and many yards of cinders had to be hauled for filling before the surface was ready for the installation of the track. Sewers had broken down a number of times in different places. In a great many cases it was found that pipes were laid closer to the surface than the plans or drawings in the city engineer's office would show. It had also been found necessary at times to ask the gas company to remove its pipes or to change the location of a manhole and the city had often had to change the location of manholes.

On the interurban lines there had been two or three sinkholes and two or three minor contingencies of the same character. In one of the instances mentioned over 60,000 yd. of filling had been placed in a hole 600 ft. long.

In the lower district of the city near the Milwaukee River there was a continual settlement of pavement, tracks and foundation as the ground was very soft. Every now and then this settlement took place to such a degree that the company had to open up the tracks in the pavement and raise them again because they had got into a rut.

DEVELOPMENT OF TRACK AND TRACK CONSTRUCTION

Mr. Simmons then discussed the development of track and track construction within recent years as follows:

City construction, track. When the first electrically operated street cars were installed in Milwaukee it was thought practical to operate on a considerable amount of track which had been laid with the flat strap rail on wooden stringers which had been used originally for horse-car service. When new track was installed for electrical operation at that time a 5-in. 58-lb. tram girder rail was used. After about three or four years and at the time that the present management assumed control of the property, a little over 11 years ago, the inadequacy of these weights of rail had become apparent. Partly on account of lack of experience it was impossible to arrive at accurate conclusions as to just what materials would give the required service, but another reason was that electrical equipment for the propulsion of these cars developed so rapidly and increased so much in weight within this very short period that a change to a heavier type of rail was found necessary. A Shanghai T-rail 6 in. in height and weighing 60 lb. to the yard was proposed, and this was very shortly supplanted by Shanghai T-rail 7 in. in height and weighing 70 lb. to the yard.

Increasing weights and traffic soon showed these sections to be undesirable, and a Shanghai rail 6 in. in height and weighing 72 lb. to the yard was adopted as standard. For five or six years this section appeared to be adequate, but the weight of electrical equipment, the size of the cars and the number of people carried thereon increased so rapidly that about four years ago it was found necessary to adopt a still heavier section of rail and the company designed and had rolled for its use a Shanghai T-rail 7 in. in height and actually weighing approximately 97 lb. to the yard. This section is the present standard.

Originally the track, even in the paved street, was constructed on a gravel or cinder ballast, but it soon became evident that this style of construction was not equal to the loads imposed on it, and after the present management assumed control of the company it was decided to construct all of the tracks in permanent pavements upon a 6-in. bed of cement, and this style of construction is standard at the present time.

The joints used originally were fish-plates or angle-bars, the latter being a considerable improvement over the former. Both of these, however, have been superseded by the cast-welded joint, which also was made necessary on account of the increasing traffic imposed on these lines.

The cost of installing the pavement in connection with the tracks has been increased on account of the necessity for extremely careful and thorough work, required by increased loads and increased traffic.

Interurban construction, right of way. When the construction of interurban lines was first considered the use of public highways for their installation was deemed to be proper practice. The present management of the company, however, soon decided that the installation as interurban railways on private right of way was the proper method to be pursued, and some of the first lines of this character built by the company were placed on rights of way 30 ft. to 50 ft. in width. There was no law in the State of Wisconsin at that time permitting the condemnation of these rights of way and it was a difficult matter to secure them of any width. The need for wider rights of way very soon became apparent and a law was soon passed by the Legislature which permitted the condemnation of rights of way up to 75 ft. in width, where this might be shown as necessary. It was not long before it was found necessary in order to obtain high speed on modern interurban lines that the same rights be granted for this purpose as were granted to the steam roads; and the law was amended so that the interurban acquired very nearly the same rights as the steam roads. Rights of way are now purchased almost invariably up to the full width of 100 ft. and in many places where deep cuts or high fills are necessary in order to es tablish proper grades, rights of way much wider than 100 ft. are secured.

Interurban Track. When the first interurban lines were constructed by this company, some 10 years or more ago, a 56-lb. T-rail 4½ in. in height was considered adequate. After a few years' operation, however, the increasing weight of equipment made it necessary to adopt a heavier rail and the 75-lb. A. S. C. E. section was adopted. Some two years ago it was found necessary still further to increase the weight of the interurban rail and an 80-lb. A. S. C. E. T-rail was adopted and is standard at the present time.

The development of the art, which 10 years ago permitted the construction of wooden culverts, cattle passes, bridges, etc., along interurban electric railways, has been such that it is now considered absolutely necessary to employ concrete, stone or other forms of permanent construction, and,

of course, a much higher rate for original investment than for the types previously used.

REPLACEMENT OF RAIL

Under cross-examination by Mr. Manson, the witness, speaking of the headwear of the rail, stated that sometimes where the design of the head of the rail had called for a very thick head it might not be possible to wear it down to 25 per cent, but in other cases where the original head was not so thick it would be possible to wear it down, if the girder quality of the rail was sufficient, to even less than that. The wear of the rail was affected by the character of the soil. In the district where work was being carried on at present the character of the sub-soil was very wet and spongy and nearly the entire rail would be replaced. All replacements of that rail were charged to depreciation.

When a rail wore out in part it was cut and a new piece at least 12 ft. to 15 ft. long was inserted. If the rail had to be replaced because of a flaw, the expense of replacement was charged to maintenance, but the general replacement of rail in a piece of track that had gone down so that it was not in condition for operation was charged to depreciation. The most common experience was to replace rail in from one to three blocks practically in toto. A little piece here and there of a length or two might be all right, but the majority in most instances would have to be replaced. Ties were not always replaced with the rail. Ordinarily the ties in Milwaukee had had a little longer life than the rail. Very often on account of the bad condition of the rail the concrete foundation had become shattered and it was necessary to excavate a portion of it and renew it.

The replacement of rails during the connection of Mr. Simmons with the company had been charged to depreciation reserve; the expense of cast-welding the joints had been charged to depreciation reserve except on new lines constructed or in a few cases where an individual joint had worn out and might be charged to maintenance.

About 50 per cent of the track in the city was on a concrete foundation, the ballast was on crushed stone ballast and in some cases on cinders and gravel.

Mr. Manson asked about the expense of building a mile of track on a stone ballast foundation with 5-in. 58-lb. rail compared with the expense of building a mile of track with 7-in. 97-lb. Shanghai rail on concrete foundation.

The witness stated that there would be the difference in the price of concrete for one item and the essential difference would be in the 61 tons of steel representing the difference in the weight of rail necessary. There would be a little difference in the case of handling the lighter materials as compared with the other, making a minor increase in the expense of labor. A fish-plate joint on an average rail would not cost more than 60 to 75 cents. The angle-bar joint would cost in some cases as high as $1.50 or $1.75. In one case the cost had reached $1.87. The cast-welded joint cost the company anywhere from $3 to $3.50.

In making his estimate of $15,900 for the cost of a mile of new track on a concrete foundation with 97-lb. 7-in. rails, Mr. Simmons figured the cost of rails at $40 per ton. This estimate was based on the price at which rail was figured during 1908.

It cost more to maintain way over which cars were operated at high speed than where the speeds were lower, not only on account of the greater grinding and wearing effect on the rail while braking, but because the car was more liable to spread the gage than where it was operated more slowly. The cost of maintenance also increased with the weight of the cars.

INCREASED SPEED AND WEIGHT

Commissioner Halford Erickson asked whether increased speed or weight of cars was more damaging to track. The witness replied that both increased the foot-pounds in the blows given by the car and it was almost impossible to separate the two effects. Mr. Manson asked what the difference would be with a 20-ton car if (1) the weight of which was increased 50 per cent, or (2) if the weight was kept the same but the speed was increased 25 per cent. The witness thought that in the cases cited the 30-ton car would be the more destructive, but that if the speed had been increased 50 per cent instead of 25 per cent, the more speedy car would do more damage.

Taking up the direct examination again, Mr. Mack asked if it was not a fact that the cost of welding joints, as stated by Mr. Simmons, was less than the ordinary market cost. The witness thought the cost in the market at the present time would be even more than $1 above the cost which the company paid; he did not believe he could get any one to contract to weld the joints for less than $4.50 at the present time. The rail on the city street was very much larger than on the interurban lines on account of the frequent stops in the city. If a motorman using full current in the city had to slow up, even if he did not actually stop the car, it was in effect a stop so far as the track was concerned.

Mr. Curtis asked how the standard of track construction in Milwaukee compared with the best standard track construction in other cities. The witness stated that the track construction in Milwaukee was as good as that in any city of the country where the use of T-rails in city streets was permitted. The interurban track construction was practically up to the best interurban electric railway track construction.

ADDITIONAL TESTIMONY OF EDWIN W. OLDS

The examination of Edwin W. Olds, superintendent of rolling stock, by Mr. Mack, of counsel for the company, was continued on March 29. Mr. Olds, presenting a list of corrections of the inventories of rolling stock and equipment made by Mr. Gore, accountant for the city, stated that the Gore inventory was nearly correct and that he thought the errors had been caused by mistakes in copying and misunderstanding the inventory. The following statement on this subject was presented by Mr. Olds:

CHANGES IN INVENTORY

Our first inventory was Jan. 1, 1898. At the time I took hold of the department, Dec. 15, 1896, there were 192 closed cars. Between that time and Jan. 1, 1898, there were scrapped or sold 43 of the old type of cars, there being shown on the Gore inventory, built prior to 1896, 125 single-truck cars and two double-truck closed cars. A number of these 43 cars were sold for children's playhouses and cottages, and used at different places, some of them at Waukesha Beach. A few were sold to small railroads and continued in use as street cars. About 20 or 25 were scrapped.

The average value of single-truck cars in 1898, as shown on the inventory, was about $650 each. This inventory being taken Jan. 1, all of the closed cars were equipped with motors, which makes their value more than the single-truck open cars. It must be remembered that at this time the motors and trucks were changed from open cars to closed cars in the fall and back to open cars in the spring, so that the value of closed cars would be, as previously stated, more in winter than in summer.

In 1906 you will note that but 42 single-truck closed cars were still owned by the company. My judgment is that about 40 of the cars disposed of were scrapped, the balance, as previously stated, sold at prices ranging from $50 to about $300 for bodies alone, with trucks from $175 to about

$400, with electrical equipment complete from $350 to $1,000. The cars sold for about $1,000 were of the better class and more modern motors, average prices being about $500 complete with trucks and motors.

Single-truck open cars, as shown by Gore inventory, 1898, 130, this number being reduced to 80 in 1906. But few of the open cars were scrapped, most of them being sold to small roads at prices varying from $100 to $300 for bodies alone, with trucks $175 to about $400, with electrical equipment complete from $350 to about $600. A few which had been rebuilt with more modern motors were sold at a better figure, or about $1,000 each. I cannot give the original cost of the single-truck closed and open cars at the time they were purchased. Judging, however, from values at that time, their cost would average for bodies and trucks about $1,200 each, with electrical equipment from $2,000 to $4,000 each. None of the old single-truck closed cars or open cars had been in regular service for five or six years, and were not used at all for about four years.

All of the single-truck closed cars in use at the time I took hold of the department, Dec. 15, 1896, had been rebuilt by the company putting on larger platforms and vestibules or windbreaks, as required by city ordinances, at a cost of from $200 to $300 per car. Changes had also been made in all of the motors, rewinding the fields and a large number of armatures, putting on new controllers, costing from $300 to $500 per car.

There are shown on the Gore inventory, in addition to those purchased from car builders, car purchased from the Milwaukee, Racine & Kenosha Company, Belle City Company, of Racine; Waukesha Beach Company, Waukesha; Wauwatosa Company and Whitefish Bay Company. Some of these cars were overhauled and rebuilt, equipped with motors and put into city service for a few years, but have been out of service for the last four or five years. At the present time some are being used by the way department for transporting track laborers and as bunk cars, but are of little value. The values as shown on Gore inventory of these cars were made up from our best judgment, after they had been rebuilt and overhauled, so that they could be used by the company, at a cost of from $100 to $1,000 each. Seven of the double-truck cars purchased from the Milwaukee, Racine & Kenosha Company were sold to small roads, some being sold with motors, some without.

The first value for each car as shown on Gore inventory of all cars purchased from 1897 to 1906 is the purchase price from the car builders, electrical equipment builders, and, added thereto, this company's cost for installing the electrical equipment, fenders and other miscellaneous parts, including superintendence while the cars and equipment were under construction at the manufacturer's. Subsequent valuations are reduced for depreciation, but with allowance for improvements and any reconstruction.

Cars purchased from 1896 to 1898, inclusive, were constructed without closed vestibules—that is, were without doors at the platform steps and in front of the motorman, the sash being constructed so that it could be removed in summer. These cars were all changed, there being constructed stationary vestibules with doors over each step, as is our standard practice. The cost for this work was about $400 per car.

The cars purchased in the years 1897 and 1898 were equipped with two motors, which was not found satisfactory. Two additional motors were installed with new controllers, wiring and other electrical appliances, also making necessary changes in trucks, changing them to four-motor standard equipment. The cost of these changes was about $2,000 each.

The cost of those purchased from 1899 to 1906, inclusive, as shown on Gore inventory and previously explained is practically correct, being made up same as with the previous equipments purchased, from the price paid the several manufacturers and the cost to this company of installing motors, fenders and other appliances, including superintendence.

Following the presentation of this statement by Mr. Olds, the cross-examination was begun by Mr. Manson.

TESTS TO SHOW CURRENT CONSUMPTION

Mr. Olds mentioned tests that had been made by the company to show the energy required to propel different weights and sizes of cars. It varied practically in proportion to the weight of the car. The tests were made under the joint supervision of Mr. Olds and Otto M. Rau, chief electrician. The wear on a car equipment and life of a car are affected by the condition of the road, number of stops and other factors which cause strain on the car structure and equipment. Mr. Olds said that, as a rule, a car body would last about 12 years; it could be kept in service for a longer period, but excessive maintenance would then be required. In his estimates of the proper rate of depreciation on car bodies he had assumed that cars should be maintained and kept in service only so long as it was economical to do so.

ADDITIONAL TESTIMONY OF OTTO M. RAU

On March 29 Otto M. Rau, chief electrician, on cross-examination, amplified his previous testimony that the annual allowance on poles and fittings due to age and wear should be 5 per cent, based on an estimated life of 20 years. Mr. Rau said that in making this calculation the entire equipment of poles was considered. He testified that probably 70 per cent of the poles in Milwaukee are of iron, the rest are of wood. Most of the wood poles are of cedar; 60 per cent of the iron poles are lattice, the rest tubular. A wood pole will last from 12 to 15 years and will cost from $8 to $15, depending on the length. An iron pole lasts about 25 years and costs about $25. The cost for setting either is $5 to $6, including the foundation, as both iron and wood are set in concrete. The first of the iron poles were installed about 1890, Mr. Rau believed, and had been found to be too light. Originally lattice poles were used. The company is now setting heavier tubular poles, and any present replacement would be with such poles.

Since Mr. Rau's connection with the property, which was from the conversion from horse to electric power, the company had used for trolley wire No. 4 wire, No. 0 wire and No. 000 wire. The latter would be replaced by No. 0000 as soon as heavier equipment was placed on the system.

PRICE OF SCRAP COPPER

The price of scrap copper depended upon the scarcity of ingot copper. There was a time when ingot copper was as high as 20 cents a pound, and then practically the same price could be secured for scrap. Now that copper was down in price it was not possible to dispose of scrap at all; nobody cared to buy it. The points of greatest wear of a trolley wire are at its points of support. When its area at such places has been reduced 25 per cent, it is necessary to take the wire down, even if between supports it is almost unworn. The life of trolley wire varies almost directly with the number of cars using it. There are curves in Milwaukee where the wire has lasted less than a year; in others the wire has lasted five years.

Mr. Manson asked whether, in making the estimate of an allowance of 20 per cent annually for depreciation due to age and wear of copper wire, Mr. Rau had taken the scrap value into consideration. Mr. Rau stated that this value was not considered because the cost of taking the old wire down usually consumed the amount realized from the scrap.

It would cost approximately $25 for labor to take down the wire on an intersecting curve, that is, a curve with a cross over. To take down a wire on an intersection of this nature would require two line crews of six men. The cost of taking down 1000 ft. of straight line wire might be figured at about $6.

UNDERGROUND SYSTEM

The underground feeder system in Milwaukee is laid with clay ducts, which are subject to very little wear, but settling of the soil sometimes affects the alignment of the ducts, admits water, and thereby causes some deterioration. The cost of laying tile duct in concrete is from 20 to 40 cents a foot, depending upon the paving of the street and the condition of the soil. Most of the conduit is from 3 to 4 ft. below the surface of the street, but where other street mains had been encountered it had been necessary sometimes to go as far down as 20 ft. The cost of laying the conduit, exclusive of the cost of excavating, would depend on the cost of the conduit; the company had paid as high as 8 cents a foot and as low as 4 cents a foot for the tile duct. With two ducts the cost of the concrete had run as high as 12 cents per foot of duct. When a six-duct or ten-duct conduit was laid, the cost for the concrete would run as low as 4 or 5 cents per foot of duct. Six inches on the bottom, 3 in. on each side and 3 in. on the top was required. The ducts were about 4½ in. square outside.

The drainage work was figured at 10 cents a linear foot for a trench 3 ft. deep and about 1 ft. wide. That included all the excavating and filling, but not the paving. Mr. Rau estimated the life of a lead cable at from 18 to 20 years ordinarily. Age disintegrated the lead coverings of the cables so that they deteriorated and ceased to be waterproof. The company limited the number of wires in the cables to 60 wires. The cables had been bought for 80 cents and for as high as $1.30 per foot, depending upon the price of copper. No duct contained more than one cable.

The scrap in cables was of very little value on account of the expense of cutting it out. First, the lead had to be taken off and then the insulation, and by the time the copper was reached very little was left. It was assumed that any scrap removed was offset by the cost of removing.

Mr. Manson asked whether the life of a cable was 20 years, and 5 per cent was estimated per annum for depreciation due to age and wear, no allowance being made for scrap. Mr. Rau said that this was so, and that no allowance had been made for removing the material. The company had sold scrap cable and had received for it about one-half the scrap value of scrap copper. It ought to cost about 4 to 5 cents a foot to remove a cable from the duct, depending on the condition.

CURRENT TRANSMISSION AND CONSUMPTION

The witness said that the amount of energy required increased rapidly with the speed of the cars. For double the speed three or four times as much energy would be used in the operation of the cars. Differences in live load were almost negligible in their effect on the total energy consumption, except that when more people were taken on a car more frequent stops were required, and energy was again required to accelerate the car. Under maximum load at the power house the company assumed a loss of 10 per cent in transmission.

The cost of charges in the overhead system was brought up by Mr. Manson. Mr. Rau stated that the replacement of any considerable extent of trolley wire was charged to depreciation reserve. When the wire broke and only a span was replaced the cost was charged to operating expense.

Mr. Curtis, examining Mr. Rau, stated that the attention of the witness had been called to certain matters by counsel for the city, as tending perhaps to affect the question of depreciation. He asked whether Mr. Rau desired to modify in any respect his statement regarding depreciation of property in his department. The witness did not desire to make any modification; the percentages as given originally were considered very carefully and based on his own experience.

Mr. Mack, taking up the examination of Mr. Rau, referred to the abandonment of the a.c.-d.c. system, and asked whether one of the reasons for the abandonment was the large current consumption required. Mr. Rau said that the current consumption was not excessive. It was not practicable to keep any record of the amount of current used on the different lines.

ELECTRIC CARS FOR SOUTHERN MANCHURIA

The peaceful trolley car already has found a place in Southern Manchuria, which but a few years ago was the scene of the Russo-Japanese war. Thirty hansome cars of the type shown in the accompanying illustration are to be used there on the lines of the South Manchurian Railway, and they are now on the way from the United Electric Car Company, Ltd., of Preston, Lancaster, England.

The cars are 27 ft. 6 in. over the corner posts, 34 ft. 8 in. over the platforms and 35 ft. 8 in. over all. The width over the body is 7 ft. 8 in. and over the roof 8 ft. The clear height inside the car is 8 ft. 7 in. and from the rail to the roof 12 ft. The car seats 32 passengers. A striking feature is the division into first and second-class compartments by an inside platform 4 ft. wide. Special



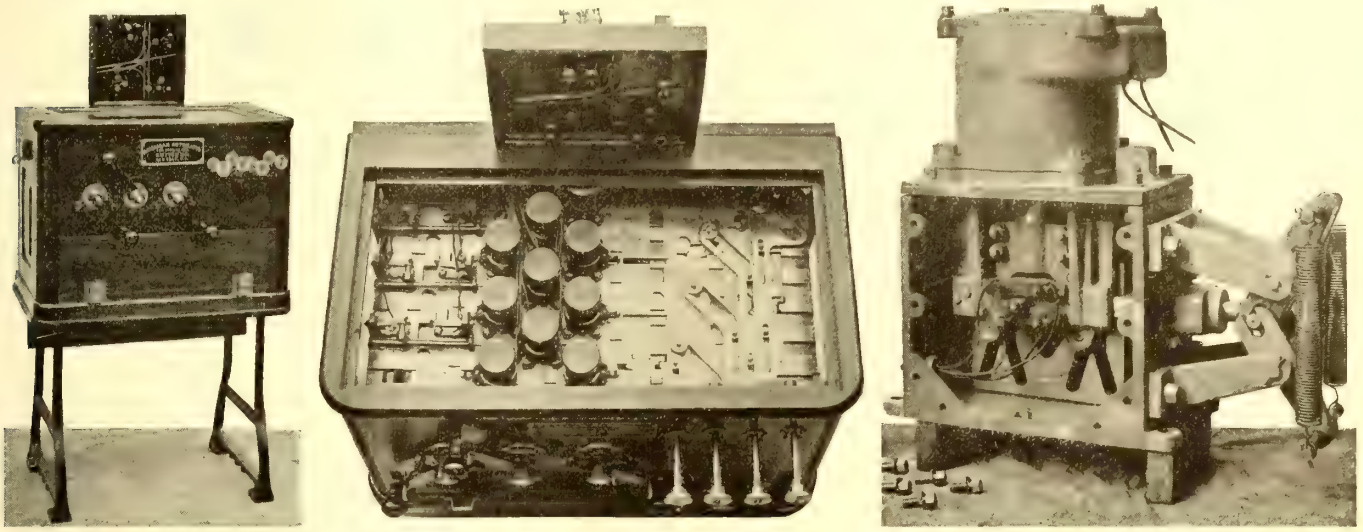
Central-Entrance Car for Southern Manchuria

side sills were required, as the steps to this platform were not to project outside the car body. In addition to the central entrance, the car is provided with end doors, which, like the others, are of the double sliding type. The inside finish throughout is of oak and North Carolina pine, with the roof boards exposed. The first-class compartment is furnished with reversible cross-seats upholstered in green mohair velvet, and the second-class compartment with longitudinal slat seats. Instead of placing ventilators in the clerestory, individual louvers are used over each window. The side sash are arranged to drop into pockets. The trucks were supplied by Mountain & Gibson, of Bury, England, and the electrical equipments by the Allgemeine Electricitäts Gesellschaft, Berlin, Germany.

The first electric car was run on the tramway lines of Rangoon, Burma, on Dec. 15, 1906, and the electrification of the system was completed in March, 1907. Many new sections have since been opened. The total number of passengers carried in the year ended Dec. 31, 1907, was 6,026,915, as against 3,433,540 in the preceding year. The car-mileage was 973,187, and receipts $189,000, as compared with 328,180 car-mileage and $90,000 receipts during 1906.

IMPORTANT AUTOMATIC SWITCHING INSTALLATIONS IN WASHINGTON, D. C.

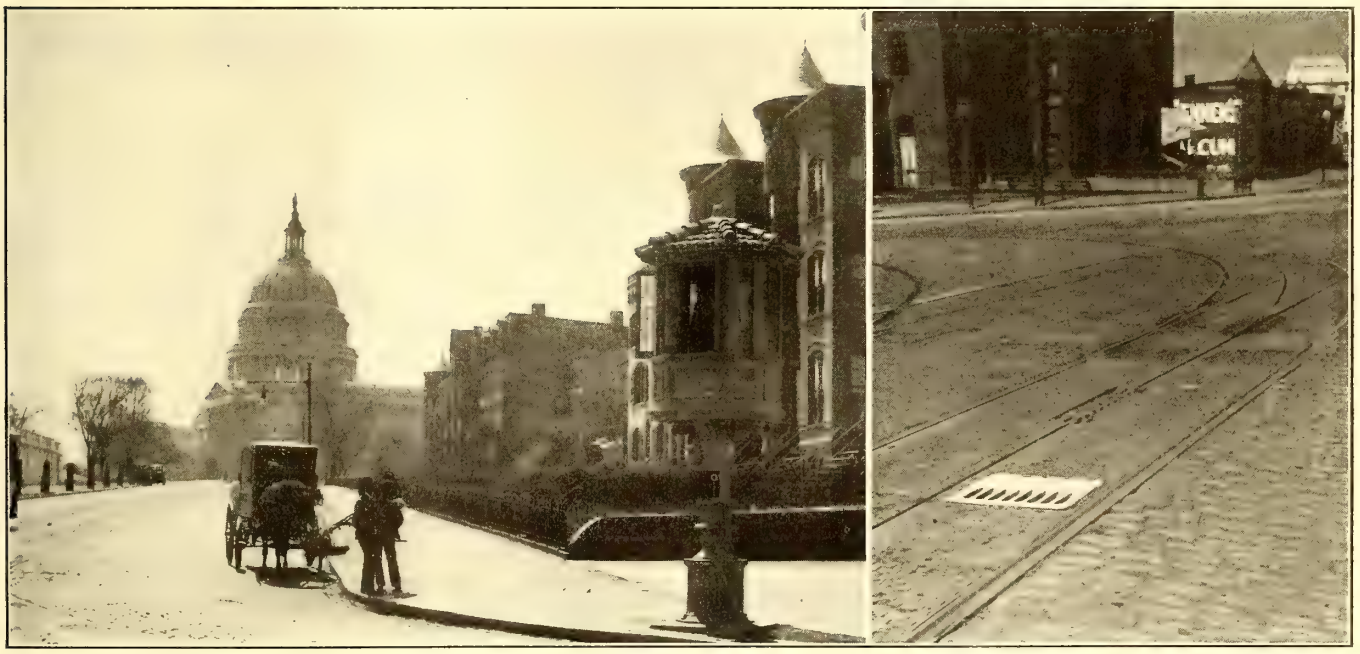
Because of the erection of the new union railroad station in Washington, D. C., the two electric railways of that city constructed during 1908 about 2 miles of tangent and curved track on the station plaza and approaches. This work was carried out by a board of construction composed of D. S. Carll and J. H. Hanna, respectively general manager and chief engineer of the Capital Traction Company; H. W. Fuller and C. S. Kimball, respectively general manager and engineer maintenance of way, Washington Railway & Electric Company, and William B. Upton, engineer of the board, but not otherwise connected with either company.



Washington Electric Switching System—Exterior and Interior Views of Tower Control Cabinet and Switch-Throwing Mechanism

It was realized that the problems of switching cars properly would be a serious one, inasmuch as the new lines led to the greatest traffic center of the city. At first, car movement was controlled by two shifts of three switchmen and one flagman, but after a few months of operation by hand switching, it was decided to install a comprehensive electro-mechanical interlocked switch and signal system built by the American Automatic Switch Company, of New York, and devised by Roy V. Collins, chief engineer of that company. The new system was placed in service during the extraordinary traffic succeeding the Presidential inauguration in March, and has been in continuous operation ever since, without mishaps of any kind.

Experience with this automatic method of car control brought out clearly several advantages over hand switching. In the first place, the only visible features of the installation are the five switching towers, which are decided ornaments to their surroundings. These towers take the place of the less ornamental shelters for switchmen and avoid the necessity of having flagmen standing in the roadways, where they cannot help being a hindrance to traffic. From engineering and financial considerations, however, the greatest advantages of this electric switch-

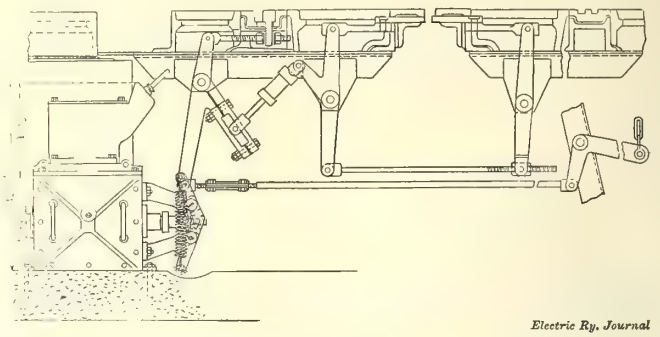


Washington Electric Switching System—View of a Switching Tower and Grating over the Protected Signal Lamps Under the Tracks

ing plan are quicker car movement, greater reliability through interlocking and saving in operating cost. Quicker car movement is permissible through an arrangement which permits the towerman to send two, three or four cars to the crossing at once, merely by touching some buttons, whereas a flagman would have to wave each car separately. Greater reliability is attained by an interlock, which prevents the towerman from making a mistake, while a flagman is liable to signal forward several cars to a point where they may collide, or else the motorman may err in reading the flag signals. As to the saving in operating cost, it has been found that one man can now carry out the movements formerly entrusted to four men.

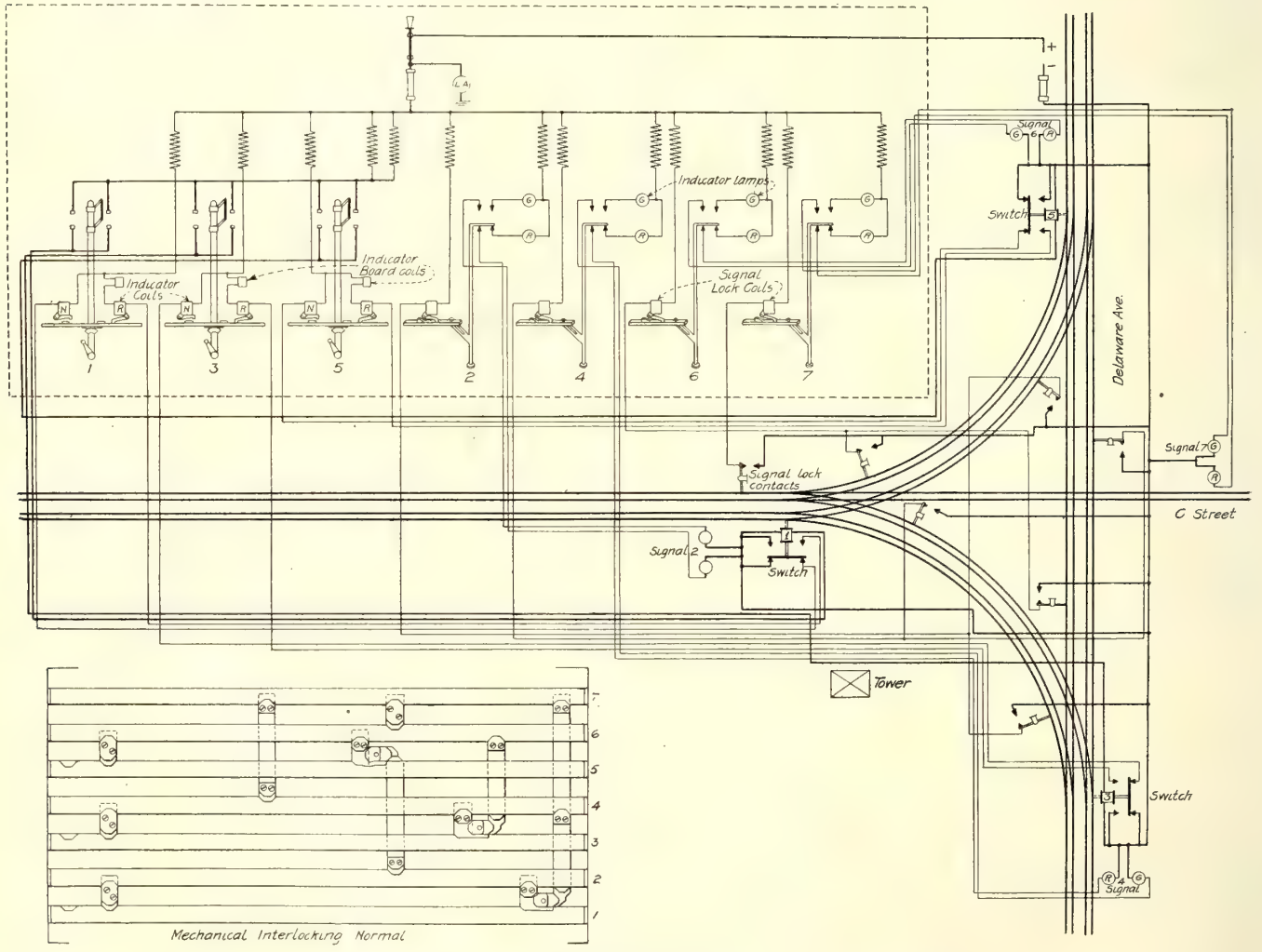
LOCATION AND CHARACTER OF SWITCHING TOWERS

The electric switches are controlled from five towers located as follows: Delaware Avenue and C Street; Union Station Plaza, West; Union Station Plaza, East; North Capitol Avenue and Massachusetts Avenue; First Street and B Street, N. E. The positions of these towers and under-track apparatus are shown on the track layout on page 737. The towers are octagonal in shape, with a maximum inside measurement of 4 ft., and are handsomely finished in bronzed copper to harmonize with the architecture of the union railroad station. They are carried on inconspicuous ornamental iron columns set on a granite base with anchor bolts embedded in concrete. The columns are hollow and contain the wiring conduits between the controlling and switching mechanisms. The towers are



Electric Ry. Journal

Washington Electric Switching System—Connections to a Track Switch



LOCKING SHEET.

Normal position of switches is *when the switch is set to send car to right.*
Reverse position of switches is *when the switch is set to send car to left.*

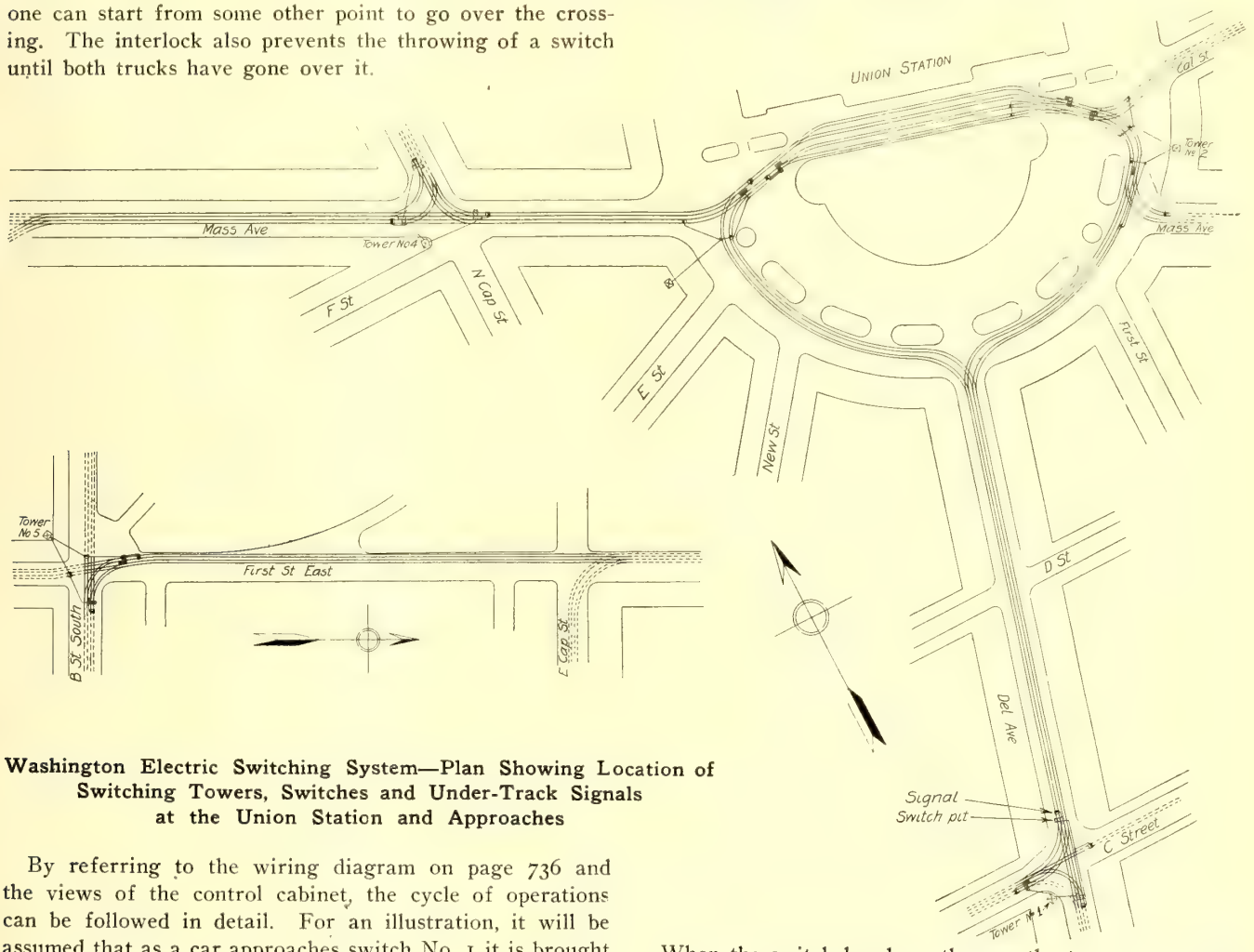
When No. 1 is thrown No. 2 is locked at normal.
When No. 3 is thrown No. 4 is locked at normal.
When No. 5 is thrown No. 6 is locked at normal.
When No. 2 is at clear No. 1 is locked at normal.
When No. 4 is at clear No. 3 is locked at normal.
When No. 6 is at clear No. 5 is locked at normal.
When No. 1 is at normal No. 2 locks up No. 6 if No. 5 is reverse.
When No. 1 is at reverse No. 2 locks up No. 4, No. 7 (and No. 6 if No. 5 is reverse).
When No. 3 is at normal No. 4 locks up No. 7 (and No. 2 if No. 1 is reverse).
When No. 3 is at reverse No. 4 locks up No. 7, No. 6 (and No. 2 if No. 1 is reverse).
When No. 5 is at normal No. 6 locks up No. 7 (and No. 4 if No. 3 is reverse).
When No. 5 is at reverse No. 6 locks up No. 7, No. 2 (and No. 4 if No. 3 is reverse).
When No. 7 is given No. 4 and No. 6 are locked (and No. 2 if No. 1 is reverse).

Washington Electric Switching System—Typical Track Layout at Delaware Avenue and C Street, with Wiring and Locking Sheet Therefor

reached by concealed steps in the columns and a trap door. These structures are about 8 ft. above the curb, so that the towerman can watch the tracks freely without obstructing the views of pedestrians. As the several installations differ only in a few details, the following description of the apparatus at Delaware Avenue and C Street will suffice to explain this method of switching and signalling.

OPERATION OF APPARATUS

The switches and signals are controlled from the tower cabinet, which is supplied with a miniature track and signal layout for the towerman's general guidance. The handles of the cabinet are electro-mechanically interlocked to prevent the sending of cars into a crossing where they could collide, the arrangement being such that one car must be entirely past a given point before the second one can start from some other point to go over the crossing. The interlock also prevents the throwing of a switch until both trucks have gone over it.



Washington Electric Switching System—Plan Showing Location of Switching Towers, Switches and Under-Track Signals at the Union Station and Approaches

By referring to the wiring diagram on page 736 and the views of the control cabinet, the cycle of operations can be followed in detail. For an illustration, it will be assumed that as a car approaches switch No. 1 it is brought under control and stops at the motorman's sub-track signal No. 2, marked *G* and *R*. This signal consists of one red and one green electric light placed in a waterproof, glass-covered case under a slotted handhole, through which the motorman can see the lamps. The normal indication is red or "stop."

If the switch lies against the car, the towerman starts to rotate that cabinet lever which controls the switch-throwing mechanism. The contact thus made completes a circuit to the solenoid actuating the switch. When the stroke is a little over half completed, the lever is arrested by the latch of one of the two return indication magnets. This latch is lifted after the track switch has completed the movement, when the control lever can be sent to the end of the stroke. This feature prevents the towerman giving a signal for the car to proceed into a switch which has not completed its throw.

The circuit to the solenoid which throws the track switch is controlled by a magnetic blow-out, quick-break switch mounted in the cabinet. This switch has two contacts on each side, and when either pair is bridged by a pivoted conductor between, the circuit to the solenoid is completed. When the cam attached to the shaft rotated by the switch control handle has made about one-quarter of its stroke, it engages the top of the pivoted conductor and forces it to bridge one pair of the contacts. The cam engagement ceases at three-quarters of the stroke, when the pivot contact is pulled back by springs to its normal vertical position. The movement of the handle in the opposite direction simply causes the pivot conductor to make and break with the other pair of contacts.

When the switch has been thrown, the towerman presses the lever controlling the No. 2 signal. This lever will move inward, provided it is not locked through the towerman having given a conflicting route to another car. At the start of the stroke the circuit to the red light is broken, and at the end of the stroke the circuit to the green or "proceed" light is made. When the stroke is completed a latch drops and locks the signal lever in the reverse or "clear" position. This signal lever is worked against a compression spring which forces the lever to its normal position when the signal lever latch is lifted. As the car passes out of the crossing, its plow actuates a signal lock contact, which completes a circuit through the signal lock coil. The latter coil lifts the latch on the signal control lever, allowing the lever to return to its normal position.

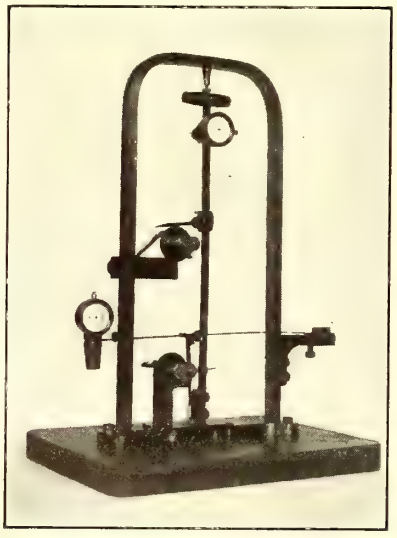
The manner of attaching the actuating mechanism to

the track switch is shown in one of the illustrations. This device is operated by a solenoid, and by means of a reversing cam plate movement is given to the switch, first in one direction and then in the other.

The mechanical interlocking makes it impossible to give the motorman the "clear" signal until the switch is in a safe position, and does not permit the switch lever to be thrown until the car is over the crossing and the signal lever is restored to normal. The several interlocking combinations are shown on the diagram. The interlocking required here is different from regular steam railway practice in that one green light is given for the car to proceed, whether the switch lies to the right or to the left, while in steam practice one signal is given to proceed to the right and another to the left. This requires different interlocking when the switch sets one way than when it sets the opposite way, and is accomplished by the swinging latch shown on levers Nos. 1, 3 and 5, which carry out the additional locking when the levers are reversed.

INSTRUMENT FOR TESTING TRACK

The Pennsylvania Railroad Company and various subsidiary companies will this year award nearly $11,000 in prizes to employees for excellence in track maintenance. Of this sum $5,400 will go to supervisors and their assistants on the main line between New York and Washington, and Philadelphia and Pittsburgh. The purpose in offering these premiums is to encourage those in charge of the tracks over which the bulk of the company's passenger trains run to keep their sections as free as possible from low joints and other irregularities. To test the track, a committee of maintenance of way officers goes over the line every few weeks during the year in a car attached to one of the regular high-speed trains. Two glasses of water are placed on the sills of two rear windows, and every spill of water is counted against the score of the section of track over which the train is passing. An instrument has also been specially designed to register every vibration of the car, either vertically or horizontally. This instrument, which is placed on the floor of the car, has two stems of flexible steel, with a weight on the end of each, so that they vibrate, one vertically and the other horizontally. The movements of the stems are recorded by pedometers, giving the number of vibrations, while cyclometers record the entire distance covered by the vibrations for the trip. Thus a severe vibration gives a greater cyclometer record than a slight irregularity. When the record made by this instrument is averaged with the number of pedometer readings and "spills" of water, and some allowance made for relative speeds, a fairly accurate estimate is had of the riding qualities of the various sections of track. Upon the records so obtained the prizes are awarded.



Instrument for Recording Rough Track

CALIFORNIA 1200-VOLT D. C. LINE

In a paper read on Feb. 26 before the San Francisco section of the American Institute of Electrical Engineers, S. B. McLenegan, general manager of the Central California Traction Company, presented a description of the 1200-volt d.c. system used by that company between Stockton and Lodi. This road is now 15.5 miles long, but several extensions are planned. The standard car equipment consists of four 1200-volt GE-205 motors rated at 75 hp each. They are geared 23:51 for passenger service to make a maximum speed of 50 m.p.h. and 16:58 for freight cars. An empty passenger car with this electrical equipment weighs about 35 tons. For 2 miles from the center of Stockton the cars are operated on 550 volts at a maximum speed of 22 m.p.h. On the right of way current is collected at 1200 volts from a third-rail. The latter differs from the conductor rails on other California lines, as it is of the New York Central type except that a 40-lb. section of 400,000 circ. mil capacity is used instead of a bullhead conductor. This rail is suspended every 12 ft. from malleable-iron brackets spiked to 10-ft. ties. Mr. McLenegan stated that he did not consider the present wooden covering sufficiently durable to withstand the alternate wet and dry seasons of California, although there has been no trouble thus far. He recommended for future protection an impregnated covering of ordinary rough lumber cut in 3-in. and 6-in. widths in lengths to suit the distance between insulators.

The substation is equipped with motor-generators which have been fitted with fibrous barriers between the brush-holders.

Probably the most distinctive feature of the 1200-volt car equipment is the dynamotor, the armature of which carries a commutator on each end of the shaft. The motor or 1200-volt end takes current direct from the third-rail and the other generates and delivers 600 volts for the operation of the auxiliary equipment. The armature coils for the 1200-volt end are on top while those connected with the 600-volt end are on the bottom of the same slot. The dynamotor has a rated capacity of 10 kw and the current generated operates the motor-control circuit, lights, air compressor and heaters. The dynamotor contactor box adjoining contains one 600-volt and one 1200-volt contactor, which control admission of current to the dynamotor or the reverse, according to the section of the line in which the car is operating and the voltage employed. When the car passes from the 550-volt to the 1200-volt section there is a short stretch of dead trolley, in passing under which the 550-volt contactor drops out automatically. When the third-rail shoe makes contact with the electric rail the 1200-volt contactor closes, causing the dynamotor to start and thereby furnish current for the auxiliary circuits. When the conditions are reversed and the car passes from 1200-volt to 550-volt circuits the 1200-volt contactor opens automatically and the dynamotor ceases to operate as the auxiliaries then take current direct from the trolley. In this case, however, the motorman closes the 550-volt contactor by means of an electrically operated switch in the cab before the trolley current is available. Both contactors cannot be closed at the same time so long as they are in operating condition. In passing from either trolley to third-rail, or vice versa, the motorman also throws an electrically operated transfer switch. This device admits current from either the trolley or third-rail and cuts off the one not in use. Both of these movements are made while the car is under full speed. The usual form of the Type M control is used. All wiring

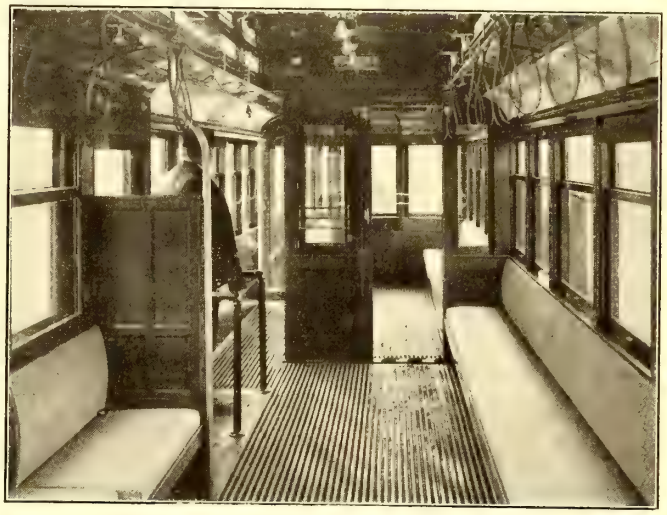
is in loricated conduit. The motor leads are encased in brass wire armor, but the author considered it doubtful whether this is advisable as shorts may be caused by their chafing through the insulation. Good rubber hose is preferable for this purpose and in the speaker's experience it has given the best results.

The installation so far had proved very satisfactory. Mr. McLenegan did not consider 1200-volt motors adapted or necessary for ordinary street railway transportation, but they were desirable for interurban roads 25 miles or upward in length. The constructed portion of the Central California Traction Company is hardly of sufficient length to indicate the motor's efficiency, but with the extensions planned there is every reason to believe that the results will amply justify the continued use of the 1200-volt equipment. The company was given an excellent opportunity to make tests of the comparative efficiency of GE-73 railway motors temporarily supplied to operate at 550 volts and the GE-205 at 1200 volts, both motors having the same rated capacity. A temporary substation was also equipped on the site of the future 1200-volt station. This combination supplied identical conditions except that the generators of the Stockton substation operated in parallel with the interurban plant, which gave 550-volt operation every advantage. Under these conditions the power consumption per car-mile for a period of six months averaged 5.23 kw-hours. With 1200-volt operation during the following six months the power consumption per car-mile fell to an average of 4.74 kw-hours, a saving of 9.1 per cent despite the fact that the 1200-volt generators were not working at the most efficient point. During fully one-third of the time the machines were without load and during the remainder the load was hardly one-half the rated capacity of the machine. The power consumption was measured on the a.c. side of the motor-generators, so the foregoing figures include not only generator, third-rail and track losses, but the power consumed at the car. It required about 150 amp at 1200 volts to start and accelerate a given car, gradually dropping back to 70 amp at full speed.

An important factor in the use of 1200 volts lies in the elimination of substations on lines of considerable length. The cost of operating a substation, exclusive of interest and fixed charges, is about $300 per month, and when once established this expense becomes practically a fixed charge. If, therefore, one substation operating at 1200 volts can be made to perform the same work ordinarily requiring two 550-volt or 600-volt stations and at the same time effect a saving of from 10 per cent to 20 per cent in power, it will best show the value of this new system. The summer heat, which varied from 90 deg. to 105 deg. Fahr. for weeks, was a hard test for this new equipment, yet after a daily run of 200 miles or more every day in the week the temperature of armatures and fields rarely exceeded 150 deg. Fahr. According to this the insulation should last almost indefinitely. During the winter it was necessary at times to operate in places where tracks were covered with water to a depth of 5 in. or 6 in. While ordinary prudence was observed under these conditions, no special precautions were taken other than to provide against wheel wash and to run slowly. Under both extremes of heat and cold the 1200-volt equipment gave less car failure than the speaker had ever experienced during his connection with electric railway work. Not a field armature or other electrical part was lost by a burn-out or any other cause.

PREPAYMENT CAR OF CORRIDOR TYPE TRIED IN PITTSBURG

On April 8 the Pittsburg Railway Company placed in service a new form of prepayment car, invented by Charles B. Price, Pittsburg, Pa., and built for him by the Niles



Pittsburg Corridor Prepayment Car—Conductor at Exit Facing the Entrance Aisle

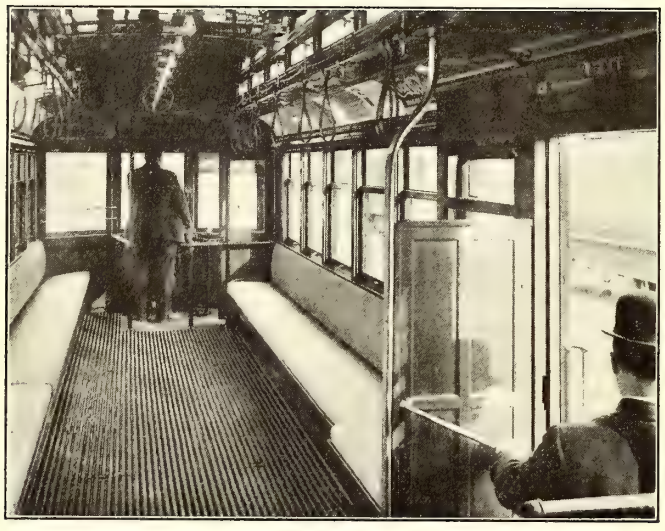
Car & Manufacturing Company, Niles, Ohio. As shown in the accompanying views and plan, the unusual features of this car body for city service are the elimination of platforms, the presence of a side corridor through which passengers must go before paying fare and entering either compartment, and the central exit under the immediate control of the conductor.

The car is for single-end operation. It is 43 ft. long



Pittsburg Corridor Prepayment Car—Entering at the Rear and Leaving at the Center

over all, 8 ft. 1 in. wide and has a monitor deck and steam coach hoods. The interior finish is of cherry, and the longitudinal rattan benches seat 50 passengers. The weight of the car body alone is 16,280 lb., which is asserted to be 15 per cent to 20 per cent less than long-platform cars of similar length and smaller seating capacity. The trucks were furnished by the St. Louis Car Company, and, like a

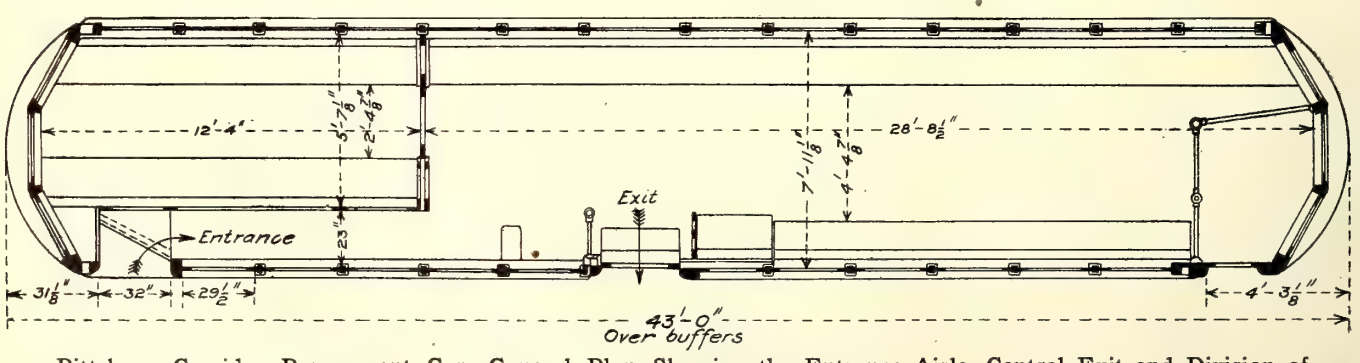


Pittsburg Corridor Prepayment Car—Illustrating the Positions of the Motorman and a Departing Passenger

number of other cars used in Pittsburg, are supplied with connecting rods.

Since the car has no platforms or vestibules, the motorman stands inside, but a protective railing saves him from jostling by passengers. The regular exit is at the center of the car, so that the motorman is obliged to watch the 20-in. exit door at his end only when the conductor opens it in emergencies.

Persons boarding the car enter at a 32-in. opening in the rear, and then proceed along a 12-ft. x 23-in. corridor between the side of the car and the partition of the smoking compartment. As they reach the end of the aisle they pay their fare to the conductor stationed near the exit, and then proceed into either compartment. The regular exit door is of the pneumatic sliding type and is 32 in. wide. It is believed by the designers of this car that the central door will aid the unloading materially, because passengers will not have to push their way through the entire length of the car. Aside from its novel features as a prepayment car, the closed ends of this design have greatly simplified the problems of heating and ventilation.



Pittsburg Corridor Prepayment Car—General Plan, Showing the Entrance Aisle, Central Exit and Division of the Body Without Platforms

A gasoline weed burner is being operated on the suburban right of way of the Los Angeles-Pacific Company.

THE 600-VOLT LIGHTING SYSTEM WITH GROUNDED CIRCUITS USED BY THE BROOKLYN RAPID TRANSIT COMPANY

Particular interest is attached to the 600-volt series lighting practice of the Brooklyn Rapid Transit Company inasmuch as standard lighting apparatus is designed for straight 110-volt or three-wire, 220-volt systems, while at the same time this company has exercised great care in eliminating fire risks from electric circuits in its shops, car houses and offices. All of the contracts made for such lighting demand that the work shall be done according to the regulations of the New York Board of Fire Underwriters and the New York Department of Water Supply, Gas & Electricity. The following typical details were embodied in the wiring specifications for the line and track department headquarters of the Brooklyn Rapid Transit Company.

CONDUITS

In general all work is of 600-volt series railway lighting and is run in conduits; all wires are Okonite or equal thereto. The conduits are of iron or steel material known as "Galvaduct" or an equally good brand approved by the engineer of the company. The inner surfaces of the conduit are smooth and free from blisters, burrs or other imperfections. The conduits are of ample size to permit wires to be withdrawn and reinserted whenever desired. No conduit smaller than ½ in. diameter is employed and ¾ in. diameter is specified if it is laid in concrete.

The conduit is perfectly water-tight and put up without fish wires or leads of any kind for pulling in wire. All joints are made with whitelead and the ends of the conduit must butt together squarely and not leave openings between the ends. The ends are reamed carefully before the joint is made. Unconcealed conduit is painted to match the prevailing color of the room. Fire-alarm, telephone and call-bell circuits are run in the regular lighting conduit.

PANEL AND OUTLET BOXES

Conduits are brought into the boxes as near to the back as possible, ending just inside of the wooden box. From these points the wires are encased in flexible tubing to the terminals on the board. All conduits must be fastened to the panel and outlet boxes with nuts on both sides and each end of conduit is fitted with an insulated bushing.

The panel box is made of 1½-in. polished slate in a hardwood box with 3-in. gutter space in all sizes, a common back of hardwood and lined with ½-in. slate. The gutter is lined with sheet iron, covered with black paint and cut for the outlets. All woodwork is fireproof and v[illegible]ished

on all sides with an insulating and fireproofing paint. These boxes are provided with a door casing having a wrought-iron door. The casing covers the entire space between the panel board and the outer box and is secured by substantial brass screws. The door is fitted with brass hinges and latch, lock and key. The part of the casing coming over the gutters is lined with sheet iron and thoroughly covered with black paint.

The panel board of these boxes is of 1½-in. polished slate, on which are mounted single-pole, quick-break, 600-volt knife switches, each provided with either a "D & W" or "Noark" enclosed fuse. The panels are constructed with a positive bus across the top of the board of sufficient length to permit the placing of the switches in line with the fuses in a single row below the bus. The bus and the bottom fuse posts are provided with copper lugs of the proper size to receive the several circuits.

All connections are made on the front of the board and all posts are of ample size to carry their current without heating. The busbars and posts are fastened to the marble slab with pins so as not to be displaced by screwing on or off of fuses or lugs. Each branch circuit is controlled by a single-pole knife switch with a fuse on the "outside" of switch. The fuses are fastened with thumb screws, slotted to receive a screw driver. The panel boards are fastened to the box with round-headed copper screws to match the other metal work, all of which is finished and lacquered.

The negative connections are made in the gutter and are soldered to the single conductor returning to the main panel board. The positive wire from the main panel board is fastened to the positive bus with a lug. The switches controlling centers of distribution are covered by iron-clad boxes with covers and latches approved by the engineer.

The outlet boxes are pressed or cast iron mounted flush with the wall inside of buildings.

FIXTURES AND RECEPTACLES

The five, four, three and two-light clusters are of the "Benjamin" wireless type with brass shells and porcelain enameled steel reflectors with marine finish. The ceiling lights and clusters are suspended by conduit with a canopy and at the proper height above the floor. The five-light side clusters are mounted so that the reflectors are at an angle of 45 deg. with the horizontal. Where desirable vapor-proof clusters of the type shown on page 1492 of the Dec. 5, 1908, issue are used. The single-light receptacles are of the keyless approved type and where used in the wall have the necessary wall plate to cover holes in the wall. The wall plate matches the other fixtures in finish and appearance. The single-light receptacles are approved receptacles with 8-in. porcelain enamel steel reflectors.

MAIN PANEL BOARD

The main panel board for power and lighting is of 2-in. polished slate with ½-in. beveled edges mounted on angle irons, carefully insulated from ground, securely fastened and firmly braced at the top of the adjacent wall and placed 3 ft. from the wall. The panels carry the following apparatus and switches: On the main panel: One circuit-breaker of the Westinghouse type "C" design; single-pole, quick-break, double-throw, 600-volt switches with lugs for the cable; "D & W" or "Noark" enclosed fuses; 500-volt to 600-volt Thomson recording voltmeter, back connected. On the distributing panel: Quick-break, single-pole, single-throw switches with fuses of the "D & W" or "Noark" enclosed 600-volt design.

At the front and at the top of the distributing panel board there are mounted two bracket lights with green glass shades and holders. On the wall back of the board 6 ft. from the floor there is installed a light which together with the two on the board is connected in circuit with the hydrant lights.

The negative bus is run at the bottom of the board and all the return wires connected there by soldered lugs of ample capacity to carry the current. All connections are made on the back of the board. The positive busbars extend across the board on the back at the top lugs of switches.

The main panel has two positive supplies coming in separate conduits and porcelain tubes from the single-pole, double-throw switch. The negative wire is run in conduit from the board to the outside and down the wall to the usual rail return. The negative bars in the distributing panel are protected by a transite covering.

MOTOR PANELS

The motor panel boards are made of 2-in. polished slate mounted on angle iron insulated from the steelwork and ground, and so placed as to give free access behind. Upon each of these boards are a quick-break, single-pole, single-throw, 600-volt knife switch and an automatic circuit-breaker of Westinghouse type "A" design. The starting boxes are mounted on the panels and the whole apparatus connected ready for service, including starting boxes, controllers, etc. The negative wires are run back to the main panel board and connected to the negative bus. The wiring is not grounded to the structure at any point.

CALGARY TRAMWAYS

Work on the tramway system at Calgary, Alta., Can., is being pushed rapidly forward. It will consist of 12 miles of track, of which about 5 miles will be double track. Lorain sections, 80 lb. and 60 lb., are being used. The bonding will be the Ohio Brass Company all-wire, solid terminal bonds except that on a short stretch of track soldered bonds will be used. Steel poles will be employed on the main street, cedar poles for the rest of the system. The feeders are of aluminum.

Power will be supplied from the municipal plant which is now being extended to meet the requirements of the system, and will consist of one Robb-Armstrong high-speed, 750-hp engine connected to a 500-kw Allis-Chalmers-Bullock generator. To ensure a continuous service a 300-kw Allis-Chalmers-Bullock synchronous motor is also being installed as well as 1000 hp of Babcock & Wilcox water-tube boilers fitted with superheaters and the induced-draft system. Twelve semi-convertible pay-as-you-enter cars are now on order with the Pay-as-You-Enter Car Corporation, and it is expected that four more will be required in the near future and a car house is now being erected for 16 cars.

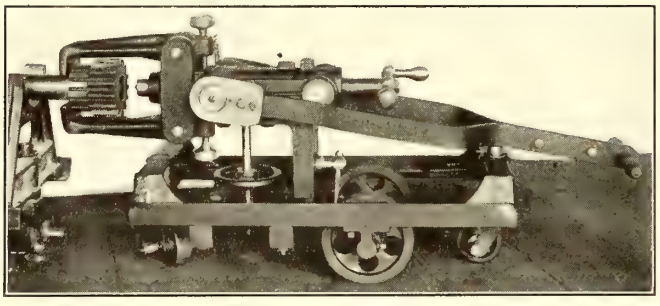
The city of Calgary is managed by a paid commission of three, the Mayor of which is chairman. The commissioners will also have control of the street-railway as well as the electric-lighting and water-works systems, etc. It is estimated that the tramway system will represent an investment of $450,000. Thomas McCauley, of Port Arthur, Ont., will be the superintendent of the street railway.

The mountain railway of Wildbad, Germany, is a cable road, the cable being driven by a 60-hp motor. Energy is supplied from the lighting system of the city, but in order to equalize sudden changes of load a storage battery is provided.

AN IMPROVED PORTABLE PINION PULLER

The American General Engineering Company, New York, specialist in railway shop tools, is now manufacturing the Austin-Hunter rapid pinion puller. This device is particularly commended because its adjustment is simple and it can be easily transported from place to place and operated by a boy. It is designed to pull pinions of the most stubborn character without the use of a sledge hammer for a starter or by other antiquated methods, thus saving the pinion and the bearing. The pinion-pulling mechanism is mounted on an A.G.E. truck, and can be lowered or raised by a vertical screw and hand wheel. The ram of the puller is adjusted by slightly loosening the vise-handle screw, then the centers are found and the screw is tightened. The center in the end of the ram acts simply as a finder, for when the strain comes it disappears, leaving the pressure to be taken up by a spring.

The jaws are adjusted by hand screws until they touch the shaft behind the pinion. Power is then applied by a lever fastened to right and left eccentrics working on machine-steel trunnions fastened in the body. The lever first is raised to a vertical position and the ram is screwed up until it jams on the shaft. The lever is then pulled down, causing a movement of 3/32 in. The lever is again raised



Portable Pinion Puller

to the vertical and the feeds again jammed on the shaft, then the lever is pulled down so that the feed screw can be operated individually. Therefore, the most stubborn pinion can be loosened and pulled off by two movements of the lever and feed, which should require no more than 10 seconds. The handle of the power lever operates from either end to move the puller from place to place. The strains are taken up by parts made of cast steel or of malleable iron.

The machine only requires the support necessary to carry its own weight, and does not need a specially strong place on the shop floor for operating the puller.

In a recent test a piece of ½-in. solid fiber was punctured by this pinion puller. The pressure required to puncture this fiber was 40 tons, whereas it requires 5 tons to remove an average keyed pinion. It would take a pull of 6 tons to shear a ⅜-in. steel pin fastened in the shaft and pinion. This, coupled with the required pull on the pinion, would allow the pinion to be pulled off the shaft and the pin to be sheared at an approximate pressure of 11 tons. This test showed that the pinion puller has a capacity of about four times that required to remove a standard keyed pinion from the shaft.

The Town Council of Dundee, Scotland, has reported favorably on the project to build an experimental trackless trolley system along the esplanade, at an estimated cost of $25,000.

A NEW FORM OF REDEEMABLE CASH FARE RECEIPTS

A number of electric railway companies in New England have recently adopted an ingenious system of redeemable cash fare receipts, patents on which have been granted the Edwin A. Denham Company, New York. The railway companies have nothing to do with the redemption of the receipts, this being arranged for through local merchants who give cash refunds on cash purchases of $1 or more. In general, the refund is equivalent to the amount of carfare paid. An additional feature of the scheme is the award of cash prizes monthly by the Denham Company to collectors of the fare receipts.

The basic principles of the redeemable-fare receipt system are illustrated by the reproduction of the 5-cent fare receipt in use on the Norwich & Westerly Railway, a 24-mile interurban line in eastern Connecticut. This road is divided into seven 5-cent fare zones. Passengers boarding cars at intermediate stations pay



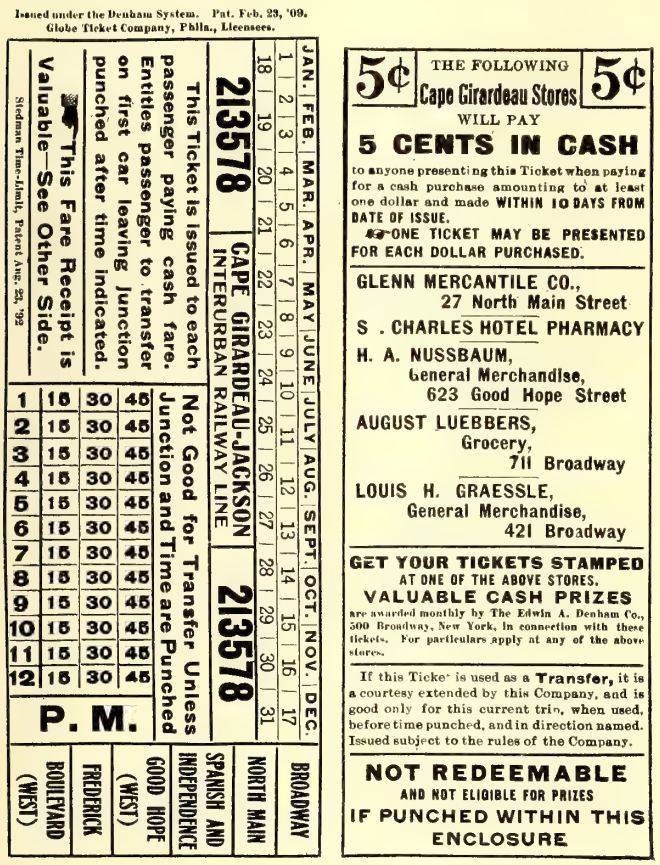
Front and Back of Redeemable Cash Fare Receipt Used by Norwich & Westerly Railway

fare through to destination upon entering the car, receiving in exchange the proper number of 5-cent fare receipts, each consisting of a transportation coupon with a redemption certificate attached.

One coupon is collected and rung up at each fare limit, the passenger retaining the redemption certificates. Each of these 5-cent redemption certificates entitles the holder to a cash refund of 5 cents on a purchase of $1 made within 10 days of date of issue at any one of the 26 stores in Norwich or Westerly listed on the back of the certificates. The passenger does not surrender the redemption certificate when redeeming it at a store, but presents it for refund and cancellation, retaining the certificate to send to the Denham Company or its local agent at the end of the month.

in competition for cash prizes, which amount to $75 each month in the case of this particular road. The prize contests involve no lottery feature. The prizes are awarded to the persons sending in the largest number of redemption certificates. All redemption certificates sent in, whether cancelled or uncancelled, are counted in awarding these cash prizes.

Another form of redemption certificate issued by the Norwich & Westerly Railway is a 35-cent certificate attached to a through strip ticket, consisting of a certificate and seven 5-cent fare coupons, which is given to passengers on payment of the through fare of 35 cents. These 35-cent certificates are good for 30 days instead of 10 days, and may be used at one store after another during that period, or until seven 5-cent refunds have been obtained thereon. Other interurban roads which are using the same or similar forms of fare receipts are the Ashaway & Westerly, the Hartford & Springfield and the Pawcatuck Valley. The prize contests are conducted along the same lines as for the Norwich & Westerly Railway.



Front and Back of Combined Cash Fare Receipt and Transfer Used by Cape Girardeau-Jackson Interurban Railway

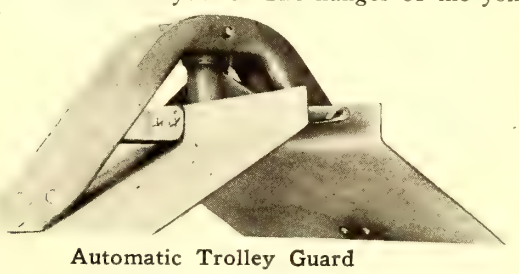
The Hartford & Springfield Street Railway Company issues the form of 5-cent fare receipt described and also a 20-cent ticket which enables passengers to obtain a refund of the total amount of the carfare paid in going to and from Hartford, although the company's cars operate for part of the distance into Hartford over the lines of another company, which collects two fares and which does not issue redeemable fare receipts. This is an indication of the elasticity of the system, which, it is claimed, can be adapted to meet almost any condition of the average street railway company.

All fare receipts issued to conductors by the companies which are using the system are charged against the conductors at face value, the conductors being allowed to turn back only fare receipts which are still attached to the original pads. Conductors' trip reports must show the number of fare receipts issued, the number of transportation coupons taken up and the number of passengers rung up on the register, and these three totals must correspond exactly with each other and with the amount of cash turned in.

Another way in which the system can be used on city lines charging a single 5-cent fare and issuing transfers is shown in the accompanying reproduction of the fare receipt used by the Cape Girardeau-Jackson Interurban Railway, which operates as yet exclusively within the town limits of Cape Girardeau, Mo. The redemption plan and prize features are the same on this road as in the case of the New England companies referred to, but it will be noted that one purpose of the ticket shown is to decrease transfer traffic. Each passenger paying cash fare receives one of these fare receipts, which is not good as a transfer unless one of the intersecting lines is punched. It will be seen that the fare receipt is thereby rendered "Not redeemable and not eligible for prizes," as indicated by the punch mark on the reverse side. This provision is also counted upon to influence passengers to refrain from asking for transfer privileges for other than their own personal use. These redeemable fare receipts are not issued to passengers who present tickets which are sold six for 25 cents in payment of fare. This particular form of fare receipt has, therefore, a fourfold purpose—stimulation of traffic, substitution of cash for ticket traffic, decreasing transfer traffic, and checking up of conductors.

AN IMPROVED TROLLEY GUARD FOR STEAM RAILROAD CROSSINGS

A number of improvements have recently been made in the construction of the automatic trolley guard manufactured by the Automatic Trolley Guard Company, Buffalo, N. Y. As formerly made the guard consisted of two plates of aluminum-coated steel riveted to angular yokes of T-section. The trolley wire was supported by special clamps bolted to the apex of the T-iron hangers or yokes. In the new design the yokes are made of channel section, as shown in the accompanying engraving, and this permits the wire to be carried by any standard car which can be bolted to the web of the yokes. The flanges of the yokes



Automatic Trolley Guard

are punched at three points to attach them to the messenger cable and to the guy wires on each side. Part of the web on each leg of the yokes is cut out and bent down to form a brace, to which the bent-up top edges of the guiding plates are riveted. The construction of the guard is such that if the wheel jumps the wire it makes contact instantaneously with the guide plates and is forced back to a central position, where it will again run on the wire. The guard is made in sections 8 ft. long and can be erected easily either over straight track or on curves.

News of Electric Railways

Cleveland Traction Situation

Creditors of the Municipal Traction Company have been paid $556,618, Judge Tayler of the United States District Court having signed the order to that effect on April 10. By so doing the receivers were not required to list this amount for taxes, which would have entailed an additional expense of about $20,000. The amount ordered paid from the money in the receivers' hands is about half the total debt of the company. It includes 50 per cent of the face value of the claims reported by the master commissioner as operating expenses (total, $301,546), or $150,773; the promissory notes of the Cleveland Railway Company, endorsed by the Municipal Traction Company, $182,000; accounts incurred by the Cleveland Electric Railway prior to April 27, 1908, assumed by the Municipal Traction Company, $33,844; an amount to the Cleveland Railway Company sufficient to pay the accrued interest on the floating debt of about $1,000,000, or $40,000, and to the Cleveland Railway on account, $150,000.

Among the claims in the accounts payable, Municipal Traction Company, for maintenance and operating expenses, approved by H. J. Davies, H. J. Crawford and W. B. Stewart, and those added by the special master, are the following:

C. L. Ayers Coal Company	$15,340	
Barrett Manufacturing Company	6,917	Lien.
Bassett-Presley Company	1,741	Lien.
Cuyahoga Telephone Company	1,393	
Cameron Electric Manufacturing Company	1,367	
Cleveland Frog & Crossing Company	12,926	Lien.
Climax Refining Company	3,411	Lien.
Columbia Machine Works & Malleable Iron Company	2,347	
Consumers' Rubber Company	2,973	Lien
Electric Railway Improvement Company	1,954	Lien.
Electric Storage Battery Company	4,986	
Glidden Varnish Company	1,308	
Goldschmidt Thermit Company	2,669	
Kelley Island Lime & Transport Company	5,226	
Lorain Steel Company	8,837	
Monongahela Consolidated Coal & Coke Company	22,271	Lien.
Macbeth Iron Company	4,047	Lien.
National Car Wheel Company	2,605	
W. M. Pattison Supply Company	3,869	
Pittsburgh Plate Glass Company	3,339	Lien.
Rochester Printing Company	5,075	
John A. Roebling's Sons Company	4,054	Lien.
Standard Underground Cable Company	6,726	Lien.
Van Dorn & Dutton Company	7,240	
George Worthington Company	9,213	Lien.
Youghiogheny & Ohio Coal Company	6,284	

In the list allowed by the special master for purchases made subsequent to April 27, 1908, as maintenance and operating claims, but objected to by the Cleveland Railway, the following among others are noted, only the larger being mentioned:

Cleveland Bronze & Brass Works	$3,955	Lien.
Cleveland Savings & Trust Company	4,000	
Cuyahoga Lumber Company	5,367	Lien.
Ingersoll-Rand Company	2,518	
Lorain Steel Company	46,072	
Martin-Barris Company	4,787	Lien.
Ohio Brass Company	5,200	

Following are some of those classified under the head of general claims:

Burrell Advertising Company, stock exchange advertising	$1,502
Clark & Winthrop, attorneys	5,407
Crawford & Soper, inspecting automobile	125
J. H. Donahey, cartoon	17
Garfield, Howe & Westenhaver, attorneys	3,500
The Hofbrau Haus, lunches for directors	731
Lorain Steel Company, rolls	4,500
Westenhaver, Boyd, Rudolph & Brooks, attorneys	9,059

Among the claims dated April 27, 1908, and prior, owed by Cleveland Electric Railway, the following are the largest:

Cleveland Frog & Crossing Company	$3,961
M. B. & H. H. Johnson, attorneys	9,295
Youghiogheny & Ohio Coal Company	7,695

Claims dated April 27, 1908, and prior, owed by Municipal Traction Company, are in part as follows:

Garfield, Howe & Westenhaver	$5,000
Cleveland Trust Company, registrar	2,000
United Banking & Trust Company	5,100

Claims against the Forest City Railway Company, dated April 27, 1908, and prior, are all small and the aggregate amount is in the same proportion.

Claims in dispute and held for further consideration are as follows:

Citizens Savings & Trust Company	$700
City of Cleveland	7,061
City of Cleveland, water department	21,547
Clifton Park Association	6,158
Underwood Typewriter Company	74

Notes of the Cleveland Railway payable to the Municipal Traction Company, indorsed and delivered to creditors, follow:

Allis-Chalmers Company		$3,000
Charges to: Cleveland Electric Railway Company.		
Barrett Manufacturing Company		$11,000
Charges to:		
Maintenance and operation	$2,905	
Cleveland Electric Railway	1,770	
Construction and betterment	175	
Neutral Street Railway	6,150	
Electric Storage Battery Company		$33,000
Charges to:		
Maintenance and operation	$32,243	
Cleveland Electric Railway	500	
Forest City Railway and Municipal Traction Company	257	
G. C. Kuhlman Car Company		$17,000
Charges to:		
Maintenance and operation	$2,126	
Pay-as-you-enter cars	14,874	
Lorain Steel Company		$50,000
Charges to: Neutral Street Railway.		
National Car Wheel Company		$6,000
Charges to:		
Cleveland Electric Railway	$4,398	
Forest City Railway and Municipal Traction Company	1,602	
Ohio Brass Company		$6,000
Charges to: Construction and betterments.		
John A. Roebling's Sons Company		$5,000
Charges to: Maintenance and operation.		
Standard Underground Cable Company		$15,000
Charges to:		
Neutral Street Railway Company	$3,141	
Forest City Railway and Municipal Traction Company	11,859	
Youghiogheny & Ohio Coal Company		$36,000
Charges to: Maintenance and operation.		

Exceptions to the classification of their claims have been made by a number of creditors, who assert that they should have been placed in the preferred list. The largest of these claims are those of attorneys who were employed by the Municipal Traction Company. Westenhaver, Boyd, Rudolph & Brooks, Garfield, Howe & Westenhaver, W. H. Boyd and Clark & Lathrop state that their services were rendered in the ordinary operation of a street railway system and that their claims should be on the preferred list for that reason. P. C. O'Brien, who has a small balance for food stuffs furnished for the directors' lunches, has put in a claim for preference on the same basis. Several days were spent in arguing this matter before the special master. The Hofbrau Haus, which has a claim for the lunches served, has not yet filed exceptions, although it is more heavily interested than Mr. O'Brien. The Burrell Advertising Company, which placed the advertising for the free stock exchange; St. Vincent's Charity Hospital, James Newkirk, stenographer, and Dr. Joseph E. Cook have also filed exceptions to their classification.

The report of operation of the Municipal Traction Company for March follows:

Gross earnings from operation	$505,297
Operating expenses	309,029
Net earnings from operation	$196,268
Miscellaneous income	2,873
Gross income, less operating expenses	$199,142
Taxes	24,103
Income, less operating expenses and taxes	$175,039
Interest	39,517
Other deductions	936
Net income	$134,586
Cleveland Railway rental	73,378
Surplus	$61,208

The assets on April 1 were $978,093, while the liabilities totaled $1,026,160, leaving a deficit of $48,067. The accrued rental due the Cleveland Railway amounts to $337,539. The receivers have on deposit, $800,289; in hands of the cashier, $7,500, and undeposited cash runs, $21,462, making total cash, $829,251.

The receivers have been discussing the summer schedules. Regarding the fare to Euclid Beach, it has been decided to charge 5 cents. It is also probable that both the St. Clair Street and Euclid Avenue routes will be used. The Municipal Traction Company changed all the cars from Euclid Avenue to St. Clair Street last summer to the inconvenience of people east of 105th Street, as two transfers were necessary in some cases. From some portions of the city the fare was almost double the former rate. If the receivers carry out their present intentions, the fare over the line will be uniform.

The Council committee of the whole voted on April 5 that the initial fare under the proposed new franchise shall be 3 cents, with 1 cent for transfer, and that the maximum shall be seven tickets for 25 cents without charge for transfers, the cash fare to be 5 cents. The Council will control

routing and schedules rather than submit questions of dispute to arbitration. These things, together with the idea of re-valuing the property for the purposes of another franchise caused Horace E. Andrews, president of the Cleveland Railway Company, to state that a settlement could never be reached under such terms; that it would be impossible to finance improvements under the conditions the Council intended to impose and that all the work that had been done toward a settlement was rendered useless by the Council's stand in this matter.

At the meeting of the Council committee, on April 12, an endeavor was made to arrive at a basis for a new contract with the interurban railroads for an entrance to the city over the tracks of the Cleveland Railway. The time was taken up in discussing different phases of the matter. T. H. Hogsett and S. H. Ginn, attorneys, and J. T. Ross, chief engineer, represented the Lake Shore Electric Railway. Mr. Hogsett, asked by Mayor Johnson if he was opposed to fixing a per car mile cost of operation higher than that of the city cars, replied that he would be willing to guarantee a fair return. The Mayor said that he felt that the cost of operating interurban cars over city tracks is about 50 per cent higher than that of city cars. Regarding the damage to track in wear and tear, Mr. Ross said that much would depend upon the weight of rails, type of construction, frequency of stops and other features, as well as the character of special work used. The pavements, he said, should be built so that the wheels would not strike them. Maintenance and depreciation charges of interurban cars are about 3½ cents per car mile, Mr. Ross said, while the charges for city cars are 2½ cents. The interest on the investment of the Cleveland Electric Railway is about 5 cents per car-mile, it was stated.

The Mayor stated that Horace E. Andrews, president of the Cleveland Railway Company, estimated the cost of operation of interurban cars at 30 cents per car mile and of local cars at 17 cents. He stated that he was willing to concede 16½ cents for the local cars as a basis of negotiations. Mr. Hogsett stated that the Lake Shore Electric Railway would be willing to pay 18 cents per car mile, including interest. Regarding interest, Mr. Ross said that this should be proportioned by the car mile, if the operation of the interurban cars adds anything to the investment or interest charges of the local company. Otherwise he thought that no interest charge should be made. The Mayor said that practically all of the property of the city company is used by the interurban companies operating over city tracks. He made a suggestion that the interurbans pay 21 cents per car mile, exclusive of interest, which would make the charge 25½ cents. President Andrews stated that he believed that the wear on the tracks by the interurban cars is much greater than the proportion shown by the weight of the cars. He also said that the large cars used on some of the roads would require three times as much current as the city cars, and that the cost of operating them is 100 per cent more than for the latter. Mayor Johnson stated on this authority that he believed the cost to the interurban companies should be represented by adding 50 per cent to the cost of operating a city car a mile, including everything but interest, for which a separate charge should be made. Objections were made to this and the question is to be taken up later.

City Solicitor Baker presented a new draft of his ordinance on April 12. Among the provisions outlined in it is that the company shall have in service 450 pay-as-you-enter cars within five months after the passage of the ordinance, if the money for this improvement can be secured. The money used for securing the cars and 75 per cent of that used for reconstruction of old cars shall be added to the capital account. The new draft also gives the Council exclusive control of the schedules and routing. Arbitration is provided in case the company believes that any service required will not yield enough to pay the expense of operation and interest on the investment at the maximum fare provided. The street railway commissioner will be in reality a technical adviser to the City Council.

All differences between the city and the company, subject to arbitration, shall be submitted to three arbitrators, one chosen by the company, one by the city and one appointed by the judge of the United States District Court. Attorney John G. White objected to the term "board of arbitrators" used in the draft and to the idea of having such a board. He wants the men chosen to adjust disputes known simply as arbitrators.

The maximum rate of fare is fixed at 7 tickets for 25 cents, with 1 cent for transfer, to be refunded. The rate charged on interurban cars shall be 5 cents. The charges to interurban companies for operation are left blank, but the requirement that they shall make up any deficits shown in operation and turn over any surplus to the interest fund of the local company is retained.

In the new draft the wording regarding the assumption of the bonded indebtedness is somewhat more reasonable. The city is to assume and provide for the payment of the bonded indebtedness if the law at the time contains a provision allowing it to do so.

The new draft was submitted to both Judge Tayler and Attorney John G. White. Both made suggestions and criticisms and stated that it must not be understood that they approved it. They want to be at liberty to make such further suggestions and criticisms as they see fit or to object to anything that may hereafter seem to be undesirable.

Terms of the Grant to the Hudson & Manhattan Railroad

The Public Service Commission of the First District of New York made public on April 9 the form of the franchise for the extension of the Hudson & Manhattan Railroad from Thirty-fourth Street and Sixth Avenue, New York, to the Grand Central Station at Fourth Avenue and Forty-second Street, which will be suggested at the hearing on April 23. The franchise follows generally the terms of the present franchise to the Hudson & Manhattan Railroad, being of an indeterminate character, so that the city may purchase the property at the end of 25 years or thereafter. The payments to the city are substantially the same as for the franchise under which the company now operates in Sixth Avenue and to the Hudson River. The tentative draft suggests stations at Forty-second Street and Fifth Avenue and Thirty-eighth Street and Sixth Avenue. It stipulates that the payment to the city for each of the stations shall be $500 annually for each entrance or exit, from the date that trains are placed in operation. The other payments stipulated in the franchise are to be at the rate of 50 cents a year for each linear foot of track and station platforms after the beginning of operation for the first 10 years, and thereafter $1 a year for each foot of such tracks and platforms from the end of the first 10 years to the time of readjustment of the terms of the original grant to the company for its Sixth Avenue line.

In addition, the Hudson & Manhattan Railroad is to pay to the city $9,000 a year for 10 years for rights under streets, parks and public places. According to the estimate of the commission, this is 3 per cent of the anticipated gross earnings annually thereafter until the existing franchise becomes subject to readjustment, in 1933. As rental for vault space, not including station platforms and space otherwise specified, the company is to pay a sum equal to 4 per cent a year on the valuation of the horizontal area of such space, this value to be based upon the value per square foot of the neighboring land, exclusive of buildings, as fixed for taxation for 1909. For the first 10 years of the franchise one-fourth of this value is to be taken as the value of the vault space and thereafter one-half, until the date when the franchise comes up for readjustment. The company is to file a bond of $200,000 before beginning construction, and it must obtain the consent of the Board of Estimate and Apportionment within six months after the franchise is granted, and the consents of the owners of one-half the value of the property in the streets under which the tunnel passes within one year.

The report that the Hudson & Manhattan Railroad Company, which operates under the Hudson River between New York and New Jersey, would extend its line to Montclair and Orange is denied by William G. McAdoo, president of the company. Mr. McAdoo said: "Not only have we no plans for such an extension, but there is no probability that we will build such a line. My brother, M. R. McAdoo, is interested in the North Jersey Rapid Transit Company, which plans to construct an electric railway from Paterson to Suffolk in New Jersey, and perhaps that company has been confused with the Hudson & Manhattan Railroad. That is the only reason I can assign for the report."

Cambridge Subway Bids Opened.—The Boston Transit Commission has opened bids for the construction of the Boston section of the Cambridge subway. The bids were classified according to free air and compressed air construction. The free air bids ranged from $749,655 to $469,097 and the compressed air bids from $1,011,148 to $531,940. The lowest bidder in each case was Patrick McGovern, Boston, and he received the contract for Section 1 on his bid of $469,097.

Monorail System Approved.—The Public Service Commission of the First District of New York has approved the application to equip the City Island Railroad, New York, with the American monorail system. The City Island Railroad is owned by the Monoroad Construction

Company, New York. It is operated with horses now. If the proposed motive power should not prove successful, it is stipulated that the road shall be restored for operation with horses or that another railroad shall be installed. The line is 2 miles long.

Suit Resulting from Sale of New York Properties Settled.—The suit of the Metropolitan Securities Company against the estates of William C. Whitney and William L. Elkins and against Thomas F. Ryan, P. A. B. Widener and Thomas Dolan to recover $965,607, alleged to have been received by the defendants out of the purchase price paid to Anthony N. Brady for the securities of the Wall & Cortlandt Street Ferries Railway has been settled, the defendants sending a check for $692,292 to the Metropolitan Securities Company.

Request for Subway Commissioners.—The Public Service Commission of the First District of New York has applied to the Appellate Division of the Supreme Court for three orders for the appointment of commissioners to determine and report whether the proposed subways known as the Canal Street route, the Manhattan Bridge route, revised, and the Third Avenue route, ought to be constructed and operated. The appointment of commissioners is asked under the Rapid Transit Law in lieu of obtaining consents of property owners for the construction of the subways. Decision was reserved.

Indiana Railroad Commission Constitutional Body.—The Supreme Court of Indiana has decided that the law creating the Indiana Railroad Commission is a constitutional act, and that the Legislature has the power to delegate legislative and quasi-judicial functions to the commission. In this connection the court held that an order made by the commission fixing rates to be charged by a railroad within the jurisdiction of the commission must be attacked in the Circuit Court within 30 days, as provided in Section 6 of the Railroad Commission Law. The rates ordered become binding and conclusive if the action to review them is not begun within 30 days.

Referee on New York City's Debt Limit.—Benjamin F. Tracy, who was appointed referee by Justice Blanchard of the Supreme Court in the suit brought by Jefferson M. Levy, David Meyer and the Fleishman Realty & Construction Company, against the Mayor and the Board of Estimate and Apportionment of New York and the Public Service Commission of the First District of New York to ascertain the amount of the city's indebtedness on June 30, 1908, filed his report with the County Clerk on April 8. Mr. Tracy finds that the amount of the permanent indebtedness at that date was $517,884,346 and that the margin of the constitutional limit would exceed $106,205,715. This margin will permit the construction of the Lexington Avenue line, to cost $60,000,000; the Canal Street loop, to cost $7,000,000, and the Fourth Avenue subway, Brooklyn, to cost $16,000,000.

Fire in Interborough Shops.—A serious fire occurred between 9 p. m. and 10 p. m. on April 7 in the shops of the Interborough Rapid Transit Company at 129th Street and Third Avenue, New York, where the company overhauls most of its equipment. Three alarms were sounded. It is said that there was some delay in summoning the fire department, and before the fire apparatus arrived the shops were in flames. In all 17 cars were largely destroyed. Eleven of these were of steel and six were copper-sheathed trailers. There were no motors on the cars, as they were in the shop for overhauling and repainting. The car bodies, however, were badly injured, the steel cars as much, if not more, than the wood cars. Some of the air-brake equipments under the cars escaped without much loss. The total loss is estimated at about $100,000.

New York Central Electric Power Association.—The employees of the New York Central & Hudson River Railroad Company occupied in the maintenance, operation and construction of the Electric Zone have formed what is known as the Electric Power Association of the New York Central & Hudson River Railroad Company. Lectures and discussions by the members on topics of especial interest to the different departments are features of the monthly meetings. A question box is open at all times to members, and many interesting subjects are brought up for discussion in this manner. After a year of pronounced success the association has decided to have a social gathering of its members on April 20 at the Railroad Men's Building, Forty-fifth Street and Madison Avenue. At the next educational meeting, C. H. Quereau, superintendent of electrical equipment, will give an address.

Six Tracks Urged for the Subway Station at the Brooklyn Bridge.—The Public Service Commission of the First District of New York has issued in detail the reply which it made recently to the request of the Board of Estimate for information as to plans for the operation and connections of the subway loop lines in New York to connect the Williamsburg, Manhattan and Brooklyn Bridges. Incidentally the commission explains its efforts to induce the Board of Estimate to appropriate enough money so that the subway station at Brooklyn Bridge may be equipped with six or four tracks. The work on the subway station was suspended at the request of the Mayor. In his letter the Mayor explained that the subway station was to be the site of the proposed municipal office building and asked delay until Bridge Commissioner Stevenson and the Public Service Commission had an opportunity to confer about the plans. The commission says that a six-track station can not advantageously be made out of a four-track station. The total cost of land, of constructing the extra tracks and of strengthening the subway in order to support the proposed new municipal office building is about $1,850,000.

Clubrooms Opened at the New Quarters of the Third Avenue Railroad.—The new clubrooms for the employees of the Third Avenue Railroad, New York, which are located in the general office building at 130th Street and Third Avenue adjoining the reconstructed car house, were opened on April 12 with an informal reception and luncheon to the men under the personal supervision of F. W. Whitridge, receiver. The entertainment continued all afternoon and evening so that the employees of every department could become acquainted with the cozy quarters fitted out for their benefit. The refreshments were served by the wives and daughters of the company's officers and several of their friends. Miss Eleanor Whitridge, daughter of the receiver, was in charge of this pleasant task and was assisted by Miss Martha D. Bowers, Miss J. Whitridge, Mrs. James A. Roosevelt, Miss Marjorie Curtis, the Misses Robinson, the Misses Marks, Mrs. Jane Craine, Miss Kathleen Maher, Miss Anne Morgan, Mrs. Douglas Robinson and Mrs. E. H. Harriman. The clubrooms are furnished with complete pool and billiard equipments and facilities for a dozen house games. The library is a branch of the New York Public Library, so that a variety of books will be available for the men. The total equipment includes seven shower baths.

Subway Proposal in Cleveland.—Thomas P. Schmidt filed an application with the City Council of Cleveland on April 5 for a franchise for the construction of a subway by the Cleveland Subway Company under the principal streets of the city, including Euclid, Superior, St. Clair and Cedar Avenues and Broadway. Subsequently articles of incorporation for the Cleveland Subway Company were filed with the Secretary of State. The capital stock of the company is $10,000. Among the incorporators are: F. A. Mehling, W. A. Greenlund, A. L. Lang, William C. Fischer and Thomas P. Schmidt. Mr. Schmidt says that the details of the project which the company has in contemplation will not be made public until after the City Council has considered the application of the company. W. R. Hopkins, who is promoting a belt line for steam roads at Cleveland, was reported as being interested in the Cleveland Subway Company. He says, however, that the belt line has no connection with the Cleveland Subway and that his plan calls for the construction of a subway from the present depot of the Nickel Plate Railroad to the center of the city, so as to afford an entrance to the city for the interurban electric railways. The plans of the company which he represents are not sufficiently well matured at this time for him to make them available for publication.

Good Road Prizes Offered by Electric Railway President.—J. P. Graves, president of the Spokane & Inland Empire Railroad, Spokane, Wash., has addressed the following letter to J. C. Lawrence, of the State Railroad Commission: "I have been considering the good roads movement in our State, and have decided to do something toward assisting that in the Palouse country, and have hit upon a plan which I should like to see carried out as an experiment. The following plan suggests itself to me as an illustration to the Palouse people that might be helpful; I have asked President Bryan, of the Agricultural College, Pullman, and President McLean, of the Moscow University, at Moscow, to act as a committee of two, and I am writing you as a third member of the committee, which would have the directing of a plan that I believe would be helpful. I am proposing to give $3,000 as a bonus, $1,000 a year, as follows: $500 as the first premium for the best mile of constructed road tributary to the Spokane Inland division; $250 as a second prize and $250 as expenses by the committee in giving directions and awarding premiums to the builders. This to continue for three years; the construction of the road to be under the direction of this committee, who will either issue by circular or such other directions as they might see fit, and will award all prizes accordingly."

John Fritz Medal Presentation.—The John Fritz Medal for 1909 has been awarded this year to Charles T. Porter, Hon. Mem. Am. Soc. M. E., for his work in advancing the knowledge of steam engineering, and in improvements in engine construction. The public ceremony of the presentation of the medal to Mr. Porter took place in the large auditorium of the Engineering Societies Building, New York, on Tuesday, April 13. Besides the simple presentation of the medal, in the presence of invited guests and distinguished representatives of engineering, there were addresses by representatives of the four groups of the profession most concerned. Among those who spoke were: Dean W. F. M. Goss, of the University of Illinois; Prof. F. R. Hutton, of Columbia University; Robert W. Hunt, of Chicago, and Frank J. Sprague, of New York. Professor Hutton, in closing his address eulogizing Mr. Porter, paid a tribute to Prof. Chas. B. Richards, associated with Mr. Porter's early work of designing, and John F. Allen, who had conceived many details of the first high-speed engine which Mr. Porter combined into a harmonious whole. Mr. Porter was born in 1829, and has been identified with engineering all his life. He has not been active in business since 1890. He was a member of the firm of the Porter-Allen Engine Company for many years. In 1867 he installed the only high-speed engines exhibited at the French Exposition, and in later years constructed the Edison station, in Pearl Street, New York.

Publicity Campaign in New York.—The Interborough Rapid Transit Company, New York, published on April 13 the first of a series of newspaper advertisements dealing with affairs of the company in which the public is interested. The title of the advertisement was "What Chokes the Subway." It occupied 78 square inches of space, being 6½ in. wide by 12 in. high. Subsequent advertisements will occupy about 60 square inches of space, being varied from time to time as the exigencies of the situation demand. The advertisement will be carried in all the papers. The gist of the first advertisement was: The subway was built to carry 400,000 passengers a day. It carries (week days) more than 800,000. Meanwhile the elevated lines carry 50 per cent more traffic than they did when the subway was planned. Congestion grows. There is no margin for delay. A 15-minute breakdown on subway or elevated would inconvenience 50,000 people. A two-hour shut-down would demoralize the city's business for a day. The company asks to build at its own expense a two-track subway from Forty-second Street to the Bronx on the East Side and a two-track subway from Forty-second Street to the Battery on the West Side. It will take three or four years to build these subways. To give immediate relief the company asks to be allowed to build an express track on both the Second Avenue and the Third Avenue elevated lines. The company is now planning to enlarge the subway station platforms and to make its express trains up of center-door cars. These improvements will add 25 per cent to the company's facilities for handling rush crowds.

Plans Proposed for Developing Transportation Facilities into Boston.—The metropolitan improvement commission has submitted to the Mayor of Boston and the Governor of Massachusetts an extensive plan for developing the transportation facilities of Boston and enlarging the docking capacity of the port. The plan contemplates the electrification of all the lines entering Boston. The depression of the tracks entering the North and South stations is advised and a four-track subway between those two stations, which shall pass under the market district, is suggested, with a sub-surface station near State Street. It is proposed that express trains shall be run from the New York, New Haven & Hartford Railroad and the Boston & Albany Railroad through the subway to the Boston & Maine Railroad and vice versa. All trains which are not run beyond the city are to be operated through the subway, under this plan. When a passenger train reaches the South station it is to be operated through the subway to the storage yards of the Boston & Maine Railroad north of the Charles River, and the equipment left there until used in a return trip. All trains of the Boston & Maine Railroad are to be run through the subway to the storage yards of the New York, New Haven & Hartford Railroad at South Boston. The commission, taking the judgment of its engineer, proposes this plan to avoid the hauling of empty cars out of the two stations, making every movement a forward one. Thus, all equipment of the Boston & Maine Railroad is to be stored in the yards of the New York, New Haven & Hartford Railroad and all cars of the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad are to be stored in the yards of the Boston & Maine Railroad at Somerville.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The hearings on the proposal to create a public utility measure were concluded on April 9. Frederick W. Whitridge, receiver of the Third Avenue Railroad, New York, was the first speaker on April 9. He was described by the opposition to the measure as perhaps the person best qualified to expound the fallacies of the New York act, under which the Third Avenue Railroad is subject to the orders of the Public Service Commission of the First District of New York. Mr. Whitridge told about the difficulties encountered by him in trying to comply with demands from the commission which in many cases were unreasonable. He said that he had had no experience with the commission regarding stock issues, and expressed the opinion that stock issues affect investors and are largely of little concern to the public. He concluded with a statement to the effect that he might favor a commission as a concession to a decadent public sentiment. Charles J. Donohue, president of the State Federation of Labor, also opposed the bill. He felt that the giving of such broad powers to a State commission would impose obligations upon the companies that would tend to disrupt the pacific labor relations now existing. William Waldo Hyde, representing the Willimantic & Stafford Springs Railway, Colchester, Norwich & Hartford Railroad and the Willimantic & Southbridge Street Railway, also spoke against the bill. He said the measure usurps the power of the Legislature, and that it should be opposed, if for nothing more, on the ground that the bill provides that those eligible to office as members of the commission shall have had no connection with a public service corporation. He asked how men with no experience in public service corporation management could be expected judiciously to direct the operations of companies with whose workings they were admittedly unfamiliar. Ex-Senator Frank S. Butterworth and John Cairns, president of the Bolton & Coventry Telephone Company, both spoke in favor of the bill.

Illinois.—The charter version bills of the city of Chicago have been introduced. There are 11 of them. Two are of general interest to the electric railways. These provide for the recall of city officials and permit the city of Chicago to own and operate public utilities and regulate them. Among the bills introduced in the House is a measure presented to permit electric railways, whether organized under the railroad act or under the State act applying to street railroads, to make traffic agreements with each other and to consolidate on a majority vote of the stock in each company in favor of the consolidation. The bill introduced in the Senate for a State Public Service Commission is still pending. It has been referred to the Senate committee on corporations and public utilities, and several public hearings have been held. The bill is patterned after the law creating the public service commissions in New York. Two bills, one requiring the removal of all overhead wires before July 1, the other dealing in an equally summary manner with all electric wires, whether for telephone, telegraph, light or power service, have been introduced. A bill has been drawn for introduction to give the city of Chicago power to prescribe by ordinance the motive power by which cars or trains may be operated within the city limits. Under similar legislation track elevation has been accomplished in Chicago and other cities of the State. J. T. Harahan, president of the Illinois Central Railroad, is reported to have said that he considers the attempt by the city of Chicago to secure the passage of an ordinance giving the city authority to prescribe the motive power to be used within the city untimely and ill-advised, especially as the Illinois Central Railroad has plans under way for carrying out work that would more than satisfy the provisions of the new measure.

Iowa.—The Legislature has begun the work of weeding out measures preparatory to adjournment. Up to April 3 the Sammis, Smith and Van Law measures providing for a utility commission and enlarging the powers of the Railroad Commission had all been killed, and the prospects are slim for the introduction of any other measures of the kind. The bill to compel railroads to obey the orders of the State Railroad Commission under penalty of $50 a day for noncompliance also met a fate similar to that of the Sammis, Smith and Van Law bills. Only one measure of interest to the electric railway has passed both the Senate and the House. It confers additional powers on city councils acting under the commission form of government. Two measures of interest have been passed by the Senate and only one has been passed by the House. Those passed by the Senate require all corporations within the State to file an annual report of their operations and provide that cities and towns shall have the right to condemn and purchase public utilities at the expiration of their franchises. The one passed by the House provides that members of the

Railroad Commission shall be appointed by the Governor hereafter.

Massachusetts.—The committee on street railways has finished all but one of its hearings for the present legislative session, but has not yet reported its recommendations upon any of the 10 measures still before it. The last hearing of this committee was scheduled for April 13, the bill considered being one authorizing the General Electric Company to use part of the tracks of the Pittsfield Street Railway. The most important measures which this committee has under consideration are the prospective consolidation of the Boston Elevated Railway and the West End Street Railway; the extension of the floating debt of the Connecticut Valley Street Railway; the assessment of expenses for street widening in certain instances upon street railways; the definition of purposes of stock and bond issues; the extension of the Boston Elevated Railway's structure to Medford; regulation of stock and bond issues and the purchase of the Bennington & North Adams Street Railway by the Berkshire Street Railway. Recommendations are expected soon on most of these matters. It is probable that the question of electric railway ownership by railroads as involved in the Bennington & North Adams bill may be set over to the next Legislature in view of the action of the New York, New Haven & Hartford Railroad Company in complying with the decision of the Massachusetts Supreme Court by divesting itself of its electric railway holdings in Massachusetts. The committee on metropolitan affairs continues to receive petitions for the discontinuance of the elevated structure on Washington Street, Boston, and the extension of the Washington Street tunnel southward to Dudley Street, Roxbury. All the important bills relating to transportation projects by tunnel and subway or by elevated structure in the Boston district have been referred by this committee to the Railroad Commissioners and the Boston Transit Commission, sitting as a joint body. The first hearing of these boards was scheduled for April 14, and the question of the Boston & Eastern tunnel was assigned for this date. The committee has asked the two commissions for their opinion as to the terms upon which the Boston & Eastern tunnel should be built, if constructed, connecting the northern suburban district with the city proper. The House has given a first reading to the bill authorizing the Railroad Commission to recommend relocations of stations of railroad corporations and street railway companies. This measure has been placed in order for a second reading.

Missouri.—The bill creating a State Public Utilities Commission of five members, to be appointed by the Governor, has been favorably reported to the House by the committee on ways and means. The bill if passed will abolish the State Railroad and Warehouse Commission and the public utility commissions of St. Louis, Kansas City and St. Joseph. Opposition has been expressed to the bill on the ground that it takes away the home-rule feature of the law enacted at the last session of the Legislature.

Nebraska.—The Senate bill of Mr. Donahue, introduced recently, places all public-service corporations under the jurisdiction of the Railroad Commission and extends the powers of that body. According to Mr. Donahue the measure is similar to the Wisconsin law, being modified only in a few non-essentials which were deemed expedient to make it especially applicable to conditions in Nebraska. It is in the judiciary committee and is soon to come up for public hearing. There is considerable opposition to the measure in various quarters throughout the State. The City Council of Omaha has adopted a resolution declaring the measure "vicious and dangerous" and "an unwarranted assault upon the rights of the people of the various cities and towns of the State."

New Jersey.—Governor Fort has vetoed the Gaunt bill giving electric railway companies the right to carry freight. Objection to the bill was strong in Newark, Jersey City, Trenton and other cities, where the opinion prevailed that regular passenger traffic might suffer if the electric railway companies availed themselves of the provisions of the bill. The Governor said that the giving of unlimited freight rights was not advisable and that cities should have the right to fix the terms under which the companies may carry freight. Senator Gaunt has since introduced a new measure which he believes will overcome the objections of the Governor to the original bill. Governor Fort has also vetoed the special measure authorizing the Atlantic City & Shore Railroad to control and operate the Central Passenger Railway. Reference to this measure was made in the Electric Railway Journal of March 27, 1909. Measures are now being introduced only with unanimous consent and objection to the bill to extend the time for the completion of the Plainfield Horse Car Railroad to July 1, 1912, resulted in its rejection. The House has passed the bill amending the county roads act so that contracts may be entered into with electric railway companies by which they may pay a portion of the cost of rebuilding county roads.

New York.—On April 12, Governor Hughes sent a special message to the Legislature urging the passage of the Travis-Lee concurrent resolution exempting dock and subway bonds from the computation of New York City's debt limit, and on April 13 the Senate passed the bill. If the bill passes the Assembly, by which it has been reported favorably, and is approved by the people, an additional $125,000,000 will be available for subway construction in New York after Jan. 1, 1910. A constitutional amendment does not have to be approved by the Governor. Commissioner Bassett, of the First District, strongly urged the adoption of the amendment. A hearing was given on April 7 on the amendment of the Public Service Commissions' law extending the authority of the commissions. Opposition developed to the proposal to increase the powers of the commissions regarding through rates and joint rates, the forms of accounts and reports required, and the amendment stipulating that franchises must be submitted to the commissions for approval before they can be exercised. The Metropolitan Street Railway was represented by R. C. Beatty; the Third Avenue Railroad by F. J. Bickford; the International Railway by Porter Norton; the Utica & Mohawk Valley Railway by F. J. Kernan, and the Brooklyn Rapid Transit Company by Timothy S. Williams. The steam railroads were also well represented. Senator Wagner urged the Senate committee on railroads to report his 5-cent fare bill, by the terms of which the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad would be compelled to charge not more than 5 cents for a ride over their lines to Coney Island. Representatives of both companies appeared in opposition to the measure. The committee has reported the measure favorably, and has also reported the Schultz bill providing for half fares for school children on surface, subway and elevated railways in the cities of the State. Senator Gledhill's bill requiring surface cars in Kings and Queens Counties to be vestibuled on one side is another measure that has been reported favorably by the Senate committee on railroads. Cars now operated in these counties are largely vestibuled only at the front, the sides being unprotected. It is expected that a resolution will be introduced this week fixing April 30 as the date of adjournment.

Ohio.—Since signing the bill providing for the free transportation of officers of the peace while on duty by electric railways Governor Harmon has approved several other measures, some of which affect electric railways direct and in general and some only remotely. The Mendelsohn measure is the most important thus far to be approved. It provides for the construction of electric underground and elevated railways in cities. Heretofore cities have not been invested with power to authorize the construction of such lines. The measure is intended primarily to aid the interurban railways in Cleveland to secure better terminals in that city, possibly with a union line into the city and a union terminal station. The Lawyer bill relating to a subway for telegraph and telephone lines is another measure which has been approved. The Governor has also signed the Badger bill on the elimination of grade crossings.

Utah.—The only bill of interest to the electric railways that has passed both branches of the Legislature amends the laws of 1907 relating to the winding up of the affairs of corporations whose franchises have expired. It has been approved by the Governor. The House bill to provide vestibules for motormen and specifying the candlepower of street-car headlights was killed in the House. The Senate bill prohibiting trespass on the right of way of railroads and the measure making it unlawful to transport passengers free were killed in committee. As stated in the Electric Railway Journal of March 27, the public utilities bill, introduced in accordance with the recommendation of Governor Spry, failed to pass. Senator Badger, the author of this bill, said he would redraw the measure and introduce it as new legislation, but sentiment against public-utility legislation was so pronounced that the prospect of a second bill meeting the same fate as the first deterred him from making another attempt.

Wisconsin.—As a result of a tabulation of the bills before both houses still to be acted upon the opinion is expressed that it will be possible to adjourn on May 15. The bill providing for the entrance of interurban railways to cities by condemnation is still under consideration. The Assembly committee on transportation has killed the bill giving interurban railways the right to run through towns without obtaining a franchise from the town boards. It has been suggested that street railway companies be added to the light, water, heat and power companies which, according to the Berner bill, are required to accept an indeterminate permit if organized prior to July 9, 1907

Financial and Corporate

New York Stock and Money Market

April 13, 1909.

The stock market returned after the Easter holidays to the rather active trading and buoyant tone that have characterized it since the beginning of the current month.

A healthy demand for bonds continues and the money market is easy. Call money to-day is quoted at 1¾ to 2 per cent; 90-day loans, 2½ per cent.

Other Markets

In Philadelphia, Rapid Transit was the leader of the market. The daily volume of transactions ran into the thousands and the price advanced steadily.

In the Chicago market there was some return of activity in the various issues of the Chicago Railways Company.

Traction issues in the Boston market, except Boston Elevated, were quiet. There was some trading in Massachusetts Electric, both preferred and common.

In Baltimore, active interest was shown in the bonds of the United Railways & Electric Company. The "incomes" were quoted at 55 and the 4s at 87⅜.

At the weekly auction of securities in New York, April 8, the following traction securities were sold: $2,000 Brooklyn, Bath Beach & West End Railroad Company 5 per cent bonds at 97½; $1,000 Kings County Elevated Railroad Company 4 per cent bond, 86¾; $1,000 Brooklyn City & Newtown Railroad Company 5 per cent bond, 99¼; $2,000 Brooklyn City Railroad Company 5 per cent bond, 103¾; $1,000 Brooklyn Heights Railroad Company 5 per cent bond, 96⅝; $1,000 Brooklyn Rapid Transit Company 5 per cent bond, 103½; $1,000 Brooklyn, Queens County & Suburban Railroad Company 5 per cent bond, 99, and $1,000 Nassau Electric Railroad Company 4 per cent bond, 81¼.

Quotations of various traction securities follow:

	Apr. 6.	Apr. 13.
American Railways Company	*45¾	45½
Aurora, Elgin & Chicago Railroad (common)	a37½	a39
Aurora, Elgin & Chicago Railroad (preferred)	a88¼	a90
Boston Elevated Railway	130½	131¼
Boston & Suburban Electric Companies (common)	*16	*15
Boston & Suburban Electric Companies (preferred)	*70¼	*70
Boston & Worcester Electric Companies (common)	*a11½	*a11
Boston & Worcester Electric Companies (preferred)	*a56	*a56
Brooklyn Rapid Transit Company	76½	76⅛
Brooklyn Rapid Transit Company, 1st ref, conv. 4s	85	85½
Capital Traction Company, Washington	*a133⅛	*a137
Chicago City Railway	*a185	*a190
Chicago & Oak Park Elevated Railroad (common)	*a4½	*a4½
Chicago & Oak Park Elevated Railroad (preferred)	*a11	*a11
Chicago Railways, ptcptg. ctf. 1	*a112	*a112
Chicago Railways, ptcptg. ctf. 2	*a41	*a41
Chicago Railways, ptcptg. ctf. 3	*a29	*a29
Chicago Railways, ptcptg. ctf. 4	*a11½	*a11½
Cleveland Electric Railway	—	*a78
Consolidated Traction Company of New Jersey	76½	*76½
Consolidated Traction Company of New Jersey, 5 per cent bonds	a106	*105¼
Detroit United Railway	58½	58
General Electric Company	158¾	158½
Georgia Railway & Electric Company (common)	*80⅛	*83
Georgia Railway & Electric Company (preferred)	*85	*87½
Interborough-Metropolitan Company (common)	14½	15
Interborough-Metropolitan Company (preferred)	42½	43
Interborough-Metropolitan Company, col. 4½s	78⅛	78¼
Kansas City Railway & Light Company (common)	*a42½	*a42
Kansas City Railway & Light Company (preferred)	*a82	*a83½
Manhattan Railway	*143	143½
Massachusetts Electric Companies (common)	*14½	*14¼
Massachusetts Electric Companies (preferred)	72½	72
Metropolitan West Side Elevated Railway, Chicago (common)	*a18	*a18
Metropolitan West Side Elevated Railway, Chicago (preferred)	*52	*a52
Metropolitan Street Railway	*23	23
Milwaukee Electric Railway & Light Company (preferred)	—	*a110
North American Company	80½	83
Northwestern Elevated Railroad (common)	*a22½	*a23
Northwestern Elevated Railroad (preferred)	*a68½	*a69
Philadelphia Company, Pittsburg (common)	42¾	41½
Philadelphia Company, Pittsburg (preferred)	43	41¼
Philadelphia Rapid Transit Company	30	32½
Philadelphia Traction Company	92½	92½
Public Service Corporation, 5 per cent col. notes	a100½	*a100½
Public Service Corporation, ctfs	a82½	*a82½
Seattle Electric Company (common)	a91½	*a91½
Seattle Electric Company (preferred)	a98	*a98
South Side Elevated Railroad, Chicago	*a60	55½
Toledo Railways & Light Company	12⅞	12¾
Third Avenue Railroad, New York	28½	29½
Twin City Rapid Transit Company, Minneapolis (common)	a104½	104
Union Traction Company, Philadelphia	55⅜	56¼
United Railways & Electric Company, Baltimore	11½	11
United Railways Investment Company, San Francisco (common)	*a35	a40
United Railways Investment Company, San Francisco, (preferred)	*a54	a57
Washington Railway & Electric Company (common)	*a44	a43½
Washington Railway & Electric Company (preferred)	*a91¼	*a91
West End Street Railway, Boston (common)	96¾	96¼
West End Street Railway (preferred)	*110½	*110½
Westinghouse Electric & Manufacturing Company, 1st preferred	117	*117

a Asked. * Last sale.

Report of Chicago Railways Company for Year

The comparative report of the Chicago Railways Company for the years ended Jan. 31, 1909, and Jan. 31, 1908, follows:

	1909.	1908.
Gross receipts	$11,037,071	$10,560,571
Expenses, 70 per cent	7,725,950	7,392,400
Balance	$3,311,121	$3,168,171
Deduct 5 per cent interest on valuation	1,730,684	1,566,158
Net income	$1,571,437	$1,602,013
Division of net income:		
City of Chicago, 55 per cent	$864,290	$881,107
Chicago Railways Company, 45 per cent	707,147	720,906

The decrease in the amount paid to the city of Chicago for the year ended Jan. 31, 1909, as compared with the year ended Jan. 31, 1908, is due to the rapid increase in the amount of rehabilitation performed and the consequent increase in the city valuation price, upon which a deduction of 5 per cent is allowed to the company.

The inventory of the property as of Feb. 1, 1908, placed the purchase price to the city at $32,589,047, while the inventory as of Feb. 1, 1909, placed the purchase price at $39,007,353.

Operations of New York City Railway

A preliminary abstract of the report of the New York City Railway for the year ended June 30, 1908, has been issued by the New York Public Service Commission, First District. The report covers the results of operation of the Metropolitan Street Railway and its lessee roads and also the following: Fort George & Eleventh Avenue Railroad; Fulton Street Railroad (to June 1, 1908, when operation ceased); Kingsbridge Railway (until March 1, 1908, when operation was placed under the jurisdiction of the receiver of the Third Avenue Railroad); Thirty-fourth Street Crosstown Railroad, and Twenty-eighth & Twenty-ninth Streets Crosstown Railroad. The operations of the Third Avenue Railroad are included until Jan. 11, 1908, when a separate receiver was appointed. The length of road operated was 134.58 miles and there were 127.27 miles of second track and 24.79 miles of all other tracks, making a total of 286.64 miles.

The income statement includes for purposes of comparison with the preceding fiscal year the operations of the Third Avenue Railroad under a separate receivership from Jan. 12, 1908:

Revenues.	Fiscal year, 1908.	Increase, 1907.
Passenger revenue (including chartered cars)	$16,539,162.67	*$675,588.70
Freight and other car earnings	37,181.35	*12,743.44
Advertising	236,874.96	39,874.96
Rent of track	14,899.28	*1,340.72
Rent of equipment	77,639.79	48,201.26
Sale of power	17,394.83	3,678.88
Miscellaneous	36.85	36.85
Total street railway operating revenues	$16,923,189.73	*$597,880.91
Expenses.		
Maintenance of way and structures	$1,385,079.06	$507,348.08
Maintenance of equipment (exclusive of horses)	2,588,969.28	1,204,669.15
Renewals of horses, harness, etc	192,434.41	68,304.66
Operation of power plant	647,050.49	*1,379.25
Provender and stable expenses	387,234.50	22,335.72
Operation of cars	4,946,622.54	449,467.14
Damages (including legal expenses)	1,404,546.39	*206,031.20
General expenses	945,670.79	271,012.12
Total street railway operating expenses	$12,497,607.46	$2,315,726.42
Taxes accrued	$1,478,126.75	$474,527.66
Net Revenue.		
Operating income (earnings over expenses and taxes)	$2,947,455.52	*$3,388,134.99
Non-operating income	569,389.64	*368,648.39
Gross income applicable to corporate and leased properties	$3,516,845.16	*$3,756,783.38
Deductions.		
Interest on funded debt	†$117,607.52	$70,500.77
Other interest	86,469.90	*7,887.79
Interest on funded debt of companies whose roads are operated under agreement	112,916.67	*32,083.33
Claims against companies in hands of receivers	383,197.27	383,197.27
Rentals:		
Interest	2,164,666.66	*2,307,430.20
Dividends	2,456,103.03	*3,363,033.00
Corporate expense	13,210.05	*12,922.24
Additions and betterments charged to income	69,474.90	69,474.90
Total deductions from income	$5,403,646.00	*$5,200,183.62
Deficit for period	1,886,800.84	*1,443,400.24

* Decrease.

† Interest on funded debt other than on $5,000,000 has not been paid or accrued. (In 1907 this item was included in "Rentals.")

The passenger traffic for the year on the various routes was as follows:

PASSENGER TRAFFIC FOR YEAR ENDED JUNE 30, 1908.

Route. Electric:	Car-miles.	Revenue passengers.	Transfers collected.	receipts per car-mile. July 1 to Sept. 24, 1907.	Sept. 25, 1907- June 30, 1908.
*Second Avenue	3,688,775	22,001,757	12,980,743	33.69	28.57
Third Avenue (to Jan. 12, 1908)	6,348,152	19,346,818	7,873,272	32.74	30.92
Lexington Avenue	4,793,996	28,636,766	12,277,133	31.17	29.48
Fourth Avenue and Williamsburg Bridge	217,235	896,090	272,529	22.12	20.20
Williamsburg Bridge	211,384	3,397,939	.....	45.81	48.92
Fourth Avenue	5,367,141	28,996,627	15,101,698	26.92	27.04
†Fourth Avenue, Grand Central and 23d Street	158,215	1,263,511	432,905	41.57	38.99
Broadway and Amsterdam Avenue (from Feb. 17, 1908)	862,851	4,508,695	1,513,072	....	26.13
Broadway and Columbus Avenue	4,849,011	38,837,749	12,330,305	47.61	37.73
Sixth and Amsterdam Avenues	4,494,901	27,263,692	14,965,713	28.89	30.75
Seventh Avenue	453,102	2,029,419	846,746	21.98	22.57
Canal Street	96,213	98,556	113,607	7.09	4.57
Eighth Avenue	4,686,279	27,973,348	14,692,546	32.87	28.96
Ninth Avenue	1,345,091	6,768,165	4,836,389	28.03	24.28
Kingsbridge (to March 1, 1908)	383,047	938,278	424,542	14.80	10.63
145th Street	113,800	619,159	355,340	24.77	27.74
125th Street (to Jan. 12, 1908)	483,394	3,382,721	1,729,290	36.37	33.90
116th Street	824,003	5,393,888	5,902,637	32.46	32.81
86th Street	899,830	5,349,867	6,115,521	28.03	30.23
59th Street	1,084,171	7,026,922	13,152,947	28.83	33.39
34th Street	1,392,156	10,599,233	11,452,475	40.35	37.37
23d Street	2,148,884	18,295,891	11,437,247	46.47	41.40
14th Street	2,583,622	15,931,402	8,377,525	32.61	30.35
Christopher and East 23d Street	636,502	3,612,927	2,224,223	31.13	27.53
Eighth Street	1,563,734	9,786,875	5,409,519	33.44	30.66
53d Street (to March 1, 1908)	11,947	6,430	7,183	2.86	2.60
Avenue A (to March 1, 1908)	139,838	235,689	98,610	8.98	8.11
Mount Vernon	153,838	418,454	55,673	14.70	13.26
Total, electric lines	46,653,570	293,616,868	164,978,390	33.26	30.67
Horse:					
Sixth Avenue	121,964	267,986	143,428	12.36	10.56
East Belt and First Avenue	896,276	3,087,010	1,088,449	22.12	15.59
West Belt	858,799	4,496,580	1,503,942	39.77	22.66
17th and 18th Streets	46,766	63,443	53,022	7.38	6.45
Bleecker Street	18,523	5,071	851	1.63	1.29
Avenue C (Prince and Houston Streets)	724,005	3,063,859	1,971,101	25.17	19.97
Metropolitan Crosstown (Spring and Delancey Streets)	415,416	2,434,667	1,571,219	36.82	27.31
Chambers Street	446,708	2,572,022	1,488,153	36.87	26.50
Fulton Street (to June 2, 1908)	86,885	443,864	180,333	35.11	22.53
28th and 29th Streets	568,149	2,939,582	1,468,891	29.31	24.89
Total, horse car lines	4,183,491	19,374,084	9,469,389	29.41	21.32
Grand total	50,837,061	312,990,952	174,447,779	32.97	29.88

* The First Avenue Branch from 59th Street to 125th Street was completely electrified and operated Feb. 5, 1908.
† Route withdrawn March 1, 1908.

The following statistics, contained in the report, relate to the accidents and the rates of wages:

ACCIDENTS.	July 1 to Sept. 24, 1907.	Sept. 25, 1907, to June 30, 1908.
Number of accidents causing personal injury	4,793	9,758
Of which, number of persons killed	43	108
Of which, number of persons seriously injured	188	550
Of which, number of persons otherwise injured	4,562	9,100
Divided as follows:		
Passengers	2,947	5,229
Employees	1,016	1,852
Others	830	2,677

HOURLY RATE OF WAGES OF MOTORMEN AND CONDUCTORS, JUNE 30, 1908.

Motormen:	First year, number.	First year, rate, cts.	Second year, number.	Second year, rate, cts.	Third to fifth year, number.	Third to fifth year, rate, cts.	After fifth year, number.	After fifth year, rate, cts.	Total number.
Standard cars	1,103	22½	235	23½	274	24½	612	26	2,224
Pay-as-you-enter cars	127	24	40	25	34	26	115	27½	316
Conductors:									
Standard cars	1,346	21½	206	22½	278	23½	363	24½	2,193
Pay-as-you-enter cars	197	23	13	24	31	25	39	26	280
Conductors of horse cars, 20 cents an hour									319
Drivers of horse cars, 20 cents an hour									331
All employees									10,932

Berkshire Street Railway, Pittsfield, Mass.—The Berkshire Street Railway has petitioned the Massachusetts Railroad Commission for authority to issue debenture bonds to the amount of $248,000, to be used to retire obligations, for the construction of an extension at Cheshire Harbor and for bridge repairs, and reconstruction near Farnham Station, Cheshire.

Boston (Mass.) Elevated Railway.—A meeting of the stockholders of the West End Street Railway was called for April 14, "to see what action the stockholders will take with regard to a sale of the property, privileges and franchises of the West End Street Railway to the Boston Elevated Railway, and a consolidation of the properties and franchises of said two companies as authorized by chapter 551 of the acts of the Legislature of the Commonwealth passed in 1908 or in reference to any pending bills now before the Legislature of the Commonwealth, or to be hereafter introduced before the Legislature of the Commonwealth, authorizing or relating in any manner to a consolidation of the properties and franchises of said two companies, and for the transaction of such other business as may lawfully come before such meeting."

City Island Railroad, New York, N. Y.—The City Island Railroad and the Pelham Park Railroad have each applied to the Public Service Commission, First District, for permission to issue $50,000 of 5 per cent 25-year bonds, the proceeds to be used in connection with the installation of the mono-rail system on the City Island Railroad, mention of which is made on page 746 of this issue of the Electric Railway Journal.

Las Vegas Railway & Power Company, Las Vegas, New Mex.—Dr. J. M. Cunningham, president of the San Miguel National Bank, bid in the plant, franchises, etc., of the Las Vegas Railway & Power Company for $65,000 at master's sale. The sale was the result of foreclosure proceedings brought against the company by the Trust Company of St. Louis County, trustee, to satisfy a mortgage for $313,000. It is understood that Dr. Cunningham, Frank Springer, W. J. Mills, F. D. Bullard, H. W. Kelly, Jacob Gross and A. M. Blackwell, of the original Las Vegas Light & Fuel Company, are associated with the United States Light & Traction Company, of Denver, in the purchase of the property.

Metropolitan Street Railway, New York, N. Y.—The 7 per cent dividend on the stock of the Sixth Avenue Railroad, guaranteed by the Metropolitan Street Railway, to one of whose subsidiaries it is leased for 800 years, has been passed. Frank Curtiss, president of the Sixth Avenue Railroad, has issued this statement in explanation: "Because of the unsettled state of affairs of the lessee company, and the fact that certain franchise taxes imposed on its companies' property have not been paid by the lessee company, which taxes are in litigation, your directors have decided it wise not to make the dividend at present." Justice Bishoff, of the Supreme Court, has reserved decision on an application of bondholders of the Fulton Street Railroad for an order to compel the receivers of the Metropolitan Street Railway to issue transfers with the Fulton Street Railroad. The bondholders also asked that the receiver of the Fulton Street Railroad be ordered to resume the operation of the line which was discontinued about one year ago.

Montoursville (Pa.) Passenger Railway.—A. L. Scholl, J. Harry Spencer and Dr. F. L. Moyer, Montoursville, have concluded the negotiations for the purchase of the Montoursville Passenger Railway and the property of the Montoursville Electric Light, Heat & Power Company, owned by the Railways Company General, and these gentlemen will formally assume active control of the above companies on May 1.

New York, New Haven & Hartford Railroad, New Haven, Conn.—The Public Service Commission of the Second District of New York has authorized the New York, New Haven & Hartford Railroad to purchase all the stock of the New York & Portchester Railroad and the New York, Westchester & Boston Railway. This will eliminate the Millbrook Company as a holding concern for the New York & Portchester Railway and the New York, Westchester & Boston Railway.

New England Investment & Security Company, Boston, Mass.—At a recent meeting of the trustees of the New England Investment & Security Company, preliminary steps were taken for a legal separation of the New York, New Haven & Hartford Railroad from the New England Investment & Security Company. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, retired as president and trustee of the New England Investment & Security Company and was succeeded in both positions by Lucius S. Storrs, Springfield, who is president

of various individual electric railways which are controlled by the New England Investment & Security Company. The New England Investment & Security Company has been under legal control of the New York, New Haven & Hartford Railroad since the electric railway companies were taken over. Originally all the directors of the holding company were also directors of the New York, New Haven & Hartford Railroad, but with Mr. Mellen's retirement the last director of the New York, New Haven & Hartford has severed his connection with the New England Investment & Security Company. Plans now call for legal separation of the two interests before May 1. Notes or bonds amounting to $15,000,000 in the treasuries of the subsidiary companies and of the New York, New Haven & Hartford Railroad itself will be made negotiable and disposed of. These notes have been held by the New York, New Haven & Hartford Railroad as simple promissory notes. At the meeting a settlement was effected of all matters of account between the New York, New Haven & Hartford Railroad and the New England Investment & Security Company and mutual releases were exchanged. Mr. Storrs as the successor of Mr. Mellen will hereafter be responsible only to the trustees of the New England Investment & Security Company.

North Mount Vernon Railroad, Mount Vernon, N. Y.—The property of the North Mount Vernon Railroad has been sold under foreclosure to John Johnston, Brooklyn, N. Y., for $500. Mr. Johnston assumes obligations against the company of more than $25,000 in taxes, assessments, etc. The property of the company will be formally turned over to Mr. Johnston by W. W. Ladd, receiver of the New York City Railway, on April 29.

Rhode Island Company, Providence, R. I.—The answer of the Rhode Island Company to the Government's merger suit, to compel the New York, New Haven & Hartford Railroad to relinquish its control of the Rhode Island Company, has been filed in the United States Circuit Court. The Rhode Island Company contends that the three judges before whom the Government seeks to have the case tried on its merits do not constitute a Circuit Court. This claim, previously submitted by the other defendants, has been disallowed, and it was filed by the Rhode Island Company merely in order that the Rhode Island Company might be included with the others in case the suit should reach the Supreme Court.

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil.—The stockholders of the Rio de Janeiro Tramway, Light & Power Company will vote on May 3 on the question of increasing the capital stock of the company from $25,000,000 to $40,000,000. Of the new stock only $6,250,000 will be issued at present, and this will be offered to stockholders of record to the extent of one share of new stock for every four shares held by them. The new issue is to provide funds for financing the purchase of the Carril de Jardin Botanico and for extensions and improvements.

United Railways Company, St. Louis, Mo.—The United Railways Company called for payment on April 9 $1,200,000 of collateral trust 5½ per cent gold notes dated July 1, 1907, and due July 1, 1909.

At the inauguration of the new City Council of Chicago on April 12, Mayor Busse discussed among other subjects the necessity for unification of all of the surface and elevated railways in Chicago, and their operation as one complete system. He said: "I believe that none of us can better serve the interests of the people of Chicago than by doing everything that lies within our power to bring about unification of the transportation service at the earliest possible date. In no other way can we get rid of the friction that at the present time hampers the service and prevents proper co-ordination of transportation routes." Referring to subway construction, Mayor Busse said: "When we have united operation of local transportation systems then subways can be planned which will accurately fit into and supplement the present service. The construction of subways with separate ownership and operation would only add another complicating element to the situation." On the question of electrification of railway terminals, Mayor Busse reported progress in that the Illinois Central Railroad was already committed to the policy of electrification and he hoped a way would be found to advance beyond the stage of discussion in the near future in the case of other railway companies entering Chicago. Legislation is now pending in Springfield which is intended to give cities specific authority to require electrification of the railway terminals in the same way as the authority conferred to require the elevation of tracks. If passed, this act will assist the city in its solution of this problem.

Traffic and Transportation

Report to District Commission on Pay-As-You-Enter Cars

H. C. Eddy, executive officer and secretary of the District Electric Railway Commission, Washington, D. C., has submitted to the commission a report in regard to the design and method of operation of the pay-as-you-enter cars recently placed in service in Washington. An abstract of the report follows:

"It is the purpose of this report to reply to the criticisms received and point out what appear to the writer to be the undesirable as well as the desirable features of the pay-as-you-enter cars, particularly as far as the public welfare and interest are concerned. It is also my purpose to compare these cars with others of the pay-as-you-enter type which are being operated in other cities.

"Summarizing the letters received [from District residents] it will be seen that the general opinion is unfavorable to the cars, not so much because of the pay-as-you-enter feature but because of the seating arrangements and the consequent wide aisles which provide a standing capacity equal to perhaps twice the seating capacity, incidental to which is the alleged necessity of forcing one's way through these crowded aisles to the front exit.

"From reports received from the city officials of municipalities where pay-as-you-enter cars are in operation, it appears that in most cities the cars are equipped with cross seats and a short longitudinal seat at each end. Exceptions to this rule are Columbus, Ohio; New York City, and Des Moines, Ia. In the two first-named cities longitudinal seats are used exclusively, although a recent order for cars on the Third Avenue Railroad in New York calls for cross seats. The cars in Des Moines are equipped with a longitudinal seat on one side and cross seats on the other side. In Newark, N. J., I am informed that while the cars now in operation are equipped with cross seats all cars ordered in the future will be equipped with longitudinal seats only. The reason for this change is not given. Passengers are allowed to leave by the rear-exit door, especially when cars are crowded, in every city which I have heard from, but the front exit is ordinarily used. In Des Moines the rear exit is used exclusively.

"The platform arrangements differ from each other only in detail, the general arrangement being a pipe railing adjustable on double-end cars and fixed on single-end cars. In regard to public opinion concerning these cars all reports state that it is favorable to the pay-as-you-enter type, the report from Chicago, where this type of car has been in service for a longer period than in any other city, stating that 'public opinion in regard to the pay-as-you-enter car is enthusiastic as against any other street car now in operation,' adding that the entire equipment in Chicago within 15 months will consist of this type of car. Continuing, the writer, Bion J. Arnold, who is the traction expert for the city of Chicago, says: 'The companies, as well as the city (which participates in the net profits of the earnings), very materially profit by the use of the pay-as-you-enter car as against the old type. One or two reasons will be sufficient, I believe, to justify the statement. In the first place all fares are collected, while in the old style of car during the rush hours many passengers evade the conductor and the fare is not collected. Another important feature of the pay-as-you-enter car is almost the entire elimination of accidents when passengers are boarding and alighting. The passenger boarding the car is doing so under the eye of the conductor. Consequently, he does not give the signal to start until the passenger is safely aboard. It is practically impossible to leave the car until it comes to a stop and the door is opened by the motorman.'

"Several of the reports received state that the companies' receipts show an increase since the pay-as-you-enter car was put in operation by them.

"My assistants and myself have been making very careful observations of the construction and operation of these cars in use on the lines of the Capital Traction Company, and from these observations, and the reports received from other cities and data secured from various other sources, including my own observations of the operation of prepayment cars in Pittsburgh and Philadelphia, I am of the opinion that the prepayment car as a type is a long step in the right direction toward the solution of successful street car operation in the interest of the public as well as of the operating companies. I am also of the opinion that cross seats are to be preferred to longitudinal seats and that the rear exit should be opened for passengers sitting or standing adjacent thereto when cars are well filled. Under all other circumstances I believe the front exit only should be used, as by this means the time and inconvenience of loading and unloading will be reduced to a minimum.

There are many arguments for and against sliding and swinging exit and entrance doors leading from car body to platform, but I believe the two sliding doors at each end with only a stanchion between them as adopted in New York City after exhaustive tests and experiments will prove to be the most satisfactory.

"A large platform, while objectionable in many respects from an operating and construction point of view, is by no means impracticable and has the great advantage of allowing several passengers to board the car while waiting to pay their fare instead of standing in line on the street.

"The sign 'pay as you enter' should be placed conspicuously on the dasher instead of in the vestibule window where it obstructs the motorman's view. Passengers are not allowed to stand on the platforms, which is, on the whole, advantageous to the public as it tends to eliminate accidents as well as to facilitate the entrance and exit of passengers.

"I have also observed that passengers are frequently allowed to leave the car by the rear exit when cars are well filled, although this practice is not always followed, as I believe it should be. The practice of not allowing passengers to alight from a car while in motion I believe is most excellent. Statistics of the Police Department show that more than half the street car accidents which occurred in the District of Columbia during the year ending June 30, 1908, were either boarding or alighting accidents, and I understand this is the case in most cities.

"The success of the pay-as-you-enter car depends largely on the co-operation of the public, and as it is a radical change from what the public has been accustomed to it always requires a considerable time for people to adapt themselves to the new order of affairs when these cars are first introduced. If the pay-as-you-enter cars now in operation on the Fourteenth Street line were equipped with cross seats and passengers were allowed to leave by the rear door when cars are full it is believed that but little objection would be raised to the new cars.

"The crowding of these cars is undoubtedly a serious matter and this is due in a large measure to the wide aisles which are consequent to the unusual width of the cars and the use of longitudinal seats, a large space for standing room being thus provided. It is believed, however, that if the longitudinal seats were replaced with cross seats this cause of complaint would be greatly reduced. The general question of the crowding of cars having been already acted upon by your commission, doubtless this difficulty as complained of on the pay-as-you-enter cars will be further reduced by this means."

The Experiment with Special Cars for Women

Daniel L. Turner, general inspector of the Public Service Commission of the First District of New York, has submitted to the commission a report covering the operation of the women's car by the Hudson & Manhattan Railroad for the first four days of the experiment, namely, from March 31 to April 3. Mr. Turner says:

"As well as can be determined from a short period of operation, the 'exclusively-for-women' cars have demonstrated their efficacy under the conditions prevailing on the Hudson & Manhattan Railroad."

The report further finds that while the women's cars carried the heaviest loads during the rush hours, as might be expected, they are well patronized during the whole period of their operation. Of 672 cars noted, 170 of which were the cars for women, the average loads on the women's cars for the entire period were 38, compared with an average of 53 passengers in the other cars. The women's cars carried more people from New York at night than to New York in the morning, the average being 45 during the evening rush hours westbound, and 20 during the morning rush hours eastbound.

The report says that at the peak of the rush hours, the women's cars carried very nearly their proper proportion of the train loads, indicating that their use does not interfere with the proper distribution of the passengers throughout the trains. No confusion or interference whatever, which tended to retard or obstruct the movement of the trains, was noted during their operation. However, the train interval is never less than three minutes.

The Hudson & Manhattan Railroad has submitted figures to the commission which show that the average number of women using the cars increased steadily from the first day. The largest number of women carried in one car on the first day was 90 and that was during the evening rush hours westbound. On the first day, March 31, the women's cars on 41 trains carried eastbound 959 passengers, or an average of 23 16/41 per car; on the same day in the evening on 50 trains the women's cars carried 2156 passengers, or an average of 43 3/50 per car. On April 1 the women's cars on 41 trains carried eastbound in the morning 1305 passengers, or an average of 31.83 per car; in the evening, on 50 trains, the women's cars carried 2038 passengers, or an average of 40.56 per car. On April 2 the women's cars on 41 trains in the morning rush hours, eastbound, carried 1199 passengers, or an average of 29.24 per car; on the same day, westbound, the women's cars on 50 trains carried 2154 passengers, or an average of 43.08 per car. On April 3, in the morning rush hours, eastbound, the women's cars on 41 trains carried 1201 passengers, or an average of 29.29 per car; on the same day, the cars on 50 trains carried 2411 passengers, or an average of 48.22 per car. On April 5 (no women's cars having been operated on April 4, Sunday) the women's cars on 41 trains, eastbound, during the rush hours, carried 1382 passengers, or an average of 33.71 per car; on the same day, westbound, on 50 trains, they carried 2236 passengers, or an average of 44.72 per car.

The Public Service Commission of the First District of New York issued an order on April 12 calling for a hearing on April 20 on the question whether the Interborough Rapid Transit Company should not be compelled to provide separate cars for women on its express trains in the subway.

Trip of Indianapolis, Columbus & Southern Traction Company Car, Louisville to Cleveland

A synopsis of the results attained on the trip of a special car from Louisville to Cleveland and return, at the time of the last meeting of the Central Electric Railway Association, has been received from A. A. Anderson, general manager of the Indianapolis, Columbus & Southern Traction Company. The maximum number of persons carried on the car at any one time was 56, but 96 different persons were on the car at some time during the trip. The following summary shows the record made by the car:

		Speed Rate.
Louisville to Cleveland, 509 miles; running time	16:49	29.66
Lay-over time	2:41	
Night Stop (Fort Wayne, Ind.)	8:42	
Total	28:12	
Lv. Louisville	2:03 p.m., 3-23-09	
Ar. Cleveland	6:15 p.m., 3-24-09	

		Speed Rate.
Cleveland to Indianapolis, 378 miles; running time	14:37	25.86
Lay-over time	0:52	
Night Stop (Mansfield)	11:14	
Total	26:43	
Lv. Cleveland	6:37 p.m., 3-25-09	
Ar. Indianapolis	9:20 p.m., 3-26-09	

TOTAL MILES.

From Greenwood to Louisville	105	
From Louisville to Cleveland	509	614
Extra miles run in Cleveland and Mansfield	15	
From Cleveland to Greenwood	378	393
	1,007	1,007

	Miles.	Running hours.	Lay-over.		Nights.
First day, March 23..	346	11:59	2:33	Fort Wayne, Ind.	8:42
Second day, March 24.	268	9:02	1:06	Cleveland	24:22
Third day, March 25..	100	3:30	0:04	Mansfield	11:14
Fourth day, March 26.	293	12:02	1:03		....
	1,007	36:33	4:46		44:13

Tuesday, March 23, 1909, 8:53 a.m. } .....35 hours and 37 minutes
Friday, March 26, 1909, 10:30 p.m. }

Starting from Greenwood and Louisville on March 23, the car, in traveling to Fort Wayne, Ind., covered 346 miles in 11 hours and 59 minutes, making an average speed of 28.87 m.p.h. From Seymour to Indianapolis, 62 miles, the speed was 35.22 m.p.h.; and from Muncie to Bluffton, 42 miles, 34.06 m.p.h.

Traveling from Fort Wayne to Cleveland, 268 miles, on March 24, the running time was 9 hours and 2 minutes, an average of 29.67 m.p.h. Between Lima and Findley, 32 miles, the speed attained was 34.91 m.p.h.

The return trip from Cleveland was made by way of Mansfield, Ohio.

More Pay-As-You-Enter Cars for Columbus, Ohio.—The Columbus Railway & Light Company, Columbus, Ohio, has ordered 30 pay-as-you-enter cars of the same type used on the Oak Street line for the last year from the American Car Company.

No Complaints in New York.—The Public Service Commission of the First District of New York did not receive any complaints on April 1 and 2. The commission was es-

tablished in July, 1907, and up to April 1 received on an average, 16 complaints a day.

Question of Increased Service in Toledo.—The committee on railroads and telegraphs of the Toledo Council has adopted a schedule for morning and evening service, prepared by Councilman J. R. Cowell, which calls for the operation of more cars than are run at present. If the ordinance meets with the approval of the Council it will be presented to the company for adoption. The company says that as many cars are being operated as business at the present time warrants.

Inland Empire System Fruit Special.—Attractive mailing card invitations were distributed recently by the Inland Empire System, Spokane, Wash., calling attention to the second annual fruit special demonstration train which was operated over the road on March 31 and April 1, 2, 3. Interesting and instructive lectures and demonstrations were given by representatives of the State agricultural institutions. The purpose of the fruit special is to promote fruit-growing in the territory served by the Inland Empire System.

Rowdies Fined.—The Interborough Rapid Transit Company, New York, has recently been annoyed by rowdies who travel on its Third Avenue elevated line and insult passengers and make themselves generally obnoxious. On April 5 the police arrested 25 of the offenders and arraigned them before Magistrate O'Connor in the Yorkville Police Court on April 6. Each was fined $10. The magistrate said that public outrages of the kind perpetrated by the hoodlums were altogether too frequent, and that he proposed to deal summarily with all offenders against public decency who were arraigned before him.

Hearing on Express Rates.—A hearing was held before the Public Service Commission of the Second District of New York on April 6, regarding the increase in express rates by the United Traction Company, Albany, and the Electric Express Company. E. S. Fassett, general manager of the United Traction Company, said that a plan is being perfected to combine the express business of the Electric Express Company, the United Traction Company and the Hudson Valley Railway under the Electric Express Company, and that the contract between the companies would be submitted to the commission for its consideration and approval.

Fare Question in Philadelphia.—The case of the Philadelphia Rapid Transit Company against the city of Philadelphia, argued in the State Supreme Court, has been taken under advisement. The company contended that its contract with the city permitted it to charge any fare it wished up to 5 cents, and that if it charged, or had charged, anything less, it was purely voluntary on the company's part. The city contended that the company's contract with the city prevented the company from changing in any way the conditions and fares in force when the contract was signed, unless the company secured the consent of the city to such change.

Limited Service on Ohio Electric Railway.—The Ohio Electric Railway, Cincinnati, Ohio, will establish limited service between Toledo and Lima and between Lima and Bellefontaine on April 18, preliminary to the inauguration of a through limited service between Toledo and Columbus. The Toledo terminals have been established at Avondale Avenue and Eleventh Street, but cars will probably be operated to the union interurban station on Superior Street as soon as the building is ready for occupancy. The building at the Avondale Avenue and Eleventh Street terminal will be used for freight and express purposes when the union terminal is completed.

Traffic Suit in Pittsburg.—The City of Pittsburg has brought suit to compel the Pittsburg Railways Company to abandon its downtown loops, to increase the number of cars operated on certain lines during the rush hours and restrain the company from operating the cars of one company over the lines of another company. The suit is generally regarded as a retaliatory measure on the part of the city because of the failure of the State Railroad Commission to uphold the city in its demand for street railway reforms before conducting a thorough investigation. An abstract of the report of Stone & Webster, retained by the commission to investigate traffic conditions in Pittsburg, was published in the Electric Railway Journal of March 20, 1909, page 528.

To Prorate on Freight Shipments Originated by Electric Railway.—C. T. Chapman, traffic manager of the Toledo & Western Railway, Toledo, Ohio, has entered into an agreement with several steam railroads which carries with it the same privileges and conditions regarding the through shipment of freight as are observed among the steam railroads. The steam railroads will prorate on the rates on freight shipments originated on the Toledo & Western Railroad. The agreement is with the Delaware, Lackawanna & Western Railroad, the Grand Trunk Railroad, the Ontario Central Dispatch Company and the New York, Ontario & Western Railroad and becomes effective on May 1. The Toledo & Western Railway serves a territory in which freight is particularly susceptible to development. Its freight cars are of a standard size and are transferred to the connecting lines at Toledo.

Hearing on Side-Door Cars in New York.—The hearing on the question of operating side-door cars in the New York subway was continued before Commissioner Eustis, of the Public Service Commission for the First District, on April 8. The Interborough Rapid Transit Company was again represented by Frank Hedley, vice-president and general manager, and A. A. Gardner, counsel. Mr. Gardner and Commissioner Eustis disagreed about the attitude of Mr. Gardner more than a year ago regarding side-door cars. Finally the hearing was adjourned until April 29. In the meantime a copy will be made of the records of the meeting at which Mr. Gardner is said to have spoken in favor of side-door cars. The commission has granted the Interborough Rapid Transit Company an extension of 30 days in which to complete and have ready for service the second side-door experimental train. It was announced on April 13 that the Interborough Rapid Transit Company would have its experimental train of side-door steel cars ready for operation on April 19. The eight steel cars now being rebuilt are part of a recent consignment of 50 all-steel cars so constructed that they could easily be changed to the side-door type. They are also intended for use on the express tracks.

Modifying Brooklyn Elevated Brake Equipments.—The Brooklyn Rapid Transit Company has notified the Public Service Commission of the First District of New York that as a result of tests which it has made recently it is prepared to carry out the recommendations of the commission regarding the modification of the braking system in use on its elevated lines. E. W. Winter, president of the company, in writing the commission, said that the company had found the work of substitution considerably more involved than was expected. Mr. Winter transmitted to the commission a letter from William G. Gove, superintendent of equipment of the company, dated April 5, in which Mr. Gove stated that a careful inventory of the whole equipment had been made with special reference to the details of the new apparatus required. Mr. Gove concluded his letter as follows: "We have found that it will be necessary to readjust the system of brake leverage under all cars and are considering the use of slack adjusters to place this installation on a par with the Interborough Rapid Transit Company and the Long Island Railroad in that respect, and in fact, with all of the more modern elevated or subway properties, and with the idea of making our installation better, if possible, than any other similar service."

New Commutation Rates Between Washington, Baltimore and Annapolis.—On April 1 the Washington, Baltimore & Annapolis Electric Railway established a 60-trip monthly ticket between Washington and Baltimore at $12, a reduction of $1.75 over the old rate. At the same time the company also established a rate of $12 for 60-trip tickets between Washington and Annapolis. This is a reduction of $2 over the previous rate. The company is making a special effort to secure regular commuters, and as part of the company's campaign G. H. Gall, general passenger agent, addressed the following letter to government employees at Washington who reside in Baltimore: "Your name has been given to me as a daily traveler between Baltimore and Washington. I beg to call your attention to a new rate and service which we shall put into effect on April 1. The rate will be $12 for a 60-day monthly ticket, good between the District line and Baltimore. This used in connection with street car tickets at the rate of six for a quarter will make a very low rate, a few cents over $14 a month. The advantage of this rate is that transfers without further cost will be given to any of the connections of the H Street line of the Washington Railway & Electric Company. The new service will consist in a special limited car to leave Baltimore Terminal Station at 7:20 a. m. and reaching White House Station at 8:30 a. m. As the run from that point to the Treasury is but 18 minutes, you will see that there is ample time to reach any department before 9 o'clock. Our equipment was never in such good condition as it is at present, and we feel justified in soliciting your patronage, realizing that you require a thoroughly reliable service. I trust that you may give this your consideration and, after April 1, your patronage. I inclose time card showing various trains. This, however, does not show the new 7:20 car."

Personal Mention

Mr. George W. Lang has resigned as assistant superintendent of the Ottawa (Que.) Electric Railway, to engage in business for himself at Calgary, Alta.

Mr. Bion J. Arnold has been engaged by the Detroit United Railway to make an appraisal of its entire property. Mr. H. A. Foster will assist Mr. Arnold in the work.

Mr. Thomas R. Cummins has resigned as engineer of maintenance of way of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., effective on April 15, to become vice-president and general manager of the D. Cummins Company, Conneaut, Ohio, packers.

Mr. Dumont Clarke, president of the American Exchange National Bank, New York; Mr. A. A. Tilney, of Harvey Fisk & Sons, New York, and Mr. Charles Francis Adams, 2d, Boston, have been elected directors of the Hudson & Manhattan Railroad, New York, to succeed Mr. G. M. Lane, Mr. Cornelius Vanderbilt and Mr. Andrew Freedman.

Mr. George W. Wells, who for the last two years has been superintendent of the mechanical department of the West Penn Railways, Connellsville, Pa., has resigned from that company to become manager of the electrical department of the H. W. Johns-Manville Company in New Orleans. Mr. Wells is a native of Boston. He took the shop course at the Lynn Works of the General Electric Company and afterwards served in the engineering and sales departments of the company. Subsequently he entered the employ of Stone & Webster, Boston, Mass., and was manager of the electric lighting and street railway systems in Tampa, Fla. Mr. Wells' past experience has equipped him splendidly for his new duties with the H. W. Johns-Manville Company, and the officers and employees of the West Penn Railways expressed regret at his resignation.

Hon. James F. Shaw, president of the American Street & Interurban Railway Association and State Senator of Massachusetts, is being credited in the Massachusetts papers with a large part of the credit for the election last week to the State treasurership of Senator Elmer A. Stevens, the successful candidate. Up to within recently Senator Shaw had not expressed his preferences in the contest, but shortly before the election announced his position in favor of Senator Stevens, and the election was carried owing largely to this endorsement. Senator Shaw has taken a prominent part in Massachusetts legislative matters during the present session. One of his bills which has been exciting a great deal of interest and popular support, and which is now before the Legislature, authorizes the voters to express their choice for United States Senator at the time of the election of members to the Legislature. Senator Shaw believes that this is the closest possible approximation to direct election of United States Senators by the voters under the constitution. The measure is receiving wide popular support throughout the State.

OBITUARY

E. I. Robinson, formerly of the Laclede Car Company, died in St. Louis on April 10, after a lingering illness of two years. Mr. Robinson was of Scotch parentage and birth and was brought to the United States by his parents when a baby. He was 60 years old at the time of his death, and had been a widower for nine years. He was the father of nine children. For the greater part of his life he was engaged in the manufacture of street cars, and for many years was vice-president and general manager of the Laclede Car Company, St. Louis. He remained with that company until five years ago, when he sold his interests along with other stockholders to the St. Louis Car Company. He remained with the St. Louis Car Company for a short time after the purchase, as manager of its Laclede works.

William Sutton died suddenly a few days ago from heart failure at his country home near Baden, Mo. Mr. Sutton was a native of England, and came to America at the age of 18. He began his career with the Jackson & Sharp Car Works, Wilmington, Del. Later he became chief draftsman of The J. G. Brill Company, Philadelphia, and subsequently general superintendent of that company. Twenty-three years ago he located in St. Louis as superintendent of the Brownell Car Company. Later he organized the Laclede Car Company, which was absorbed by the St. Louis Car Company. Mr. Sutton also assisted in organizing the American Car Company, which was absorbed by The J. G. Brill Company. Six years ago Mr. Sutton became chief mechanical engineer of the St. Louis Car Company. He retired from business in October, 1908, and lived on his estate near Baden.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (* indicates a project not previously reported.

RECENT INCORPORATIONS

***Arkansas Co-operative Construction Company, Bentonville, Ark.**—Incorporated to build a standard gage electric interurban railway from Joplin, Mo., to northwest Arkansas, about 200 miles. Officers: Winlock Morris, president; H. A. Luekens, vice-president; J. W. Blocher, secretary; Dwight Dickson, treasurer; P. H. Sackett, chief engineer.

Blue Valley Traction Company, Kansas City, Mo.—Incorporated to construct an electric railway from Raytown, Jackson County, to Kansas City, a distance of 10 miles. Capital stock, $300,000. Stockholders: U. S. Epperson, J. M. Lowe, E. M. Sweetman, C. C. Carver, Sam T. McDermott James W. Jones, J. M. Devine, H. H. Dixon and C. W. Gorman, all of Kansas City, Mo. [E. R. J., April 10, '09.]

***Montana Rapid Transit Company, Helena, Mont.**—Incorporated to build an electric railway, 72 miles long, from Helena to East Helena, Jefferson, Boulder, Basin Calvin to Butte. Two branches are planned, one into the camp of Corbin, and the other from East Helena to Lakeview on Lake Hauser where, it is said, a pleasure resort will be established. It is stated that the preliminary surveys have been made and more than one-half of the right-of-way purchased. Capital stock, $5,000,000. Officers: Joseph K. Toole, president; H. G. Pickett, vice-president; E. C. Day, secretary.

***Cleveland Subway Company, Cleveland, Ohio.**—Incorporated to construct electric railways under all the principal streets of Cleveland, including Euclid and Superior Streets, Clear and Cedar Avenues, Broadway, Detroit Avenue, etc. Application for a franchise was filed with the City Council on April 5. Capital stock, $10,000. Incorporators: F. A. Mehling, W. A. Greenland, A. L. Lang, William C. Fischer and Thomas P. Schmidt.

***Oklahoma Union Traction Company, Tulsa, Okla.**—Chartered to construct an electric interurban railway from Tulsa to Sapulpa, passing through the counties of Creek and Tulsa, a distance of 20 miles. Capital stock, $100,000. Incorporators: Albert A. Small, C. L. Holland, E. T. Tucker, G. C. Stebbins and S. A. Orcutt, all of Tulsa.

***Philadelphia Suburban Traction Company, Philadelphia, Pa.**—Application will be made on April 27 for a charter for this company to build an electric street railway from Southampton to Hatboro. The applicants are: W. E. Watt, J. L. Grogan, H. C. Case, J. A. Bonnell and W. A. Merrisk, Newtown.

FRANCHISES

San Francisco, Cal.—It is stated that Frank D. Stringham, who recently applied to the Board of Supervisors for a franchise for a street railway from Stockton Street and Market Street to the Bay, has filed an additional application asking for permission to construct a street railway on East Street from the junction of Bay Street to the Presidio. [E. R. J., Feb. 6, '09.]

Lawrence, Kan.—The City Council has granted C. C. Sullivan, representing Dayton, Ohio, capitalists a franchise for an electric street railway in Lawrence. W. Laming, representing the Kansas City & Kansas Southwestern Railway was also granted a franchise for an interurban railway through the city.

Charlotte, N. C.—David Barry, Amherst, Mass., and James W. Barry have been granted a franchise to build an electric railway in Concord and Cabarus County. [E. R. J., Dec. 26, '08.]

***Portland, Ore.**—The Western Oregon Trust Company has applied to the County Commissioners for a franchise for an electric railway on the Barnes road extending from the present terminus at the City Park on Washington Street.

Chehalis, Wash.—The City Council has granted the Twin City Light & Power Company a franchise to build an electric railway in Chehalis. [E. R. J., March 27, '09.]

North Yakima, Wash.—The Yakima Valley Transportation Company has applied for a franchise to use the roads of the Fruitvale district for two extensions, each of which is to be about 3 miles long.

***Seattle, Wash.**—D. C. Conover and E. P. Moran have applied to the County Commissioners for a franchise to construct an electric railway on one of the county roads between Bellevue on the east shore of Lake Washington and a point on the west shore of Lake Sammamish. A

franchise is also asked for a branch line from Medina landing on Lake Washington, 2 miles, to a junction with the main line, also another branch line 1½ miles long.

TRACK AND ROADWAY

*Talladega, Ala.—It is reported that the Alabama Power Development Company is planning to construct an electric railway from Talladega to the shoals, 9 miles, and thence through Lincoln to the Coosa River to a point below Greensport.

Atlanta Northeastern Railroad, Atlanta, Ga.—J. L. Murphy writes that this company is planning to start work during the summer on the projected railway between Atlanta, Roswell, Alpharetta and Cumming, 47 miles. Steam will be used for hauling freight and it is probable that either electricity or gasoline motor cars will be used for passenger service. Principal office, Candler Building, Atlanta. Officers: J. P. Brooke, Alpharetta, president; Robert P. Jones, Equitable Building, Atlanta, vice-president; J. L. Murphy, Candler Building, Atlanta, secretary; W. T. Spalding, Candler Building, treasurer; M. Mason, Terminal Station, Atlanta, chief engineer. [E. R. J., March 13, '09.]

Lewiston Terminal Company, Ltd., Lewiston, Idaho.—This company, which was recently incorporated to build a street railway in Lewiston, has elected the following officers: M. A. Means, president and general manager; H. G. Darwin, vice-president; E. C. Smith, secretary and treasurer. Material for the construction of 6000 ft. of track, which will be laid simultaneously with the pavement, is being assembled and it is stated that work will be begun just as soon as the City Council grants the franchise. [E. R. J., April 3, '09.]

DeKalb Midland Railway, DeKalb, Ill.—H. J. Burdick writes that this company proposes to construct an electric railway from DeKalb to Sandwich, via Elva, Waterman and Somonauk. It is expected that construction work will be started about July 1. Power will be purchased. Headquarters, 1741 Railway Exchange Building, Chicago. Capital stock, $150,000. Officers: John F. Pearce, Chicago, prisedent; H. J. Burdick, Elgin, vice-president and treasurer; J. W. McQueen, Elgin, secretary; O. F. Cole, Chicago, chief engineer. [E. R. J., Feb. 20, '09.]

Calumet Traction Company, Hammond, Ind.—This company, which was recently incorporated to construct an electric railway from Hammond to East Chicago, North Calumet and Center, has changed its name to that of the Indiana & Chicago Traction Company. W. J. Riley, East Chicago, secretary.

Logansport, Frankfort & Indianapolis Traction Company, Logansport, Ind.—A. A. Newer, Logansport, advises that this company expects to let contracts for the building of its proposed railway by Aug. 1. It will be 39 miles in length and will extend from Logansport to Frankfort, via Deer Creek, Young America, Burlington, Michigantown, Carroll and Middlefork. At Frankfort connection will be made with the lines extending into Indianapolis. The Strang gasoline motor system is being considered. It is proposed to transport both passengers and freight. A repair shop will be built at Burlington, where the company also plans to establish an amusement park. Officers have not yet been elected. Capital stock, $100,000. [E. R. J., Nov. 21, '08.]

Terre Haute & Southwestern Railway, Terre Haute, Ind.—H. C. Pugh, president, advises that this company contemplates building a steam railroad and not an electric railway, as was noted in the Electric Railway Journal of Feb. 20, 1909.

Kansas City-Western Railway, Kansas City, Kan.—It is stated that this company will make several improvements to its railway at Brenner Heights during the next 30 days, which will include the construction of a depot, side tracks sufficient to accommodate 20 cars, and a loop. J. W. Richardson, general superintendent.

Kensington (Md.) Railway.—This company is said to contemplate the construction of an extension from Kensington to Sandy Spring. The first section to be built will be 4 miles in length and will extend from Kensington to a point on the Brookeville turnpike about 1 mile above Glenmont.

Excelsior Springs & Suburban Railway, Excelsior Springs, Mo.—It is reported that Henry J. Arnold, Denver, Col., has purchased from W. A. Bell, a controlling interest in this proposed electric railway. It is said that Mr. Arnold will push the construction of the railway which is to connect Excelsior Springs and the Chicago, Milwaukee & St. Paul Railroad, a distance of 2½ miles.

South Flatbush Street Railway, Brooklyn, N. Y.—J. J. Boughman states that this company expects to start construction work about June 1 on its proposed 3-mile street railway from the Brighton Beach line of the Brooklyn Union Elevated Railroad, at Avenue Q to Avenue Q and Flatbush Avenue, Brooklyn. Two cars will be operated. Power will be rented from the Brooklyn Rapid Transit Company. Capital stock, $30,000. Officers: L. S. Sadler, Carlisle, Pa., president; J. C. Langdon, 180 Montague Street, Brooklyn, secretary; J. J. Boughman, New Cumberland, Pa., treasurer and general manager. [E. R. J., Feb. 13, '09]

Elmira Water, Light & Traction Company, Elmira, N. Y.—This company, it is reported, will spend $150,000 in track improvements this year. It is said to be the intention of the company to relay its track with heavier rails on a large part of its railway.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—This company has awarded to I. A. Hodge & Company, Inc., Syracuse, the contract for the construction of its proposed railway from a point between Jordan and Memphis to a line of the Syracuse, Lakeshore & Northern Railroad at Lakeland.

Genesee & Orleans Electric Railway, Rochester, N. Y.—The project of building this electric railway from Batavia north to Oak Orchard Harbor on Lake Ontario via Albion, a distance of 30 miles, is said to have been revived and is being energetically pushed by Geo. W. Mische, Rochester, with intention of commencing construction this summer. The railway will be standard gage, laid with 80-lb. rails and is to be operated by electricity, using Niagara Falls power. [S. R. J., Sept. 7, '07.]

*Elizabeth City, N. C.—It is reported that D. G. Wilson, Weeksville, is interested in a proposition to build an electric railway from Elizabeth City to Albemarle Sound, 14 miles.

Goldsboro (N. C.) Traction Company.—This company advises that it has about completed a 2½-mile street railway in Goldsboro, extending from the Union depot through East Goldsboro to Rivilo Park, which is owned by the company. Plans are now being considered for the immediate extension of this line to Swan Springs and White Hall, a distance of 16 miles. Four cars will be operated. A repair shop will be erected in East Goldsboro. Headquarters: National Bank Building, Goldsboro. Capital stock authorized, $150,000; issued, $45,000; bonds authorized, $200,000. Officers: E. T. Oliver, Raleigh, president and general manager; S. L. Blackburn, Richmond, Va., vice-president and electrical engineer; J. S. Oliver, Goldsboro, secretary and treasurer; E. R. Austin, Goldsboro, superintendent. [E. R. J., Jan. 23, '09.]

Washington Investment Company, Washington, N. C.—W. E. Jones writes that this company will start construction work at once on its proposed 4 1/3-mile electric street railway in Washington which will also reach Suburban Park, at Washington Heights. It is reported that contracts have already been awarded and the material is now being delivered. A power station and a repair shop will be erected at Washington Heights. Three cars will be operated. Capital stock, authorized, $100,000. Bonds, authorized and issued, $65,000. Officers: W. E. Jones, president and general manager; Isaac Buck, vice-president; George A. Spencer, secretary and treasurer, all of Washington. [E. R. J., April 4, '08.]

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.—This company announces that it expects to be prepared to let contracts about May 15 for the construction of its proposed electric railway, which is to connect Urichsville and Wheeling, W. Va., a distance of 55 miles. It is planned to start construction work June 1. The surveys have been made and 13 per cent of the right-of-way has been secured. Franchises have been obtained from several towns. A. E. Townsend, Cadiz, president and general manager; J. E. Tiffany, Cadiz, chief engineer. [E. R. J., Jan. 2, '09.]

Springfield, Wilmington & Cincinnati Railway, Cincinnati, Ohio.—The proceeds of a mortgage in favor of the Carnegie Trust Company, New York, N. Y., to secure $5,000,000 of bonds will be used by this company to purchase a private right of way from Springfield to Norwood, and to construct an electric railway and terminals. B. M. Barr, president, and H. D. Emerson, secretary.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Engineers in the employ of this company have reached Upper Sandusky the latter part of the week in locating a line that will connect with one which already has an entrance to Toledo. Two routes are being considered. One extends from Marion by way of Carey to Findlay, where it would connect with the Toledo Urban & Interurban Railway, and the other extends from Marion to Fostoria where connection would be made with the Toledo, Fostoria & Findlay Railway. [E. R. J., April 3, '09.]

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.—It is reported that this company will overhaul its line between Findlay and Fostoria during the next few months, and relay about 5000 new ties and lengthen several sidings.

Valley Electric Railway, Hood River, Ore.—H. B. Langille advises that this company has been organized for the purpose of making preliminary arrangements for the construction of a 20-mile electric railway to connect Hood River on the line of the Oregon Railroad & Navigation Company and the Mount Hood region. It is the intention to organize a permanent company after the plans and estimates have been completed. The surveys are now under way. Power will probably be purchased from the Watt Development Company. Preliminary capital stock, $5,000. Officers: E. T. Folts, Hood River, president; A. M. Kelly, Mount Hood, vice-president; H. B. Langille, Hood River, secretary; G. W. Dimmick, Mount Hood, treasurer; H. B. Langille, Hood River, chief engineer. [E. R. J., March 27, '09.]

Oregon Electric Railway, Portland, Ore.—It is reported that this company is planning to spend $200,000 for improvements to its railway this year. This work will consist of completing the ballasting of the railway, station buildings at Forest Grove and Hillsboro, and terminal facilities at Forest Grove. G. W. Talbot, general manager of the company, is quoted as saying that surveys of proposed extensions will be completed within the next 90 days. By that time it will be decided on when work will be started on further extensions of the system. Two surveys are now going forward. One is to Eugene from Albany, and another from a junction with the main line near Tigardville to Newberg and Dallas. The survey from Salem to Albany is practically completed. The mileage of these proposed extensions is about 90.

Oklahoma Midland Electric Railway, Hobart, Okla.—It is stated that this company is in the market for 330 tons of 70-lb. T-rails and 30,000 ties. Address 207 East Fourth Street, Hobart. H. H. Hoover, president.

Oklahoma, Kansas & Missouri Interurban Railway, Miami, Okla.—This company announces that it is making surveys for an extension from Miami to Joplin, Mo. About 5½ miles of track are now completed between Miami and North Miami. It is the intention to operate gasoline motor cars for passenger service and steam for the transportation of freight. Principal office, Miami. Capital stock, authorized, $200,000; issued, $100,000. Franklin M. Smith, Joplin, Mo., president; William Phillie, Miami, secretary. [E. R. J., Sept. 26, '08.]

Cumberland Railway, Carlisle, Pa.—This company is reported to have awarded a contract to the Carlisle Construction Company for the building of its proposed electric railway from Carlisle to Newtonville, a distance of 12 miles. W. E. Glatfelter, Balfour, president. [E. R. J., April 10, '09.]

Laurens, S. C.—A. C. Todd, who was appointed on the committee of incorporation by the Commercial Club to look into the feasibility of building an electric railway, writes that at the present time the proposition is only being considered and that a permanent organization will be perfected in the near future. [E. R. J., April 3, '09.]

Bryan, Tex.—It is reported that J. T. Maloney, Mayor, has offered on behalf of himself and associates to build a 5-mile electric railway from Bryan to College Station, if the citizens will raise a bonus of $10,000. A committee has been appointed with G. S. Parker, chairman, to raise the necessary amount. [E. R. J., Jan. 30, '09.]

El Paso & Fort Hancock Railway, El Paso, Tex.—W. B. Latta advises that this company is making preliminary arrangements for starting construction work on its projected electric railway. It will extend from El Paso to Fabens, 32 miles, but the section extending from El Paso to Ysleta will be built first. Incorporation papers will be filed within a few weeks. Officers: C. N. Bassett, president; Felix Martinez, vice-president; Thomas O'Keefe, secretary; W. Cooley, treasurer, all of El Paso. [E. R. J., April 10, '09.]

***Gainesville, Tex.**—It is stated that the Commercial Club of Gainesville has decided to accept the proposition of capitalists to build a street railway in Gainesville. A committee, composed of J. T. Edwards, Will McKenzie, R. R. Bell and S. M. King, has been appointed to complete all arrangements for the proposed railway. Gasoline electric cars will be operated.

Missouri, Tennessee & Georgia Railroad, Humboldt, Tenn.—This company announces that it has again taken up the project of constructing an electric railway from Humboldt to Dyersburg, via Crockett Mills, Friendship and Bonicord, a distance of 35 miles. A power station and a repair shop will be built at Humboldt. Power will be furnished for lighting and other purposes. Capital stock, $1,000,000. Officers: I. H. Dungan, president and general manager; C. H. Ferrell, vice-president; O. C. Sharp, treasurer, all of Humboldt. [S. R. J., Oct. 12, '07.]

***Rockdale, Tex.**—It is reported that an interurban railway is being projected at Rockdale to connect Rockdale with Granger. H. C. Meyer, C. L. Tanner, R. H. Hicks and J. F. Coffield, all of Rockdale, are interested in the project.

Salt Lake & Ogden Railroad, Salt Lake City, Utah.—This company, which is electrifying its steam railway operating between Salt Lake City and Ogden, advises that the preliminary work necessary for the work contemplated is well under way. H. A. Strauss, Stock Exchange Building, Chicago, Ill., consulting engineer of the company, states that it has already purchased the feeder copper, 0000 grooved trolley wire, trolley poles and galvanized span wire and is daily making additional purchases of supplies.

Clintwood, Va.—Columbus Phipps, Clintwood, informs the Electric Railway Journal that a company has not yet been organized to build the proposed 6½-mile electric street railway from Clintwood to the railroad station. Construction work will be started as soon as grading is begun on the Carolina, Clinchfield & Ohio River Railroad Company's extension through Dickinson County down the McClure River. A power station will be built on the Crowe's Nest River, 2 miles from Clintwood, and the repair snops will be located at Clintwood. [E. R. J., April 3, '09.]

Weston, W. Va.—George I. Keener, who was recently granted a franchise by the County Court for an electric railway between Weston and Bendale, writes that the City Council of Weston has a franchise grant to the company under consideration. Arrangements are being made for starting construction work within a few weeks. It is proposed to build a power station near Weston and a repair shop in that city. [E. R. J., Jan. 9, '09.]

SHOPS AND BUILDINGS

Central California Traction Company, Sacramento, Cal.—It is stated that this company is planning to erect a car shop, and in the future will build its own cars.

Lowell & Fitchburg Street Railway, Ayer, Mass.—This company advises that it expects to build a new car house to replace the one which was recently destroyed by fire.

Old Colony Street Railway, Boston, Mass.—This company is said to be preparing plans for the erection of a paint shop in Fall River, where one of its repair shops is located. The size of the structure will be 150 ft. x 54 ft., and will have four tracks, accommodating 20 cars.

Interborough Rapid Transit Company, New York, N. Y.—Seventeen steel cars of the Interborough Rapid Transit Company were damaged in a fire at the repair shops of the company on April 7. No motor equipments were lost, however. The total damage is placed by the company at $100,000.

Oklahoma (Okla.) Railway.—It is announced that this company will build a new car house and shops. The main car-storage building will be 160 ft. x 100 ft., with eight tracks. The inspection shed will be 200 ft. x 50 ft., with four tracks; the machine shop will be 125 ft. x 85 ft., with one track inside and two outside; the woodworking shop will be 100 ft. x 50 ft., with two tracks; the paint shop will be 45 ft. x 100 ft. The group of buildings and the connecting tracks will cover about 14 acres. All the buildings will be constructed of pressed brick, with concrete roofing, and all will be one story high excepting a small office building, which will be two stories. [E. R. J., Sept. 19, '08.]

POWER HOUSES AND SUBSTATIONS

New York, Auburn & Lansing Railroad, Auburn, N. Y.—It is stated that the company is considering plans for the erection of a new power station on Fall Creek, on the Ithaca end of its railway.

Rochester Railway & Light Company, Rochester, N. Y.—This company has awarded the contract for the new cable towers to be constructed on each side of the harbor at Charlotte. The height of the towers will be 167 ft., and in accordance with the contract the work must be finished by May 20.

Public Service Railway, Newark, N. J.—This company, which was mentioned in the Electric Railway Journal of March 13, 1909, as contemplating the purchase of sundry equipment for its substations, has purchased from the General Electric Company rotary converters with a total capacity of 6500 kw and step-down transformers with a total capacity of 3500 kw. The Public Service Railway has also ordered various switchboard apparatus for use in its various stations from the General Electric Company.

Manufactures & Supplies

ROLLING STOCK

East St. Louis & Suburban Railway, East St. Louis, Ill., has purchased five interurban cars from the St. Louis Car Company.

Tampa-Sulphur Springs Traction Company, Tampa, Fla., has ordered four 12-bench open cars from the American Car Company.

Central Pennsylvania Traction Company, Harrisburg, Pa., has purchased 10 cars. They will be equipped with Consolidated heaters.

Union Light & Power Company, Junction City, Kan., has purchased one new 44-ft. interurban car from the Dorner Railway Equipment Company.

Cairo Electric & Traction Company, Cairo, Ill., it is reported, has purchased six 10-bench single-truck open cars from the American Car Company.

Philadelphia (Pa.) Rapid Transit Company has purchased 106 trucks from the Curtis Motor Truck Company, 100 of which are for surface operation and six for elevated service.

Tide-Water Power Company, Wilmington, N. C., has purchased four 20-ft., single-truck, semi-convertible cars and three 50-ft., double-truck open cars from The J. G. Brill Company.

Grand Valley Railway, Brantford, Ont., is in the market for four sets of double trucks and one set of single trucks. It is reported that an order for some new cars will be placed with the Ottawa Car Company.

Augusta Railway & Electric Company, Augusta, Ga., mentioned in the Electric Railway Journal of March 20, 1909, as contemplating the purchase of new equipment, is reported to be negotiating with car builders for eight single-truck cars for city service.

Indiana Union Traction Company, Anderson, Ind., mentioned in the Electric Railway Journal of March 20, 1909, as being in the market for several ballast cars, has purchased six second-hand side-dump cars from the Hicks Locomotive & Car Works.

Los Angeles & Redondo Railway, Redondo Beach, Cal., it is reported, will construct six new cars in its shops at Redondo Beach, to be equipped with multiple-unit control. These cars will be similar to 10 already in service, built by the company at its shops.

Pittsburg, Harmony, Butler & New Castle Railway, Pittsburg, Pa., mentioned in the Electric Railway Journal of April 10, 1909, as having purchased four cars from the St. Louis Car Company, advises that these cars will be duplicates of the 12 cars recently purchased from the St. Louis Car Company.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, reported in the Electric Railway Journal of April 10, 1909, as being in the market for seven cars, will purchase seven or more 55-ft. interurban cars, trucks, air brakes and other equipment. Bids for these equipments were opened on April 8, 1909.

New York & North Shore Traction Company, Roslyn, N. Y., has ordered three passenger cars from the G. C. Kuhlman Car Company, to be equipped with four GE 40-hp motors each and to be delivered in 60 days. The J. G. Brill Company recently delivered a work car to this company. It will be equipped with four GE 60-hp motors.

Columbus Railway & Light Company, Columbus, Ohio, mentioned in the Electric Railway Journal of April 10, 1909, as being in the market for 20 city cars, has ordered 30 cars of the pay-as-you-enter type from the American Car Company for September delivery. These cars will be mounted on Brill trucks, will have 28-ft. 8-in. car bodies, and will be similar to those which are now in operation in Columbus.

Galveston (Tex.) Electric Company, mentioned in the Electric Railway Journal of Jan. 30, 1909, as being in the market for new equipment, has purchased through Stone & Webster Engineering Corporation, Boston, Mass., 15 cars from the American Car Company. Five of these cars will be 12-bench open Narragansett cars mounted on Brill double trucks, and 10 will be 9-bench open cars mounted on Brill single trucks.

Mason City & Clear Lake Railway, Mason City, Ia., which was reported in the Electric Railway Journal of Jan. 9, 1909, as being in the market for two interurban cars, is reported to have placed an order some time ago with the American Car Company for these equipments. The company is also reported to have purchased in the East three additional interurban cars, 57 ft. long, which have been delivered. Each of these five cars will be equipped with Westinghouse type AMM automatic air brakes.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y., mentioned in the Electric Railway Journal of March 20, 1909, as having purchased eight cars from The J. G. Brill Company, through Meikleham & Dinsmore, New York, advises that 13 double-truck closed cars were ordered from Wason Manufacturing Company. The cars will have an over-all length of 47 ft., a body length of 36 ft. and a seating capacity of 50. In addition to the details given in previous items the following specifications were drawn:

Weight .....54,000 lb.	Curtain fixtures..... Curtain Supply Company
Wheel base.....6 ft. 6 in.	Curtain material.. Pantasote
Width over all.....8 ft. 6 in.	Destination signs....Illuminated
Height, sill to base.....12 ft.	Gongs ..... Dedenda
Body ..... wood	Journal boxes... Symington
Underframe.wood and metal	Motors GE-216
Axles ..... Hammond	Roofs ..Agasote headlinings
Bolsters ..... body	Step treads....Mason safety
Bolsters, truck.....cast steel	
Control system..GE, type M	
Couplers .....Van Dorn	

The company may, later on, purchase some single-truck cars.

British Columbia Electric Railway, Vancouver, B. C., mentioned in the Electric Railway Journal of Jan. 23, 1909, as building 18 cars in its shops, advises that 24 cars are being constructed. They will be 43 ft. 4 in. over all, will seat 48 and will weigh, complete, 19 tons. The company states that six of these cars will be finished in May, 1909, the others following. It may convert the cars into the pay-as-you-enter type. Other details of interest follow:

Wheel base.....4 ft. 6 in.	Fare boxes ..... Coleman
Length of body...30 ft. 2 in.	Fenders.....B. C. Electric Railway
Over vestibule....42 ft. 4 in.	Gongs ..Adams & Westlake No. 36
Width inside.....8 ft. 3 in.	Hand brakes...Beverly head
Over all.....8 ft. 7¾ in.	Motors....Canadian Electric Company, No. 67
Height inside....8 ft. 6¾ in.	Paint ..... Valentine
Sill to trolley base.....9 ft. 6¾ in.	Sanders...B. C. Electric Ry.
Height from top of rail to sills ..... 33 in.	Sash fixtures.....Adams & Westlake
Body ..... wood	Seats ..Slatted, spindle back
Underframe.wood and metal	Trolley retrievers ...Knutson, No. 2
Air brakes ...Westinghouse	Trolley attachments ...Nuttall, standard base
Car trimmings.....Adams & Westlake	Trucks ..... Brill
Control system .....GE	Varnish ... Noble & Hoares
Couplers ..... Tomlinson Autoradial	Ventilators ..... Automatic Ventilator Company.
Curtain fixtures ... Curtain Supply Company	
Curtain material ..Pantasote	

TRADE NOTES

American Creosote Works, Ltd., New Orleans, La., has changed its name to the American Creosote Works, Inc.

California Pole & Piling Company, San Francisco, Cal., has removed its San Francisco office from 25 California Street to the Fife Building.

Wonham, Magor & Sanger, New York, N. Y., have closed a contract with the Chicago City Railway to equip all the cars of that company with the "H.B." wheelguard.

H. B. Kirkland Company, 253 Broadway, New York, N. Y., has been appointed the New York sales agent for the product of the Chicago Mica Company, Valparaiso, Ind.

Automatic Car Coupler Company, Los Angeles, Cal., has been incorporated by F. R. Bonney, F. H. Norwood, W. H. Soale, K. Elliott and C. H. Wills, with a capitalization of $50,000.

Dorner Railway Equipment Company, Chicago, Ill., has received an order from the Manhattan City Railway Company, of Manhattan, Kan., for four second-hand closed trailers.

National Lock Washer Company, Newark, N. J., supplying its National "Balance" Curtain Fixture for 200 cars recently ordered by the Third Avenue Railroad Company, New York.

American Bridge Company, New York, N. Y., has been awarded the contract for 1100 tons of structural steel for the new warehouse of the H. W. Johns-Manville Company, New York, at Milwaukee, Wis.

E. W. Pittman, formerly of the Pittsburg Construction Company, has entered the service of the McClintic-Marshall Construction Company, Pittsburg, and is now in charge of the St. Louis office of the latter.

T. N. May, New York, N. Y., has established an office

at 2 Rector Street, where he now is carrying on a general railway equipment and supply business. Mr. May was formerly with the Christensen Engineering Company, the Consolidated Car Heating Company and the Brady Brass Company, New York.

G. S. Ackley, president of the National Brake Company, Buffalo, N. Y., returned to this country on the *Mauretania* on April 3, after an extended business trip abroad in connection with the new Ackley Adjustable brake.

Delta Electric & Manufacturing Company, Chicago, Ill., has been incorporated with a capitalization of $5,000 to manufacture and sell electrical machinery and appliances. The incorporators are Weldell P. Slayton, Harry E. Kiefer and Frank L. Belknap.

Empire Car Company, Chicago, Ill., has been incorporated with a capitalization of $15,000 to build and repair railway cars and to manufacture and sell machinery. Joseph B. Koon, P. J. Minogue and M. F. Sullivan are the incorporators.

Botanical Decorating Company, Chicago, Ill., manufacturer of natural preserved plants, artificial flowers, vines, paper novelties and Japanese and papier-mache decorations, will remove its business from 271 Wabash Avenue, Chicago, to 310 Fifth Avenue, Chicago, on May 1.

Jordan Brothers, Inc., New York, N. Y., were mentioned in the issue of April 10 as having received an order for a rotary converter from the Public Service Corporation of New Jersey for its Montclair substation. The item should have stated that the company had received an order for a commutator truing device for the converter described.

W. R. Garton Company, Chicago, Ill., has secured the order for the catenary material of the Chicago, Ottawa & Peoria Railway. The order was taken by the Garton Company in behalf of the Electric Railway Equipment Company, Cincinnati, of which it is the Central Western agent. Several notices in regard to the construction of this railway have appeared in these columns.

Buckeye Engine Company, Salem, Ohio, announces the appointment of Louis Bendit as Kansas City sales manager, with offices at 504 New York Life Building, and J. R. Detweiler, district manager, Wichita, Kan., with offices at 505 Barnes Building. The company has had 62 years of steam engine experience and is also building gas engines suitable for natural or producer gas in various sizes up to 5000-hp units. The steam engines are built in simple, tandem or cross compound types up to 8000-hp units.

Dossert & Company, New York, N. Y., report the receipt of the following large orders recently: 200 solderless, 500,000 circ. mil cable taps, from Chicago City Railway; cable taps for 1,000,000 circ. mil cable, from the Grand Trunk Railway System; 100 large cable taps from the Capital Traction Company, Washington, D. C.; 500 solderless two-way cable connectors from the Pressed Steel Car Company, for use on electrically lighted steel passenger cars; 750 Dossert solderless rail bonds from the Illinois Tunnel Company.

Duntley Manufacturing Company, Chicago, Ill., recently organized under the laws of Maine with a capitalization of $500,000, has just announced the officers and directors of the permanent organization as follows: President, J. W. Duntley; vice-president, A. W. Maconochie; secretary, F. A. Rautenberg; treasurer, Eugene McComas. Directors: J. W. Duntley, H. W. Davis, M. H. Tichenor, Samuel Deutsch and W. J. Calhoun. The company will manufacture among other things new lines of gasoline handcars and speeders, vacuum cleaners and calculating machines.

American Blower Company, Detroit, Mich., received a letter under date of March 20, 1909, from Provident Chemical Works, St. Louis, Mo., stating that the generator direct-connected to one of the blower company's Type A self-oiling engines, purchased some four or five months before, was doing fine service. The cost of operation has been very small, the company's engineer being confident that it does not exceed $7.50 per month for about 120 16-cp lamps. The owner believes that the cost of the entire outfit will be saved in less than a year's time from date of instalment.

Fred C. Adams, Chicago, Ill., manufacturer of Palustrol disinfectant, states that this product is being successfully used on the South Side Elevated Railway and the Metropolitan West Side Elevated Railroad, Chicago, Ill., and on several of the large steam railways which have headquarters in Chicago. Palustrol is a product recommended by medical men to destroy all contagious germs. It has been used in the Cook County consumptive hospital, Chicago, Ill., with success for the past three years. Mr. Adams states that he will furnish Palustrol free of charge to charitable institutions or hospitals maintained for the benefit of the employees of railway companies.

Albany Car Wheel Company, Albany, N. Y., will begin at once the manufacture of chilled iron wheels for steam and electric cars, having recently acquired a suitable foundry. J. A. Kilpatrick is president of the company. He has been in the wheel business for 30 years and is the general manager of the Canada Iron Corporation, Montreal, Que. J. A. MacIntyre, who has been associated with Mr. Kilpatrick for several years, is superintendent of the Albany Car Wheel Company. J. A. Granger, for a number of years with the New York Car Wheel Works, Buffalo, N. Y., and the Griffin Wheel Company, Chicago, Ill., is in charge of sales in the new company.

Keystone Lubricating Company, Philadelphia, Pa., reports a practical test of the economy of pure mineral grease in electric railway work made by the Providence & Fall River Street Railway Company. A car having a new two-motor equipment, geared for about 25 m. p. h., was supplied with lubricants consisting of 25 lb. of Keystone motor grease for the motor and axle bearings at one end, and an equal weight of the ordinary stock grease, that has hitherto been in use by the road, for these bearings at the other end. The car was then put into regular service. A recent report stated that the entire 25 lb. of the ordinary grease and two-thirds of a second charge of 25 lb. had been consumed, whereas less than one-third of the original charge of Keystone grease had been used up.

Cosmos Lubricating Company, Chicago, Ill., is making a lubricating oil which is said to be especially adapted to railway work. The oil has withstood a fire test of 1200 deg. Fahr., has a viscosity of between 580 and 625 deg., and a cold test of between 10 and 14 deg. Fahr., according to the grade of the oil. The grades run from thin to a very heavy oil and from a soft to a hard grease. The combination in one oil of both a high fire test and a low cold test is a feature that is of considerable interest. Another specialty of the Cosmos Lubricating Company is a cylinder oil which it is claimed will not leave a deposit on cylinders. The plant of the company in Chicago is at 9-15 North Ada Street. The directors of the company are J. G. Wiegand, C. H. Wiegand, D. E. Patterson, H. A. Ellithorpe and Charles Heywood.

Climax Stockguard Company, Canton, Ohio, announces that the company has been re-incorporated under the name of the Climax Railway Supply Company. The general offices will remain at Canton, Ohio, and the general sales office, heretofore located at 503 Title & Trust Building, has been moved to 570 Old Colony Building, Chicago, Ill. In addition to marketing the clay and metal cattle guards and the farm-crossing gates which the company manufactures, the new company will act as Western representative of the Nachod Signal Company, the Bonney Vehslage Tool Company, and as the railroad representative of the Durand Steel Locker Company. The officers of the company are H. B. Stewart, president; William Simpson, secretary and treasurer; Fred B. Stewart, vice-president and general manager.

ADVERTISING LITERATURE

Barrett Manufacturing Company, New York, has printed a standard form of roof specification embodying the use of Barrett tarred felt.

Westinghouse Air Brake Company, Pittsburg, Pa., has printed instruction pamphlet No. 5030 on the Type K triple valve. This publication supersedes the issue of May, 1907.

B. F. Sturtevant Company, Hyde Park, Mass., is distributing Bulletins Nos. 161 and 163 respectively, describing economizers as used in the power plants of textile and steel mills.

National Machinery & Wrecking Company, Cleveland, Ohio, has recently published a special bargain list on second-hand railway apparatus, including engines, generators and street car motors.

Delta Electric & Manufacturing Company, 304 Commercial National Bank Building, Chicago, Ill., is distributing a small folder calling attention to its Universal non-inductive ground point, and of the wrench used in installing the point.

Williams Gauge Company, Pittsburg, Pa., is prepared to send on request its publication entitled "Is the Economic Operation of Your Power Plant a Problem?" The booklet discusses the value of the Williams feed-water regulator, steam-operated trap, pump governor and water gage.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued pamphlet No. 14, on compact type series and bridging dry battery wall telephones and two-piece desk telephones and pamphlet No. 13 on magneto telephones for electric interurban and steam railway despatching systems.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, APRIL 24, 1909 No. 17

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
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NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
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Inheritance in Railway Apparatus and Methods

Modern manufacturing is carried out on such a large scale that many of its products necessarily are compromises not wholly ideal for any individual user, but the best which can be universally employed. The cost of the patterns, dies and tools for each customer's particular wants would be so great that uniformity is financially desirable. On the other hand, the buyer can often afford to alter the equipment in accordance with the peculiar demands upon his road, because such changes are of continuous benefit to him. These facts explain why manufacturers do not avail themselves eagerly of all the apparent improvements made by customers in their products. Nevertheless, there is sometimes a mysterious retention of vestiges of old forms and methods which are carried along from design to design just as the veriform appendix is transmitted from generation to generation. Like the latter, the uses of these parts have disappeared, but not their ability for making trouble. The cove panel on many cars immediately suggests itself as an example. In very crowded and narrow streets the use of a cove panel may occasionally permit a car to pass the hub of a standing vehicle drawn up close to the sidewalk, but in most instances it constitutes an entirely unnecessary expense to the railway company. The old plan of obliging the railway company to pave between its rails and for a short distance each side is another relic of horse-car days. This rule was perfectly proper at one time, but now that the railway company is the only occupant of the streets which does not use the pavement, the continuation of this practice is absurd. In apparatus one finds not infrequently unnecessary joints, contact pieces or other parts because originally they were required and the manufacturer has not yet installed machinery to make them in any other way. Standardization of car parts is desirable, but it should not be synonymous with thoughtless adherence to obsolete forms and methods.

Curve Easements

It is the practice of most interurban railway roadmasters and section foremen to ride over the line on the high-speed cars and make notes of the location of particularly bad joints and hard-riding curves. The section foremen give attention to these defects as they are noted, usually on their own initiative. Low joints can easily be remedied by judicious tamping, but it is a much more difficult matter to correct the errors in alignment which cause cars to ride hard when entering or leaving curves. Nearly all of the high-speed interurban track now being operated was originally built with easement curves. The form of the spiral ends of these curves is mathematically correct and can hardly be improved upon. The variations in radii of the spiral are very slight, and it is not possible to detect errors by the eye alone. The center stakes must be set carefully with the aid of a transit, and, once set, they should be rigidly adhered to. Without a transit, and usually without any idea of the location of the original center lines of the curve, the section foreman squints along the rail with one eye and shifts the track in or out as he thinks best. It is possible to ease off a plain circular curve in this way so that it will ride as smoothly as a curve which is put in with accurate spirals on staked centers. The result, however, is to increase the sharpness of the center of the curve, and oftentimes to improve its riding qualities at one point

to the detriment of the alignment at some other point. It is not an unusual occurrence to find curves anywhere from 3 in to 1 ft. off the centers as originally staked out.

When a car enters or leaves a curve with a lurch, something is wrong with the car itself or with the track alignment. If all the cars behave in the same way, then the fault must lie with the track, and the chief engineer, not the section foreman, should be advised. A re-survey of the curve will usually locate the trouble, which may be either in the alignment near the point of curvature, or the superelevation of the outer rail and the run-off beyond the end of the spiral. Section foremen can be depended upon to bring the track to good surface and alignment on tangents by rule of thumb and good eyesight alone. The best of them, however, cannot approach the accuracy of a transit in correcting bad curves.

Subway Station Design in Massachusetts

By its decision favoring the general character of the stations designed by the Boston Elevated Railway Company for the new subway to be built in Cambridge, Mass., the Railroad Commissioners set the seal of approval upon an important principle of terminal and way station arrangement. Rival plans for these stations were submitted to the board by the engineers of the city of Cambridge, but in finding them less advantageous the board emphasizes the point that, while long walks are a disadvantage in the transfer of passengers between trains and surface cars, congestion is thereby reduced, traffic separated according to its origin and destination, and the general movement of travel facilitated.

The most interesting design from the engineering point of view in connection with the Cambridge stations is that for Harvard Square terminal. The railway company has endeavored to avoid here the features of design which have proved more or less troublesome at the elevated terminal stations built in 1901 at Dudley Street and Sullivan Square. At Dudley Street the surface cars and elevated trains are brought to substantially the same level of tracks, and transfer is free and bodily without check or warrant across platforms separating the two classes of service. Both surface cars and elevated trains pass through the station on looped tracks. At Sullivan Square the elevated trains used a through loop track, but the surface cars are berthed at the ends of stub tracks arranged in the manner familiar to patrons of steam railroad terminals. Only a short platform space separates the trains and cars here, as at Dudley Street. This arrangement undoubtedly makes for rapid transfer between cars and trains when traffic is light, but when the movement of travel through the station is heavy the unrestricted platforms and absence of positive channels along which traffic must move tend to create considerable congestion. Passengers walk or run across the inter-track spaces at cross-purposes, and free, flexible travel is thereby handicapped.

At the Harvard Square station, however, different platforms are provided for the transfer between trains and cars coming from different directions, and these platforms are connected in plan by well-lighted, clean and substantially straight passages, which automatically separate opposing streams of travel, while avoiding ascending stairways except in the climb from the platform nearest the street to the surface. Even this is a short flight, and will be traversed by a comparatively small number of patrons of the road, presumably, since the bulk of the traffic will proceed further on connecting cars. No small advantage of the Harvard Square design is the possibility of holding in close check all tendencies of transportation bargain hunters who exhaust their ingenuity in trying to take a round trip for a single fare. While these passageways are, of course, somewhat long, as pointed out by the commission in its decision, they will clearly be of the greatest value in reducing congestion at times of great travel, especially in connection with the intercollegiate football matches and other games of Harvard University on the adjacent Stadium and Soldiers' Field. Economy of operation will also lie with the plan favored by the company and now accepted by the board.

There can be few engineering problems solved without the sacrifice of at least some desirable conditions, and, as a whole, there is no question that the Harvard Square plan will prove to be an advance over the earlier designs for subway stations under the peculiar conditions of transferring found in Boston. The design of the station at Central Square and, in principle, that at Kendall Square, need not be discussed at this time, as it is a simple case of installing two train tracks between two parallel platforms and arranging for easy access to and from the street above, where transfers can be effected between the cars running on the street level.

Falling Telephone Wires

When electric railways were first constructed it was considered necessary to protect the trolley wires by "guard" wires, but these were found to constitute a graver source of trouble than that which they were intended to prevent, so their use has now disappeared. It is comparatively rare that accidents are caused by foreign wires falling on trolley wires, so that there are not very many decisions in the law covering cases of this kind, but the question came up recently before the Supreme Court of Missouri in a case against the telephone and electric railway companies of Kansas City, both of whom were made defendants.

During an evening storm a telephone wire on one of the electric railway poles, formerly a part of the local telephone system but later abandoned, was broken and fell over the trolley wire and the next morning at 6 o'clock a child was killed by coming accidentally in contact with it. The evidence as to the time at which the wire broke and whether the telephone company had been notified of the accident was conflicting. Two persons the previous evening had noticed that the wires were sagging, but had not broken, and stated that they had called up the telephone company and had notified it of the condition of the wire, but no employee of the company was found to have received this message. The railway company, so far as the evidence went, was ignorant of the fact that its trolley wire was crossed. The court, in the decision which appears in 116 *Southwestern Reporter*, page 528, held that there was nothing to indicate negligence on the part of either of the defendants. It admits that after the public use of the

wire had been discontinued it should have been removed from the railroad pole, but says "the liability for such negligence is governed by the consequence that could reasonably be anticipated to follow from the negligent act." The court did not think anyone would expect that telephone wires carried parallel to a trolley wire and 15 ft. from it would be likely to become crossed with it. Neither did the court consider that the notification by telephone already mentioned was sufficient to involve the telephone company in responsibility for the resulting accident. On this point the court said:

> We are not saying or implying that notice in such case might not be given by telephone, but notice given to some one, without knowing to whom it is, and no evidence that it reached the person or concern for whom the notice was intended, is no notice at all.

As there was nothing to indicate that the railway company had any reason to anticipate or detect the defect and as it occurred at night, when the inspectors were not engaged in their work, blame could not attach to the railway company. It was held, therefore, to be one of those unavoidable accidents for whom no one could be held directly responsible.

As will be seen, stress was laid in the decision upon the kind of notice given each company of the accident, to the extent to which it could have been foreseen and to the care required to have detected it after its occurrence. If, in any one of these points, the defense of either company had been defective it would probably have lost the case. But the law does not presuppose extraordinary wisdom or foresight. The company may have been negligent in letting an unused trolley wire remain on the poles, but if there was but little likelihood, as in this case, of the wire coming in contact with the power wire the lack of care was not sufficient to make the company culpably negligent. If, however, the telephone wire had been carried across the trolley wire, where its contact with the latter would have been a natural result of its breakage, the decision would probably have been different.

The Avoidance of Accidents

Of the unfortunate accidents which have befallen new electric installations the most conspicuous have occurred on newly electrified steam railroads; the public regret which they occasioned is greater only in degree than that which has arisen from other and lesser accidents on smaller properties in other parts of the country. The latest of these was reported last week, the result of a head-on collision on the Chicago, Lake Shore & South Bend Railway.

When a wreck occurs on a railway it is the custom to institute a rigorous inquiry designed to disclose the cause, to locate the responsibility therefor and to make it possible to provide adequate safeguards against the danger of a repetition of accident from the same source. If defective equipment or track appears to have been the cause the repairs which are made may help to raise the standard to which the employees in the departments affected will endeavor thereafter to conform; if the responsibility should be located definitely upon one or more employees the problem of discipline and future prevention is made more complex. If an employee is found to have caused an accident by wilful neglect of ordinary precautions or non-observance of clear and simple rules the utmost that the management can administer in the way of discipline is summary and ignominious discharge. The effect of discipline of an employee because he may have been the careless or the unwitting contributory cause of an accident depends very largely, so far as its influence on the other employees is concerned, upon the extent of their desire to hold their positions in good standing and upon the measure of their personal loyalty to the company and to the officials to whom they report directly. Some men feel the full measure of responsibility for life which they assume when they operate a car filled with passengers; but the negligent, indifferent attitude of a few others is so notorious that the chief inspector of the Railroad Commission of Indiana, who has been painstaking in his efforts to improve the operating methods of railroads, has stated publicly that a law should be passed providing a penalty for employees of electric railways who neglect to observe rules. It is plain that the large majority of employees are reasonably careful in their methods; if they were not the number of accidents on all roads would be startling.

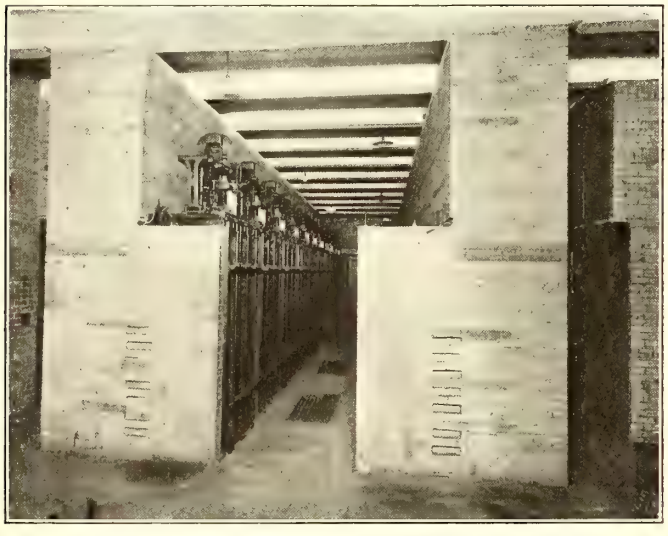
It is easy for the public, without much understanding of the facts, to censure the management of a road which is unfortunate enough to have a wreck involving the loss of life. When a new enterprise is developed or a new property constructed the difficulties of establishing a reliable service are enormous. All of the employees are new to their work, and time, the principal means of separating the careful from the careless, is lacking. This is particularly the case with an electric railway because its revenues are derived from a service that is essentially personal in its character and the mistakes of operation, whether due to faulty methods or to faulty interpretation by the employees of perfect methods, unfortunately affect those who take advantage of the service offered. The manufacturer of a commodity, a desk, for instance, does not have to consider the danger that his product may involve loss of life if his employees should fail to study and observe carefully all the rules which have been formulated for their guidance; but extreme and continual care is required from the operating official of an electric railway.

If any methods can be adopted whereby the danger of operation on a new line may be lessened they should be made part of the preliminary training of initial employees. It is too clear for argument that a new road cannot secure at the outset advantages in the selection of trained employees for important service equal to those enjoyed by a long-established line, which has been able to develop the standard of its men through years of operation. If a new line can supplement its prescribed course of training before starting operation by a preliminary period of rigorous experimentation it will be desirable. Many men without long experience fail to appreciate how fast they travel on a car propelled by electric power or how important it is to give strict compliance to rules for safety which railroad experience has shown to be necessary; effort and expense that may be required to impress employees with these facts will be repaid well.

MAIN SWITCHBOARD OF PRATT STREET POWER STATION, BALTIMORE

An article in the STREET RAILWAY JOURNAL for May 9, 1908, described certain parts of the work of reconstructing and extending the power plant equipment of the United Railways & Electric Company, of Baltimore, which has been carried on during the last two years by L. B. Stillwell under a contract with that company. Those who read this article will remember that the large system of the company, operating some 800 cars, was supplied with power a few years ago from seven power plants equipped exclusively with direct-current apparatus.

The new plants, now approaching completion, provide for the supply of the entire system, with the exception of the Bay Shore service and a small section in the extreme northwesterly portion of the city, from the Pratt Street power house, which has been equipped largely with alternating-current apparatus generating three-phase current at a potential of 13,000 volts. At Bay Shore, a small

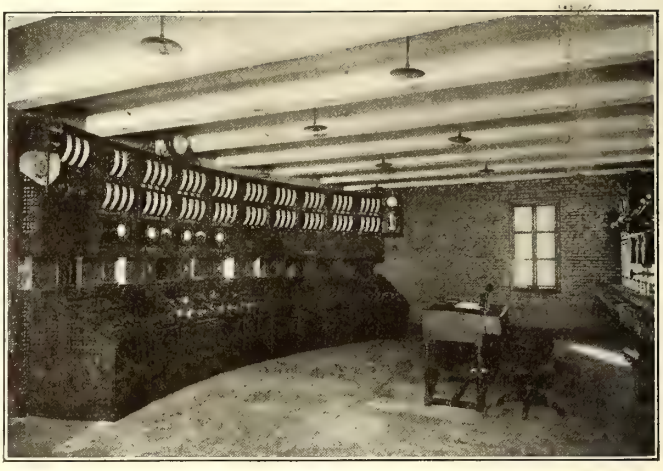


Baltimore Switchboard—Oil-Switch Gallery

direct-current power house co-operates with the Pratt Street supply during the summer months, and at Owings Mills a direct-current equipment of 780 kw supplies lines in the immediate vicinity, which at the present time cannot be supplied advantageously from Pratt Street.

The steam plants which have been shut down have been replaced by substations equipped with transformers and rotary converters, of which five, equipped with high-class modern machinery, are now in operation.

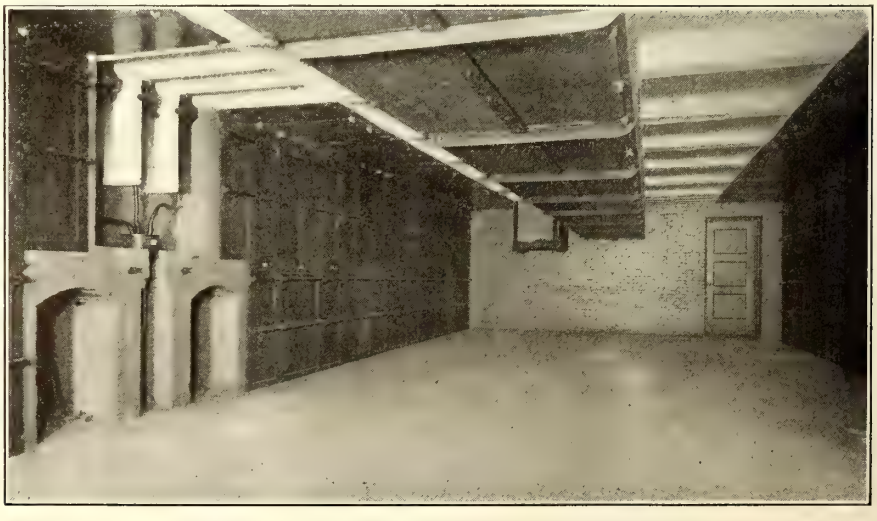
The arrangement of the Pratt Street power house is unusual in the fact that the boiler house is placed between two engine rooms. When the work of reconstruction was undertaken by the present consulting engineers of the company, one of these engine rooms was equipped with five 2000-kw alternators driven by reciprocating engines, while the other contained one 5000-kw engine-driven alternator and three 1800-kw direct-current generators. The work of shortening the power house, which was necessitated by the decision to widen Pratt Street after the Baltimore fire, which involved the need of moving the three 1800-kw direct-current generators and re-erecting them upon new foundations, was described in our previous article, as was also



Baltimore Switchboard—A. C. Control Board

the erection of a second 5000-kw engine-driven alternator and a 5500-kw turbo-alternator.

The problem of switch gear arrangement and connections for operating a plant comprising two widely separated engine rooms equipped with generating units exhibiting great variety both in respect of type and output was still further complicated by the necessity of providing for the utilization of a large amount of power expected to be transmitted from the water-power plant of the McCall Ferry Power Company on the Susquehanna, and by the necessity for continuing the provision for possible interchange of power in case of emergency with the Westport power plant of the Consolidated Electric Light & Power Company. After careful consideration of the conditions, both immediate and prospective, it was decided to erect in engine room No. 1, at Pratt Street power house, a switchboard structure arranged for the ultimate installation of all switch gear, busbars, cables, control apparatus and instruments required not only by the present plant, but by the maximum power equipment which can be constructed on the land owned by the company at Pratt Street, and by a possible 40,000 kw of power from an outside source.



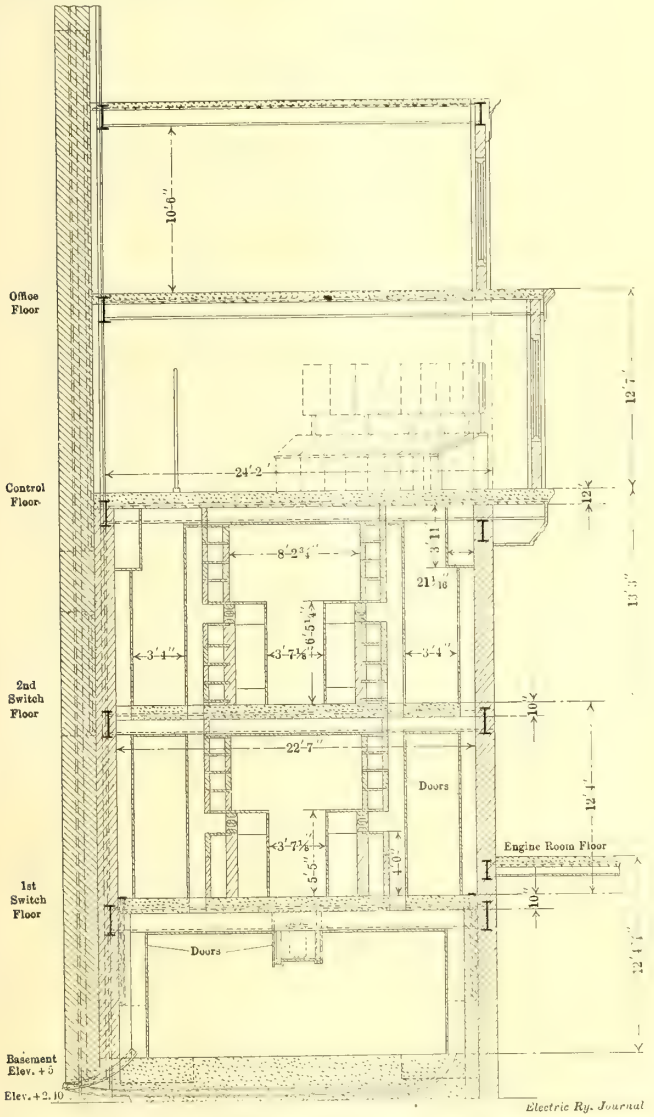
Baltimore Switchboard—View in Basement

The new switchboard is now in successful operation, and it is now possible to supplement the article printed in the issue of May 9, 1908, by a description of this remark-

ably compact, flexible and effective organization of switching apparatus.

The arrangement of the switchboard is such that no wires cross each other, and the runs are, without exception, short and direct. From the basement, where all the feeders leave, up to and throughout the structure, each conductor carrying high-tension current is in a compartment by itself.

The switching structure proper is 25 ft. wide, about 85 ft. long, three stories and basement in height, and is enclosed by a brick wall. The basement is used for all the feeder ends and series transformers required by them. The first floor is used for the main busbars, the group feeder busbars, feeder oil switches, and for the leads from the alternators with their series transformers. On the second floor are located the alternator busbars and oil switches, and the third floor is devoted to the control and operation of all high-tension apparatus, as well as of the exciter, field and auxiliary systems. The fourth floor will be used for offices.

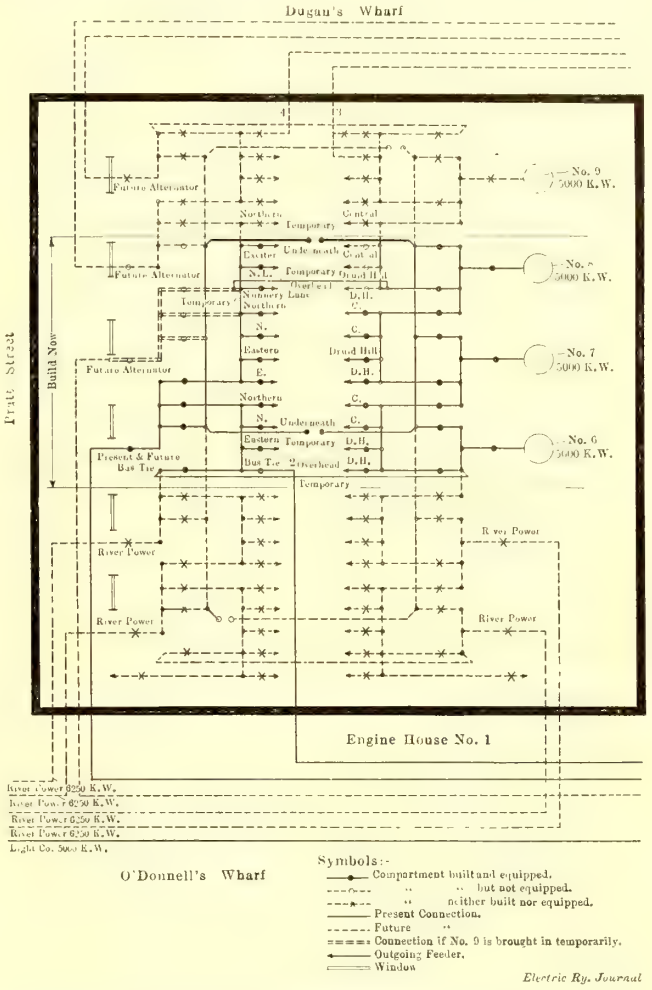


Baltimore Switchboard—Cross-Section Through Oil-Switch and Bus Structure, Control and Office Floors

An elevation in cross-section of the structure is shown above and the arrangement of conductors is given on page 764.

HIGH-TENSION BUSES

The most noteworthy feature of the high-tension bus system used in this structure is its great flexibility. The main busbars form a ring, with disconnecting switches at two points. The alternator and the feeder-group busbars from another ring, each alternator section of which is connected to the main and group busbars through oil switches. By this means, as may be seen by reference to the diagram below, it is possible to by-pass any desired section



Baltimore Switchboard—Single-Line Diagram of High-Tension Connections for Engine House No. 1

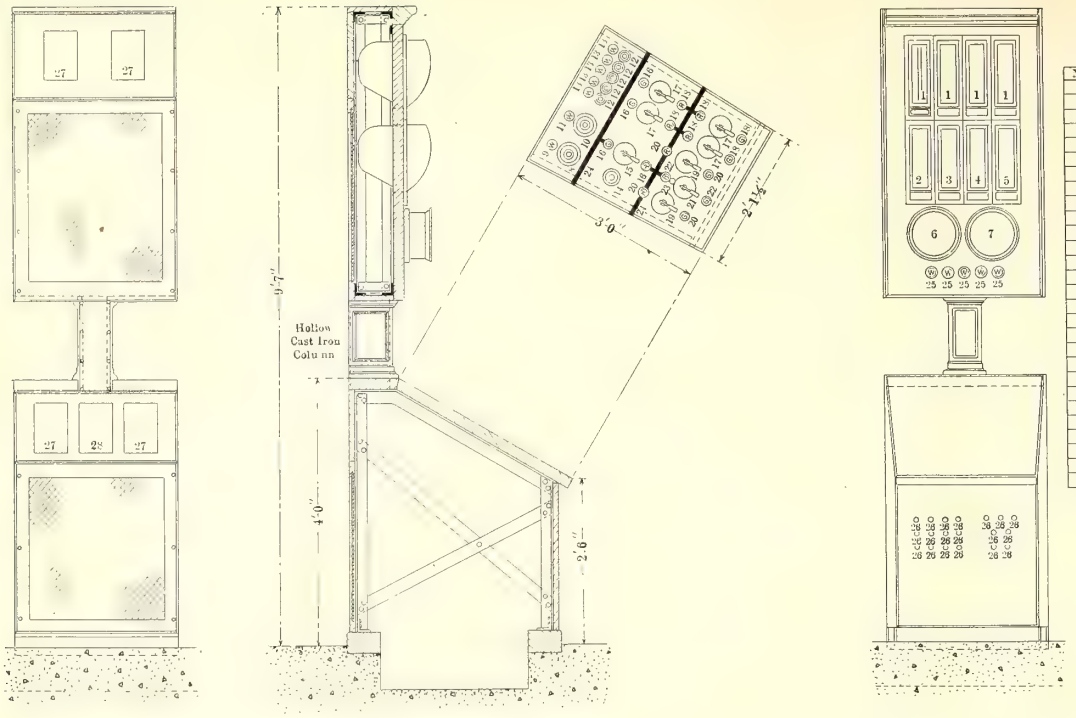
or sections, under almost any conditions, without interfering with the continuity of service on all other sections of the system. The high-tension feeders are taken off the feeder-group buses, there being four feeders connected to each bus. Each generator may be connected to the main bus or to either one or both of two feeder-group buses.

A permanent grounding system is run throughout the switchboard structure, having receptacles at various points to receive flexible leads, for grounding transformer cases, switch bases, all buses, oil switch pots and feeder cables.

HIGH-TENSION CONTROL BOARD

The alternating-current control bench is built in a semicircle comprising 22 sections of black marine-finished slate, and is supported upon a structure of cast iron. Only 10 panels of this bench board are being installed at present, and the five pedestals now in use in the old house are to be transferred to the new control house. One panel of the bench board is shown in detail on the next page.

Miniature buses corresponding diagrammatically to one phase of the high-tension buses are arranged on the control bench. Adjacent to these strips are pilot lights corresponding to the high-tension switches. By noting the lamps burning and their position relative to the copper bus,



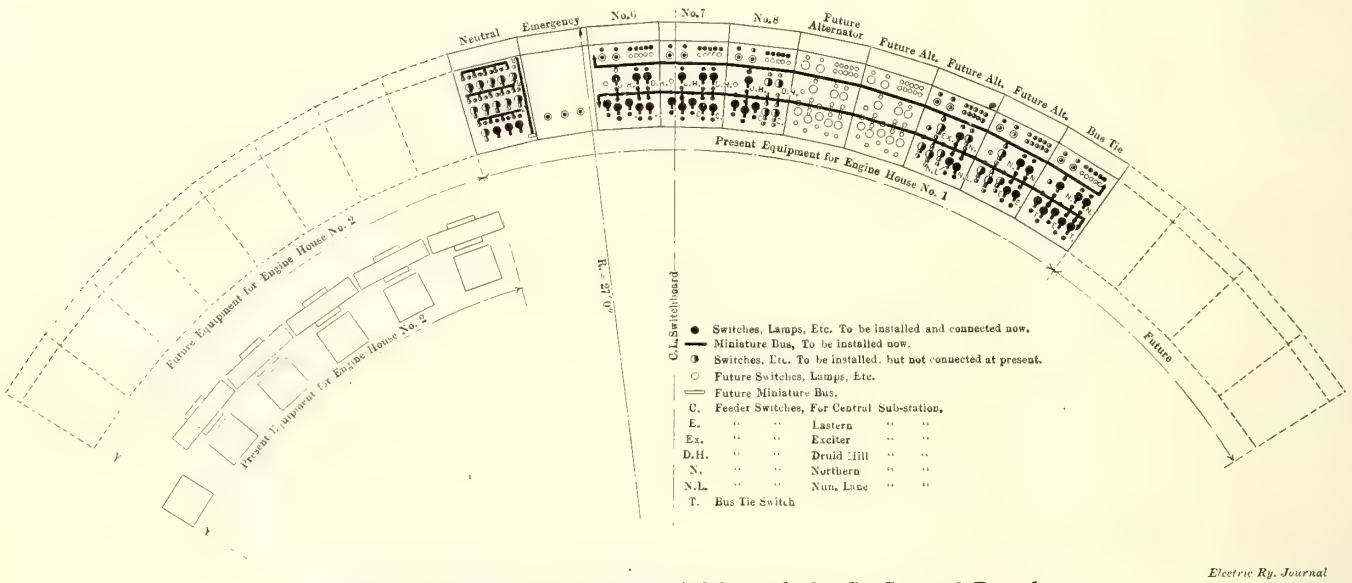
Index to Meters, Lamps, Switches, etc.

No.	Description
1	A.C. Feeder Ammeter
2	Alternator Ammeter
3	Voltmeter
4	Power Factor Indicator
5	Indicating Wattmeter
6	Recording Wattmeter
7	D.C. Field Ammeter
8	Engine Governor Control Wheel
9	Signal Lamp for Ditto
10	Field Rheostat Control Wheel
11	Lamp indicating Steps on Rheostat
12	Push Button for Engine Signals
13	Indicating Lamp for Ditto
14	Pull Switch for Tripping Field Sw.
15	Oil Sw. Control Sw. for Main Bus
16	Indicating Lamp for Ditto
17	Oil Sw. Control Sw. for Feeder
18	Indicating Lamp for Ditto
19	Oil Sw. Control Sw. for Group
20	Indicating Lamp for Ditto
21	Oil Sw. Control Sw. for Alternator
22	Indicating Lamp for Ditto
23	Synchronizing Receptacle
24	Miniature Bus
25	Indicating Lamp for Relay
26	Testing Receptacles
27	Time Limit Relay for Feeder
28	Time Limit Reverse Cur. Relay for Alt.

Note:- Letters G, R & W on Signal Lamps indicate respectively Green, Red & White.

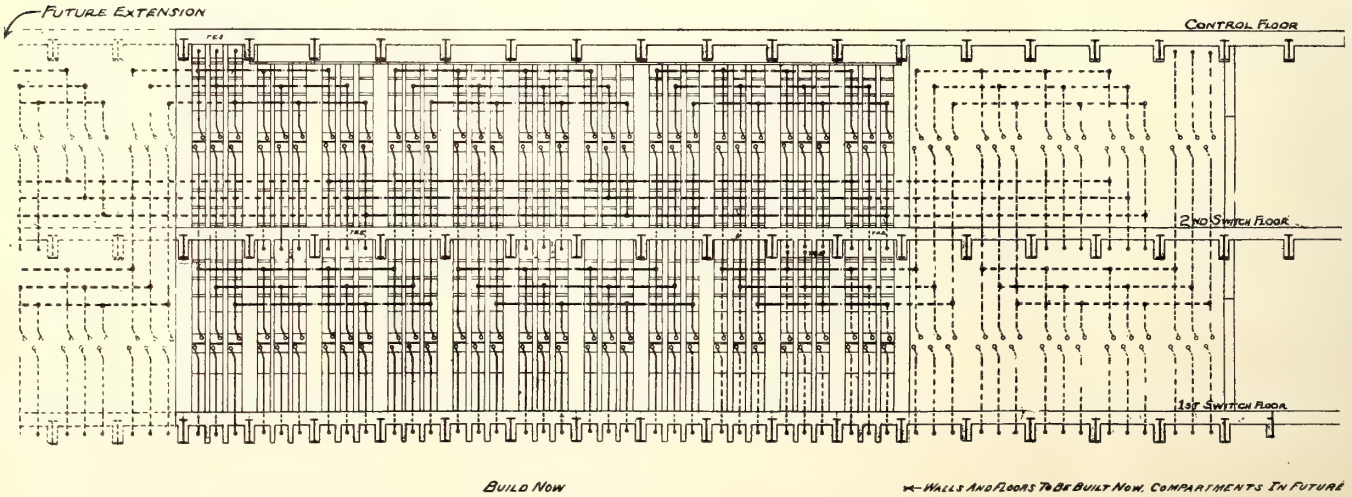
Electric Ry. Journal

Baltimore Switchboard—Plan and Elevation of Panel for Alternator and A. C. Feeder Control



Electric Ry. Journal

Baltimore Switchboard—General Plan of A. C. Control Board



Baltimore Switchboard—Longitudinal Section of Oil Switch and Bus Structure

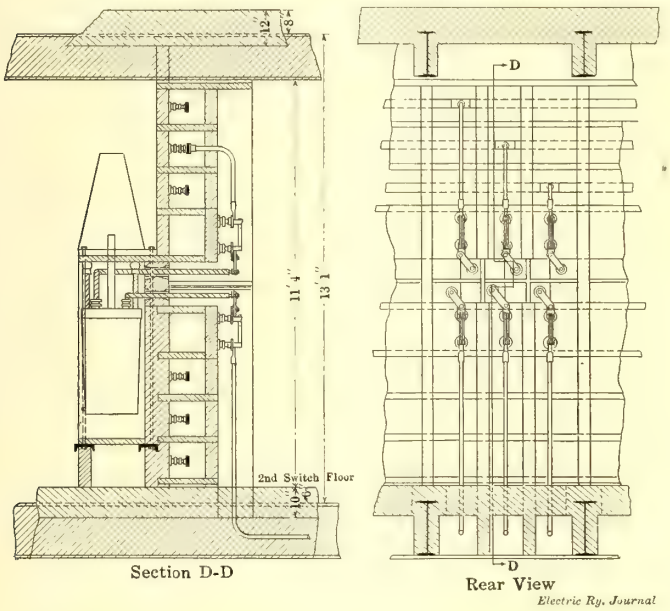
the operator may at a glance see the status of all circuits, busbars and switches.

One section of the control bench is fitted with standard testing instruments. On every bench containing ammeters, voltmeters and other instruments there are plug receptacles connected to buses running to the testing instruments, and so arranged that, by means of plugs, any instrument may be connected to the standard instruments for comparison. The test instruments provided for are voltmeter, ammeter, power factor meter, indicating wattmeter, recording wattmeter and frequency meter.

Each generator section of the bench is provided with five push buttons for signaling to the engineer, and three switches for controlling the engine and generator. One of these three trips the field switch, another controls the governor motor, and a third controls the field rheostat motor.

EXCITER SWITCHBOARD

This switchboard is located on the control floor, opposite to and facing the curved bench board. There are 25 black marine-finished slate panels, provided with a full complement of apparatus, instruments, etc., especially arranged to control all exciter, field, auxiliary, battery and lighting



Baltimore Switchboard—Cross-Section of Oil Switch and Bus Compartment

circuits. These circuits are 110 volts, as are also the alternating-current instrument circuits, so that no current of a higher potential than 110 volts is brought to the control floor. The exciter and auxiliary buses are entirely separate and cannot be thrown together, though the exciters may be connected to either bus. Control circuits are fed normally from the battery, but in emergency may be connected either to the exciter bus or to the auxiliary bus.

The present battery is of 600 amp-hours' capacity, and is located in a detached building in the rear of the power plant, but provision has been made on the switchboard for replacing this battery by one of 2000 or 3000-amp capacity, which can be thrown on the exciter system in case of need.

BUSBAR AND OIL SWITCH STRUCTURE

The busbar and oil switch structure is shown in the elevation and in some detail on this page. It is built of light-colored shale brick, with concrete slabs, poured as the structure was made. Each busbar is supported vertically in the center of a 12-in. square runway, on insulators attached to blocks of soapstone set in the brick wall. One new and interesting feature is the isolation of the oil switch leads by the insertion of a stone slab between each, as shown in detail cross-section.

Throughout the structure copper tubing is used for all high-tension single-conductor leads, and each lead is placed in the center of a 12-in. square runway and supported on triple petticoat insulators with barriers between phases, and covered with removable fireproof doors. All series and potential transformers, disconnecting switches, etc., are protected in a similar manner.

A comprehensive system of pipes and ducts is installed for the reception of the cables, the main feature of which is the complete isolation of each group of cables belonging to a machine unit and the installation of each cable in a separate conduit. In the switchboard structure all control and direct-current power cables are carried in loricated and fiber conduits from the control switchboards to the basement and to the manholes, these pipes being laid in the floor filling and built into the walls, so as to be hidden completely from view and making the communication of trunk to contiguous cables practically impossible.

All three-phase high-tension cables are run in vitrified tile and fiber conduits buried in the floors and walls. The single-phase leads from the generators are placed in vitrified tile ducts that are suspended from the engine room floor beams on a concrete slab.

TESTING TRANSFORMER

A high potential transformer is installed on the basement or cable floor, with its leads connected to busbars supported on a structure along the whole length of the ceiling, as shown in the section and in the photographic view of the basement. This transformer is of 150-kw capacity, with a capacity of 300 kw for a minute or more. With it the voltage can be steadily raised from 3000 volts to 50,000 volts. Views are also shown on page 762 of the curved control switchboard and of the second switch floor, which in general appearance resembles the first floor.

THE POWER CONSUMPTION OF THE BLANKENESE-OHLSDORF SINGLE-PHASE LINE

During January of this year a power-consumption test was made on the Blankenese-Ohlsdorf division of the Prussian State Railways to determine whether the motor manufacturer had met the guarantees for the several sections. The single-phase portion of the route is 26.6 km (16.5 miles) long, and is operated at 25 cycles, 6000 volts. The equipments tested comprise 54 sets of Winter-Eichberg motors rated at 115 hp on the one-hour basis. The results of the tests were exceedingly gratifying, and the power consumption was found to average only 33.6 watt-hours per ton-kilometer (about 48.7 watt-hours per ton-mile), while the guaranteed average was 41.3 watt-hours per ton-kilometer (about 59.8 watt-hours per ton-mile). These equipments were furnished by the Allgemeine Elektricitäts Gesellschaft and 25 more are under construction for this railway.

Estimates have been made of the cost of converting to electric traction the Central Railway of Peru, which consists of nearly 200 miles of track. The road rises 16,000 ft. in the Andes Mountains in a distance of 110 miles. Ample water power is available for generating electricity and the cost of electrifying the entire road is placed at $3,750,000.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

After the presentation of testimony before the Railroad Commission of Wisconsin, at Milwaukee, on April 2, in the case relating to the city rates of fare of the Milwaukee Electric Railway & Light Company, an adjournment was taken to a time hereafter to be fixed, in case it should be thought advisable to offer further testimony. The following testimony has been given on behalf of the company, in addition to that reported in previous issues of the Electric Railway Journal:

ADDITIONAL TESTIMONY OF C. N. DUFFY

C. N. Duffy, comptroller of the company, was recalled for further examination on March 31.

A question was asked by Lester C. Manson, special assistant city attorney, regarding the practice of the company in charging to maintenance or depreciation, and Mr. Duffy stated that the operating expenses carried all of the current ordinary repairs, renewals and replacements, while those that were uncurrent or extraordinary were charged in depreciation reserve, with the exception that the power plant had charged practically all of its extraordinary expenditures of this nature in operating expenses until the subject came up in June, 1907, in connection with the charge for a smokestack mentioned in the testimony of Mr. Davidson, published in this issue.

In the adjustment of the accounts of the company the property that was scrapped, displaced, sold or disposed of otherwise was credited to the property account, and its value was written off the books through depreciation reserve. Incidentally, $126,000 had been written off in two years in that way.

The maintenance expenditures of the company included

EARNINGS AND EXPENSES OF MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY (RAILWAY ONLY), SUBMITTED BY C. N. DUFFY, COMPTROLLER.

(A)

As per books, less taxes paid and charge for depreciation based on 5.37 per cent of physical property.

Nineteen hundred and eight figures, based on cash investment, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus additions and betterments in 1907 and 50 per cent of additions and betterments in 1908.

Nineteen hundred and seven figures, based on cash investment, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus 50 per cent of additions and betterments in 1907.

	1908.	1907.
Gross earnings from operation	$3,223,179.82	$3,221,912.44
Operating expenses (including unexpended "reserve charges" in "operating expenses," as follows: 1908, $42,374.10; 1907, $63,311.64)	1,678,704.88	1,684,066.73
Net earnings from operation	1,544,474.94	1,537,845.71
Deductions:		
Taxes, as paid	*200,343.99	165,057.34
Depreciation	†599.353.07	‡580,558.07
Total deductions	$799,697.06	$745,615.41
Net income from operation (exclusive of providing for amortization of cash investment, interest on working capital, or contingencies over and above the sums unexpended in "reserves," $42,374.10 in 1908 and $63,311.64 in 1907)	744,777.88	792,230.30

	1908. Per cent.	1907. Per cent.
Percentage of net income to cash investment of §§14,893,512.58 in 1908 and ¶¶14,543,512.58	5.00	5.45
Percentage of net income to value, based on tax levy for the year 1908, as per assessment of Wisconsin State Board of Assessment, $17,000,000 (80 per cent of $21,250,000)	4.38	4.66
Percentage of net income to property and plant capitalization, in 1908, $19,865,000; in 1907, $19,200,000 (80 per cent of capitalization outstanding on Dec. 31, 1908 and 1907, respectively, as per books)	3.75	4.13
Percentage of net income to cost of property and plant, in 1908, $20,536,000; in 1907, $20,181,000 (80 per cent of cost of property and plant on Dec. 31, 1908 and 1907, respectively, as per books)	3.63	3.93

*Eighty per cent of total taxes paid.

†In 1908, 5.37 per cent on $11,161,137.17, computed as follows: $10,586,137.17, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus additions and betterments in 1907, $450,000, and 50 per cent of additions and betterments in 1908, $125,000.

‡In 1907, 5.37 per cent on $10,811,137.17, computed as follows: $10,586,137.17, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus $225,000, 50 per cent of additions and betterments in 1907.

§Compiling $14,318,512.58, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus additions and betterments in 1907, $450,000, and 50 per cent of additions and betterments in 1908, $125,000.

¶Compiling $14,318,512.58, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus 50 per cent of additions and betterments in 1907, $225,000.

(B)

As per books, less taxes paid and charge for depreciation based on 10 per cent of gross earnings. Actual earnings at present rates of fare and assumed earnings based on ticket fares, seven for 25 cents.

	Based on actual gross earnings of 1908, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1908, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.	Based on actual gross earnings of 1907, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1907, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.
Gross earnings from operation	$3,223,179.82	$2,907,373.41	$3,221,912.44	$2,911,904.84
Operating expenses (including unexpended "reserve charges" in "operating expenses," as follows: In 1908, $42,374.10; in 1907, $63,311.64)	1,678,704.88	1,678,704.88	1,684,066.73	1,684,066.73
Net earnings from operation	1,544,474.94	1,228,668.53	1,537,845.71	1,227,838.11
Deductions:				
*Taxes as paid	200,343.99	200,343.99	165,057.34	149,556.96
Depreciation (10 per cent of gross earnings)	322,318.00	290,737.00	322,191.26	291,190.48
Total deductions	$522,661.99	$491,080.99	$487,248.60	$440,747.44
Net income from operation (exclusive of providing for amortization of cash investment, interest on working capital, or contingencies over and above the sums unexpended in "reserves," $42,374.10 in 1908 and $63,311.64 in 1907)	1,021,812.95	737,587.54	1,050,597.11	787,090.67

*In 1908, 80 per cent of total taxes paid; in 1907 taxes figured as amount actually paid, or amount that would be paid on reduced gross earnings based on reduced rate of fare, seven tickets for 25 cents.

	Based on actual gross earnings of 1908, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1908, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.	Based on actual gross earnings of 1907, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1907, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.
	Per cent.	Per cent.	Per cent.	Per cent.
Percentage of net income to cash investment of $14,893,512.58 in 1908 or $14,543,512.58 in 1907, computed as stated in (A) above. See notes § and ¶ at foot of Table (A)	6.86	4.95	7.22	5.41
Percentage of net income to value, based on tax levy for the year 1908, as per assessment of Wisconsin State Board of Assessment, $17,000,000 (80 per cent of $21,250,000)	6.01	4.34	6.18	4.62
Percentage of net income to property and plant capitalization, $19,865,000 in 1908, $19,200,000 in 1907 (80 per cent of capitalization outstanding Dec. 31, 1908 and 1907, respectively, as per books)	5.14	3.71	5.47	4.10
Percentage of net income to cost of property and plant, $20,536,000 in 1908, $20,181,000 in 1907 (80 per cent of cost of property and plant, Dec. 31, 1908 and 1907, respectively, as per books)	4.98	3.59	5.21	3.90

in operating expenses were 9.9 per cent of gross earnings in 1907 and 9 per cent in 1908. The Chicago ordinances allow 6 per cent for "maintenance and repairs," and Mr. Duffy said that that amount was unquestionably not adequate. The question of drawing the line as to where maintenance stopped and depreciation began was a very large one, due largely to the policies of different companies, conditions of operation, type of apparatus and various other things. For instance, Mr. Duffy had stated in conventions of accountants that if a company had maintenance broad enough to include the up-keep of the property there would be no depreciation. The use of 9 or 10 per cent of the gross earnings of the Milwaukee Electric Railway & Light Company had not been broad enough for that purpose.

Submitting the detailed report of daily earnings on page 768, Mr. Duffy said that all of the car-miles traveled and all of the time required by the trip of every car operated over each one of the 24 lines, city and suburban, the four Racine city lines and each of the three interurban lines were absolutely segregated one from another.

Mr. Manson asked what proportion of the total expense of maintenance of the Public Service Building was charged against the railway department of the Milwaukee Electric Railway & Light Company. Mr. Duffy's recollection was that in 1907 about 85 per cent was charged to the railway and 15 per cent to lighting, on the basis of the proportionate gross earnings of each. About 15 per cent of the 85 was charged to the Milwaukee Light, Heat & Traction Company. The Public Service Building was charged by the lighting department 2 cents per kilowatt delivered for the power which was consumed in the building. The same practice was followed with utility equipment and car house.

Referring to special accounts in the operating expenses of the Milwaukee Light, Heat & Traction Company, Mr. Manson mentioned the fixed monthly charge against utility service to cover depreciation. Mr. Duffy stated that the bookkeeping entry was to debit utility equipment and credit depreciation reserve with a fixed amount every month. For instance, the charge for the utility service in 1907 was

(C)

As per books, less taxes paid and charge for depreciation based on 5.37 per cent of physical property. Actual earnings at present rates of fare and assumed earnings based on ticket fares, seven for 25 cents.

	Based on actual gross earnings of 1908, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1908, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.	Based on actual gross earnings of 1907, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1907, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.
Gross earnings from operation	$3,223,179.82	$2,907,373.41	$3,221,912.44	$2,911,904.84
Operating expenses (including unexpended "reserve charges" in "operating expenses," as follows: $42,374.10 in 1908, $63,311.64 in 1907)	1,678,704.88	1,678,704.88	1,684,066.73	1,684,066.73
Net earnings from operation	1,544,474.94	1,228,668.53	1,537,845.71	1,227,838.11
Deductions:				
*Taxes as paid (80 per cent of total taxes paid)	200,343.99	200,343.99	165,057.34	149,556.96
Depreciation	†599,353.07	†599,353.07	‡580,558.07	‡580,558.07
Total deductions	$799,697.06	$799,697.06	$745,615.41	$730,115.0
Net income from operation (exclusive of providing for amortization of cash investment, interest on working capital or contingencies over and above the sums unexpended in "reserves," $42,374.10 in 1908 and $63,311.64 in 1907)	744,777.88	428,971.47	792,230.30	497,723.08

*In 1908, 80 per cent of total taxes paid; in 1907 taxes figured as amount actually paid, or amount that would be paid on reduced gross earnings based on assumed reduced rate of fare, seven tickets for 25 cents.

†In 1908, 5.37 per cent on $11,161,137.17, computed as follows: $10,586,137.17, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus additions and betterments in 1907, $450,000, and 50 per cent of additions and betterments in 1908, $125,000.

‡In 1907, 5.37 per cent on $10,811,137.17, computed as follows: $10,586,137.17, balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett, plus $225,000, 50 per cent of additions and betterments in 1907.

	Based on actual gross earnings of 1908, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1908, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.	Based on actual gross earnings of 1907, as per books. Rate of ticket fares, six for 25 cents, or 25 for $1.	Based on gross earnings of 1907, if rate of ticket fares had been seven for 25 cents in place of six for 25 cents, or for $1.
	Per cent.	Per cent.	Per cent.	Per cent.
Percentage of net income to cash investment of $14,893,512.58 in 1908 or $14,543,512.58 in 1907, computed as stated in (A) above. See notes § and ¶ at foot of Table (A)	5.00	2.88	5.45	3.42
Percentage of net income to value, based on tax levy for the year 1908, as per assessment of Wisconsin State Board of Assessment, $17,000,000 (80 per cent of $21,250,000)	4.38	2.52	4.66	2.93
Percentage of net income to property and plant capitalization of $19,865,000 in 1908, $19,200,000 in 1907 (80 per cent of capitalization outstanding Dec. 31, 1908 and 1907, respectively, as per books)	3.75	2.16	4.13	2.59
Percentage of net income to cost of property and plant, $20,536,000 in 1908, $20,181,000 in 1907 (80 per cent of cost of property and plant, Dec. 31, 1908 and 1907, respectively, as per books)	3.63	2.09	3.93	2.47

CASH INVESTMENT, INCLUDING BOND DISCOUNT AND PERCENTAGE OF NET INCOME TO SAME.

	1908.	1907.
Balance Dec. 31, 1906, as per report of Dickinson, Wilmot & Sterrett	$14,318,512.58	$14,318,512.58
"Bond discount," excluded by Dickinson, Wilmot & Sterrett in original cost of property, $8,885,644.17	1,036,055.83	1,036,055.83
Eighty per cent of "bond discount," excluded by Barrow, Wade, Guthrie & Co., city's accountants	104,631.98	104,631.98
Eighty per cent of "bond discount," as per company's books in 1907	80,000.00	80,000.00
Fifty per cent of additions and betterments, as per company's books in 1907	.....	225,000.00
Additions and betterments in 1907 (100 per cent)	450,000.00	.....
Eighty per cent of "bond discount," as per company's books in 1908	180,550.41	.....
Additions and betterments in 1908 (50 per cent)	125,000.00	.....
	$16,294,750.80	$15,764,200.39

1908.		1907.	
Percentage of net income of $744,777.88 to $16,294,750.80, see Table (A)	4.57%	Percentage of net income of $792,230.30 to $15,764,200.39, see Table (A)	5.03%
Percentage of net income of $1,021,812.95 to $16,294,750.80, see Table (B)	6.27%	Percentage of net income of $1,050,597.11 to $15,764,200.39, see Table (B)	6.66%
Percentage of net income of $737,587.54 to $16,294,750.80, see Table (B)	4.53%	Percentage of net income of $787,090.67 to $15,764,200.39, see Table (B)	4.99%
Percentage of net income of $744,777.88 to $16,294,750.80, see Table (C)	4.57%	Percentage of net income of $792,230.30 to $15,764,200.39, see Table (C)	5.03%
Percentage of net income of $428,971.47 to $16,294,750.80, see Table (C)	2.63%	Percentage of net income of $497,723.08 to $15,764,200.39, see Table (C)	3.16%

$89,000 odd; the value of the performance of the work, measured by unit prices, was $114,000, leaving $25,000. The difference represented the difference between the actual cost of performing the service and what the service would have cost had it been performed by an outside company; the difference was credited to the depreciation reserve of the railway company, which owned the utility service. In the calculation of cost there were included the operating expenses, charges for inquiries and damages, insurance, taxes, interest and depreciation. The true cost was what it would have cost the company to have the work done by an outsider.

ADVANTAGES OF JOINT OPERATION

A question regarding the relative advantages accruing to the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company was asked by Mr. Manson, and Mr. Duffy stated that 95 cars of the traction company were operated on the interurban lines tage to an interurban road to have a terminus in a large city, it would be a great deal more of an advantage to have the arrangement which the Milwaukee Light, Heat & Traction Company has with the Milwaukee Electric Railway & Light Company, permitting the passengers to be transferred and carried to any point in the city of Milwaukee.

Edwin S. Mack, of counsel for the company, said that the history of the line was that the traction company was built after the city road, and was constructed in order to constitute a feeder to the city lines. Mr. Mack did not doubt that it was an advantage to the Milwaukee Light, Heat & Traction Company to be connected with the Milwaukee Electric Railway & Light Company, but the point was that it was an equal, if not a much greater, advantage to the Milwaukee Electric Railway & Light Company to be connected with the Milwaukee Light, Heat & Traction Company. The advantage of operating two systems to-

THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, REPORT OF PASSENGER EARNINGS, SUBMITTED BY C. N. DUFFY, COMPTROLLER.

Saturday, March 27, 1909. Compared with Saturday, March 28, 1908.

Time.	Temperature. This year. High.	This year. Low.	Last year. High.	Last year. Low.	Weather. This year.	Weather. Last year.
5 A. M. to 8 A. M.	32	32	32	30	Cloudy	Cloudy
8 A. M. to 11 A. M.	35	35	33	31	"	"
11 A. M. to 2 P. M.	38	38	34	34	"	"
2 P. M. to 5 P. M.	38	38	34	34	"	"
5 P. M. to 7 P. M.	37	37	33	33	"	"
7 P. M. to 10 P. M.	35	35	33	33	"	"
10 P. M. to 12 P. M.	32	32	31	30	"	"
Average temperature for 7 periods	35	35	33	32		

Commutation tickets collected.			
4c	72,951	4c	71,158
4 1-6c	112,384	4 1-6c	101,600
	185,335		172,758

Lines.	Mileage. This year.	Mileage. Last year.	Car hours. This year.	Car hours. Last year.	Passenger earnings. Per car mile. cents. This year.	Per car mile. cents. Last year.	Per car hour. Dollars and cents. This year.	Per car hour. Dollars and cents. Last year.	This year.	Last year.	Increase or Decrease.
Wells-St.-F'll Ave., City.	4,320	4,483	484	517	32.19	31.67	2.87	2.75	$1,390.64	$1,419.58	*$28.94
Wells St.-F'll Ave. I. U.	189	....	16	....	30.23	..	3.57	..	57.13	.....	57.13
Fond du Lac-Nat. Aves.	2,815	2,585	288	287	28.30	30.26	2.77	2.73	796.74	782.17	14.57
Walnut St.-Nat. Ave...	2,687	2,796	309	315	29.51	28.45	2.57	2.53	793.05	795.45	*2.40
Eighth Ave.-Third St...	2,283	2,187	256	234	29.02	26.66	2.59	2.49	662.49	583.15	79.34
Burnham-3d Sts., City..	2,592	2,753	267	287	26.18	23.08	2.54	2.21	678.64	635.28	43.36
Burnham-3d Sts., I. U.	155	....	18	..	12.85	..	1.11	..	19.92	.....	19.92
Oakland-Delaware Aves.	2,885	3,501	299	378	22.73	21.43	2.19	1.98	655.68	750.20	*94.52
Holton-Mitchell Sts....	2,685	2,628	291	292	25.59	25.17	2.36	2.27	687.19	661.39	25.80
Muskego Ave.-8th St...	2,655	2,154	291	240	24.07	24.82	2.20	2.23	639.03	534.57	104.46
Clybourn-Wisconsin St.	1,222	1,337	147	161	38.53	31.81	3.20	2.64	470.78	425.30	45.48
Twelfth-Wisconsin Sts.	2,420	2,549	292	311	34.26	29.54	2.84	2.42	829.08	752.96	76.12
State-Wisconsin Sts....	2,174	2,262	267	274	37.00	36.02	3.01	2.97	804.47	814.72	*10.25
First-Ave.-Vliet St....	1,658	1,655	188	189	23.07	21.53	2.03	1.88	382.50	356.24	26 26
Howell Ave.-Vliet St..	1,955	1,881	218	219	23.78	22.60	2.13	1.94	464.91	425.12	39.79
North Ave.....	1,356	1,057	166	117	25.23	24.11	2.06	2.18	342.15	254.79	87.36
P. S. Bldg.-St. Francis.	767	....	79	..	22.96	..	2.23	..	176.09	.....	176.09
Total	34,818	33,828	3,876	3,821	28.29	27.17	2.54	2.41	$9,850.49	$9,190.92	$659.57

Comparison with current date:	Mileage. Month to date.	Mileage. Year to date.	Car hours. Month to date.	Car hours. Year to date.	Car mile to date.	Car hour to date.	Passenger earnings. Total for month.	Total for year.
This year	923,191	2,892,956	102,249	320,495	25.92	2.34	$238,783.82	$749,736.40
Last year	887,407	2,845,045	99,358	320,855	24.47	2.17	218,445.38	696,165.94
Increase or decrease	35,784	47,911	2,891	*360	1.45	.17	20,338.44	53,570.46
Per cent increase or decrease	4.03	1.68	2.91	*.11	5.93	7.83	9.31	7.70

*Decrease

only, and the railway company had the benefit of the use of that equipment when it received credit for fares for Milwaukee passengers without payment of fixed charges on the equipment. The traction company had the benefit of the use of 11 cars of the railway company that were operated partly within and partly ouside of the city. When the interurban cars entering Milwaukee crossed the city fare limit point they were charged with the expense of operation of the cars. The railway company had the benefit of the use without cost of about 11 miles of single track and of other property belonging to the traction company.

Further questions were asked by Mr. Manson about the advantage accruing to the Milwaukee Light, Heat & Traction Company through its entrance to the city of Milwaukee. The witness stated that while it would be an advantage to the railway and light company had the better of the bargain.

Mr. Duffy added that in the use of property the Milwaukee Electric Railway & Light Company undoubtedly enjoyed all the advantages that were definitely fixed when it had the use of 95 cars and 11 miles of track. If Mr. Manson knew some of the conditions that obtained in some of the other cities in reference to the interurban problem and how endeavors had been made to work out a basis of application, he would have a greater appreciation of what the Milwaukee Electric Railway & Light Company enjoyed.

Responding to a question as to what account the expense incurred in paving was charged, the witness said that it was charged according to the character of the work per-

formed and how the expense was incurred. If the city of Milwaukee repaved a street and the company was charged as a property owner for its proportion, the expense was placed in taxes. If the maintenance of way department, in keeping the track repaired, had occasion to restore the pavement, the expense was charged to operating expenses. If the maintenance of way department reconstructed a track, and in connection therewith had paving to do, the expense was charged to the work order covering the work, which in the case of reconstruction would be placed finally in depreciation reserve. If an entire new track was built and paving or repaving was necessary, the expense would be charged to construction.

The accompanying statement was submitted by Mr. Duffy, showing the charges against depreciation reserve for the railway in 1907.

RECONSTRUCTION, RE-EQUIPMENT, BETTERMENT, UNCURRENT AND EXTRAORDINARY EXPENDITURES CHARGED TO DEPRECIATION RESERVE—RAILWAY—YEAR 1907.

Roadway and track		$188,097.06
Overhead and underground electric system		8,410.68
Buildings and improvements		721.17
Car bodies, trucks and electrical equipment		95.35
*Miscellaneous—		
Property sold or scrapped in 1907	$18,405.08	
Less credit	2,136.71	16,268.37
		$213,401.93

*Details of property sold or scrapped in 1907—

Motors	$5,500.00
Flat cars	1,200.00
Power plant machinery	737.08
Clocks	118.00
Cars	7,649.52
Miscellaneous	1,063.77
	$16,268.37

DISTRIBUTION OF POWER PLANT ACCOUNTS

In the distribution book covering operation of power plants and substations the various items and charges were assembled by plants, and at the end of the month there was deducted from the total expense shown, at a charge of 2 cents per kw-hour, all the power not used for railway or light; the railway and the two companies were charged on the basis of car-hours and the light on the basis of the wattmeter consumption.

In 1907 the total expense of operating the power plants was $581,247.06, divided as follows: Electric current for railway system, $353,307.94; electric current for lighting system, $163,249.18; steam for heating purposes, $24,968.47; electric current for all other purposes than railway and lighting systems, $39,721.47.

The number of transfer passengers could increase and had increased without regard to the change in revenue passengers. There was a more rapid increase in the transfer business than in the revenue passenger traffic.

The statement of Mr. Duffy regarding efficiency of management as an element which should be taken into consideration in computing a proper basis of return was brought up, and Mr. Duffy stated that the Milwaukee railway, or any other road, might furnish satisfactory service with present management, and be able to eke out some measure of return on the investment, while another management would put the property into bankruptcy. No amount of salary would put certain capacity into a man or draw certain service from him. The witness knew of two companies, each of which had had at its head a man who was not capable, in his judgment, of filling the position, both of whom received very large salaries.

In these cases the character of the service rendered, the condition of the property and the measure of return to the owners emphasized what he said. The stockholders paid for something they did not get. If either of the men he had in mind were operating the Milwaukee property they could not haul passengers for 5-cent fares, let alone 4-cent fares, judging by what they had done in their own cities. Very often a man's efficiency was overrated; his efficiency ought to be judged by his results. The results were evident in the form of increased facilities and better services without correspondingly increased cost, so that the public that used the service did not pay an undue charge for it.

Mr. Duffy made a correction of a statement made by him before the commission as it appeared in the transcript and was copied in the Electric Railway Journal of March 27, 1909, page 555, in which he was quoted as saying that the ad valorem tax on the non-operative property for 1908 nearly exhausted the reserve for taxes. It was the ad valorem tax on the operative property, taking the place in that year of the 5 per cent tax on gross earnings, that exhausted the reserve for taxes.

The witness also made a statement amplifying his discussion regarding the practice of the company in loaning money to employees who were in need of funds because of sickness or death in the family. No interest was charged on these advances. They were regarded as part of the relation of employer and employee. The man was employed by the company and expected to continue, and in time to catch up. The men appreciated this privilege.

ADDITIONAL TESTIMONY OF MR. DAVIDSON

Charles J. Davidson, chief engineer of power plants of the company, was recalled for cross-examination on March 30.

In answer to an inquiry regarding the steam furnished to the Milwaukee Central Heating Company, Mr. Davidson said that the greater portion was exhaust steam, but he could not state the percentages of exhaust and live steam. It was more economical to operate an engine and use the exhaust steam for heating or other purposes, if such other purposes existed, than it would be to secure the increased efficiency of the engine by running it at its high efficiency condensing and taking the necessary live steam from the boilers. But in spite of that fact, considerably more steam would be used than if the steam was furnished for the engine alone. All of the engines under consideration in the Oneida Street plant were compound engines. Practically only one engine was run non-condensing in 1907 in that plant.

A question was asked about the manner in which the price of 35 cents per 1000 lb. for steam sold by the Milwaukee Electric Railway & Light Company to the Milwaukee Central Heating Company was fixed. The witness said that the price was predicated upon the cost of operating the plant before the Milwaukee Central Heating Company property was acquired. When the plant was operated under its most efficient condition a price was made which would leave the cost per kw-hour to the Milwaukee Electric Railway & Light Company approximately as nearly as possible what it was before the heating company business existed. To be conservative a little allowance was made to be sure that the price was enough to cover the cost. It was probably a little in excess; the Oneida Street plant probably profited a little by the transaction.

The cost of operation of the Oneida Street plant would be affected slightly by the arrangement to furnish steam to the Milwaukee Central Heating Company in other respects than in the coal consumed per kw-hour. That would depend, however, upon other conditions. At certain seasons of the year there would be no additional cost. Under conditions of maximum operation a little additional labor

would be required in the boiler room. The policy had been pursued consistently of preserving as nearly as it could be calculated by any means the price per kw-hour which would have obtained had no steam been taken by the heating company. The price for steam furnished to the heating company had varied. The same price for steam furnished to the heating company had been made at the Public Service Building as at the Oneida Street plant.

A high-efficiency compound engine like those at the Oneida Street plant, designed for condensing operation, would lose 25 per cent or 30 per cent of its efficiency by being operated non-condensing, but the loss in efficiency of an equally high-grade modern steam-turbine when run non-condensing would be considerably more.

LOSSES BY AGE AND WEAR

Testifying as to the life of generator parts, Mr. Davidson stated that a set of brushes might last three or four hours or three or four years. The cost of replacing brushes was charged to current maintenance. The commutators on the three largest machines in the Oneida Street plant were about ready for renewal; they had been used a little less than nine years. The life of a commutator was determined by its use, not its age. Renewals of commutators were charged to current maintenance in the case of small machines, but when the company was ready to replace the commutators of the machines at the Oneida Street plant, which would cost a great many thousands of dollars, a work order would be issued and the expense would be charged to depreciation reserve account. In two of the Oneida Street machines the windings have had to be replaced probably five or six times, and the expense was charged to current maintenance. Other generator-parts, subject to replacement, were the laminated core, which might be injured by an armature short circuit, and the armature spokes.

Replacements of parts of the boilers were charged to current maintenance. From time to time practically every element that entered into the boilers had to be replaced. A time was always reached, however, when the large parts of a boiler of the type used by the company would not be worth anything because the expensive part of the boiler was no longer repairable.

Taking up the direct examination of the witness, Mr. Mack asked whether the price paid for steam heat was just to the railway. Mr. Davidson stated that in his judgment it was a reasonable division. He was equally interested in producing results for both of the companies, and the price was as nearly equitable as they had known how to make it. In fixing the price, allowance was made for depreciation and for interest on the investment. The price paid by the Central Heating Company, of Detroit, to the Edison company of that city up to within a comparatively short time was 20 cents per 1000 lb.

A question was asked by Mr. Mack as to the increase or decrease of cost of labor after the line had been passed which marked the maximum efficiency of a given force of labor. The witness stated that just as soon as the maximum capacity of one man had been reached and an additional man had to be employed it was very rarely the case that the proportion was such that the additional man could be employed fully and advantageously, although it might be necessary to have him. One man was the least that could be employed.

In a majority of cases in electric railway and light power plant work a change in the art had made it necessary to supersede machines before the time had been reached when maintenance became excessive, and it appeared cheaper to replace than to try to keep the machine as a whole and replace it part by part. This statement applied more strongly to certain classes of machines, and it was absolutely true as to all of the old marine-type engines in the old Edison plant at Milwaukee. Those machines reached the stage where maintenance was excessive before they were put out of operation, and if they were not obsolete it would be cheaper to throw them away and buy new machines even of the same type than to try to repair them now.

APPORTIONMENT OF MAINTENANCE CHARGES

The apportionment of charges as between current maintenance and depreciation reserve was subject to revision in the comptroller's office and an instance had occurred where the department charged a smokestack to current maintenance and in the comptroller's office the charge was revised and placed in depreciation reserve. In asking a question about the apportionment of these charges, Mr. Mack said that he merely wanted to bring out the fact that the company attempted in its central administration to have uniformity of practice and at the same time there was a good deal of difference of opinion as to where to draw the line between maintenance and construction.

Mr. Davidson stated that it was a matter of conservatism and honesty on the part of the head of the department not to try to make a showing at the expense of the depreciation reserve account, and if there was any question so far as he was concerned about the matter he tried to err on the side of charging a repair to current maintenance rather than subject himself to the possible criticism of having attempted to show a cheap rate of kw-hour output by charging to depreciation reserve account.

The effect of age upon machinery, provided proper care is taken of it when it was not in use, depends somewhat on what the machinery is. Commutators do not rust or corrode, and there is very little chance that anything would happen to them. On the other hand, it is very difficult to prevent a good deal of deterioration when engines, pistons, etc., were not in use.

Answering a question from Mr. Manson about the cost of steam supplied to the heating company, Mr. Davidson said that his reputation was at stake just as much on the results he secured in one case as in the other, and he had tried to take into account all of the various factors which existed or might arise from time to time in order to give the railway company the current at exactly the price or possibly a little more, enough so as to be conservative, that it would have if the heating company did not exist.

Mr. Mack said that it would appear by the examination by counsel for the city as if it were the deliberate policy of the company to increase all charges so far as possible on the railway end of the system and save them on every other feature of the business. Mr. Davidson stated that absolutely no policy of that kind had been followed. Of the live steam produced at the Oneida Street plant the witness estimated that about 3 per cent was furnished to the heating company in 1908.

Commissioner Roemer said that the company had made something by disposing of the steam to the heating company over what it would have made if it had condensed the steam and used it in the boilers. Mr. Davidson said that it was a more economical use of the steam; a greater percentage of the thermal value of the steam was used in that way than if it was condensed after it left the engine. Mr. Mack asked what was the most recent development in the Oneida Street power plant. The witness said that the company had been required recently by the city building

inspector to remove, replace or reconstruct the entire portion of the building which was made up of terra-cotta cornice. He should estimate that this repair would cost in the neighborhood of $10,000. That would be charged to depreciation reserve account.

W. J. Curtis, of counsel for the company, asked if the building was properly constructed in that respect in the first place and Mr. Davidson said that it was.

COST OF GOING VALUE

Mr. Mack introduced as evidence on March 30 a statement compiled by Prof. M. E. Cooley relating to the Milwaukee Central Heating Company to illustrate his idea of the cost of going value. The business of this company has not yet reached a profitable point, and Professor Cooley testified that the expense of conducting the business until it should earn a reasonable return on the investment was properly an element of capital cost of the property. Professor Cooley, Mr. Mack stated, had assumed that the company would begin to make a profit on Dec. 31, 1912, simply because he wanted to have his diagram show a profit within the length of the sheet of paper that he had, and that was as far in the future as he could go. The idea was intended simply to be illustrative of the theory. A letter on this subject from C. N. Duffy, comptroller of the company, to Professor Cooley was also submitted in evidence. Mr. Duffy made the following statement:

In examining the figures I am afraid that you have been too optimistic with respect to "gross earnings," as I do not believe that the earnings of 1909 will reach $85,000, $37,000 more than in the year 1908, 70 per cent. Neither do I think the "gross-earnings" will increase in the years 1910, 1911 and 1912 as you have shown them, reaching $240,000 in the year 1912. I should think that an accumulative increase of 25 per cent per annum in gross earnings is all that we could reasonably expect; this would make the gross earnings in 1912 $120,000 instead of $240,000, as shown, or just 50 per cent of the required amount to overcome a deficit. This would mean on my basis that the $240,000 gross earnings would not be reached before 1915, if reached in that year.

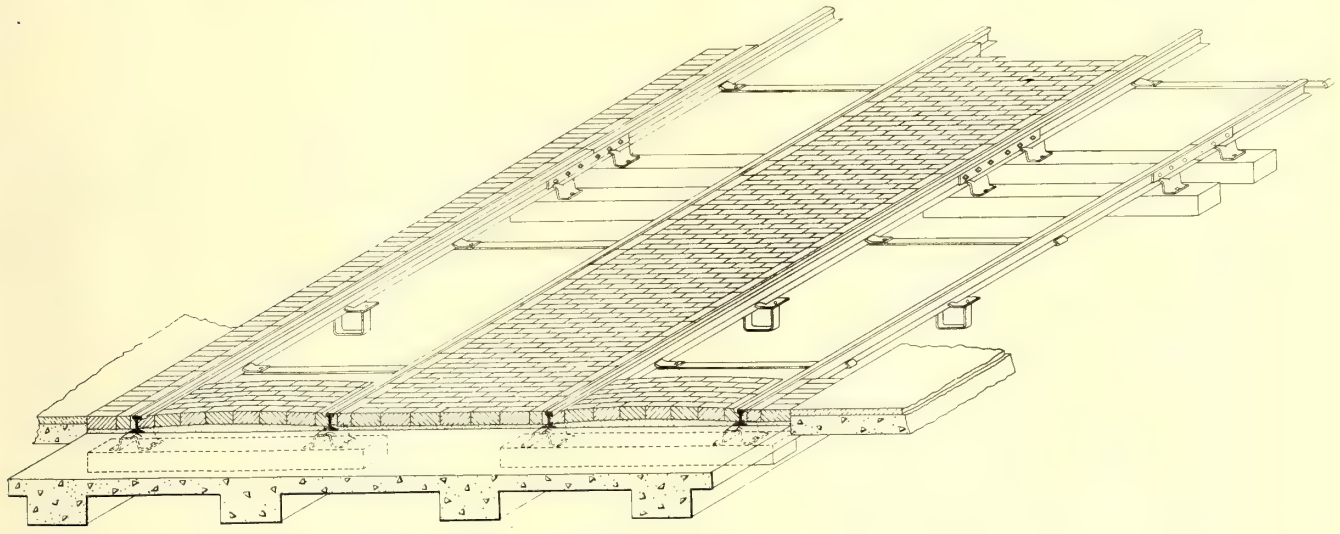
In other words, the first 10 years of operation would produce a deficit, while you figure that the seventh year of operation would get the results of operation to a point where there would be no deficit.

On the other hand, the cost of the property may not reach the figures you show, which would reduce the amount necessary for "return," "depreciation" and "taxes," but I think your operating expenses for the years 1909, 1910, 1911 and 1912 are figured too low.

T-RAIL IN PAVED STREETS AT CHARLOTTE, N. C.

The method employed by the Charlotte (N. C.) Electric Railway, Light & Power Company in constructing about 15,000 ft. of T-rail track in paved streets during 1908 is shown in the accompanying engraving. The company's franchise requires it to pave between tracks and for 2 ft. on either side of its tracks, and as the latter are spaced 10 ft. apart between centers, the company paved a width of approximately 18 ft. at the center of the street, with the exception of an intermediate strip between the tracks that was laid at the expense of the city. The paving used was vitrified brick, which was laid at the same time as the new track. The track and paving were laid on a concrete foundation having a 9-in. x 18-in. longitudinal concrete beam under each rail, with a 5-in. slab connecting the tops of these beams and acting as a base for the pavement.

During construction only one line of track was disturbed at a time, and that line for not more than two city blocks, while the opposite parallel track was maintained in service. Upon the removal of the rails, fastenings and ties of the old track, the street was graded to a depth of 10 in. to lines parallel to the proposed street grade and to a width of 8 ft. The sub-grade thus prepared was compacted thoroughly with a 10-ton steam roller. All soft, spongy places caused by imperfect back filling in the trenches, or otherwise, were refilled with material selected from the original street surface.



T-Rail in Charlotte, N. C.—Isometric Drawing Showing Track Construction

In the prepared foundation, trenches were cut for 6-in. x 7-in. ties, these trenches being of 6 in. greater depth, width and length than the ties shown in the drawing. At the rail joints, which were placed opposite in the track, these trenches were spaced 20 in. apart on centers, and in the balance of the track 12½ ft. apart on centers. The filling material from the street surface was deposited under each tie and tamped thoroughly in place. Standard chair plates for A.S.C.E. 80-lb. rail were spiked to the ties thus set, and the rails laid to slack gage with opposite joints and angle connections as mentioned. Spaced equally between the ties were placed tie plates, each carried by a chair of special type, designed to anchor the rails to the concrete base to be laid later. At intervals of 6 ft. 3 in., except at the joints, special tie rods were set to maintain the spacing of the rails. These rods had a hook on both ends, which engaged the outer edge of the flange of both rails;

on the inside of both rails a strap of iron, attached to the rod by means of a bolt in a slot, engaged the inner edge of the rail flanges. The design of this bolt and slot made the position of the strap adjustable, so that the exact spacing of the rails could be obtained.

When the ties, rails, chairs and tie rods were set for a length of track, an 8-in. x 20-in. trench was cut longitudinally under each rail. In both of these trenches temporary forms, consisting of 1-in. boards held in position by outside stakes, were set for the concrete beams under the rails. Forms also were set 14 in. from the outside of each rail and to such height that the 5-in. base of concrete provided for the pavement extended to within 5 in. of the top of the rails. In these forms concrete, consisting of 1 part Portland cement and 3 parts sand and 6 parts broken stone, was laid to the lines shown in the drawing. The anchors, tie rods and rail chairs are embedded in concrete; the tops of the ties extend up into the 5-in. slab between the beams and their ends are embedded in the latter.

The sand and broken stone for the concrete were delivered to storage piles along the side of the street, with a space of 10 ft. to 12 ft. between these piles and the track. The concrete was made in a Foote portable mixer, which was moved along between the storage piles and the track as the work on the base progressed. The sand and broken stone were shoveled directly from the storage piles into the charging hopper of the mixer. The concrete was delivered from the mixer to place in the track by means of wheelbarrows.

For 14 in. on the outside of each rail, 1 to 2 mortar was spread to a thickness of 1 in. on the concrete base. On the mortar course was laid directly a standard vitrified paving block, a header course being placed along the rail and the balance of the 14-in. space filled out with stretchers. A joint ¾ in. wide at the top, left between the row of headers and the rail, was filled with asphalt mastic to provide for any movement of the latter. Between the rails a cushion of sand 1 in. thick at the rails, and with a crown of 1 in. at the center of the track, was spread on the concrete base. On this cushion the paving blocks were laid at right angles to the track in regular courses, and in making the closures half-brick or bats were permitted only on one side. At intervals of 75 ft. transverse 1-in. expansion joints were filled with 15 per cent pure asphaltum and 85 per cent finely ground rock dust, mixed and heated on the line of the work. The proportions of asphaltum were increased as required to secure the proper plasticity of the mastic compound.

When the brick were laid and the expansion joints filled, the surface was rolled with a 10-ton steam roller. The joints between the brick were then filled with grout, consisting of 1 part cement to 2 parts sand, with enough water added to give a consistency of thick cream. This grout was brushed over the surface with rubber-tipped floats until the joints between the bricks were filled completely. The grout thus poured was covered with a thin coat of sand to protect it until the cement had set.

All the materials except the bituminous mastic used along the outside of the rails and for the expansion joints were provided by the street railway company at approximately the following prices: T-rails, 90 lb. to the yard and in 90-ft. lengths, at $35.65 per ton; ties, 35 cents each; tie rods, 55 cents; anchors, 55 cents, and chairs, 42 cents. Plates, bolts, washers, and so forth, were also furnished at average prices. The amounts allowed the contractors for other construction materials were as follows: Broken stone, $1.50 per cubic yard; sand, 60 cents per cubic yard; cement, most of which was of the Atlas brand, $1.82;



T-Rail in Charlotte, N. C.—Laying Brick Pavement Betweeen Rails and Track Prepared for Concrete Base

standard paving brick, $32 a thousand; whole groove brick, $46 a thousand, and half-groove brick, $27 a thousand.

The work was done under the direction of Hazlehurst & Anderson, consulting engineers, of Atlanta, by the Atlanta Construction Company at the following unit prices:

Track was taken up and relaid at 34 cents per linear foot, rails unloaded and distributed at 90 cents per ton, excavation for foundation and concrete beams at $2.00 per cubic yard, brick pavement laid at 42 cents per square yard.

The first contract for 7500 ft. of track was finished Aug. 20, 1908, at an expense for labor and materials amounting to $38,692.38. Of this amount the labor item was $9,117.27.

At the time of estimating the cost of materials T-rail was worth at the mill $10 per ton less than the grooved-girder type so generally used in street railway track on paved streets. The estimated cost of actual construction of the two types of rail was approximately the same. Hence the estimated saving to the company was $10 per ton on some 320 tons of steel on the two contracts.

The alignment and surface of the track laid in this manner that has been in operation for about eight months are exceptionally good. It is also stated that the operation of cars over these tracks seems to be entirely satisfactory.

DISCUSSION OF NEW ACCOUNTING SYSTEM FOR WISCONSIN PUBLIC UTILITIES

The new accounting system prescribed for the Wisconsin public utilities by the Railroad Commission of that State was discussed at a joint meeting of the Wisconsin Electric & Interurban Railway Association, Fox River Gas & Electric Association, and Northwestern Electrical Association, held at Sheboygan, Wis., on April 12 and 13. About 50 representatives of operating companies were present. Ernest Gonzenbach, president of the Northwestern Electrical Association, presided. Papers were read by Halford Erickson, member Wisconsin Railroad Commission; George Allison, comptroller Wisconsin Electric Railway and Eastern Wisconsin Railway & Light Company, and B. G. Broad, auditor Milwaukee Northern Railway. Abstracts of these three papers appear elsewhere in this issue.

Mr. Gonzenbach arranged for the entertainment of convention visitors by special trips to the power plant of the Sheboygan Light, Power & Railway Company, and to the plant of a large coal-loading and sorting company. Through the courtesy of the Milwaukee Northern Railway a visit was made to the gas engine-driven generating station of the company at Port Washington.

APPLICATION OF THE NEW ACCOUNTING SYSTEM

Mr. Allison distributed copies of the schedule of accounts which he had arranged under the new classification for the use of the Wisconsin Electric Railway and the Eastern Wisconsin Railway & Light Company. The discussion on this paper was introduced by C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, who said that he was pleased to learn that Mr. Allison had found the accounting system prescribed by the commission to be adapted so well for the use of the variety of properties represented by Mr. Allison. The public utilities of Wisconsin were fortunate in having such a broad-minded commission, and the system of accounts laid down was easily adaptable for either large or small utilities. It might be possible for some of the larger companies to serve their own needs with a smaller number of accounts, but if the commission required additional subdivisions for its needs the utility companies should be willing to fulfill its requests.

A. D. Alt, manager Mondovi Electric Light Company, had not yet adopted the new accounting system, because a number of questions were under consideration with the commission. The lighting plant was an offshoot of a flour mill which obtained its power from a hydraulic plant, built primarily to run the mill, and from an auxiliary steam plant built for the same purpose. Both or either methods of generating power were used as conditions demanded, and the mill and light plant employees were engaged in both kinds of work in no regular way. Mr. Alt asked for suggestions as to the proper apportionment of the power costs, so that the accounting system prescribed by the commission might be followed for the lighting plant. No electrical current was supplied to the mill, but the light plant generator was belted to the hydraulic turbine shaft, which operated the mill machinery.

Mr. Duffy explained his view that it was the purpose of the commission to obtain as clearly as possible cost figures for the generation of power by gas, steam and water, and that such figures should be given willingly by the companies because of their value for comparative uses by the commission. He would suggest that Mr. Alt ascertain the total cost of developing power for both the mill and the lighting plant, and then apportion the cost according to the best possible estimate of the quantity of power required to generate the electric current used. Later in the discussion, Mr. Duffy's suggestion was approved by a representative of the commission.

Irving P. Lord, Waupaca Electric Light & Railway Company, called attention to the fact that many lighting plants in Wisconsin were operated in connection with grist and saw mills; these plants would not be possible, and the service would not be available unless one kind of plant could depend upon the other. The conditions at Waupaca resembled the power situation with the Mondovi company in that the Waupaca Light & Railway Company obtained its power from a water-power plant when water was available and at other times from a steam auxiliary. It was found that the income of the railway and the lighting departments was about equal, and that the power requirements were fairly evenly divided; therefore, in keeping the accounts the charges for fuel, labor and general maintenance were made one-half to railway and one-half to lighting.

Mr. Allison, when questioned, stated that in the method of accounting as outlined by him it was the practice to pass all accounts through one voucher journal, and then recapitulate at the end of the month, by using a distribution sheet and taking the distribution direct from the vouchers. An adding machine was very useful in this work.

METHODS OF CHANGING ACCOUNTING SYSTEM

After the presentation of his paper, Mr. Broad asked for information as to the methods followed by other roads in accounting for ticket earnings. Some companies based their daily earnings on a count of the ticket sales and others on a count of the tickets redeemed. On the Milwaukee Northern road the percentage of cash fares received on trains amounted to but 10 per cent of the total receipts, and was getting smaller as people became accustomed to the use of tickets and mileage books. It was the practice of that road, when tickets or mileage were sold, to consider the money received as earnings.

Mr. Gonzenbach stated that it had been the practice of the Sheboygan Light, Power & Railway Company for several years to count the canceled tickets turned in by conductors and make out "daily earnings" reports on the basis of the tickets turned in. The monthly statements, however, showed the amount of money taken in, and of course there were discrepancies between the sum of the daily earnings for any one month and the monthly earnings. He thought it the best plan on a moderate sized road to account for the money as it was received.

Mr. Duffy outlined the ticket accounting methods followed by the Milwaukee Electric Railway & Light Company. When tickets were sold ticket sales and ticket cash were credited, and unused tickets being liabilities, ticket sales and ticket cash were debited when the tickets were taken up on the car. Tickets constituted liabilities until they were presented for transportation, after which the earnings should be credited and the ticket sales and cash debited. The Milwaukee company had about $60,000 outstanding tickets and 81 per cent of the business of the road was done in tickets.

Mr. Allison said that on the roads which he represented the amount of ticket sales was so small comparatively that he hardly thought it worth the expense to count all canceled tickets and carry a "tickets credited" account. Mr. Duffy was undoubtedly right as to principle, but with a

small railway, where it was too great an expense to count the tickets, Mr. Allison favored Mr. Broad's method.

Mr. Broad said that the Milwaukee Northern road kept an accurate record of all passengers carried and that number, when divided into the gross receipts from those passengers, gave a result which did not vary 5 cents either way for any month during the year.

August Westermeyer, auditor, Sheboygan Light, Power & Railway Company, had accounted for earnings for five years under the system advocated by Mr. Duffy and for the past year had accounted for earnings under the system advocated by Mr. Broad. He stated that the average results showed that for his company the additional expense for counting tickets received was not warranted.

Halford Erickson, member of the Wisconsin Railroad Commission, after presenting his address on the principles of rate making, of which an abstract is published elsewhere in this issue, introduced William J. Hagenah, accounting expert for the commission, who spoke in part as follows:

STATEMENT OF WILLIAM J. HAGENAH

The classification of accounts which we have prescribed is the result of a careful study of the systems in use in this State and also those in other States. Our investigation has been as thorough as it has been possible to make it. With the assistance of the different State associations and of some of the largest and some of the most active properties in this State, we have perfected a system of accounting which we think will be satisfactory to all. We will admit that a great many of the items appearing in our forms heretofore have never been part of the records of utilities in this State, and therefore we asked you to co-operate with us. The responses to this request were not as satisfying as they might have been, possibly due to a feeling of hesitancy. However, we have tried to prepare a classification which would suit the different utilities without establishing a precedent.

The classification is divided into two major groups, Class A and Class B. The underlying principle of these accounts is the same for each class regardless of the size of the utilities. It was our purpose to prepare a classification which would admit of comparisons between the accounts used by the smaller companies and the detail accounts of the large companies.

We have also adopted in this classification another feature which consists of determining a classification of accounts by which all power used, whether produced, rented or purchased, would be accounted for. Of course steam power is the most common in use, but there is hydraulic power, and gas power generation is used quite frequently also. There is the cost to be determined of the power that is purchased, and if each utility will keep an accurate record of this the question of power accounting, whether steam, gas, hydraulic or otherwise, will be simplified. Manifestly, it will be unfair to each utility to compare the cost of power that is generated with steam with the cost of power generated by hydraulic means. This comparison should be made at the place where hydraulic and steam power are generated under the same conditions. If we did not have the separate accounts defined in this classification it would manifestly be impossible to determine the cost of power, whether for commercial purposes or for traction purposes. This cost should be made public to the patrons of particular utilities. True costs can be determined in no other way than by the separation of accounts and with the system properly followed by utilities the commission can determine whether the basis of sale is satisfactory and just to the public buying the utilities' products, and whether it should be satisfactory to the utility.

In case of hydraulic utilities we have further divided to include the transmission and transformation accounts and where needed the storage battery account. In each case, however, these accounts are separate and distinct. When the cost of gas power production is compared with the cost of steam power production at the steam power plant it is necessary that the cost in each case shall equal the worth at each point. Consequently, the cost of hydraulic power would be the cost of the steam power at the place where it was delivered.

In treating undistributed accounts in the list it is requested that those companies which prefer to distribute or itemize certain accounts shall indicate in each case the account into which the items have been distributed so that in analyzing adjustments can be made by the commission.

Accurate depreciation records have never been kept with the possible exception of a few utilities in the State. We have been unable to prescribe a basis upon which the depreciation should be allowed. The percentage is not stated in this classification. It is known, however, that depreciation is going on constantly, and it is desired that the physical and financial standing of each utility be known. This can be provided for either by making actual reduction from the revenue or gross earnings, or by making a fictitious entry in the nature of an open or unadjusted account.

It is desired that the utilities treat taxes as an operating expense. In view of the fact that operating expenses do not include depreciation and some contingencies which are incidental to a business of this nature, they are not a proper representation of the efficiency of the management or the propriety of the account.

APPORTIONING POWER COSTS

Mr. Hagenah was questioned regarding the proper charges and accounts to be used in reporting for the combined mill and electric light plant described by Mr. Alt. Mr. Hagenah said that the plant primarily was operated as a commercial business or a utility business. The proper accounts should be kept to show the total cost of power and the kw-hours produced; at the end of a month a careful analysis of the cost of the current should be made and then the power used by the electrical department should be charged against it. The first thing to do was to find the cost of the service and charge it to the electric department.

Mr. Duffy said that as rates for current were fairly well established in Wisconsin the electrical department should charge itself with the purchase of current from the hydraulic department just as if that current had been sold to some other company; and the question for the management to decide was the exact rate per unit to be used in making the charge.

Mr. Gonzenbach called attention to the fact that in determining this unit rate it would be necessary to take into account the fixed expense for the plant and have the rate include a charge for the readiness-to-serve condition.

Commissioner Erickson stated that in order not to work any hardship on the electric railways, the Wisconsin commission had been inclined to accept in general the railway accounts formulated by the Interstate Commerce Commission. The Wisconsin commission had decided to adopt the Interstate classification with the exception of that part which related to power plant output. For that subject it desired the public utilities to adopt the classification provided for the electric light companies. Thus, he would recommend that the combined railway and lighting properties which were to change over to a specified system of accounting on July 1, adopt the Interstate Commerce Commission classification for the railway end, and the Wisconsin commission accounts for the electric light department. While the Wisconsin commission had prescribed a classification of accounts for electric utilities it was not the intention that the companies be compelled to keep these accounts. The purpose was largely to have a system of accounts under which the utilities could make detailed and definite reports to the commission. The accounts might be subdivided to suit any convenience of the utilities so long as they were not separated until they could not be combined properly in reports to the commission.

RATE-MAKING FOR PUBLIC UTILITIES*

BY HALFORD ERICKSON, MEMBER RAILROAD COMMISSION OF WISCONSIN

The so-called public utility law of this State has made it one of the duties of this commission to prescribe uniform systems of accounting for the various public utilities which are included in the provisions of this law. Our commission has endeavored to comply with this requirement. To that end we have prepared classifications of accounts, together with blank forms for annual reports. Some of these classifications and forms have already been sent out and are now in the hands of the parties for whom they are intended. Others are in the hands of the printer; and there are also some that are ready for the printer. The printing, however, is not likely to require a great deal of time and we, therefore, expect to be able to distribute them among the various utilities at an early date.

In developing these classifications and forms we have earnestly endeavored to perfect systems of accounts that are not only sound from a theoretical point of view, but that also will fit in with or apply to the various conditions under which the different utilities are operating. To this end we have made as thorough a study of accounting principles as it was possible for us to make in the time allotted for this work. We have also examined a large number of accounting systems now in use in this and other States. We have held frequent conferences with representatives of the various utilities in this State for the purpose of obtaining their views and co-operation in this work. We have also carried on a voluminous correspondence with most of these utilities for the same purpose. The result is that the work we have performed represents views and thoughts that have been obtained from many sources and in a great variety of ways.

Upon some of the utilities in this State, particularly the larger ones that can afford to, and that keep very complete and up-to-date records of both their financial and other transactions, our demands for information and suggestions have indeed been heavy.

These demands have invariably been cheerfully met. Their managers, comptrollers and accountants have not only devoted a great deal of time to our work, but they have also opened their books and records for our inspection. This assistance has been of great value to us. Many of those who have thus assisted us are present here. I take this opportunity of expressing my personal appreciation, as well as that of the commission, for all the courtesies that in various ways have been extended to us by those who are operating public utilities in this State.

Our efforts in connection with this work have been mainly directed toward the development of such classifications and statements of the gross earnings, operating expenses, net earnings, fixed charges, expenditures for construction, and the operating statistics generally of the various utilities as would seem to be demanded by existing conditions, and as it is thought would aid us and everybody concerned in obtaining a better understanding of the many intricate problems that are constantly arising in connection with the operation of these utilities.

It is not my intention to here enter upon any detailed discussion of these classifications or work, either as a whole or in part. All I had thought of doing at this time is simply to point out a few facts which tend to show the importance of a detailed classification of the operating expenses and a correct and suitable system of accounting from the point of view of rate-making, and to understand the conditions under which the plants are operating. In order to do this it will be necessary for me to say something about the investments that are required in such plants and the relation which both the earnings and the expenses bear to these investments. In this connection it will also be necessary to call attention to the nature of the services or products that are rendered by such plants and to the rates that are charged by them for these services, as well as to certain other facts that are more or less closely related to the question under discussion.

*Abstract of paper read before the joint meeting of Wisconsin Electric & Interurban Railway Association, Northwestern Electrical Association and Fox River Valley Gas & Electrical Association, at Sheboygan, Wis., April 12, 1909.

SCIENCE OF RATE-MAKING IN A BACKWARD STATE

There are many reasons why I desire to emphasize rate-making at this particular time. Rate-making is one of the most important features in the management of public utilities. The rates they charge for the services they render constitute the means by which their revenues are obtained. It is because of the right to make such charges that private capital enters such undertakings.

One would think that a feature as important as this ought to be thoroughly understood, not only by those who make and collect such rates, but by those who pay them. But this is not always the case. In many instances there appears to be an almost woeful lack of sound information as to how a reasonable, just and equitable rate schedule should be built up. The result is that many of the rate schedules that are now in effect appear to be built up on mere guesses, without much of any reference to any other factor than expediency. They are often so constructed as to be inequitable to both the owners and the customers of a plant, and to make extensions of the business almost impossible except perhaps by underhanded methods. All this has led to a situation that is far from what it should be. It is to a considerable extent responsible for the fact that the science of rate-making is in a more backward state and, generally speaking, less well understood than almost any other feature that pertains to the operation and management of such utilities.

A rate schedule to be sound must to a considerable extent be based upon the cost to the plant of furnishing the services it covers. By this is not meant that this cost is the only element that enters into rate-making. There are many factors that must be considered in this connection, but none of these would seem to be of more or even of as much importance as the cost in question. As this cost depends upon the value of the plant or the amount of interest the owners are entitled to thereon, as well as on the operating expenses, depreciation and other items of this character, it is manifest that rate-making must be very closely connected with accounting and other operating records. In fact, this connection is so intimate that a correct method of rate-making is almost out of the question unless the financial and other records are properly kept. The former is dependent upon the latter. Some reference to what is involved in fixing rates would, therefore, not seem to be out of place here.

It is not my purpose, however, to endeavor to outline in full any sound method of rate-making. All I desire to do, all I hope to be able to do, is simply to briefly discuss a few of the more important elements that should be considered in this connection; most of these elements, which are so essential in building up a rate schedule, can be obtained and made available only where all the records of the utilities are properly kept.

EXTENSIVE FIXED INVESTMENT REQUIRED

Public utility corporations are of such character that in order to be properly equipped for performing the services which they render to the public, they require an extensive and costly fixed investment. An electric plant, for instance, must have large power houses and other buildings, costly machinery of various kinds, miles of wire and pole lines, and a great deal of other equipment. All this costs money. In fact, the investment required is usually several times as great as the annual gross earnings. This is also in a measure true of many manufacturing plants, although since these may be kept more steadily in operation their annual sales usually constitute a considerable proportion of their investment. In commercial enterprises, on the other hand, the fixed investment is relatively small and their capital is usually turned over several times each year.

While in some respects the products of public utilities may be regarded in the same light as other manufactured commodities, a little examination of their nature will show that this is not in every respect in accordance with the facts. Electricity, for instance, seems to differ from the ordinary manufactured articles in this, that it is more in the nature of a service than of a commodity. This is also true of transportation. While gas and water are in a sense commodities, the character of their delivery and use is such that even gas plants and pumping works are performing services for their customers rather than produc-

ing commodities for them. The fact that all of these utilities are producing something which is measured and sold at given prices per unit, very much like ordinary manufactured articles, would not seem to change the situation in this respect.

Electricity also differs from ordinary manufactured goods in this, that it cannot be manufactured at a constant rate and stored and disposed of as the demand for it may dictate. For some productive undertakings, for instance, the situation is such that the time of production can be determined by their management. For other undertakings, again, the conditions are such that the time of production is determined by the parties who are served. In the case of many manufacturers it matters but little just when their plants are in operation as their products can be and usually are stored until wanted. In other cases, again, such as in electric plants, the service they furnish must be rendered when desired by their purchasers. For those who come in the former class the size of the plant can be adjusted to the total output. For those who come in the latter class the size of the plant is determined by the maximum instantaneous demand. For a given demand the plant must be as large when this demand continues only a short time per day as if it were constant throughout the entire 24 hours.

A plant that must stand ready to furnish service the moment it is called upon to do so is also apt to have a relatively high cost for fuel for power and for wages. In other words, the cost per unit of the services they render is apt to be relatively much greater than it would be if the demand was more constant. While electric plants furnish the best example of plants that come in the latter class, what is true of electric plants in this respect is also in the main true of gas plants and water works. While the latter have some advantages over electric plants in the way of storing their products, these advantages are by no means as great as in other manufacturing industries. Gas, because of its nature, can be kept only for a limited time. This is also true of water. Both must also be kept under constant pressure, which of itself is costly. The equipment of an electric railway in a city must be adequate to accommodate the heavy travel that often occurs mornings and evenings, although the equipment then required may be very much greater than the equipment that is needed during the rest of the day.

The furnishing of electricity is a service that must be rendered simultaneously with the demand for it, and since electricity cannot be stored it is evident that the generating, distributing and measuring equipment of the plant must be ample for handling the maximum demand that may be made upon it, even if this demand does not last but a few minutes or hours each day.

From these facts it is clear that the size or the capacity of an electric plant is determined by the instantaneous maximum demand that is made upon it by its customers. In other words, this demand fixes the investment that is necessary for the performance of the services in question. Since the period during which this demand continues each day is usually comparatively short, it also follows that the investment required for such plants when measured by their output or product is found to be relatively very high.

DETERIORATION AN EXPENSE

These facts relating to the nature of the services furnished by electric plants and to the relation between the investment and the output, are important because of the light they throw on the expenses that are involved. The plants are deteriorating with age. This is due partly to wear and tear and partly to natural decay and obsolescence. This deterioration is an expense. It must be met by the owners and is properly chargeable against the revenues. The same is true of a reasonable rate of interest on the amount invested. Both of these items depend very largely upon its size or capacity. That is, they are greater for larger than for smaller plants. Taxes and insurance are other items that come in the same class, and this is also the case for certain other expenses. The greater proportion, if not all of these expenses, is directly proportional to the investment. They increase with increases in the investment. As the investment in turn depends upon the maximum instantaneous demand, these expenses are also more or less closely dependent upon this demand. This is as true for each user of current as for the plant as a whole.

The items of expense which have thus been explained are usually classed under the head of fixed expenses and constitute that part of the total cost which as a rule is not affected by the output or by the extent to which the plant may be used. They are as large when the output is at a minimum or even when there is little or no output as when it stands at the maximum. What has been said concerning them clearly indicates that they are as great for a consumer connected with the plant who is using little or no current, but whom the plant must hold itself in readiness to serve, as for a consumer with a like installation who is using a great deal of current. The former has the capacity to demand current at any time to the full extent of his installation. This the plant must be ready to furnish. In other words, the capacity of the plant must be great enough to meet this demand when called for.

The expenses thus spoken of are as stated directly dependent upon the investment that is required for the consumers, and that must be made in order that they may be served. But they constitute only a part of the cost of operation. The plant must be kept running in order to produce and deliver current whenever it is called upon to so deliver it. In other words, the plant to render the service required must not only be a completed plant but it must be kept in constant operation. To keep it in operation, however, entails further outlays. No electric plant can be kept running or be made to produce anything except at considerable expenditure for fuel or power, water, waste, oil, lamp renewals, and for such repairs, renewals, labor, supervision and other items as are required for the operation of the plant and depend upon the same. These items are called the running or variable expenses and they depend upon the output. They increase as the output increases and practically in the same proportion.

DETAILS OF FIXED AND VARIABLE EXPENSES NECESSARY

In order to be able to make rates that are just and equitable, and to obtain a safe basis for the greatest possible extension of business of the plant, it is absolutely necessary to have on hand full data showing the details and the totals of both the fixed and of the variable expenses of a plant. Such knowledge, it seems to me, is essential both to the rate-makers and the managers. Without it much of the work of both must, to a large extent, be based upon estimates rather than upon actual facts.

While detailed information with respect to both the fixed and variable expenses of a plant is almost indispensable, such information is not easily obtained. The reason of this is found in the nature of these expenses. Some items, for instance, are such that they come directly in either one class or the other, and can be easily picked out. Other items again are such that while they come wholly within one or the other of the two classes, they are usually so mixed up with each other that they cannot be separated except by careful classification and recording at the time they are incurred. There are still other expense items which do not come wholly within either class and which, therefore, will have to be apportioned between these two classes on some arbitrary basis, which arbitrary basis in turn will largely depend on the relation which the balance of the two classes of expenses bear to each other. In fact, most of the expense items are so inter-related that they cannot be exactly separated between the fixed and variable classes except by a careful classification and analysis upon the original records. This may apply to such items as interest, depreciation, etc., as well as to many other items.

Since a classification of expenses which has thus been found to be necessary is combined with so many obstacles and difficulties, the question naturally arises: How can the separation be best and most economically made? The answer to such a question has already been suggested. It is, that such separation cannot often be accurately made except when the accounts and records are properly kept and adjusted to conditions under which the plants are operated. While the accounting systems which we have prepared should not be classed with cost accounting, they have been prepared with a view of so classifying the various expense items that in most instances under them the work of separation may become easier than now is the

case, and that safe bases may be found upon which to apportion the common items.

It is true that our classifications do not go as far in this respect as might be desirable. At the same time they go as far in this direction as it was possible to make them go without coming in too serious conflicts with present practices of accounting that are regarded as sound from other points of view. In fact, the necessity for a more accurate separation of the fixed and variable expenses than is possible under many of the present methods of accounting constitutes one of the strongest arguments for improvements in accounting methods in so far as public utilities are concerned.

COST OF THE PLANT

What has been thus said with respect to correct classifications and records of the operating expenses proper would also seem to apply with equal force to the cost of construction and extensions as well as to the operating statistics in general.

The cost of the plant should be known, because of the important part it plays in fixing the value of the plants for rate-making purposes, or in fixing that value upon which the owners are entitled to reasonable returns. Operating statistics generally, which are too numerous to specify here, are also necessary, not only to those who are making the rates, but to those who are managing the plant. In fact, they are almost indispensable to both of these functions.

The subject of rates and rate-making is one that is very close to us. In one form or another it is involved in most of the cases that come before the commission. While we are doing all we can in solving this problem we find it an exceedingly difficult one to deal with. While many of the principles and facts that should be considered in rate-making are now fairly well understood the bottom has not been reached. I am quite certain that those among us are few who do not have a great deal to learn before we can say that this subject has been fully mastered. To make a rate schedule that under all conditions is equitable to each of the various classes of customers; that yields a reasonable return on the investment, or that is fair and just to all concerned; and that will also assist in promoting or extend the use of the current, is, indeed, a difficult task. It is a task that is worthy of the best efforts not only of those who are actually operating such plants, but of commissions such as ours. It is a problem in the solution of which we need your earnest and frank co-operation.

RECORDS SHOULD BE FULL

Besides those given there are numerous other reasons why the financial, and even other records, should be as complete and as detailed as possible. One of these is that without such records it is almost impossible to obtain a correct statement of the net earnings of a plant. Correct statements of the net earnings are necessary in order to understand both the financial and the rate situation of any given company. This is self-evident. Yet the accounts of so many companies are so incomplete that they often do not contain nearly all the elements that must be taken into consideration in preparing an accurate statement of the net earnings. In many cases no account at all is taken of depreciation. In other cases again depreciation is inadequately stated. Many other items are also over- or understated. The cost of ordinary repairs, or maintenance, for instance, is sometimes charged to construction, while in other cases maintenance expenses include items for new additions which belong either in the construction or in some other account. The result is that the accounts of such companies are often misleading, and point to conclusions that are entirely at variance with the actual situation.

When the operating expenses fail to include all items that should be included therein, the net earnings become overstated and show a false prosperity of the plant. When the operating expenses include more than there should be included in them the net earnings become understated and indicate that the plant is not as prosperous as it actually is. The situation in both cases is apt to be injurious to the plant. In the former case it may lead to rate and other complaints that are not warranted by the conditions, and which would not have arisen if the actual situation had been known. Under the latter showing the plant in the long run is apt to be injured in other ways.

PRACTICAL APPLICATION OF THE NEW WISCONSIN ACCOUNTING SYSTEM*

BY GEORGE ALLISON, COMPTROLLER, EASTERN WISCONSIN RAILWAY & LIGHT COMPANY AND WISCONSIN ELECTRIC RAILWAY

The object of this paper is to show the practical application of the new accounts in connection with a combined railway, electric and gas utilities company.

We realize that every company in the same line of business will show the final net results from operation in practically the same general form. All companies do not, however, follow uniform methods of accounting to arrive at these results. Owing to these conditions, I am compelled to deal strictly with the various new classifications as they have been applied to the systems of accounting formerly in use by our companies, the Eastern Wisconsin Railway & Light Company, at Fond du Lac, and the Wisconsin Electric Railway Company, at Oshkosh.

The system used in the railway department at Fond du Lac was based virtually on a condensed classification as adopted by steam railroads, while at Oshkosh the American Light & Traction Company's form was used.

I wish to emphasize that in adopting the new form it was necessary for me to consider, in addition to our Wisconsin companies, three Illinois companies, two of which are operating on hydraulic power.

For the convenience of members, copies of our new form have been prepared. These forms have been made on a duplicator, for the reason that we have not as yet adopted a standard printed form, preferring to try the system, so as to permit any changes or additions in the accounts or statistics, if found necessary.

RAILWAY DEPARTMENTS

In the railway departments we have adopted Class B, and in the electric and gas departments Class A.

Beginning with the city railway department, operating revenues, under "revenue from transportation," we have used "passenger," "chartered car" and "miscellaneous" revenues. In addition to this, we separate "tickets collected" and have opened this account for our own information and convenience.

In the interurban railway department we have made use of a few necessary extra accounts in addition to those adopted for the city department. Formerly we considered receipts from advertising and the various rental accounts for the separate departments as "revenues from transportation," but under the new classification these now appear as "revenues from sources other than transportation."

Our previous monthly exhibits of gross earnings have been condensed somewhat, and the new subdivisions of accounts for operating revenues are giving us greater detail, combined with speedy reference.

Our former arrangement of schedule of operating expense accounts, although condensed and somewhat different from the new arrangement prescribed, was, on the whole, very satisfactory.

The principal change in all of the classifications is the addition to operating expenses of "depreciation," "taxes" and "contingencies."

In "way and structures" we have found it advantageous to go a little beyond Class B by subdividing the "maintenance of roadway and track" and adding "maintenance of paving," "removing ice and snow" and "cleaning and sanding track." These last two accounts were formerly in use with our company and were then included under "conducting transportation."

We find it somewhat difficult to apportion the proper charges to the many subdivisions of "maintenance of electric lines," and in the future will probably adopt Class C for this item. Our previous system classified all of this maintenance under "overhead system repairs." Our report at present shows but one account for "miscellaneous maintenance of way," and we may find it advisable to open additional accounts under this heading, to guard against having too many doubtful items charged to this account.

Formerly we made all subdivisions of charges direct to

*Abstract of paper read before Wisconsin Electric & Interurban Railway Association, Sheboygan, Wis., April 12.

their respective accounts, and therefore did not use the term "other operations, debit" or "credit."

Under "equipment" it was necessary to add the "maintenance of power plant equipment" and "maintenance of substations, transformer station and storage battery equipment." Both of these were formerly included under our Fond du Lac system in the proportion of "power" charged to "conducting transportation." "Traffic expenses" were included under "conducting transportation."

The next group of operating expenses is "conducting transportation." Owing to the fact that our power is subdivided among the different departments, I have made but one proportionate charge under this heading, excluding "maintenance of the power plant equipment." I will later go into the details of our general power plant expenses account.

For our own reference, we have found it necessary to separate the "wages of motormen" from those of "conductors."

An account has also been opened for the "heating of cars." These subdivisions are not required by the commission. We have also included "power purchased," for the reason that this charge is made on account of our interurban railway only.

Under "general expenses" we have also made a proportionate charge on account of distribution to the various departments.

The group of "undistributed accounts" for the various departments includes "injuries and damages," "insurance," "rent of track and terminals," all of which formerly were included under "conducting transportation." In the standard classification these accounts are under "general." The "stationery and printing" was charged to "general expense." "Rent of equipment" was not provided for in the old classification.

It has been necessary to open an additional "undistributed account" as a general charge, for the reason that we have some items that are of a general character and not chargeable to any particular department.

Having referred to "depreciation," etc., together with "revenue from sources other than transportation," we come to the "proportion of deductions from gross income." In order to correctly distribute this charge to the different departments it is necessary to know the actual capital stock and bond issue for each department.

ELECTRIC UTILITIES DEPARTMENT

We next have the electric utilities department, the operating revenues of which are identical with those that were formerly in use. All of the non-operating revenues are additional accounts except the "profit on merchandise sales" and the "wiring and installation work." There is much more detail in the new subdivision of operating expenses prescribed by the commission. The charge for "power" is made proportionate, the same as in the railway departments. Formerly our "customers' installation and repairs" included the following new accounts: "Labor removing and resetting meters," also "transformers," both of which now appear under "distribution." "Customers' premises expenses" is now listed under "consumption." Our former account for the repairs and replacement of tools and implements of this department is now charged to "miscellaneous distribution system operating labor" and "supplies and expenses." We now also have an additional account, "meter department supplies and expenses."

"Maintenance of transformers" and "Maintenance of meters" were formerly combined as one account.

The group of "consumption" accounts are identical with those formerly used.

A number of accounts under "commercial" were formerly included in the "general salaries and expenses" account, except "promotion of business salaries and commissions" and "supplies and expenses," which was known as one account, "canvassing and advertising."

"General expense," proportionate charge, follows the same routine in this department as in the railway; and this also applies to the gas department.

GAS DEPARTMENT

In the gas department, among the "operating revenues," the only additional account necessary was "power earnings." Under the "non-operating revenues" we formerly had but one account, "profit on merchandise," and this included the profit on "piping and connections."

Reference to the operating expenses of this department shows that the prescribed accounts, in general, have gone into greater detail than we had heretofore.

Under the "production" group we had but one account, "manufacturing labor," and this included the following new accounts: "Retort house labor," "purifying labor," "miscellaneous labor" and "operating labor for steam." The "water for steam" and the "retort supplies and expenses" were called "manufacturing supplies."

All of the maintenance accounts were grouped in a "works repairs" account.

DISTRIBUTION

The operations were formerly classified into two accounts, "distribution labor" and "distribution supplies." The "maintenance" accounts, being identical, did not require any changes. The subdivisions for the "commercial" accounts required the same changes as installed in the electric utilities department, because we had but one account, and this was known as "canvassing and advertising."

The changes installed in the balance of the accounts for this department harmonize with those in the railway and electric utilities departments, explained previously.

APPORTIONMENT ACCOUNTS

I will now take up the general accounts, from which proportionate charges to the various departments are made. The "power plant expenses" account is apportioned on the basis of the kw-hour for the different departments. The "general expense" and "undistributed (general)" accounts are charged on the basis of the gross earnings for each department.

In connection with the "power" account, you will note that in addition to "steam power" I provided for "hydraulic power." This was necessary because some of our Illinois companies are operating by water-power. I have tried a combined power account for steam and hydraulic, but found it would not answer our purpose, owing to the fact that if for any reason the Illinois companies should be compelled to run on steam power, we would find it very difficult to determine the exact cost of either power.

While, in reality, there are no new accounts in the power item over those formerly used, the commission's accounts are in much greater detail. The power accounts which I have adopted are so arranged that, while there is a considerable difference between the various power accounts for the different departments, we can give the commission all the information required from any of the departments without being obliged to go into any additional details. On account of a variation in the new arrangement of the "maintenance of power plant" charges for the railway department and electric utilities department, I have found it necessary to show one subdivision of the total power charge including "maintenance," and another excluding "maintenance." In the railway department this maintenance is included under "equipment" group.

In the "general expense" account you will find the addition of the account "Railroad Commission expense."

There have also been added the maintenance accounts for the general office buildings, fixtures and grounds and the office equipment.

UNDISTRIBUTED GROUP OF ACCOUNTS

I have found it necessary to establish among the general charges an "undistributed" group of accounts, which covers "stationery and printing" not chargeable to any department, and also includes the "operation of the general stores department," "maintenance of stores equipment" and "maintenance of stores department buildings, fixtures and grounds."

On account of operating but one storeroom for all of our departments, we found it extremely difficult to properly subdivide the accounts to the different departments, and after a conference with William J. Haganah, statistician of the commission, the general form that we have adopted was approved by the commission.

We next have the group called "recapitulation of all departments." It is unnecessary for me to enter into any lengthy explanation of this; suffice it to say that if an ab-

breviated general statement of all the accounts is sought, it will be found here.

A considerable amount of detail is required for the "construction and equipment" accounts of the various departments. It is rather difficult to follow the numerous detailed accounts, but I agree with the commission that it is advisable to start with a large number of accounts and reduce these as the occasion arises and necessity requires.

The "stock" accounts have been reported to us under one general account in the general balance sheet, "material and supplies on hand." We have a separate stores department system.

The statistics for the various departments have been adopted to meet our immediate requirements, and, therefore, should not be considered final. We are trying them out, and shall add or drop statistics from time to time, as necessity requires.

We are comparing this year with 1908, putting both on the new classification prescribed by the commission. This involves considerable additional work, but we feel that we will get the benefit of the same in our monthly reports for next year.

With our companies the next application of the new systems of accounting has entailed considerable labor, yet, as in the case of Mike O'Hara, we have found it possible to meet the situation by diligently applying ourselves to the task. Mike O'Hara, who was long on work but short on spelling, got a job on the police force of Milwaukee. Soon after he reported for duty, a policeman was wanted to shoot a horse that had broken a leg. Mike was assigned to the job. He boarded a car and got off at Sixth Street. Walking down a few blocks he found the crippled horse and with two shots put the horse out of its misery. He then got out his notebook to put down the name of the horse, the owner, etc., and then looked up to see the name of the street on which the accident occurred. The street sign showed Sobiesky and Kosciusko Streets. Mike looked at this jumble of letters for a minute. His pencil wavered. He then put the book back in his pocket, caught the horse by the tail and dragged him to the next corner.

As explained in the early part of this paper, the systems of accounting previously in use at Fond du Lac and Oshkosh were not uniform, the Oshkosh property being a recent acquisition. It was apparent that a standard form or monthly report for both offices was a necessity. The idea of putting into effect the Railroad Commission's new classifications of accounts was coincident with the desire to standardize the reports.

COMMISSION'S ACCOUNTS WELL ARRANGED

As we began the work of changing over to the new system it became self-evident that the commission's accounts were well arranged, and in rearranging the electric and gas utilities departments we were surprised and pleased to observe the well-designed manner in which the various accounts of these departments could be meshed with those of the railway. Upon observing these conditions in the actual work, I could not refrain from remembering the spirit evinced by our commission in striving hard to harmonize accounts of a similar nature, but pertaining to different departments.

The commissioners have been exceedingly courteous and have responded most generously to our numerous requests for information and assistance. They have been the first to break away from the position of the Interstate Commerce Commission, that the old steam railroad classification must be followed, and by so doing we feel that they are abreast with the times and have set a good example for other commissions.

Four three-phase locomotives possessing a number of novel features have recently been built for the Valtellina Railway by Ganz & Company, Budapest. Each carries one 8-pole motor and one 12-pole motor, both of which are connected to the three pairs of driving wheels by crank-arms. When running with the 8-pole motor alone the speed is 40 m.p.h. and the tractive effort is 12,100 lb. With the 12-pole motor alone the speed is 26 m.p.h. and the tractive effort 12,100 lb. and with both motors in cascade the speed is 16 m.p.h. and the tractive effort is 14,500 lb. The total weight of the locomotives is 62 tons.

METHODS OF CHANGING THE OLD ACCOUNTS TO THE NEW*

BY B. G. BROAD, AUDITOR AND PURCHASING AGENT, MILWAUKEE NORTHERN RAILWAY

The Railroad Commission desires that we redistribute our accounts and maintain them hereafter in an intelligible form so it may judge accurately the condition of each public utility over which it has jurisdiction and recommend, possibly, necessary changes that may better the community served and the company's property.

There should be no serious difficulty in arranging the mechanical appliances to secure the bookkeeping results nor should the "methods of changing the old accounts to the new" be a scare-crow. We receive money as before and spend it as sparingly now, if not more so, than a year or so ago. Therefore, it is a question of distribution only. We used to be able to keep all of this record on one book which we carried in our hip pocket, with the result that we knew we made money or lost money, but were unable to analyze or tell truly why we did. Now, we prepare our accounts and methods as carefully as an engineer draws his specifications and, I personally believe, much more so. We must absolutely know the details of all departments, the policy of the management and the scheme of financing in order to record truly the operations of a company, as every act of every officer or employee is reflected in the accounting department sooner or later. The accounting department is the pocketbook of the individual which, as you know, is the vital part of any business.

It is necessary to bear these facts in mind when changing over the old records to the new, and be mindful to look at the situation in its entirety so as not to be lost in a mass of detail. There are several methods of effecting this change; among them I suggest:

First—By closing your books as at any fiscal period and reopening them under the new schedule. This can be done very easily by preparing beforehand the forms and educating the heads of departments and employees to the use of the new schedule. The capital accounts will remain the same, as will the cost of property and all fixed accounts, such as taxes and reserves. The open construction and equipment accounts will probably need adjustment unless they be absorbed into capital and property accounts. The only difficult point in this method is to teach the operating heads of departments to distribute their expense according to the new schedule.

Second—There is that laborious, painfully accurate but fruitless attempt at redistribution by practically rewriting your books. I have known companies to hire so-called experts to check over old books and try to make dead history read as a modern narrative with the result that either their object is lost before they are through or their story is the same old pitiful canard. Just think what a job it would be to change the charge on 10,000 or more vouchers, to recapitulate these charges to sense; to reclassify the earnings of each day for several years and to uncover the fact that dividends paid were not really earned, as we had neglected to provide any "Duffy" reserves.

REDISTRIBUTION BY PERCENTAGES

However, there seems to me to be a fairly good scheme as a third suggestion toward redistributing open accounts while still operating our cars, lighting systems and gas jets. That is, a percentage system.

The new classification follows closely the standard adopted heretofore by public utilities in other States; especially is this true of the classification for electric railways, as is shown by the following comparison:

The grouping of the operating expenses of the standard classifications which has been adopted by the American Street & Interurban Railway Accountants' Association is as follows:

Maintenance of way and structures.
Maintenance of equipment.
Operation of power plant.
Operation of cars.
General.

*Abstract of paper read before Wisconsin Electric & Interurban Railway Association, Sheboygan, Wis., April 12, 1909.

In the new Wisconsin classification the accounts are grouped as follows:

Way and structures.
Equipment.
Conducting transportation.
Traffic.
General.
Undistributed.

From this comparison it will be noted that the first two headings in each grouping are practically similar. The next two, "operating of cars" and "operation of power plant," are grouped together under one heading, "conducting transportation," although the subdivisions or refinement accounts are kept practically the same. These were amalgamated probably to conform with the provisions of the Interstate Commerce Commission, which, you know, is prone to abide by the counsels of steam railroad accountants who know nothing of a central power station, but consider power as a part of a train.

"Traffic" has been added as a new group; and, well, too, as we are now quite ambitious imitators of commercial railroads, with our lodge-joining general agents, genial park managers and publicity departments. Certain items that were included in the general account of the standard classification have been segregated and placed under a new group called "undistributed." This refinement is readily taken care of by percentage, provided that local abnormal charges are considered, such, for instance, as a very heavy charge because of accidents. As all accidents were charged to "damages" under the old classification, you will readily see that one expensive accident would sadly derange the entire percentage scheme.

DISTRIBUTION OF TOTAL OPERATING EXPENSES

As the grouping of these two classifications is so similar you can see that, having the relative percentage of the old standard, it is an easy matter to prorate the operating charges to the new distribution. Roughly I have figured the percentage of the American standard as follows:

	Per cent
Maintenance of ways and structures	8½
Maintenance of equipment	8½
Operation of power plant	35
Operation of cars	32
General	16

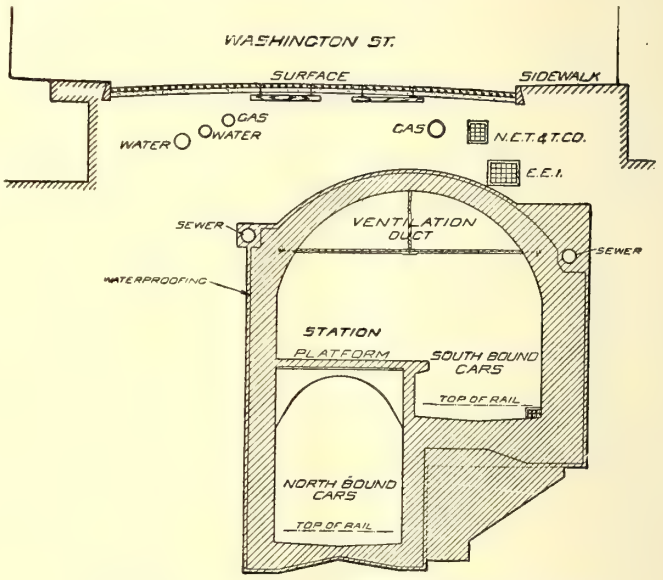
Although these proportions are taken from a yearly record, still they may vary somewhat, but an average may readily be obtained by application to any road that has used the old standard. Further refinement may be obtained by working out the percentage of the subdivisions and applying the same method of disposition. As stated before, the capital and property accounts do not need to be changed. The open construction and equipment accounts must be dealt with individually as local conditions may warrant.

The revenue accounts are practically the same as the old standard except under different names and can readily be redistributed to comply with the new provisions. Care should be exercised in keeping charges against revenue out of operating expenses, for often gross operating expenses are swelled abnormally by amounts that should be deducted from the revenue and should not be charged into operating expenses, such as park receipts, rental of cars maintained by the company, etc.

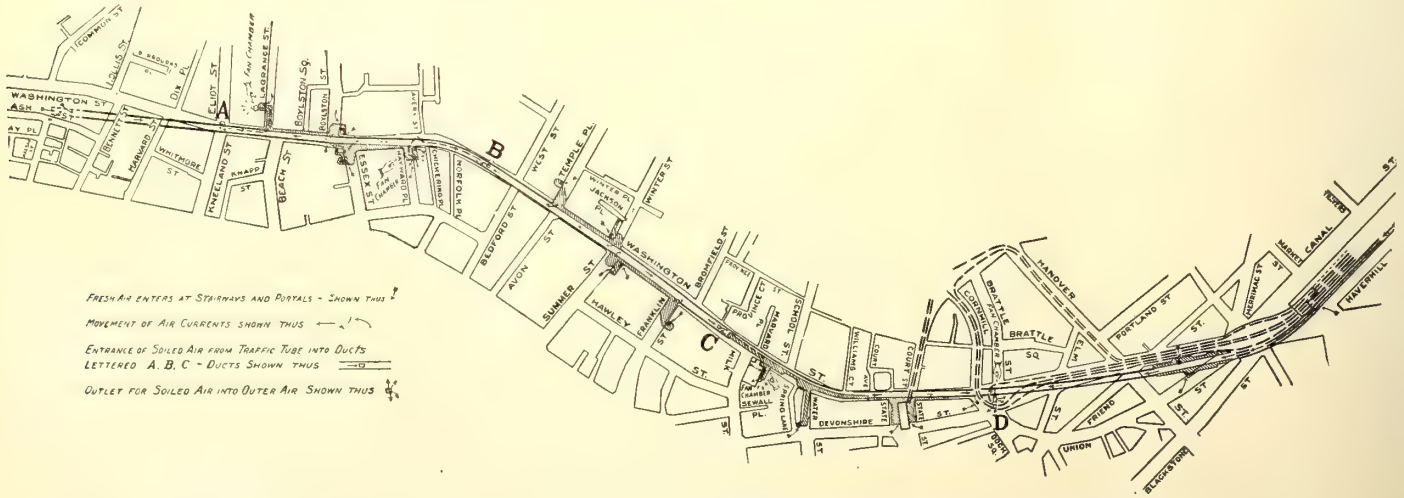
There may be methods that seem more simple as the local conditions may require; for as the methods of making the change are left to us individually to work out as best fits our bookkeeping systems, the task is merely a local one and should not cause undue worry. The essential thing to consider in making this change of old accounts is to have it a true record and thoroughly intelligible to the managing officers and the Railroad Commission.

VENTILATION OF THE WASHINGTON STREET TUNNEL, BOSTON

In the account of the Washington Street subway, Boston, published in the Electric Railway Journal for Nov. 28, 1908, a short statement was published of the system of ventilation employed. As in the original Boston subway and in the East Boston tunnel, fresh air is admitted at the stations and portals and withdrawn from the tunnel at points about midway between.



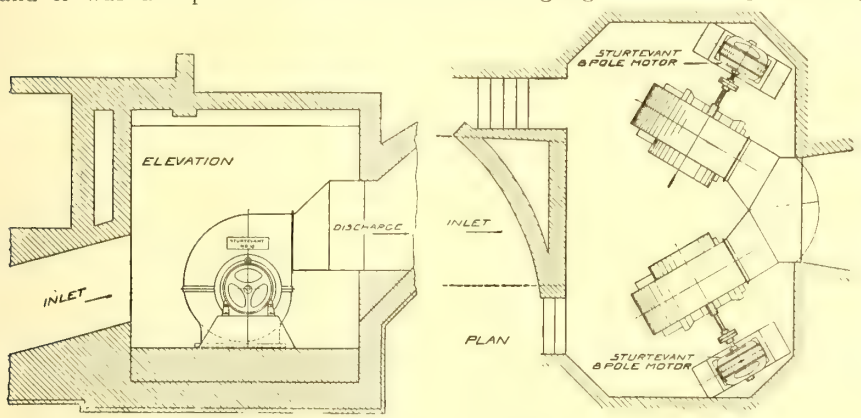
Cross Section of Tunnel at Milk Street Station



Plan of Washington Street Tunnel, Boston, Showing Location of Fan Chambers and Direction of Air Flow

The map shows the location of the fan chambers and the direction of air flow, which is indicated by arrows. At each of the four points, *A, B, C* and *D*, the air in the

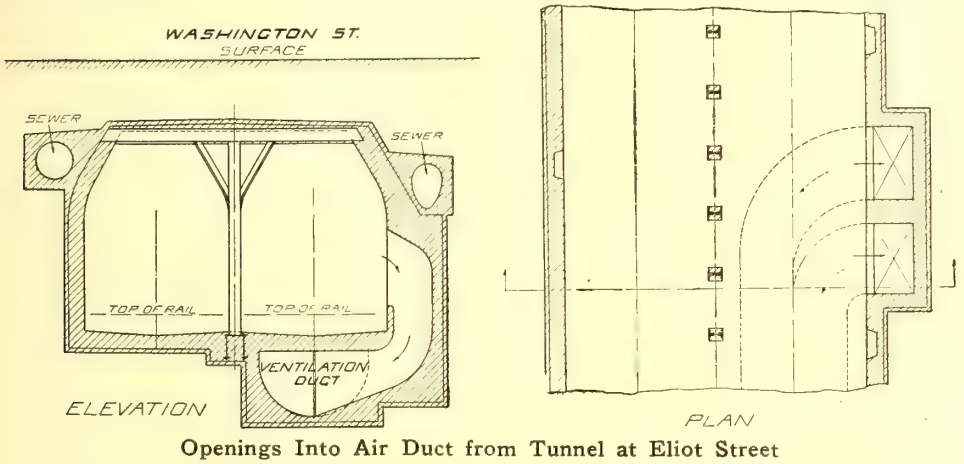
tunnel enters a duct which leads to the nearest fan chamber. In some cases the ducts are beneath the tunnel, as at Eliot Street, or at the side, and in other places, such as at Milk Street, they are above. These ventilating ducts have a cross-sectional area of at least 40 sq. ft., which results in a velocity of air in the tunnel of about 1 ft. per second, equivalent to a change of air in each section of at least three times per hour. The vitiated air is discharged by means of ducts, because the location of the buildings made it impossible to discharge the air at the points where it was desired to take it from the tunnel, and it was not practicable to deliver it through grated



Fan Chamber at Lagrange Street

areas in the sidewalk on account of the large number of people passing in the daytime.

As an example of the operation of the ventilating system, the section having the fan chamber near the Old South Meeting House, at Milk Street, may be considered. Air enters at the entrances at Summer Street, Franklin Street, the Old South Meeting House, Water Street and the Old State House, at State Street, as shown by the arrows, to the arch duct *C*. The foul air entering the duct at *C* flows to the fan chamber near the Old South Meeting House, which is a distance of about 270 ft., and is there discharged into the atmosphere by means of the motor-driven electric fan. At La Grange Street, Haymarket



Openings Into Air Duct from Tunnel at Eliot Street

Place and the Old South Meeting House the exits for foul air on what was formerly private ground. At Adams Square, however, the discharge is through a grated opening on the easterly side of the Adams monument.

The fans used for ventilating the Washington Street Tunnel are of the Sturtevant multivane type, driven direct-connected by Sturtevant eight-pole motors. These fans consist of a wheel made up of 60 blades securely riveted to the side plates and to the steel arms, the other extremity of which is cast in the hub. The blades are spooned to add strength and stiffness to the wheel and to distribute equally the air pressure within the fan. The speed varies from 225 to 250 r.p.m., and the capacity of the fans is 25,000 ft. of air per minute.

BRAKES*

BY F. D. MILLER, NATIONAL BRAKE COMPANY, BUFFALO.

During the month of March I was invited by some of your members to address a few words to the committees of the Iowa State Legislature on the subject of brakes, and more particularly on the comparison of the modern hand brake with the air brake for service on medium-weight city cars. After these hearings your Mr. Crafts addressed a letter asking me to prepare a paper embodying as much of the argument used before the Legislature as might be of interest to you. It is quite a different proposition to speak to a legislative committee on a subject with which they are not supposed to be conversant and to address the same words to men who are perfectly familiar with all the points covered, and expect to receive from them the same attention and interest. I shall, however, try to make good my promise.

There are very few roads which do not have, no matter what the weight of the car or whether equipped with air brakes or not, a hand brake by which the car can be controlled, not only under ordinary circumstances, but in cases of emergency. The only force which can be utilized in stopping a car is that which arises from the resistance which the rails present to the sliding of the wheels. Hence the problem of designing a brake rigging resolves itself into determining what is the maximum of this force and in laying out a rigging which will give a pressure between the shoe and the wheel just under that required to slide the wheel.

To determine the maximum retarding force we must determine the coefficient of friction between the wheels and the rails. This obviously will vary with the weather conditions and the condition of the rail, but from a large number of experiments it is found to average about 0.18 of the weight of the car on the rail. The weight, and not the length of the car, as in the case of the bill before your Legislature, is the proper starting point for considering what method of braking shall be used. With a coefficient of 0.18 between the rails and the wheels, there is required to skid the wheels a ratio of brake shoe pressure to the total weight on the braked wheels as follows: At 7½ m.p.h., 70 per cent; at 20 m.p.h., 95 per cent; at 40 m.p.h., 120 per cent, and so on. These considerations fix the limit of efficient braking pressure, as, of course, as soon as they are exceeded the brakes will lock the wheels of the car and therefore place it out of control, for, as you all know, there is less friction between a sliding wheel than can be obtained between a brake block and a rolling wheel. Theoretically, other factors which have to be considered in determining the maximum retarding force are the effect on the car body and upon the passengers. For ordinary stops, where the comfort of the passengers is considered, the rate of retardation, or decelleration, should not exceed 3 ft. per second per second. In extreme cases it may go as high as 7 or 8, but this not without danger to the passengers within the car, as they will undoubtedly be thrown

*Abstract of paper read before the Iowa Street & Interurban Railway Association, Cedar Rapids, Iowa, April 22-24, 1909.

from their seats and the car body itself subjected to severe strain. A distance of 20 ft. is the least in which a car traveling 8 m.p.h. can be brought to a stop without shaking up the passengers within the car. The same car traveling at the rate of 10 m.p.h. might be brought to a stop within 30 ft., but it would entail a much more violent shaking up of the passengers. It is hardly practical to stop a car traveling 10 m.p.h. within a distance of 30 ft., or a car traveling 12 m.p.h. within a distance of 40 ft., or a car traveling 14 m.p.h. within a distance of 60 ft., or a car traveling 16 m.p.h. within a distance of 80 or 90 ft., and so on. These distances are independent of the kind of brake; they simply show the limits within which any brake must operate.

The improved hand brakes now on the market have been thoroughly tested, and it is a fact that their retarding force is equal to that which can be applied with comfort to the passengers. It follows, therefore, that for the ordinary service stop the hand brake is in every way suitable for cars under the interurban class.

When it comes to the question of handling emergency stops the hand brake has the advantage of simplicity. There is very little to get out of order, and the motorman, instead of being able to throw on all his power at once, thus increasing the liability to slide the wheels, quickly but gradually brings to bear against the wheels the maximum of efficient braking pressure. Should the wheels begin to slide he is at once conscious of it and can instantly release.

At this point it may be interesting to outline the method by which we proceed to lay out a brake rigging, and for the purpose of illustration I select one of the cars of the Third Avenue Railroad, of New York City. The car in question measures 35 ft. 11¾ in. over the crown piece and weighs approximately 26,640 lb. Following the usual practice, the brake rigging is designed to yield a pressure equal to 100 per cent of the light weight of the car. These cars are equipped with Peacock brakes, and, starting with a 12-in. ratchet handle, with the use of the small size Peacock brake, which has a gear ratio of 14 to 34, a 50-lb. pull on the ratchet handle will yield approximately 770 lb. on the chain. Dividing the weight of the car by this number, we obtain as a result a little less than the whole number 35, which is the ratio to 1 we must obtain by means of the brake rigging and trucks to give the required braking power. The trucks on this car are the Brill maximum traction trucks, and the ratio on these trucks is 6.38 on the large wheels, and 3.19 on the small, or a total of 9.57 on one truck. As this is a double-truck car, the total for both trucks is 19.14. By dividing the weight of the car, 26,640, by 19.14 we obtain 1392 as the number of pounds which must be developed on the radius bar, so by means of the levers under the car we have to increase the 770 lb. to 1392. By a proper placing of the fulcrum point it is possible to bring the greatest braking pressure on the forward truck, no matter from which end the car is operated. This is very desirable, for in braking a car the weight is thrown forward to the front truck, so that with an equal braking pressure on both trucks the wheels of the rear truck will slide first.

The improvements in hand brakes have all been aimed toward the reduction of the time necessary to their full application. There are many companies which, perhaps, have had a great deal of difficulty with the brake arrangement on the old type of maximum traction trucks, where there was usually so much slack that it required a great deal of both time and winding to apply the brakes. I speak of this type of truck, not because it has sinned more than others in this respect, but simply for purposes of illustration. The brake arrangement on this particular style of truck has been immeasurably improved by an invention of J. S. McWhirter, superintendent of car equipment of the Third Avenue Railroad, and the patent purchased by The J. G. Brill Company, which manufactures the trucks. A detailed drawing may be found on page 383 of the Electric Railway Journal of Feb. 27, and, as noted there, the braking weight on the pony wheels may be varied by changing the position of the fulcrum suspended from the bell-hanger lever. In the case of the trucks in use on this car, the pony wheels bear 33 per cent of the braking weight, but to get back to the matter of slack in brakes, there is almost no lost motion on the brakes of this truck. What little there is arises on account of the journal boxes rather than anywhere else, so that the formula for levers may be depended upon to give the exact chain travel for any weight of car. In the case of the car being used as an example, it was found that the leverage ratio necessary to develop the required braking power was 1 to 35. The shoes clear the wheels by 3/16 in., hence the proportion $35 : 1 :: x : .1875$, and x equals 6½ in., or the chain travel necessary to take all the slack out of the brake. While speaking of this chain travel it is interesting to note the difference when the large-size Peacock brake is used with a gear ratio of 12 to 48. For the same weight of car the leverage necessary is only 21.3 : 1 instead of 35 : 1. Substituting these numbers in the above formula, x equals a little less than 4 in. When it comes to setting the brakes this difference in chain travel becomes more apparent. In the case of an actual experiment with one of the Third Avenue cars it was found that with the small brake 10½ in. of chain was wound, while with the large brake only 6⅛ in. were wound. This matter of chain travel becomes important in designing a hand brake to be used in connection with the air brake, for here the hand brake must be so designed as to take care of the greatest piston travel likely to occur.

Many companies, no doubt, have been confronted with the problem of designing a hand brake which will work efficiently along with the air brake on the cars which have thus been equipped. For a long time it was the exception to find a car equipped with air brakes where the hand brake was equally effective in controlling it. Such is no longer the case. There are many designs which furnish a hand brake with which the modern city car, up to 40,000 lb. in weight, can be operated and controlled down steep grades or on the level as well as by any other means. The subject of designing a hand-brake rigging to work in conjunction with air is, however, large enough for a paper by itself.

Many improvements have also been made in the details for the rods and levers which go to make up the brake layout. That used by the Metropolitan Street Railway, of New York City, embodies perhaps as many of these as any that could be mentioned. By means of safety stops and proper designs of jaws they have a brake rigging whose efficiency would not be materially affected if the different pins should be broken in two under the shearing strain and drop on the roadway.

INSPECTION AND MAINTENANCE OF ROLLING STOCK*

BY W. F. RABER, GENERAL MANAGER, OTTUMWA RAILWAY & LIGHT COMPANY

The rolling stock of the street railway property usually represents but a fraction of the total investment, yet by no other one thing is the company so critically judged by the public as by the condition of its cars. A city is often known by its street cars, so is the company operating them. No other part of the equipment comes in such close daily contact with the public, which will give but a passing recognition for the thousands of dollars invested in power plants, track and overhead equipment, but which is vitally interested, and rightly so, in the cars. The interest, perhaps, is not so much in the kind of car operated as the condition in which they are kept. New equipment cannot be bought every few years, but the cars in service can be kept clean, well painted and in good repair. The writer does not believe in spasmodic repairing, cleaning and painting, but in constant effort in the up-keep of the rolling stock, whether it be new or old. Prosperity is sometimes an excuse for laxity in the up-keep of rolling stock as well as business depression. The company that keeps its property at the highest point during prosperity can best afford to retrench during a depression.

The prime requisite for the inspection and maintenance of rolling stock is a well-organized and thoroughly balanced force of employees. No other department in a street railway organization needs as efficient a force of employees as the car shops. The size of the force and the

*Abstract of paper read before the Iowa Street & Interurban Railway Association, Cedar Rapids, Apr. 22-24, 1909.

number of shop departments, of course, depends on the size of the property operated. The manager or superintendent can give only a small portion of his time each day at the barns, hence this very important department must be entrusted to a foreman or master mechanic who is fully capable of keeping the equipment as a whole at its highest efficiency at all times at a reasonable cost. Too much credit cannot be given to him when he has fully performed the duties entrusted to him. He must be encouraged by allowing him to take the full initiative, even though mistakes occur; let him have full sway and he will uncover many "tricks in the trade"; consult him when contemplating changes in equipment, for he has ideas along practical lines that will assist in making a final decision and will save the company money when the up-keep of the equipment is making a bad showing on the operating ledger. If the property is large enough, the same may be said of the foreman, painter, carpenter, machinist, electrician, and the heads of all departments.

Provide suitable workshops and ample storage barns. It is economy to have the storage barn near the repair shop, although not necessarily under the same roof. Provide storage room for every car, for there is some time out of the 24 hours that they should be sheltered. It is gratifying to see the advocates of storage yards are getting fewer each year. Aside from the fire risk there is no other excuse for exposing rolling stock to the elements. Build barns and shops according to the recommendations of the underwriters and no complaint can be made on the insurance rate, and to a great extent the decay of the rolling stock can be prevented.

Regarding the shop and tools, provide as much pit trackage as practical in the repair shop and have the pits well heated. Separate the paint shop from the main workshop, so as to avoid smoke and dust, provide plenty of daylight and have it well heated. Separate the supply room from the shop and issue material on requisition only. Equip the shop with such tools and machinery as the property will permit of. For the average small road it will be well to have a forge, lathe, drill-press, boring mill, shaper, grinding wheels, a wheel press, an air or vacuum cleaner, an armature lift and portable crane. When rebuilding of car bodies is undertaken a limited amount of wood-working machinery is indispensable.

The average city car should be thoroughly inspected in every detail at the end of about 1500 car miles run if given a good general inspection every night at the barn and a running inspection on the line once each day. The periodical inspection should begin at the trolley and end at the brake rigging in a systematic manner, giving attention to the entire equipment, and renewing only such parts as are necessary or test out below standard. Major repairs, such as armature, fields, bearing, journal, wheels and brakes should always be repaired or renewed at this inspection, and never left for the night crews. The foreman should use his own shop kinks to the best advantage possible. There is a tendency at these general inspections to renew parts that have not yet reached the scrapping point. Here is where judgment must be used and standards of wear adopted. This is particularly true of trolley wheels, contact fingers, motor brushes, brake shoes and car wheels.

Particular attention should be given to brush tension and condition of the field coils. There is no standard for brush tension, but where the track is rough it requires considerable more than factory standards. Weak fields are the forerunner of more electrical trouble than any other part of the electrical equipment. Set a standard and test the fields often; if any are found below standard, remove them at once and replace with new or repaired coils. Vacuum treatment given to weak and apparently worthless field coils will often restore them so that they are good for years of services. Impregnated coils often last longer than new coils untreated, and the cost is about equal to the scrap value of the untreated coil.

Sweep and dust cars every night; if the shop or barn is equipped with compressed air or vacuum cleaning apparatus this work can be done easier and better than by hand. A thorough or general cleaning once a week will suffice. Use a terminal cleaner inside. A fountain brush and hose are very rapid and effective on the outside. There is no better disinfectant to use in cleaning cars than soap and water. Some of the later types of cars are constructed so that they can be cleaned inside with hose and brush, but there is still room for improvement, and it is surprising that car builders at this late date do not give more attention to the details of construction with the idea of sanitation in view. Railway men should demand some radical improvement along this line. They will welcome the day when a car can be built that is vermin proof.

The paint shop should be in charge of a man who can do lettering and striping and understands the mixing of paint and the preparation of the body from the beginning of the operation. Paint specifications furnished by paint manufacturers, as a rule, are satisfactory, but a practical car painter will work many a kink and short cut that brings results which are often superior and at less expense. New cars fresh from the builders are, as a rule, only moderately well painted, in spite of the most rigid specifications. This is due to the rush in getting them out. A car properly painted in the railway company's shop will outwear a car from the factory about two to one. For new cars, give the body a coat of varnish after about six months' use, then each year, if the car is in daily use. Inside finish will usually look well for two years, except the floors, seat frame and vestibule, which will require about the same attention as the outside of the body. Car bodies well painted and thoroughly seasoned will last for years if followed each year or 18 months with a coat of varnish and an occasional touching up before applying the varnish. To have cars look well at all times adopt standard colors and maintain them. Use only a medium grade of varnish and apply it often, particularly on open cars when the wear is greater and the high-grade varnish is scuffed as readily as the medium grade.

Keep constantly at your rolling stock. If necessary, reduce the working force so that when the winter cars are out the shops can be working on the summer equipment. This will give better results in the long run than to bunch the work into short seasons. A better force of men can be kept together, which means much to your company.

HOW TO HANDLE ACCIDENTS*

BY ARTHUR G. RIPPEY, ATTORNEY CLAIM DEPARTMENT, DES MOINES CITY RAILWAY COMPANY AND INTERURBAN RAILWAY COMPANY

A claim department is purely a business proposition. It is simply a means for protecting the companies so far as practicable against the expense incident to claims that are without legal basis and are founded either upon misapprehensions as to legal rights or upon a deliberate purpose to defraud the companies by the assertion of manufactured claims. To justify itself, the claim department must save more than it costs. The work which the department at Des Moines attempts to do divides itself into two classes; one is the prevention of accidents, and the other minimizing the expense after an accident has occurred.

INSTRUCTIONS TO TRAINMEN

The claim department makes it a point to see that specific instructions are given to employees along the lines that experience has developed involve the most danger. Motormen are not only cautioned generally as to the effects of carelessness, indifference and inefficiency in operating cars, but in addition to this their attention is called to the fact that the danger of accident is enhanced by any disobedience to rules, such as failure to make crossing stops; permitting unauthorized persons to operate a car; drinking, either on or off duty; failure to ring the gong at intersections or when passing teams or vehicles; passing standing cars without first coming to a stop; starting cars without the proper signal, and so on. In the same way conductors are impressed with the importance of knowing, when signals are given for the cars to start, that no one is in the act of boarding or alighting from the cars, and of properly flagging railroad crossings, and of attention to their rear lights, and to the display of proper signal flags. They also are strictly warned as to drinking and as to the absolute necessity of compliance with orders and are told what to

*Abstract of a paper read before the Iowa Street & Interurban Railway Association, Cedar Rapids, Iowa, April 22-24, 1909.

do in emergencies, as protecting the car by flagging in each direction when a car is off the track on a steam railroad crossing or when it has stopped there for lack of power. In general, the claim department attempts to supplement the work of the operating department, which promulgates the rules and fixes penalties for their disobedience by making clear to the operating employees the reasons for the rules and the consequences, in the way of accident, which may ensue if they are violated.

Both motormen and conductors are instructed as to the absolute necessity of prompt and complete accident reports. In case of an accident which results either in a personal injury or in damage to property of any consequence, the employees in charge of the car are required to immediately notify the superintendent and claim department by telephone, and where there is a personal injury the company's surgeon as well. To facilitate the prompt giving of these notices, we are now installing an independent telephone lead, to be used exclusively for this purpose. Where the damage is to property only and is very slight, the report is made by the train crew when it comes in from its trip.

ACTION IN CASES OF SERIOUS ACCIDENTS

In case of a personal injury, the claim agent and surgeon upon receiving the notice mentioned immediately proceed to the place where the accident occurred, the surgeon to care for the injured persons and to aid in removing them either to a hospital or to their homes, and the claim agent to assist the crew in securing witnesses and in ascertaining the exact cause of the accident. It is the duty of the trainmen to secure the names and addresses of all persons who saw, or might have seen the accident, or who know anything material bearing upon the question of liability.

If the accident is of any consequence the trainmen are immediately taken from their car to the claim office, where we obtain from them written detailed statements, which are signed by them. An investigator is then given the names and addresses of all the witnesses and is sent out with instructions to obtain a detailed written statement, signed by each. We also endeavor to secure immediately a written signed statement from the prospective claimant. We regard it as of the utmost importance to do this while the facts are still fresh in his mind, and when, if he has the disposition to misstate them, he has not the information to do this effectively. If he has given a detailed written statement over his signature, it is probable that he will not later manufacture a story out of whole cloth entirely at variance with the facts.

We also make it a rule immediately after the accident to go through the neighborhood where the accident occurs, looking for witnesses and to take statements from every one in the vicinity, whether he claims to know anything with reference to the accident or not. This we consider to be of great importance. Our experience is that if a suit is brought the plaintiff ordinarily does not know the names of the passengers upon the car and has few witnesses of that kind, but that the plaintiff's witnesses are persons who happen to be in the vicinity, such as some one standing in a doorway or looking through a window or on the street a block away, who saw the accident. We have observed that this class of witnesses is very positive in its statements as to how the accident occurred and is generally thoroughly convinced of the defendant's negligence. As an illustration of the value of taking statements of this character, we have now a suit pending in which the plaintiff is asking for $20,000 and is relying upon the testimony of a witness who was in a building about a block distant. Shortly after the accident occurred we secured a written statement from this witness to the effect that she was in this building over a block away, so located that she could not see the accident and that she did not see it and that she knew nothing of it until some time afterward. If this case is ever tried and this witness attempts to testify along the lines which I understand the plaintiff now expects, her written statement may prove somewhat of an embarrassment to her.

STATEMENTS BY CLAIMANTS

We have claimants, and doubtless others have the same experience, who refuse to sign a statement prepared by us to cover contingencies of this kind. We request them to present their claims in writing to us. For this purpose we have had a blank printed. This blank covers the salient features of the accident and provides space for the amount of damages to which the claimant thinks himself entitled. Few claimants refuse to make out statements of this character, and it is our experience that if the claim ripens into a suit, the plaintiff's knowledge that he has presented a specific claim in writing has a salutary effect and his testimony on the trial usually does not vary much from the statements presented in the written claim.

Wherever it is possible, I induce the claimant to come to my office where I take a detailed account of the accident in the form of questions and answers. That is, I ask the claimant questions such as would be asked a witness if he were on the stand, covering all of the material matters which I know of or which I can anticipate. These questions and the answers of the claimant as they are given are taken down in shorthand by my stenographer and are then transcribed and read over by the claimant and signed by him. This I regard as the most satisfactory statement which can be obtained. The short statement written up in longhand is usually a statement of mere conclusions and is only an outline. A statement such as I have referred to covers the details and it is much more difficult for the claimant later to evade it or to explain away what he has said.

ACCIDENT FILES

It is our purpose to keep on file a complete history of each case, including the signed statements of the claimants and of all witnesses and the crew, the original report of the accident, a plat made by our engineer, photographs showing the car and all surroundings, all records showing the condition of the car and its equipment, with reports of its inspection, and reports of the weather bureau if material. In other words, we attempt to obtain at once and to file away for future reference, everything which we anticipate may become material in the event of a controversy.

PAYMENT OF CLAIMS

In the absence of an emergency, a claim agent who authorizes the payment of the company's money for personal injuries or damage to property without having made a thorough and complete investigation of the accident and having before him all of the facts, has failed to perform his duty to the company. Without this information, the fundamental inquiry as to the company's liability cannot be answered. As soon as we are able to form an intelligent opinion as to the question of liability, if the case is one for an adjustment, we attempt to compromise it. Except in cases of serious personal injury, and very frequently in such cases, delay increases the amount which it is necessary to pay in order to secure a settlement. The lawyers who make it a business to solicit claims of this kind do not delay and when a claimant has given one of them a contingent contract for 50 per cent the difficulty in making a just settlement is very much increased.

It is gratifying to know that there is at least one exception to this rule. Last fall a careless motorman started a fire in one of our cars, causing a panic among the passengers and injuries to several of them. One was a farmer living in an adjoining county. Within a few days we had a letter from his lawyer, who is a lawyer of standing in his community, advising us of the accident and stating that at the time they did not know the extent of the injuries and that when they were fully informed as to them they would be glad to take up the matter of a settlement. We wrote back, telling him that when he wished to take the matter up we should be glad to consider it with him. Some three months afterward this lawyer came in. He said his client had suffered pain in one of his arms and they feared a permanent injury, but this had disappeared; that he had suffered pain in his groin which had continued for a good while, but this had gone; that he incurred some expense on account of a physician and for three months had not been wholly disabled but had been able to do about one-half of his customary work upon the farm. When we asked how much he thought his client ought to have, the lawyer replied that under the circumstances any reasonable man ought to be satisfied with $20. We agreed with him and sent him a check and voucher to close the settlement.

As to the settlement of small claims as a matter of policy, without reference to the question of liability, it is perhaps

impossible to lay down any hard and fast rule. There is a constant conflict between the question of expense and the universal indisposition to be imposed upon. As a general proposition no claim which is wholly without any merit should be compromised simply because the amount which the plaintiff proposes to settle for is small. Further, it is sound policy to refuse to settle small claims where it is clear that they may be defended with entire success. The payment of claims falling within either of these two classes is unwarranted encouragement to the subsequent assertion of like claims. It is against sound business policy as well as sound public policy. On the other hand, where there is any doubt about a small claim and where the claim is asserted in good faith, the company, in my judgment, is warranted in making a settlement wherever it can be done upon a basis that is obviously more economical than a contest would be.

In making settlements, if the claim involves a large amount, I consult with the general counsel of the company and with the manager before opening negotiations with the claimant. Settlements are made by the claim department. We have printed forms of release. We almost invariably pay claims by check, regarding this as an advantage, as the checks are made payable to claimants and the indorsements of the claimants are required in order to enable them to obtain the money. Where a suit has been brought upon the claim, in addition to a release and voucher, we insist upon having a stipulation of settlement signed by the party and a dismissal of the case signed by the plaintiff, with a release by the plaintiff's attorney of any attorney's lien that has been filed.

CLAIMS OF ADMINISTRATORS OR GUARDIANS

If the claim is asserted by the administrator of a decedent or guardian of a minor and a settlement is made, whether suit has been brought or not, we first satisfy ourselves that the law in regard to the appointment of the legal representative has been fully complied with. After this is done, we require the legal representative to file in the proper court a petition for authority to settle the claim and to secure an order of court authorizing the settlement. After the settlement has been made, the legal representative reports the settlement to the court, attaching a copy of the release. We then have an order of court approving the form of the release and ratifying and confirming the settlement. When this has been done we pay over the money.

A concrete illustration of the importance of care in these matters recently occurred with us. We had made a settlement of a death claim. Within a day or two before the running out of the statute of limitations, the court, acting upon the motion of a lawyer who should have known better, issued a citation requiring the administrator to appear immediately and show cause why he should not at once commence a suit against the Des Moines City Railway Company. The administrator was able to show, in response to this citation, that the reason he did not institute suit was that he had settled the matter pursuant to an order that the court had theretofore made authorizing him to do so, and this was the end of it.

COST OF CLAIMS TO THE COMMUNITY

The growing importance of this matter of personal injury claims, not only to the companies but to the public at large, is something that very few people appreciate. The taxpayers of our county annually contribute enormous sums of money to carry on our courts. In our district court there are four divisions: the criminal division, the equity division and two law divisions, one for odd numbered and one for even numbered cases. The judges who are presiding in these two law divisions advise me that over one-half of their time is devoted to the trial of cases predicated upon injury to persons or damage to property. In other words, in Polk County nearly one-half of the expense incident to the maintenance of the courts is caused by the activity of the personal injury lawyer, so-called, in his efforts to realize upon his 50 per cent contingent contracts. It would be a great surprise to taxpayers generally to know the extent of the burden which these lawyers are imposing upon them as well as upon us; and the community would be greatly benefited, not only financially but ethically, if this superfluous energy could be diverted to other channels.

In the millennium the ideal traction company will not have any claim department, because the ideal way of handling accidents is not to have them. So long, however, as the persons who operate the cars are human, and the persons who ride in the cars are human, and the persons who use the streets are human, accidents will be inevitable; therefore the claim agent need have no fear that his occupation will not continue. All that the claim department can hope to accomplish is to aid in preventing accidents by increasing the efficiency of the operating force and to aid in minimizing the results of accidents by maintaining and increasing the efficiency of the claim department itself.

APPLICATION OF INTERSTATE SYSTEM OF ACCOUNTS TO STREET AND INTERURBAN RAILWAYS*

BY H. E. WEEKS, SECRETARY AND TREASURER, TRI-CITY RAILWAY, DAVENPORT, IOWA

In order that we may duly appreciate the work done in formulating the system of accounts which has been adopted by the Interstate Commerce Commission, let us briefly review the history of the American Street & Interurban Railway Accountants' Association.

The Street Railway Accountants' Association was organized at a meeting held at Cleveland, Ohio, on March 23 and 24, 1897. The object of the association, as stated by the constitution, was to bring together those engaged in the accounting departments of street railway companies for the interchange of ideas, to promote the adoption of a uniform system of accounts and to improve the work of the accounting department. At that meeting a committee was appointed to draw up a standard classification of operating expense accounts. This committee, which consisted of three of the ablest accountants in the street railway business, reported to the first annual convention, held at Niagara Falls, N. Y., October, 1897, a system of operating expense accounts. The convention devoted a large part of its time to the consideration of the report. Each account was discussed, and when necessary amended. The classification was not adopted, however, until the convention held in October, 1898.

At the convention held in October, 1904, the committee on standard classification of accounts was empowered by resolution to revise the classification if it was deemed advisable or advantageous to do so. This action was taken with the thought particularly in mind of amplifying the classification to cover specifically the operation of interurban railways, most of which had entered the field since the promulgation of the classification.

The committee reported to the 1905 convention that in its opinion no change should be made in the present classification of accounts, but that subsidiary accounts should be provided, and made specific recommendations as to what they should be. The question was again reported on by the committee at the 1907 convention and a large amount of time was given to the discussion and amendment of a tentative classification, which was finally referred back to the classification committee for final revision with power to act.

This classification is in substance the classification which was finally adopted by the Interstate Commerce Commission with the exception that the Interstate Commerce Commission does not treat discount and commission on securities issued for construction purposes or to raise funds for construction, as a proper capital expenditure, chargeable to expenditures for road and equipment.

The adoption of this classification was brought about only after strenuous efforts by officials representing a capitalization of about $2,000,000,000 of street and interurban railway interests. The fact that these men were willing to sacrifice their valuable time to attend the conferences with the Interstate Commerce Commission indicates the importance to the industry of the matter at issue.

The Interstate Commerce Commission proposed to adopt a system of street railway accounts patterned largely after the existing steam railroad classification, and the adoption of a classification by the commission was rendered impor-

*Abstract of a paper read before the Iowa Street & Interurban Railway Association, Cedar Rapids, Iowa, April 22-24, 1909.

tant by the fact that the State commissions of a number of the States had expressed the intention of adopting the classification promulgated by the Interstate Commerce Commission. The matter would otherwise have been of comparatively little importance, as comparatively few electric roads conduct an interstate business.

When the impracticability of the application of steam road accounting to electric railway work and the necessity of at least three groupings of accounts for roads, according to size, was brought to the attention of the commission by these men acquainted with the needs of the industry, the commission recognized the importance of adopting the classification which had been perfected after years of work on the part of those familiar with the requirements of the street and interurban railway industry.

The 39 accounts of the original classification of the Accountants' Association covered in a comprehensive manner all the requirements of the urban railways. The accounts added in the new classification are nearly all made necessary by the growth of the interurban business. Although but few roads in the State of Iowa are compelled by law to adopt the Interstate Commerce Commission classification, there is not a road in the State that can afford not to adopt it.

Practically all existing financial records, statistics and blanks of the street and interurban railway companies of the country are based upon the classification. The Census Bureau and other statistical departments of the National and State governments have been using it for nine years. This fact alone makes available data of inestimable value for comparative purposes. In these days the manager who is unable to make an analytical comparison of the results of his operation with other roads and profit by the application of more economical methods thus brought to his attention will be supplanted speedily by a more progressive man. The adoption of the classification renders possible the close analysis of operating methods of a property necessary to efficient administration.

Another reason for the adoption of the classification was necessary, the fact that already there are 30 States whose laws give to the State railway commission or other legally constituted body, jurisdiction over electric railways and that these commissions have signified their intention to adopt the Interstate Commerce Commission classification, should be indication enough of the tendency of the times to induce all to fall in line and put their records in shape to make comparison when they are compelled to adopt the classification.

DEVELOPMENT OF TRAFFIC ON INTERURBAN LINES*

BY C. M. CHENEY, GENERAL FREIGHT AND PASSENGER AGENT WATERLOO, CEDAR FALLS & NORTHERN RAILWAY

Most interurban railway managers have come to realize that the knowledge of traffic development gained by steam railway traffic men through years of practical experience, and methods practised by the steam railways in creating and holding traffic are the methods that interurban lines should adopt and follow to a considerable extent. A thorough knowledge of the methods used by steam roads in locating industries, solicitation of business, proper handling of claims and accounts, is invaluable to the interurban traffic officer. It puts him on an equal footing with the representatives of the steam roads and in a sense gives him an advantage, as he is in a position to know exactly what the steam roads are doing, and he can work out many plans which will be pleasing to the shippers, remunerative to his company and not thought of or considered possible by the steam roads. This knowledge also brings him in close touch with and widens his acquaintance among steam road representatives, which is also very desirable, especially when working out joint tariffs and divisions. A thoroughly organized traffic and industrial department with a competent and well posted man in charge is desirable for any electric interurban line engaged in the handling of passenger, freight and express business, no matter how small its mileage may be. That most managers now concede this fact and have departments of this kind has contributed much toward their success during the past three or four years.

*Abstract of a paper read before the Iowa Street & Interurban Railway Association, Cedar Rapids, Iowa, April 22-24, 1909.

FREIGHT TERMINALS

In the development of competitive business we have found that a very important item to consider is proper terminal facilities and track connection with at least one steam road. While most of the interurban lines located in the Central West have fairly good terminals, some have not and have hesitated about acquiring better and more extensive terminal facilities on account of the seemingly big expense, on the ground, perhaps, that the amount of prospective business in sight will not justify the outlay of money required. In a sense an interurban line engaged in the handling of freight without terminals is in about the same position as a merchant trying to run a store without a building. The amount of freight business which such a road is able to develop is necessarily limited to less than carload merchandise. The possession of good terminal facilities increases the opportunities for the development of freight business and gives an interurban line a standing not only with the shippers, but with steam lines as well.

A few years ago the Waterloo, Cedar Falls & Northern had very limited freight terminals in the City of Waterloo and had track connection with but one steam line, reached only through the city streets. Freight cars could be handled at night only and abutting property owners protested. The management decided that good freight terminals were necessary in order to develop and handle carload business and an outer belt line extending around the north and east side of the city was built, connecting with the steam line terminals and with large freight depot facilities in the city which were leased for a long term of years. At the terminus of the Denver division, 17 miles north, another connection with the Chicago Great Western was effected at the same time. The electric line through these connections afforded the Chicago Great Western a much shorter route to points on its line north and west and a traffic contract was entered into whereby freight destined to or coming from points north and west of Waterloo was turned over to the Waterloo, Cedar Falls & Northern for handling. This arrangement opened up a new territory for the Waterloo jobbers and enabled the steam and electric lines to jointly develop not only business in the new territory, but much competitive business which the steam line did not previously enjoy on account of inability to meet the time made by other competitive lines.

Last year an additional belt line was built around the west side of the city through a new factory district and track connections made with two other steam lines entering Waterloo. The completion of this track furnished freight transfer points with four steam lines and an outer belt line three-fourths of the way around the city. Side tracks were built into the various industries in the new factory district and a station opened with an agent in charge.

The construction of this line has furnished from two to four cars of business per day since the opening of the station. The completion of this line also puts the Waterloo, Cedar Falls & Northern in a position to compete as an intermediate line with a steam road for interchange switching between two other steam roads. An electric locomotive and switching crew were put on to handle industry and interchange switching and is now interchanging between the railways from 5 to 25 cars per day.

LOCATING NEW INDUSTRIES

The location of industries on interurban tracks is an important factor in the development of business and an interurban company is in about an equal position with steam lines in the matter of locating industries. It is necessary to keep in touch with the various commercial bodies and keep posted on what industries are seeking locations, also to get hold of these prospective shippers first if possible and show them over the line, explaining to them the many advantages to be had in locating along the interurban tracks. Other arguments which can be advanced are that the electric road is a small line, a local concern perhaps, on the ground and in position to give immediate attention in the matter of side tracks without going through a lot of red tape; good switching facilities, and if desired

the handling of less than carload freight to and from their doors; good car service for their working force, and many other small advantages that can lawfully be extended. Several of the most important industries on the tracks of the Waterloo, Cedar Falls & Northern were located through efforts of this kind. One of these industries in particular the first year gave approximately 500 cars of business and the next year over 700 cars. An industry just located this month has already turned 30 cars of business to the electric line.

Much business may be developed by keeping in close touch with contractors and material men. It has been found that by watching the awarding of contracts and getting after the successful contractor immediately, it is often possible to get material such as cement, brick, plaster, hollow blocks, stone, sand, etc., purchased from points in territory tributary to the electric line, and that in return for the small attention and effort given the material is invariably routed by way of the interurban road.

While the Waterloo, Cedar Falls & Northern has been watching the development of competitive business, it has not neglected the development of local business, and as a result the small local towns are quite well represented in all lines of business, having good stores, lumber yards, elevators, stock, grain and produce dealers. Six or seven co-operative creameries deliver to it their butter shipments for Chicago and New York at various country road crossings. This butter is picked up in through refrigerator cars and amounts on an average to one carload each week during the winter, and two cars each week during the summer months.

The writer is continually trying to locate different business enterprises in our local towns and has met with good success. Care is also taken to see that wide-awake stock and grain buyers are cultivated in the local towns, and the result is that the interurban road is getting each year many cars of stock and grain from territory directly tributary to competitive steam lines.

As an illustration of what may be accomplished in a small way in the promotion of business in a local territory with little effort, the writer had occasion to visit one of the small country towns on the line about four years ago. While in conversation with the cashier of one of the banks it was learned that he was corresponding with four or five Illinois farmers relative to buying farms and locating at some point in Iowa. Following this up the writer made a trip to Illinois to see these farmers, expecting if successful to get the haul on six or seven cars of emigrant movables. They were interested and subsequently bought farms and located at different points along the line. These new settlers happened to be progressive farmers and immediately began tilling their farms. They also interested other farmers in doing the same thing, and as a direct result from 75 to 125 cars of drain tile have been shipped into this territory each year since that time against practically nothing in preceding years.

The matter of development of less than carload shipments, or package freight, milk shipments and express shipments has been carefully looked after, and good increases are continually being shown in this business. Some years ago when package freight was first handled between Waterloo and Cedar Falls it was necessary to meet dray line competition in order to get the business, the towns being but 8 miles apart. A motor freight and express car was equipped, a schedule of two trips each way per day for this car was arranged and a determined effort made to get the business. By degrees the dray line competition has been eliminated and nearly all the package freight between the two cities is now being handled by motor express cars. This car is also handling in connection with the Chicago Great Western, Chicago merchandise shipments into Cedar Falls amounting to several thousand pounds daily. This joint arrangement was made possible owing to the fact that the steam road had for years been unable to get this business on account of its inability to meet the time made by other competitive lines. This car is also run through the factory district handling package shipments to and from the various factories, which is an arrangement that is daily developing new revenue.

Much success has been met in the matter of working up milk shipments for city dairies from farmers along the line. This milk is picked up at country road crossings by the passenger cars and is handled by ticket arrangement, each can bearing a ticket of the required denomination. Milk tickets are on sale and may be purchased at any of the company's stations. The Wells-Fargo Express Company operates over the entire line, and therefore the development of express business is left largely to that company, the results so far being exceedingly satisfactory to the railway company.

PASSENGER TRAFFIC

In the development of passenger traffic the methods pursued must, to a large extent, depend upon the local conditions. The first and most important item to consider is the building up of the steady travel. Every possible encouragement should be given to suburban living. The arrangement of convenient schedules and granting of commutation rates will accomplish much in this direction. The assistance given in locating industries in cities employing large working forces adds materially to the daily receipts. This is especially noticeable on the line between Waterloo and Cedar Falls. A large number of working people who live in one city and have employment in the other are being handled each day on that line; also quite a number of working people who have suburban homes on the line between the two cities.

The Waterloo, Cedar Falls & Northern sells six tickets for a quarter, good on city and interurban lines. The sale of these tickets has been pushed vigorously for several years and has aided to a great extent in the development of steady travel. For several seasons the sale of combination Chautauqua tickets on the interurban line has been vigorously pushed. This ticket includes round-trip transportation to the city, good each day, and admission to all Chautauqua entertainments during the season. Each year a large number of these tickets have been disposed of, bringing in considerable outside revenue to the Chautauqua Association, helping them to perfect a strong organization and put on high-class attractions. The amount of net revenue directly derived from the sale of these tickets is not very remunerative to the railway company, but the business indirectly developed on the other lines by reason of the increased value of the attractions put on by the Chautauqua Assembly has been well worth the effort put forth in the sale of the combination tickets.

PARKS

A good first-class amusement park located on the line at a convenient point will develop a large amount of business. In the smaller cities it is generally a hard matter for an amusement park not owned by the local electric line to exist, the attendance usually being too small to pay the expense of maintenance. An amusement park is located on the line of the Waterloo, Cedar Falls & Northern between Waterloo and Cedar Falls which so far has proved an exception to this rule. This park has been running for two seasons past and has met with very good success. The railway company has made it a practice to assist the management in every manner possible in the way of advertising through newspapers, placing neat and showy banners on cars, running popular excursions at various times during the season from country stations and furnishing plenty of cars to properly handle the crowds. It has also aided from time to time in the way of cash donations to assist in securing large and costly special attractions.

Joint ticket arrangements with some of the steam roads make it possible to sell through tickets to all points. This arrangement has been the means of developing a large business. Cars on the interurban divisions are scheduled to make connection with Chicago Great Western trains at Denver Junction, 17 miles north of Waterloo, and in connection with this steam road a large number of passengers are handled from strictly competitive towns.

In the development of business of all kinds the writer has found that the best success is attained by continually watching the corners, keeping in close touch with the various commercial bodies, assisting in locating new industries, improving the car service and making it evident to shippers, merchants, manufacturers and the general public that the electric line is alive to the situation, is looking out for their interest as well as its own and that at all times it is ready and willing to earn a dollar.

TRACTION REHABILITATION CONTROVERSY IN CHICAGO

Price, Waterhouse & Company, the certified auditors who were authorized by Mayor Busse, of Chicago, to investigate the books and accounts of the Board of Supervising Engineers and the Chicago City Railway Company, rendered reports to the Mayor on April 10. The report on the Board of Supervising Engineers follows:

REPORT ON BOARD OF SUPERVISING ENGINEERS

In conformity with your instructions, we have examined the books and accounts of the above board for the period of practically two years, commencing with its organization in April, 1907, up to Jan. 31, 1909, our examination being for the two-fold purpose of (1) inquiring, in connection with and as a part of our investigation of the accounts of the Chicago City Railway, into the contracts and other records kept by the board in relation to the expenditures for the rehabilitation of the railway, and (2) verifying the expenditures of the board itself, and we beg to report as follows:

There is every evidence that an effective control is maintained over the progress of the rehabilitation work and all expenditures in connection therewith. Very full and complete records are kept with respect to the expenditures and the accounts are in agreement with those of the railway company. If anything, there has been a tendency to elaborate the bookkeeping and accounting records, which to some extent has involved a duplication of the detailed accounts kept by the company, but these methods have been adopted advisedly and with a view to making the records of the board self-contained and independent of those of the company.

With regard to the matter of rebates to which we refer at some length in our separate report on the railway, we found that the board was fully informed regarding these special arrangements, but for its knowledge whether or not all rebates are credited that should be, we believe that in the main it must depend on the good faith of the officials of the company. Regarding the matters of accounting, to the treatment of which exception is taken in our report on the railway, these are, of course, matters as to which differences of opinion might well exist.

As to the board's own expenditures, we cannot do better by way of informing you of the amount and character of these expenditures than to submit an abstract thereof which is enclosed with and made a part of this report. We would add that we made a careful analysis of the various expense accounts and investigated all items of any importance and found properly approved vouchers on file therefor.

According to figures shown in the board's books, which figures we have verified for ourselves so far as related to the Chicago City Railway, the total cost of the rehabilitation amounted, up to Jan. 31, 1909, to $25,490,890.58 (including therewith the addition between June 30, 1906, and Feb. 1, 1907, as well as the 15 per cent added under the ordinance to the expenditures since Feb. 1, 1907). This total is made up as follows:

Chicago City Railway	$15,169,629.37
Chicago Railways Company	10,007,352.76
Calumet & South Chicago Railway	313,908.45
	$25,490,890.58

The total expenditures of the board were $397,224.51, which is slightly over 1½ per cent of the rehabilitation expenditures. In view of the importance of the work, the magnitude of the amounts involved and the character of the services desired, the above ratio of expense would not appear to be unreasonable or excessive.

We take pleasure in acknowledging that all information requested was promptly furnished and every facility was extended to our representative for the purpose of this examination.

REPORT ON CHICAGO CITY RAILWAY

The report on the Chicago City Railway was a more voluminous document. It stated that the company keeps two sets of books, one the "partnership" books, the other the "individual" or corporation books, and that the accountants were denied access to the latter as a whole, although they were given permission to inspect in the individual books any specific item arising in the partnership books which seemed to call for such further inspection.

The first important charge against the company was that it had included in the cost of reconstruction, and hence in the amount on which the company had received 15 per cent for carrying on and financing it, under the ordinance, certain percentages of the operating expenses of the maintenance of way and other departments, including the store department, and percentages of the salaries of general officers and clerks and of general expenses. The total amount so charged, on which 15 per cent had been paid, was $571,903. The accountants said that the ordinance on this subject reads: "There shall be added 10 per cent of such amount [cost of rehabilitation] as a fair and proper allowance of the company for conducting the said work and furnishing said equipments and 5 per cent for its services in providing funds therefor." The accountants believe that the charges criticised, or at least some part of them, should have been covered by the 10 per cent allowance specified in the ordinance for carrying on the work of rehabilitation.

Another point discussed in the report was that the company was wrongfully allowed $16,608 as contractor's profit and brokerage on a final payment of $110,722, made subsequent to Feb. 1, 1907, on 100 cars ordered and received before Feb. 1, 1907. The ordinance went into effect Feb 1, and the question was whether this material was purchased subsequent or prior to that date.

In regard to rebates the accountants said they found properly credited a rebate of $4,000 on one rotary converter which cost $36,300, but that they found no similar credit for another converter purchased about the same time, although the statement was made by the company that such credit had been made in the individual books.

Considerable attention, at the request of the Mayor, was given to the subject of rebates, and the report contains the names of the companies from which the largest amounts in rebates were secured, and in the case of one manufacturer an abstract of the basis upon which rebates were calculated. In this instance the rebate for certain apparatus was 5 per cent on the price given in the official contract. For other apparatus it was $2 per kilowatt on a total of $18.15 per kilowatt. The accountants found that the total amount credited in the partnership books for rebates in the two years under inspection was $126,425, with $8,369 still to be received.

The report concludes by condemning the policy of rebates, and stating the belief of the accountants that in the long run equipment and materials could be purchased as economically in the open market, dealing alike with the different manufacturers without fear or favor of any.

ANSWER TO CHARGES

In answer to these charges it was stated in Chicago that the Board of Supervising Engineers had directed a letter to the accounting firm in which the disputed point was explained in detail. In this letter, which was signed by the chairman of the board, Mr. Arnold pointed out that there was an item of $24,000 in trade discounts credited to the partnership account, which, in his judgment, should go to the individual account of the company, but as there was a doubt the city was given the benefit of it, and the amount was held as a guarantee fund to cover any small errors or discrepancies that might be found. As no such errors were found, Mr. Arnold suggested that the

amount far more than offset the $16,000 criticised by the accountants. The report of the auditors to the Mayor did not mention the $24,000 trade discounts which it is said the company might properly transfer from the partnership to the individual account.

INTERVIEW WITH MR. ARNOLD

Mr. Arnold, in speaking of these reports in New York last week, said:

I am glad to see that Price, Waterhouse & Company gave the Board of Supervising Engineers a clean bill of health. I do not believe that any erroneous charges will be found on any of the books of the railway company if a full knowledge of all the conditions is had. The charge mentioned of $571,903 for office and other operating expenses was an item well known to the board, and covered the expense of storage yards, superintendence and other overhead charges necessitated by the rehabilitation work and on which by the ordinance the company is entitled to the contractor's profit of 10 per cent for carrying on the work and 5 per cent brokerage, making a total of 15 per cent. The charge of $16,608 was the contractor's profit and brokerage under the ordinance on a final payment of approximately $110,000 made for cars during March, 1907. This was during the period between the dates Feb. 1, 1907, when the ordinance went into effect, and May 1, 1907, when the Board of Supervising Engineers was completely organized. The question of this allowance was fully discussed at the time, and was unanimously approved by the members of the board, including the representatives of the city. I do not recall the circumstances of the other items, but all vouchers of the company have been carefully checked up by the auditors of the Board of Supervising Engineers and by the auditors in behalf of the city, Marwick, Mitchell & Company, and all questions relating to them have been approved by the special traction counsel of the city, Walter L. Fisher. All rebates have also been checked by the manufacturers concerned, and the payments have tallied in every case. The practice of giving and accepting rebates by the company in purchases from various manufacturers has been necessary to secure the most favorable terms of purchase, and the city as well as the company has secured benefit from this practice.

STATEMENT FROM MR. FISHER

In an interview which appeared in the Chicago *Record-Herald* of April 15, Walter L. Fisher, special traction counsel for the city, said:

I agree with the auditors on the item of the $16,000, and hold that the company was not entitled to contractor's profits on the $110,000, which should have been paid when the cars were delivered before the passage of the ordinance. The auditors were clearly wrong, however, in questioning the item of $572,000 allowed in the rehabilitation costs. The same thing applies to the Chicago Railways Company as well as the City Railway Company, but the supervising engineers have strictly followed the ordinances.

The Lorain Steel Company was recently awarded the contract for furnishing special work and rails to the Glasgow (Scotland) Municipal Tramways in competition with all of the steel manufacturers of the United Kingdom. The American firm bid $4,600 and $5,300 on two lots of special work whereas the lowest bids from any of the British manufacturers for the same work were $5,700 and $5,650, respectively. The bids on heavy girder rails were $30 per ton, by the Lorain Steel Company, and $47.50, by the lowest British bidder.

The high-speed electric railway which the Cairo Electric Railways & Heliopolis Oases Company is building between Cairo, Egypt, and Heliopolis is nearing completion. A 10,000-hp generating station is being built at Choubrah, on the banks of the Nile River, which will not only supply current for the railway, but also for lighting in Heliopolis and for power purposes in Cairo.

HISTORY OF THE OMAHA & COUNCIL BLUFFS STREET RAILWAY

As earlier announced in these columns, the Omaha & Council Bluffs Street Railway on Jan. 24 began publishing, through the medium of the Omaha daily press, weekly articles comprising a history descriptive of that company. In the foreword announcing this interesting series, G. W. Wattles, president, over whose signature each article appears, said:

It is the policy of the Omaha & Council Bluffs Street Railway Company to comply with all reasonable and just demands of the communities it serves. For some years past there has been a growing demand in all cities of the country for information regarding the business operations of public-service corporations. To meet this demand and in a friendly spirit give to this community such information as it is entitled to know regarding the affairs of the street railway company, it has been decided by the board of directors of this company to publish weekly articles in the Sunday editions of our daily papers, which will give an outline of the history, the development, the operation and the financial conditions of our company.

The first street railway in Omaha was paid for by local business men. In 1867 a franchise was granted to the Omaha Horse Railway Company, and cars were started June 16, 1869. The stubborn fight of the Omaha business men to build their own road and keep it running in the face of losses and other discouragements is the base of several sorrowful chapters in Omaha's street railway history. The road started with "first-class cars and horses." It was 2 miles long, and experienced no expansion in five years. The first car, bought second-hand in Chicago for $700, is now the "single piece of property of the horse railways of Omaha that remains intact in existence." An illustration of this omnibus car, with its body pivoted for turning with the horses at the ends of the line, was presented in the Electric Railway Review for Aug. 10, 1907, page 165.

The rate of fare at the beginning was 10 cents. Money was lost so rapidly that fare boxes were installed and the conductors discharged. In an endeavor to increase the riding the rate of fare was cut to 5 cents in 1870. Drivers worked 14 hours a day and received $1.50. W. H. Smith, now general manager, began service as a driver in 1872. Within two years he was made superintendent.

In 1878 the bondholders foreclosed, and the property was purchased by W. W. Marsh, who controlled it for five years and built several extensions. The addition of the "Park" line in 1880 brought about the first transfer station in Omaha, and passengers were given bodily transfer under the supervision of a switch tender. From 1878 to 1883 the road paid operating expenses, but there were no profits. About 35 cars were operated. At this time the road was again reorganized, but without a change of name. The career of the newly organized Omaha Horse Railway lasted until April 1, 1889. During this period the city grew rapidly and many extensions were demanded. Streets were regraded, and this called for new tracks. Also double tracks were built on some streets. The road made money, but all profits were put into the extensions and betterments of the property.

In 1889 there were 25 miles of horse-car track, and then began a demand for some better method of operation. The management was not anxious to spend large sums in adopting new motive power that might soon be superseded by electricity. Competition at that time was popularly believed to be a solution of public utility problems. This

is evidenced by the fact that in Omaha, subsequent to granting a franchise for cable roads, the City Council granted franchises for two electric railways at the same time and under the same conditions. A competing road, the "Cable Tramway Company of Omaha," was granted a franchise in 1874. "No limit was placed on the duration of the franchise; no rate of fare was specified, and nothing was said about transfers." A bonus of $40,000 was subscribed for the new road to be paid if operation would be hastened and a bitter fight was carried on between the companies both in court and out.

Doubt as to the validity of the cable-road franchise caused the formation of a new company known as the Omaha Cable Tramway Company. A franchise ordinance conferring rights for a period of 40 years and authorizing the company to occupy and use practically any and all the streets in the city, mentioned specifically, was submitted to the people at a special election May 22, 1888, and was approved by a majority of votes. For power this franchise permitted "endless cables, electricity, compressed air, steam motor (under certain conditions), or by such other motor as may now or hereafter prove to be practicable." This is the principal franchise under which the present company is operating. The validity of the first cable franchise, however, was later sustained by the State Supreme Court. When the second franchise described was granted there were three separate railway organizations operating or building in Omaha. Both roads were menaced by electric lines and so consolidation resulted in 1889.

Franchises were granted to two electric lines—Omaha Motor Railway Company and Northwestern Street Railway Company—in 1887. The former road began operating in 1889. Six months before this road began operating the consolidated horse and cable railways had made contracts for electrical equipment. A consolidation with the Motor Railway was brought about in the fall of 1889.

Competition caused the erection and equipment of two expensive electric power houses and one cable power house where there might have been but one, and duplicates in many miles of track, all of which could have been avoided had the people preferred to deal with and encourage the existing company instead of granting franchises to new organizations and inviting competition.

The eight years preceding the Trans-Mississippi exposition, held at Omaha in 1898, were lean for the consolidated street railway because of the hard times preceding and following the panic of 1893, bicycle competition from 1893 to 1896 and reconstruction, extension and electrical equipment. Four small roads were taken over in this period. The exposition year brought earnings double those of any previous year and for the first time in the history of the Omaha roads, 30 years, there was a surplus in the treasury greater than the immediate demands. A dividend of 2 per cent was paid in 1898 and by 1902 4 per cent was paid. "It is now realized by the management, however, that these apparent profits consisted of money which should have gone to make up a renewal or depreciation fund."

A consolidation of the Omaha and the Council Bluffs Bridge roads took place in 1902, which brought the present company, the Omaha & Council Bluffs Street Railway Company, into existence. Following this the entire property was rebuilt and re-equipped and since then many extensions have been made. Among the improvements are the following:

New 10,000-hp power station.
New substations.
Track with 73-lb. girder rails.
Replacement of old cars with new 40-ft. cars mounted on double trucks.
Large brick shop and car house.
Overhead rebuilt.
Five lines double tracked.
Seventeen extensions made.

In 40 years the road has grown from 2 miles of single track with four horse cars, to a system of 140 miles of track with 350 modern double-truck cars. Following sections of the history will describe the physical features of the present property.

THE INLAND EMPIRE FRUIT SPECIAL

The Inland Empire System, which operates through a rich fruit district in Washington, instituted a "Fruit Special" last year to carry lecturers from town to town to instruct the owners of orchards along the line in the best methods of fruit raising and handling. This novel experiment by an electric railway was so successful that it was repeated this year. The lecturers were professors from the Washington State Agricultural College and of the University of Idaho,



Two Four-Car Trains at Spring Valley Junction, 40 Miles South of Spokane



Lecturer on Inland Empire Fruit Special Explaining Methods of Tree Culture

who started from Colfax on Wednesday evening, March 31, and completed their itinerary at Palouse on April 3. The railway company provided for good audiences by sending out a program showing when the train would reach each station and what subjects would be discussed. The lectures were accompanied by demonstrations in planting, spraying and pruning fruit trees on the flat car shown in the illustration.

That the passenger service of the Inland Empire System is being pushed as energetically as the freight business is proved by the accompanying view of the two four-car trains meeting 40 miles from Spokane, at Spring Valley Junction, where the Colfax, Washington and Moscow Idaho, divisions diverge. Each train is made up of two trailers and two motor cars.

CONVENTION COMMITTEE AT DENVER

The committee of the American Street & Interurban Railway Association, appointed to investigate the advantages of various Western cities for the convention of the association next fall, left Chicago Saturday evening, April 17, for Denver, where it arrived on April 19, and is making its headquarters at the Brown Palace Hotel. The members of the committee taking part in the trip are: John I. Beggs, president, Milwaukee Electric Railway & Light Company, Milwaukee, Wis.; E. C. Foster, first vice-president, New Orleans Railway & Light Company, New Orleans, La.; A. E. Lang, president, Toledo Railways & Light Company, Toledo, Ohio, and B. V. Swenson, secretary, American Street & Interurban Railway Association. Hon. James F. Shaw, president of the Boston & Worcester Electric Companies, expected to be a member of the party, but important duties in connection with the Massachusetts Senate, of which he is a member, prevented at the last moment his accompanying the party. The American Street & Interurban Railway Manufacturers' Association also appointed a committee, which is accompanying the committee of the railway association. The gentlemen composing this committee are: President, Joseph R. Ellicott, of the Westinghouse Traction Brake Company, New York; vice-president, Charles C. Peirce, manager railway department, General Electric Company, Boston, Mass.; James H. McGraw, president, McGraw Publishing Company, New York; E. M. Williams, manager street railway sales department, Sherwin-Williams Company, Cleveland, Ohio, and secretary, George Keegan, Interborough Rapid Transit Company, New York City.

It will be remembered that at the last meeting of the association the selection of a convention city was left to the executive committee, and that at a meeting of the executive committee, held in New York Jan. 28-30, it was decided that the convention should be held in some city west of the Mississippi River. Subsequently, it was decided to visit several cities west of the Mississippi River before the final decision should be reached. Denver is the first city to be visited by the committee.

According to a British contemporary, a narrow-gage electric railway is contemplated to connect Pretoria with the Rand district in the Transvaal. The distance is about 33 miles.

The Dolter surface contact system has been abandoned on the London County Council Tramways' line between Mexboro and Swinton, and the overhead trolley has been installed.

COMMUNICATION

DISCHARGED EMPLOYEES

The Louisville Railway Company,
Louisville, Ky., April 14, 1909.

To the Editors:

There is no question that has given so much concern to the railway companies and is of more importance than the employment as motormen and conductors of men who have been discharged by other companies. There is nothing more demoralizing to the service than trainmen who are incompetent, dishonest and unfit for their positions, but many street railway companies will employ men, regardless of their previous conduct with other companies, and thereby injure the standing of their own employees. I have known men, discharged for almost every crime in the calendar, who would apply to other railways for employment and be put into service without a question. Is it any wonder that the cost of the claim departments throughout the country has increased to such an alarming extent? Some system should be in force on the railways throughout the country that would encourage honesty, capability and proficiency, but this can never be done by the employment of men whose conduct was of such character as to render them unfit for service in the company that discharged them. I have known men to work up damage suits against certain companies, then, after their exposure and discharge, to go to other systems and secure employment, no questions being asked. I have known men discharged for riot, attacking cars and breaking the law in many ways, employed by other companies within 24 hours from the time they had served jail sentences. I have known employees to enter into combinations with ambulance chasers, disreputable lawyers, to mulct the companies for damages, but after being discovered and discharged, these same men had no difficulty in securing employment on another railway. These things, in my opinion, degrade the positions of motorman and conductor with every company.

A few years ago, when the railways were more careful in regard to the men whom they employed, the cost of the claim department was insignificant compared with what it is to-day. Expensive safety appliances have been adopted to reduce accident claims, but seem to have no effect, and will not until the various companies adopt some plan whereby an improvement can be made in the employment of trainmen. Men who rob and steal from one company will certainly do the same thing with another company when employed in the same position. It has almost reached the point now that many employees will not stay on any system for any length of time because they feel that they can do just as they please until caught, and will then secure positions with other companies.

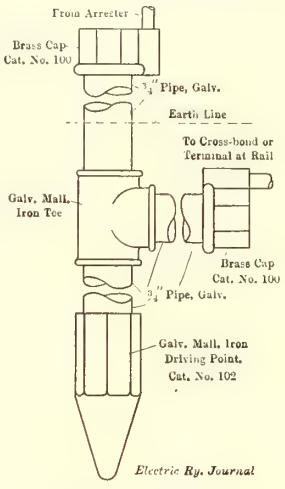
It seems that if a united effort was put forth by the various companies the positions of motormen and conductors could be so elevated that when a man received such a position he would be encouraged to hold it. More care in the original selection of the men and greater pains in their teaching would, to a great measure, improve the character of the men in these important positions. If a man knew that when he was let out of the service of one company for misconduct he would have a hard time securing employment with other railways, it would certainly bring about a better class of employees. The two most important positions on an electric railway, so far as money making and saving are concerned, are those of motor-

man and conductor. If these men are thoroughly competent and honest, the whole problem of paying dividends is solved. I should like to see this question discussed by the American Street & Interurban Railway Association, to see if a plan cannot be adopted whereby the system of employment can be improved.

J. T. Funk,
General Superintendent.

AN EFFICIENT GROUND FOR LIGHTNING ARRESTERS

The Electric Service Supplies Company, Philadelphia, Pa., has made a specialty of lightning protection for electric railways, and has installed many thousands of its type E.G. Garton-Daniels arresters under a guarantee. The efficiency of this type of arrester, or in fact of any type, depends very largely on the ground connection employed. Not only should a ground wire be run from the arrester, but on railway circuits a connection should also be made from the ground wire to one of the rails. With such a connection, at the instant of static discharge, the line, the ground and the rails are at equal static potential. If no rail connection to the arresters is used, at the instant of discharge the line and the ground are of the same static potential, but the rails for the moment act as one plate of a static condenser whose path of easy discharge is through the car to the line. Where bare copper wires are used, leading from the ground line to the arresters and to the rails, corrosion often destroys the connection in two or three years. The accompanying engraving shows the details of a new method, devised by the Electric Service Supplies Company, for making the double connection, which is simple, inexpensive and durable. Instead of wires, ¾-in. galvanized-iron pipe cut to suitable lengths is used. The vertical pipe is capped at the bottom with a malleable iron driving point, and the connections to the rails and the arrester are made by special brass caps having terminals for the short connecting wires.



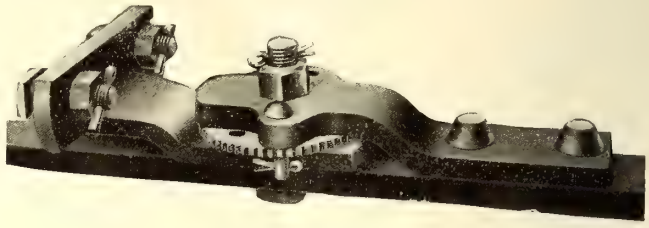
Grounding Device for Lightning Arresters

AN ADJUSTABLE SWITCH ROD

The Buda Foundry & Manufacturing Company, Chicago, Ill., has added to its extensive equipment of track tools the adjustable switch rod shown in the accompanying cut. This tool is intended to make the proper adjustment of switches so easy that employees will have no excuse for neglecting this important feature of track maintenance. One of the strongest merits asserted for this design is that it is unnecessary to remove the center, or main retaining bolt, to effect the adjustment. Only the auxiliary pin at the side is removed and the eccentric moved in the desired direction after which the auxiliary pin is returned. When the auxiliary pin is in the position illustrated the adjustment is within ⅛ in., but this can be reduced to 1/16 in. by putting the auxiliary pin on the opposite side and at the same time throwing over the eccentric wheel to correspond.

The objection offered by the manufacturer of this rod against rods requiring the removal of the main retaining bolt is that when the bolt is rusty it can only be removed by cutting off the nut. If the workman who makes the adjustment has no suitable substitute the switch would have to be spiked in position until the necessary repairs could be made.

The No. 1 Buda rod ordinarily is fitted with adjusting



Adjustable Switch Rod

means at both connections with the switch point in order that with the switch stands set approximately true each point may be adjusted to its stock rail without shifting the stand. The No. 2 rod has one adjustment and the No. 3 rod is usually rigid.

MISSOURI ELECTRICAL CONVENTION

The third convention of the Missouri Electric, Gas, Street Railway & Water Association was held at the Colonial Hotel, Springfield, Mo., April 15, 16 and 17. President William B. Hays, of Poplar Bluff, in his presidential address, gave a brief review of the history of the association. It was organized in St. Louis, Oct. 21, 1907, with 20 members. One convention had been held since then, in April, 1908. The membership is now 50.

The session Thursday afternoon was opened by a paper on "Insurance on Public Service Plants," by C. W. Hough, general manager of the Consolidated Light, Power & Ice Company, of Joplin. Mr. Hough and Judge David D. Hoag, secretary of that company, are getting up an insurance exchange for electric light and power stations to be conducted along the lines of a mutual company and similar to the insurance exchange that exists among ice manufacturers.

Insurance to the amount of $400,000 has been subscribed, and policies will be issued when $1,000,000 has been subscribed. The cost of insurance is to be equal to the actual losses paid members, plus 25 per cent for conducting the business. Several members testified to the saving in cost of insurance which the ice manufacturers' insurance exchange has effected. A considerable number of electric light companies represented also manufacture ice. The other papers read were on "Tungsten Lamps," "Equitable Rate Making," "Engineering Experimental Stations," "High-Tension Transmission," "Office System and Accounting," "Keeping Operating Records," and "Operation of Steam Boilers with Chain Grate Stokers."

At the executive session the rules were changed so as to admit water companies, and the name was changed to Missouri Electric, Gas, Street Railway & Water Association.

The following officers were elected for the ensuing year: President, W. K. Bixby, Springfield; first vice-president, R. Irvine, Marshall; second vice-president, F. E. Murray, Louisiana; third vice-president, P. A. Bertrand, Jefferson City; secretary-treasurer, C. L. Clary, Sikeston.

The next convention of the Missouri Electric, Gas, Street Railway & Water Association will be held in Jefferson City on April 14, 15 and 16, 1910.

News of Electric Railways

Cleveland Traction Situation

On April 14 Judge Tayler granted Receivers Bicknell and Scott, of the Municipal Traction Company, authority to expend about $113,270 for improving the tracks where most needed. The receivers made application to pay for this work from the maintenance and renewal fund, and under these circumstances the court felt free to grant the request. The receivers intend to relay the tracks on portions of various streets with 104-lb. steel rails in 6 in. of concrete. In addition, the receivers may spend $25,000 in improving the tracks on Superior Avenue and Payne Avenue. More money is needed for improvements, but the receivers will probably be unable to obtain it until the special fund for that purpose accumulates.

At the meeting of the Council committee of the whole on April 14, the time was taken up largely by the discussion of the wording of the clause in the proposed ordinance relating to boards of arbitration. It was finally decided that a protest might be made to the court by either side if the appointee should be found to be prejudiced.

Attorney Thomas H. Hogsett presented a clause, incomplete in detail, as a substitute for the one in the Baker draft relating to interurban cars. It provides for a 5-cent fare and transfers at certain points. The place for car-mileage is left blank, but provision is made that earnings in excess of the charge for operating over the city tracks shall be put into a fund to meet possible deficits. Every five years the surplus is to be added to the interest fund of the Cleveland Railway, and a readjustment of the charges is to be made. Control of the operation of the cars and schedules by the city is qualified by adding the word "reasonable" in the portion relating to that point and only the dead weight of cars is to be considered in negotiations relating to them.

In order to simplify matters, President Andrews, of the Cleveland Railway, and Attorney Ginn, of the Cleveland, Southwestern & Columbus Railway, agreed to discuss terms upon which the Lorain Avenue tracks of the Cleveland, Southwestern & Columbus Railway might be purchased by the Cleveland Railway Company. Officials of the Northern Ohio Traction & Light Company also stated their willingness to extend the contract under which the Cleveland Railway operates 1500 ft. of its tracks from the city limits to Garfield Park and the loop at that point.

Mayor Johnson stated that some of the contracts provided that crews of the Cleveland Railway should take charge of the interurban cars when they enter the city, and said that he thought the right ought to be retained to compel all interurban cars operated in Cleveland to be manned by crews of the Cleveland Railway, although it might never be necessary to exercise authority under the stipulation. No expression of opinion regarding this point was offered by the representatives of the interurban companies. It would probably not meet with their approval, however.

Representatives of the city delayed answering the request of Attorney Hogsett for some disposition of the right of the interurban roads to use subways in the future by saying that arrangements of this kind could not be taken up at this time. All the interurban companies desire the right to use a subway if built. Mayor Johnson and City Solicitor Baker say that only all-metal cars should be allowed in a subway. Such other restrictions would probably be made that the regular interurban cars would be prohibited from operating in the subway. Attorney John G. White stated that the vital weakness of the general plan under consideration is that it offers no incentive to progress in the development of the street railway system.

At a meeting held in the office of Attorney Hogsett on April 16, representatives of the interurban railways decided upon terms under which they are willing to operate in connection with the local system. One of the features of the plan is that they pay the Cleveland Railway a sum equal to the cost of operating their cars over the tracks necessary to reach the center of the city. If there is a deficit under the plan of fare adopted the interurban companies will pay their share of the loss incurred. The companies will agree to reasonable regulation of the routing of interurban cars, but not to any regulation that would add to the cost of operation and increase the revenue to the city system. They are willing to pay the cost of operation in full, but are not willing that their cars should be so handled as to enable passengers on the city lines to ride at less than cost.

The latest draft of an ordinance prepared by City Solicitor Baker provides that the interurban railways shall make up any deficit that occurs, and that should there be any surplus from the revenue derived from city business, it shall go to the interest fund of the Cleveland Railway. Representatives of the companies say that such an arrangement is unfair and not in accord with the idea of the Tayler plan. Mr. Baker's ordinance also contemplates a charge of 30 cents per car-mile for the operation of interurban cars on the city lines, whereas the representatives of the interurban companies have presented figures purporting to show that the cost is less than 20 cents per car-mile. They claim that the city's charges for maintenance and depreciation of tracks and special work and for current are excessive.

Another objection is that the city wishes strictly to regulate the operation of express cars. This would hamper the movements of these cars to such an extent that they would be worthless to the companies and to merchants and other business concerns. The manager of one of the systems entering Cleveland said that unless the city is willing to make more favorable terms with the interurban companies the merchants of the city will suffer severely, as trade will be diverted to other cities.

In his campaign for M. B. Excell for Congress, as the successor of Senator Burton, Mayor Johnson is injecting the 3-cent plank again, preparatory to his race for re-election to the Mayor's office this fall.

The latest draft of the proposed ordinance contains the provision that the fare shall be 5 cents cash on all lines operated on Euclid Avenue that in any way contribute to the service in East Cleveland until a new contract is made with East Cleveland and approved by the city. The representatives of the Cleveland Railway objected at the meeting on April 13 to the trivial conditions that have been worked into the clause relating to forfeiture of the franchise.

Most of the morning of April 19 was taken up by a discussion of the question of whether interurban railways should be allowed to reduce their fares below 5 cents. Mayor Johnson and members of the City Council objected to any agreement that would allow them to reduce the rate. The Mayor stated that he questioned the wisdom of allowing the cars to stop for passengers at all. Attorneys F. H. Ginn and T. H. Hogsett said that the interurban companies ought to have the same right that city companies enjoy. If there is a surplus after the deduction of operating expenses sufficient to warrant it, the interurban companies should be permitted to reduce the fare. City Solicitor Baker said that the interurban companies should not be permitted to charge a fare that would make them active competitors of the city companies. The question of issuing transfers at certain points was also discussed. Mayor Johnson stated that he felt this would be of doubtful benefit to the interurban companies. At present transfers are not issued, but the city fare must be paid by those who ride inside the city limits. No agreements were reached upon important points.

Unprecedented Ice Jam at Niagara Submerges "Gorge Route"

One of the most remarkable and unprecedented ice jams in the history of Niagara occurred on April 9 in the lower gorge of the river, between the Whirlpool and the mouth of the river. The ice piled to a height of 25 ft. to 30 ft. along the rapids in the lower gorge and to a height exceeding 50 ft. just below the Suspension Bridge at Lewiston. The jam was caused by a fierce gale on Lake Erie on April 8, which broke up the ice in the lake and drove it in immense quantities into Niagara River and over the falls. On April 9 the wind shifted to the north over Lake Ontario and checked the flow of the ice out of the river below the falls and backed the water and ice in the lower gorge to a flood level of 40 ft., which is 12 ft. higher than the record of previous years.

The roadbed and tracks of the Niagara Gorge Railroad or "Great Gorge Route," which are laid along the bank of the river from the Whirlpool Rapids to Lewiston, a distance of 3 miles, at only a slight elevation above the rapids, were buried under ice varying in depth from a few feet at the whirlpool to 25 ft. and 30 ft. at Lewiston. Considering the weight of the ice piled on the tracks and roadbed only a small amount of damage was done to the railroad. The cakes and floes were packed so tight against the cliffs back of the tracks by the swift current that an ice wall was formed over and alongside the roadbed protecting it from the rush and swish of the ice-laden current which the jam had raised to a higher level than the tracks. When the jam broke and the water receded the ice bank

or wall toppled over into the rapids without injuring the roadbed. There were a few small washouts between "Giant Rock" and "Devil's Hole," where the damage to the tracks was most serious, but they were confined to the outer track.

The steel trestle between "Giant Rock" and "Devil's Hole" was undisturbed except for a wooden trestle, which was washed away. As soon as it became apparent that the jam would cover the tracks and carry away the poles the company cut the feed cables into sections and pulled them up the bank out of reach of the ice. Two hundred men were put to work to clear the tracks of ice, rebuild the parts of the line washed out, put in new poles, replaced cables, etc., and by April 17 one track was nearly ready for service and it was expected the entire line would be restored and in operation by May 1. The company's property at Lewiston was not damaged as it is located on the bank of the river out of reach of the ice jam. The Lewiston & Youngstown Railway, which runs from Lewiston to Youngstown and Fort Niagara Beach, was uninjured as the tracks of the company are located on the upper bank of the river some distance from the brink. The power house of the Ontario Power Company under the bank below the Horse Shoe Falls on the Canadian side was partially submerged, the flood rising over the sills of the windows, which are 35 ft. above the level of the river, and water and ice poured over the float on which the turbines and generators are installed, compelling the company to suspend temporarily. No permanent damage was done to the power house or its machinery, however, and as soon as the jam broke and the river receded the water was pumped out and the generators were dried and prepared for service. Both the Rochester Railway and the Syracuse Rapid Transit Railway, which receive power from Niagara, were compelled, however, to operate their reserve plants for a short period.

A second ice jam occurred on April 19, the immense quantities of ice from Lake Erie going over the falls on April 18 and 19, "grounding" under the jam in the lower Niagara River below Lewiston and forcing the water up the gorge, thus submerging the tracks of the Niagara Gorge Railroad with water and ice, and making it necessary to stop repair work. On April 20 the ice jam had risen to a height of 62 ft. at Lewiston, or within 18 ft. of the floor of the Suspension bridge connecting Lewiston and Queenston. A mile of track of the Niagara Gorge Railroad had been cleared, but the ice again submerged about one-fourth to one-half of this track. On April 20 it did not appear that much additional damage had been done by this second rise of the river, but all work will have to be suspended until the water again recedes, and it is questioned now whether the repair work can be completed by May 1. In any event, the outer track, which it had been hoped would be in operation by April 24, will not be ready for service by that date.

Letter from President Shaw

Hon. James F. Shaw, president, American Street & Interurban Railway Association, has sent the following letter to the presidents and general managers of street and interurban railway companies of America:

"At the mid-winter meeting of our executive and other committees, held in New York a few weeks ago, there was much discussion by those present on the question of how to bring about a better understanding on the part of the public of the difficulties and problems which confront electric railway operating companies. It was the general consensus of opinion that if the people knew more about the electric railway side of the problem, much of the adverse sentiment which is now prevalent in many places would disappear and would be replaced by a helpful, healthy sentiment."

President Shaw continues that one method of accomplishing this result, and which demands the co-operation of the different companies, is the reprinting in the public press, in whole or in part, of articles of interest to the general public which appear from time to time in the technical press. The association has made arrangements with the electric railway papers by which copies of these papers containing articles of particular value for this purpose be furnished by the secretary on application.

Letter from President Winsor

Paul Winsor, chief engineer of motive power and rolling stock, Boston Elevated Railway Company, Boston, Mass., and president of the American Street & Interurban Railway Engineering Association, has sent the following letter to the associate members of that association:

"As is well known, there is a campaign on foot to increase the associate membership of the American Street & Interurban Railway Association. The results so far have been extremely gratifying, the number of associate members having been increased by about 150 per cent since the 1908 convention.

"The executive committee of the Engineering Association at its last meeting, realizing the possible good that might result from a concerted and persistent effort on the part of our membership for the acquisition of new members, went on record as favoring such a campaign on our part and instructed the president and secretary to issue a circular letter to the members, urging them to interest themselves in this direction.

"Undoubtedly a large field for operations is left, as there are certainly a great many men identified with the engineering work of active members who are eligible but are not enrolled in the membership, and whom we should make a strong effort to get. It is not to be implied, however, that you are requested to confine your efforts entirely to men who would ally themselves with the Engineering Association, as in many cases it is very probable that close association exists with men who would naturally ally themselves with one of the other allied or affiliated associations. Each member is therefore urged to appoint himself a committee of one on increase in membership, and to work energetically with the desired end in view.

"The badge of membership in the American Street & Interurban Railway Association and its affiliated associations is also commended to the associate member as the best means of exciting and maintaining that esprit de corps so essential for the realization, to the fullest extent, of the spirit of organization.

"Please remit applications and dues direct to the secretary of the Engineering Association, 552 Harrison Avenue, Boston, Mass., making checks payable to the American Street & Interurban Railway Association."

Public Service Commission Files Suit for Damages.—Papers have been served on Frederick W. Whitridge, receiver of the Third Avenue Railroad, New York, in an action begun by the Public Service Commission of the First District of New York to recover the statutory damages of $5,000 a day for 15 days on account of the construction of the Fort George loop of the Third Avenue Railroad by the company without waiting for the consent of the commission.

Present for Newton W. Bolen.—Newton W. Bolen, superintendent of transportation of the Public Service Railway of New Jersey, and his wife were surprised at their home in West Hoboken on April 14 by a delegation of officials and employees of the company who journeyed from Newark in the private car "Public Service." Mr. and Mrs. Bolen were given a silver service and an immense bouquet of American beauty roses, the occasion being the 25th anniversary of their marriage.

Non-Resident Lectures at the University of Minnesota.—Edward P. Burch, consulting engineer, Minneapolis, is giving a course of 10 lectures on "Electric Traction for Railway Trains" at the College of Engineering of the University of Minnesota. The subjects of the lectures are: "History of Electric Traction," "Advantages of Electric Traction," "Characteristics of Steam Locomotives," "Characteristics of Electric Locomotives," "Motor Car Trains," "Electric Railway Motors," "Power Required for Trains," "Steam, Gas and Water-Power Plants," "The Transmission System," "Electrification of Railroads."

Committee from Detroit Studying Situation in Cleveland.—Chairman Eddy, F. A. Smart, D. M. Ireland, Frank Kennedy, W. C. Pasha and Paul C. Renaud, acting as a sub-committee of the committee of 50 appointed by Mayor Breitmeyer of Detroit to study the street railway situation in Detroit, went to Cleveland on April 14 to consider street railway matters there insofar as the conditions in Cleveland may affect the situation in Detroit. Their principal work was to study the system of appraisement used in arriving at a valuation of the local Cleveland properties. They also conferred with the officers of the Cleveland Railway and Mayor Johnson.

Hearing of Joint Commission on Boston & Eastern Tunnel.—The Massachusetts Railroad Commission and the Boston Transit Commission, sitting as a joint board at the request of the Legislature, held a hearing on April 14 on the proposed tunnel of the Boston & Eastern Electric Railroad under Boston Harbor. The general plans of the company were presented to the joint board by Moorfield Storey, Boston, counsel for the company, who explained that the company has practically secured from the Railroad Commission a statement that the public convenience of the road has been demonstrated; that the company is now be-

fore the Legislature to secure permission to build a tunnel under Boston Harbor and bring it up to the business center to a terminus near Post Office Square, where arrangement would be made for connection with other lines if necessary. W. H. Coolidge, attorney for the Boston & Maine Railroad, said that the road would injure existing companies.

Convention of the Southwestern Electrical & Gas Association.—Arrangements are being made this year for a very large attendance at the convention of the Southwestern Electrical & Gas Association, at Dallas, May 20-22. Headquarters will be at the new Southland Hotel, where arrangements have been made for displaying the exhibits. For this purpose, the billiard room as well as several vacant rooms in the basement of the hotel have been secured. Manufacturers desiring space should at once send their applications to D. G. Fisher, 300 Commerce Street, Dallas, Tex. The available space has been divided up into areas of about 40 sq. ft. each, and each manufacturer who is a member of the association will be furnished with one space without charge. A fee of $10 for each additional space will be made. Current will be supplied at 110, 250 and 500 volts direct current and at 220 volts, single phase and two phase at a charge not to exceed 5 cents per kw-hour for power, and 10 cents for lighting.

Freshet Damage in the East.—The Middle Atlantic and New England States were visited by a very severe rainstorm on April 14. Streams generally assumed freshet proportions and electric railways and railroads suffered severely in some instances. The worst conditions were reported in Vermont and New Hampshire around the head waters of the Connecticut, Merrimac and Androscoggin Rivers. The water in the Connecticut River at Holyoke was especially high. In Brattleboro, Vt., farther up the river, the water reached the highest point ever recorded there. The West River branch of the Central Vermont Railroad was washed out in several places, and the Brattleboro Electric Light Company had to abandon the operation of its main plant temporarily on account of the rise of water. Several manufacturing plants in St. Albans, Vt., had to shut down temporarily, and the St. Albans Street Railway also had to suspend operation for a time. In Waterbury, Conn., the Connecticut Company had to suspend its lighting service and the operation of cars temporarily in Naugatuck, Woodbury, Middletown, Watertown, Oakville, Waterville, Cheshire and Thomaston.

Electrification Plans of the Long Island Railroad.—The Long Island Railroad has recently placed a number of important contracts for equipment and rolling stock preparatory to carrying out during the spring and summer the electrification of several of its branch lines. The company proposes to build two additional tracks between Winfield and Jamaica, a distance of 8 miles; to construct a 2-mile two-track connection between the main line and the Montauk division; to build a freight connection between its Montauk division and the freight yards at Long Island City, a distance of ½ mile, and to build the proposed cross-island trolley from its railroad station at Huntington to Amityville, a distance of 18 miles. Contracts for the material for this work have all been awarded. In connection with the construction of these lines there will follow the development of the company's power transmission system, and substations will be built at Huntington, Farmingdale and Winfield, all of which will be supplied with power from the main station of the company in Long Island City. The apparatus for these substations has been purchased. In addition, the Long Island Railroad has contracted for the reconstruction of 50 miles of its main line for third-rail operation. Motor equipments for 50 cars have already been ordered, and the company expects to contract within the next 60 days for 125 steel motor cars complete.

Commissioners to Consider Transit Routes in New York.—Nine commissioners to consider subway routes and other rapid-transit matters were appointed on April 16 by the Appellate Division of the Supreme Court. The appointments were made as the result of a recent application by the Public Service Commission of the First District of New York in accordance with the terms of the Public Service Commissions law. Randolph Hurry, Edward C. Crowley and Richard W. Hallaman were named to look into the Manhattan Bridge route, revised; Summer G. Gerard, Thomas A. Janvier and Thomas B. Kilburn will take testimony in regard to the Canal Street route, and William G. Davis, Douglas Mathewson and William H. Ellison will consider the River Avenue elevated and subway route. The commissioners will hold public hearings to determine whether the lines in question shall be built. If their reports favor the construction and operation of the routes they will be taken, when confirmed by the court, in lieu of the consents of the property owners along the lines of the proposed routes. The select committee of the Board of Estimate and the sub-committee of the Public Service Commission appointed to confer on the Fourth Avenue subway for Brooklyn met on April 16. Comptroller Metz, who has opposed the construction of the Fourth Avenue line, now says that if Borough President Coler, of Brooklyn, will secure releases from 90 per cent of the property owners along the line as to damages he (the comptroller) will consent to the construction of the first three sections of the line. The Public Service Commission of the First District of New York has approved the contracts of the six sections of the road.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The judiciary committee has returned an unfavorable report on the public utilities bill. The chairman said that the committee was unanimous in its decision that the bill reported by the special commission of 1907 ought not to become a law. He moved to table the bill and that it be made the order of the day for April 21. The question of seats for motormen on suburban lines came before the railroad committee again on April 15. The bill had been reported adversely, but was assigned another hearing by special request. It was urged by some that the measure be passed as a permissive act. A resolution which has been favorably reported by the railroad committee provides for the extension of the life of various rights controlled by the Connecticut Company until Nov. 1, 1910. If the railroad commissioners in 1910 find that at least 25 per cent of the proposed lines has been actually constructed the franchises are continued until the rising of the Legislature in 1911. The Senate has passed resolutions authorizing the Connecticut Railway & Lighting Company to extend its lines in Watertown and to build a line from Milford to Derby by way of Orange.

Iowa.—A resolution has been adopted by the Senate providing for the appointment of a joint committee to investigate utilities and report to the Thirty-fourth General Assembly. The House has rejected the bill requiring street cars more than 35 ft. long and weighing 35,000 lb. to be equipped with power brakes.

Massachusetts.—An important action of the House of Representatives during the past week occurred with reference to the bill providing for the establishment of an 80-cent rate for gas in East Boston. On Tuesday the House passed this bill to be engrossed. On Wednesday Speaker Walker took the floor and secured a reversal of the previous day's vote through reconsideration on the ground that the passage of the bill would injure the State's long-established policy of assigning rate-making powers in connection with public-service corporations only to suitably experienced and technically qualified commissions. Speaker Walker stated that if the Legislature should attempt to make rates for public utilities the practice would discourage investment in railway, lighting and telephone properties and that it would be disastrous to both the companies and the welfare of the State. The House killed the bill by a vote of 91 to 77. The committee on street railways has reported a bill to authorize the Connecticut Valley Street Railway to fund its floating debt and to refund its funded debt, and the bill has been given a first reading in the House. This committee has also reported a bill authorizing bond and stock issues for specified purposes under the approval of the Railroad Commission. The Smith bill defining further the purposes for which stock and bonds may be issued by street railways has been reported to the Senate by the committee with the recommendation that the measure be referred to the next Legislature. The Senate bill authorizing the General Electric Company to use a part of the tracks of the Pittsfield Street Railway has been given a third reading, passed to be engrossed and sent to the House for concurrence.

New Jersey.—A trolley freight bill has been passed. The first Gaunt measure was vetoed by Governor Fort, as mentioned in the ELECTRIC RAILWAY JOURNAL of April 17, 1909. A second measure was then introduced by Mr. Gaunt. The Governor signified his opposition to the second measure and a third was prepared to meet his wishes and introduced. It was signed on April 16. The bill provides that street railways throughout the State may carry freight and express matter without obtaining the consent of the common councils or other governing bodies of the municipalities. Such traffic, in municipalities having over 12,000 population, must be confined to the hours between 11 p. m. and 6 a. m., unless the governing body of the municipality consents to other hours. In municipalities having less than 12,000, freight and express matter may be carried at any hour of the day or night. The provisos enact that, first, no perpetual franchise shall be granted; second, that the Voorhees act, taxing the gross receipts of street

railway companies 3 per cent this year and ½ per cent additional each year up to 5 per cent, shall be applied to receipts for freight and express traffic, and all other acts relating to taxation shall also apply; third, that the limited-franchise act shall not be by implication repeated; fourth, that this act may be altered, repealed or modified at the will of the Legislature. The attempt at public-utility legislation was lost. Senator Gebhardt tried to force the issue, but was suppressed. At the eleventh hour he introduced a bill which was a copy of the Pierce bill, for which the Martin bill was substituted, and moved its consideration without reference. Senator Frelinghuysen moved that the bill go to the railroad and canal committee, and the motion was carried. Subsequently Governor Fort and the Republican Senators conferred and it was decided to keep the Martin bill in committee in the Senate.

New York.—The annual appropriation bill, which has passed both the Senate and Assembly, aggregates $22,497,153, an increase of about $1,600,000 over last year's appropriations. The finance committee has reduced the appropriation asked for by the Public Service Commission of the Second District by about $80,000, practically one-quarter of the amount asked for to carry out the work of the commission for the coming year. In the Assembly on April 15 two concurrent resolutions were adopted providing for legislative committees appointed not by the Governor but by the Lieutenant-Governor and the Speaker of the House, to sit during the summer months to deliberate on the proposed charter revision for New York City, and the question of whether the telegraph and telephone companies shall be included among the corporations now under the supervision of the Public Service Commissions and report to the next session of the Legislature. These resolutions, after their adoption in the lower house, were sent to the Senate for concurrence. The Assembly has passed the O'Malley bill, which puts directly up to the courts the responsibility for the collection of the $26,000,000 special franchise tax which the corporations of New York City have been evading for years. The Senate committee on cities on April 14 reported the Travis bill to amend the Rapid Transit act, especially in the direction of prescribing "indeterminate" franchises for rapid transit growth in New York. Joseph H. Choate, counsel for the receiver of the Third Avenue Railroad, opposed the extension of the powers of the Public Service Commissions on April 14. He attacked a clause in the proposed amendments giving the commissions sweeping power in ordering through routes and joint fares. The clause would apply to the transfer situation in New York City, which is now up for adjudication in the courts. Mr. Choate held that it would be more seemly for the commissions to await the judgment of the highest courts in the matter than to reach out for powers of regulation that were never contemplated in the original Public Service Commission act.

Rhode Island.—Under the State constitution the session of the Legislature which convened on Jan. 5, 1909, continues for 60 days. These 60 days expired on April 20, but as there is considerable business on file, the session this year will continue from 3 to 11 legislative days. Up to and including April 8, 356 measures had been presented for action. Of these 6 public laws, 61 resolutions, 5 business charters or amendments to charters, 7 charters other than business or amendments to such charters, have become laws. Of the bills still pending 9 have been passed by the Senate, but have not yet been acted upon by the House; 8 have been passed by the House, but have not yet been presented to the Senate for concurrent action; 129 are on the files of the judiciary committees, 72 are before the finance committees, 12 are before the committees on corporations, 42 are on the files of the other committees, and 5 have been indefinitely postponed. In Rhode Island the Governor has no veto power, and a bill is enacted upon its passage by both houses in concurrence when properly engrossed. Fewer railroad measures than usual have been presented for consideration this year, and of them only one has been passed. It amends the act incorporating the Pascoag & Providence Street Railway, so as to give the company permission to file application with the Town Councils of the several towns for the location of its tracks on or before June 1, 1911, instead of by March 1, 1904. On the files are the following: An amendment to the charter of the Western Rhode Island Railway which extends the time for location and completion of the main lines of the company to June 1, 1911; an act authorizing the Providence, Warren & Bristol Railroad to increase its capital stock; an act to protect steam railroad passengers and employees, and an act authorizing the town of Foster to exempt the Providence & Danielson Railway from taxation until July 20, 1916. If this last measure passes it will be the first one to exempt a railroad from direct taxation.

Financial and Corporate

New York Stock and Money Market

April 20, 1909.

The Wall Street stock market during the week has been irregular and trading has been less active than it was at the beginning of the month. Spasmodic advances and reactions have occurred, and sales have been largely professional and manipulative. At the same time there is an undeniably strong tone, the result of the improved condition of the steel trade and the partial revival of business. Trading in traction stocks has been less active but prices have been well maintained.

The money market continues to be easy, with demand light and cash reserves in the banks heavy. Quotations to-day were: Call, 1¾ to 2½ per cent; 90 days, 2½ per cent.

Other Markets

The daily average of transactions in Philadelphia Rapid Transit during this week has been about 10,000 shares. The price has been pushed up until a top record has been made at 35¾. Union Traction has also been somewhat active, but price changes have been insignificant.

A few transactions in Boston Elevated and West End, and a few in Massachusetts Electric have been recorded, but they have been principally for odd lots. Prices have remained practically unchanged.

In the Chicago market, Subway and Chicago Railways, Series 2, are the only issues that show signs of life. Trading has been meagre and without character.

Transactions in Baltimore are still confined to trading in the bonds of the United Railways & Electric Company. These are still active. The 4s are selling at 87¾ and the incomes at 55½.

In the auction of securities in New York last week, $2,500 Brooklyn City Railroad Company first mortgage 5 per cent bonds were sold at 103.

Quotations of various traction securities as compared with last week follow:

	Apr. 13.	Apr. 20.
American Railways Company	45½	46
Aurora, Elgin & Chicago Railroad (common)	a39	*a39
Aurora, Elgin & Chicago Railroad (preferred)	a90	*a90
Boston Elevated Railway	131¼	131½
Boston & Suburban Electric Companies (common)	*15	*15
Boston & Suburban Electric Companies (preferred)	*70	*70
Boston & Worcester Electric Companies (common)	*a11	15
Boston & Worcester Electric Companies (preferred)	*a56	a58
Brooklyn Rapid Transit Company	76⅛	76⅝
Brooklyn Rapid Transit Company, 1st ref, conv. 4s	85½	85⅜
Capital Traction Company, Washington	*a137	*a137½
Chicago City Railway	*a190	*a190
Chicago & Oak Park Elevated Railroad (common)	*a4½	*a4½
Chicago & Oak Park Elevated Railroad (preferred)	*a11	*a11
Chicago Railways, ptcptg. ctf. 1	*a112	*a112
Chicago Railways, ptcptg. ctf. 2	*a41	*a41
Chicago Railways, ptcptg. ctf. 3	*a29	*a28½
Chicago Railways, ptcptg. ctf. 4	*a11½	*a11½
Cleveland Electric Railway	*a78	*a78
Consolidated Traction Company of New Jersey	*76½	a77½
Consolidated Traction Company of New Jersey, 5 per cent bonds	*105¼	a106½
Detroit United Railway	58	57
General Electric Company	158½	158
Georgia Railway & Electric Company (common)	*83	82
Georgia Railway & Electric Company (preferred)	*87½	*85
Interborough-Metropolitan Company (common)	15	15⅛
Interborough-Metropolitan Company (preferred)	43	44⅛
Interborough-Metropolitan Company (4½s)	78¼	78¾
Kansas City Railway & Light Company (common)	*a42	*a44
Kansas City Railway & Light Company (preferred)	*a83½	*a83
Manhattan Railway	143½	143¼
Massachusetts Electric Companies (common)	*14¼	14
Massachusetts Electric Companies (preferred)	72	71
Metropolitan West Side, Chicago (common)	*a18	a18
Metropolitan West Side, Chicago (preferred)	*a52	a52
Metropolitan Street Railway	23	*23
Milwaukee Electric Railway & Light (preferred)	*a110	*a110
North American Company	83	83½
Northwestern Elevated Railroad (common)	*a23	*a23
Northwestern Elevated Railroad (preferred)	*a69	*a68½
Philadelphia Company, Pittsburg (common)	41½	42
Philadelphia Company, Pittsburg (preferred)	41¼	42¼
Philadelphia Rapid Transit Company	32½	35
Philadelphia Traction Company	92½	93
Public Service Corporation, 5 per cent col. notes	*a100½	a100¼
Public Service Corporation, ctfs	*a82½	a81
Seattle Electric Company (common)	*a91½	*91½
Seattle Electric Company (preferred)	*a98	*a98
South Side Elevated Railroad, Chicago	55½	*a56
Toledo Railways & Light Company	12¾	12⅝
Third Avenue Railroad, New York	29½	30¼
Twin City Rapid Transit, Minneapolis (common)	104	103½
Union Traction Company, Philadelphia	56¼	56¾
United Railways & Electric Company, Baltimore	11	12¼
United Railways Investment Company, San Francisco (common)	a40	*a37½
United Railways Investment Company, San Francisco (preferred)	a57	56
Washington Railway & Electric Company (common)	a43½	*a43⅛
Washington Railway & Electric Company (preferred)	*a91	*a92
West End Street Railway, Boston (common)	96¼	97½
West End Street Railway, Boston (preferred)	*a110½	*a110
Westinghouse Electric & Manufacturing Company	—	82½
Westinghouse Electric & Manufacturing (1st preferred)	*117	119

a Asked. * Last sale.

Annual Report of United Railways & Electric Company of Baltimore

Gross earnings of the United Railways & Electric Company of Baltimore amounted in the year 1908 to $6,834,802, a decrease of $183,279, or 2.61 per cent from the previous year. Operating expenses, which amounted to 48.18 per cent of gross earnings, showed a decrease of $176,749 from the total expenditure in 1907. The number of car-miles run decreased 0.7 per cent. Results of operations for three years compare as follows:

	1908.	1907.	1906.
Miles of track	401.2	396.2	394.5
Gross earnings	$6,834,802	$7,018,081	$6,583,102
Operating expenses	3,293,338	3,470,087	3,220,942
Net earnings	$3,541,464	$3,547,994	$3,362,160
Other income	3,240	6,505	4,725
Total net income	$3,544,704	$3,554,499	$3,366,885
Charges, taxes, etc	2,637,182	2,487,942	2,365,587
Net divisible income	$907,522	$1,066,557	$1,001,298
Extraordinary expenditures	813,751	1,028,899	980,000
Surplus	$93,771	$37,658	$21,298
Operating expenses—per cent of gross earnings	48.18	49.44	48.93

Included in the operating expenses as shown were $195,098 expended for maintenance of way and $380,386 for maintenance of equipment, a total of $575,484. This sum is equivalent to 8.4 per cent of gross earnings. From the net income available from the year's operations there was appropriated for extraordinary expenditures $813,751, which is equal to 11.9 per cent of gross earnings. The total expended from earnings, therefore, for maintenance and "extraordinary expenditures" was $1,389,235, or 20.3 per cent of the gross revenue. W. A. House, president of the company, in calling attention in the report to the appropriation of over $800,000 for extraordinary expenditures, states that "in addition thereto, $337,474 has been expended under the arrangement made with the Maryland Electric Railways Company for purchases, construction, etc., of property leased to your company. Notwithstanding these large expenditures, there has been an actual decrease during the year in accounts and notes payable of $291,703."

Referring to the rehabilitation of the property begun several years ago, Mr. House states that "during this period 182.6 miles of city track, out of a total of 234.6 miles, have been reconstructed or electric or cast-welded. In some cases tracks which have been reconstructed have also been electric-welded. Five car houses and terminal stations, of the latest and most approved fireproof, concrete construction, have been erected. In every instance the car houses have been located after a thorough study of conditions and with a view of saving car-mileage. The car house system is now nearly completed, the company having but two new buildings in immediate contemplation, for both of which funds are now in hand.

"During this period 530 cars have been purchased and placed in operation, and the company's equipment is adequate for present requirements. The capacity of the power generating stations has been increased from 16,879 kw to 35,405 kw, and six new substations have been constructed with a capacity of 28,000 kw.

"While your power station capacity has been increased, it should be borne in mind that six small power stations, equipped with old and obsolete apparatus, have been abandoned, and modern equipment installed at Pratt Street to provide for the closing down of these stations."

An abstract of other features of the report of Mr. House follows:

"The total amount of taxes, including park tax, cost of paving streets, track changes necessitated by regrading of streets, sewerage commission work, widening of streets, etc., was $722,865, or more than 10½ per cent of the gross revenue of the company, as against $694,246 in 1907, a net increase of $28,618. The park tax for the year was $423,640, as against $435,066 in 1907, a decrease of $11,426.

"Capital account was increased $21,530, covering improvements at Pratt Street power house. The sum was derived from sales of disused property, the amounts received from which were credited to capital account, as received, and deposited in a special fund and disbursed by order of court. Of the special fund referred to there was also $10,303 applied with the consent of trustees to electric welding of tracks, making total expenditures from sales of such property for the year $31,833, leaving a balance of $30,797 to be invested subject to order of court.

"In the extraordinary expenditures account are also included capital expenditures, but, in accordance with the policy of the company adopted at the time of the acceptance of the funding plan, these are carried in the above account, subject to final action by the board of directors.

"During the year 65 pieces of special work were installed and 5639 joints electrically welded on 9-in. girder rail, equivalent to 25.59 miles.

"The work of the sewerage commission has interfered with tracks and operations at a number of points, necessitating heavy outlays on the part of the company, as well as causing loss of revenue. To continue the regular service and preserve the integrity of structures, special arrangements had to be made with the commission at a number of points.

"The commissioners for opening streets were extremely active in carrying on their operations during the year, entailing a very heavy expenditure upon your company in cooperating with them in connection with the laying of improved paving. In some instances the tracks, trolley poles and overhead structure had to be changed considerably in order to conform to the new line and grade established by the city. At some places in order to lower the tracks it was necessary to drill through 6 ft. of solid rock, and at others to change the alignment as much as 5 ft."

Various other instances are given, showing "how onerous was the indirect tax imposed upon the company during the year by the operations of the various city departments, approximating an outlay of $114,544.

"In view of the work covered by the supplemental agreement with L. B. Stillwell, dated Aug. 27, 1907, not having been fully completed at the expiration of the contract, Sept. 1, 1908, a new agreement was entered into with him on Aug. 12, 1908, terminating June 1, 1909, under which Mr. Stillwell will continue to give supervision to the additions and improvements, now nearing completion, to the company's power plants. The delay has been due chiefly to the difficult nature of the work, it being necessary to carry on operations without interruption to the power service.

"In December, 1908, it was decided by the Baltimore City Court, on appeal from the Appeal Tax Court, that the easements of your company in the streets of Baltimore are subject to valuation and assessment for taxation. An appeal to the Court of Appeals has been taken from this decision—the contention of your company being that the tax of 9 per cent upon gross receipts (the so-called park tax) constitutes and represents all the taxable value of the street easements which the company enjoys.

"In conformity with the policy of publicity, and with a view to acquainting the public with the various problems encountered in the operation of a large street railway system, and the efforts that are being made to render the best service practicable, the publication of a series of bulletins in the daily papers was inaugurated, running through a period of 10 weeks. These bulletins invited suggestions, criticisms and complaints. Some of the suggestions received were found to be excellent and were adopted. It is believed that the results attained by these publications have been beneficial both to the company and its patrons.

"Prior to the consolidation there was no general exchange of transfers between the different companies, and, in some cases, 3 cents was charged for this privilege. As evidencing the extent to which this privilege has been availed of by patrons since July 1, 1890, when the universal free transfer system became effective, the following table is given:

	Transfer points.	Direction privileges.	Transfers used.
1900	71	544	*15,000,000
1901	160	1,150	35,342,134
1902	160	1,215	39,363,604
1903	166	1,279	42,788,205
1904	166	1,288	43,932,219
1905	172	1,322	49,292,821
1906	186	1,496	53,413,492
1907	186	1,504	55,165,581
1908	193	1,615	54,587,949

*Estimated.

"From this it is seen that 40 per cent of all passengers used transfers.

"While the traveling public has greatly profited by this liberal use of transfers, the general use, and, in many cases, abuse of the transfer privilege has steadily grown until the average rate now received per capita is but 3.45 cents; and, after deducting the park tax of 9 per cent upon gross receipts within the city, a net per capita revenue of only 3.15 cents.

"The average per capita revenue and the cost of transportation have been gradually but surely approaching each other, due to long rides taken for a nickel, the increase in cost of materials of all kinds and the advance in rates of pay of employees.

"It should be recognized that the service given by the company in transportation represents the commodity which it has for sale, and, by reason of legislative enactment, this

is a fixed rate of 5 cents for adults and 3 cents for children. Therefore, we endeavor to impress upon the public and upon municipal officials the fact that, as the margin of profit on the sales of this commodity is unreasonably reduced, the ability of the company to perform its functions of efficient service and to lead in the development of the city and the increase in the taxable basis is impaired.

"There were sold during the year 17 old cars to net $9,200. Since the substitution of the semi-convertible air-brake cars for the smaller type cars 127 of the latter have been sold to net $63,283."

Traffic statistics contained in the report compare as follows:

	1908.	1907.	1906.
Car-mile revenue, cents	25.55	26.06	25.30
Car-mile expenses, cents	12.31	12.87	12.37
Car-miles run	26,764,145	26,953,727	26,035,327
Revenue passengers	138,400,994	142,114,995	133,785,601
Transfers used	54,587,949	55,165,581	53,413,492

Annual Report of North American Company

The income account of the North American Company for the year 1908 shows total revenues of $1,723,186, divided as follows: Interest received and accrued, $409,541; dividends received, $1,287,539; profits and compensation for services, $26,106. The expenditures were as follows: Salaries, legal expenses, net rentals and all other expenses of administration, $91,962; taxes, $5,261; interest paid and accrued, $176,800. The balance of $1,449,163 was carried to undivided profits, making a total in that account as of Dec. 31, 1908, of $3,445,777.

C. W. Wetmore, the president, in announcing the resumption of dividends by the declaration of 1¼ per cent, payable on April 1, 1909, said that when the circular was issued on Nov. 8, 1907, giving the reasons why it had been decided to omit the dividend payable on Dec. 1, 1907, "it was hoped that the effects of the panic might be short-lived and that the payment of dividends might be resumed at an early date, but the intensity of the business depression, the uncertainties of the Presidential campaign and the consequent delay in the sales of securities of the railway and lighting companies, in which the North American Company is an investor, and to which it had made large advances, have enforced postponement until now."

In revaluing the assets as of Dec. 31, 1907, the directors wrote off $2,290,365.73 from the undivided profits "in view of the universally low range of market values then prevailing and of the uncertainty as to the extent and duration of the industrial and general business depression, then beginning to be felt, and of its effect upon the earnings of the companies" in which the North American Company is an investor. The report continues that "in the judgment of the board, the conditions resulting from the panic of 1907 were fully met by this reduction, and therefore no changes of valuation have been made as of Dec. 31, 1908.

"During the past year, as well as in 1907, because of the adverse financial conditions prevailing, capital expenditures by all of the companies have been limited to such as were deemed to be imperatively required to meet the present demands of their business, or as were unavoidable, because of franchise obligations or engagements previously entered into. The total amount of these expenditures was $3,744,195.72, as compared with $6,087,491.35 for the year 1907."

A description is given in the report of the properties of the West Kentucky Coal Company, in which the North American Company is interested, and of the Mississippi River Power Distributing Company, the entire stock of which is owned by the North American Company. This company has made a 99-year contract with the Keokuk & Hamilton Water Power Company, whereby power will be transmitted and delivered to the Union Electric Light & Power Company, the Laclede Gas Light Company and the United Railways Company of St. Louis.

Boston (Mass.) Elevated Railway.—By a vote of 209,669 to 40 the stockholders of the West End Street Railway at a special meeting on April 14 instructed the directors to appear before the Legislature in favor of the new terms for the consolidation of the West End Street Railway and Boston Elevated Railway, as proposed by the stockholders' protective committee, of which F. S. Mead is chairman, and also to request that House bill 48, the consolidation measure, be amended in accordance with the new plan. Briefly, the stockholders desire 8 per cent dividends from the date of consolidation, added security for the stock of the Boston Elevated Railway to be received in exchange for the stock of the West End Street Railway, and the distribution of certain assets of the West End Street Railway.

Delaware & Hudson Company, Albany, N. Y.—The following statement regarding the electric railways in which it is interested was contained in the annual report of the Delaware & Hudson Company for 1908, made public recently: "The earnings of the electric lines fell off through the general depression of business. They were particularly affected by reason of the partial closing down for several months of the plants of the International Paper Company, General Electric Company and the American Locomotive Company. There was a decrease in net earnings of the United Traction Company of $29,701.30; of the Hudson Valley Railway of $74,366.80; of the Troy & New England Railway of $905.30, and of the Schenectady Railway (including Electric Express Company) of $55,196.57. The net earnings of the Plattsburgh Traction Company increased $1,478.99. A dividend of 4 per cent was declared on the capital stock of the United Traction Company for the year 1908. No dividends were declared by the other companies."

Eastern Ohio Traction Company, Cleveland, Ohio.—The plans which have been suggested for reorganizing the Eastern Ohio Traction Company contemplate separate organizations for the Cleveland & Eastern Railway and the Chagrin Falls division of the company. Bonds to the amount of $800,000 are to be sold for the Cleveland & Eastern division, each bondholder to have the same interest he now holds, and, in addition, accrued interest in preferred stock and his proportion of common stock. Of the common stock $500,000 is to go with par of the new bonds and a like amount will be held in the treasury, to be issued with additional bonds if found necessary. For the Cleveland & Chagrin Falls division it is proposed to organize a company with $500,000 capital stock to purchase the property. With this will be an authorized issue of $500,000 of 20-year bonds bearing 6 per cent interest. Of this amount $232,000 will be issued to take up the present first mortgage bonds and interest. A syndicate will be formed to take enough bonds in addition to complete the purchase price of the property. Stock will go with the bonds in this instance also. The Eastern Ohio Traction Company has been in the hands of R. E. Beatty as receiver for some time.

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—Judge Carter, of the Superior Court, has directed the Union Trust Company, Indianapolis, Ind., receiver for the Indianapolis, New Castle & Toledo Electric Railway, to issue receivership certificates for a sum not to exceed $450,000, and to ask for bids until May 3 for the completion of the line between Indianapolis and New Castle.

Interstate Railways Company, Philadelphia, Pa.—The bondholders' committee of the Interstate Railways Company met on April 16 and received the report of Stone & Webster, Boston, Mass., who were retained to report on the physical condition of the property of the company. No action was taken at the meeting. It is stated that another meeting will be held soon to consider the matter in detail.

Miami (Fla.) Electric Railway.—The property of the Miami Electric Railway has been sold to satisfy a judgment secured against the company by the Empire Trust Company, New York. A franchise for the construction of the road was granted to J. H. Tatum & Company in 1895, and 3 miles of track were laid and three cars were operated. At the sale, the property was disposed of in parts to various interests.

Mineral Wells (Tex.) Electric System.—The street railway and lighting properties known as the Mineral Wells Electric System were sold at public auction recently to D. T. Bomar, of Broad & Bomar, Fort Worth, for $75,000. The plant is not in operation, and no definite plans have been made with respect to the resumption of business. The properties consist of about 6 miles of street railway, an electric lighting plant and a 30-ton ice plant. The Mineral Wells & Lakewood Park Street Railway is in no way connected with the properties purchased by Mr. Bomar.

New England Investment & Security Company, Springfield, Mass.—In the suit brought by holders of preferred stock in the New England Investment & Security Company to require the New York, New Haven & Hartford Railroad to place upon their securities a guarantee of the railroad in accordance with an agreement, the Connecticut Supreme Court has found in favor of the stockholders. The New York, New Haven & Hartford Railroad refused to carry out the agreement on the ground that Massachusetts laws prohibited such action.

New Orleans Railway & Light Company, New Orleans, La.—At the meeting of the stockholders of the New Orleans Railway & Light Company held on April 12, Oscar

L. Putnam was elected a director to succeed Albert Baldwin, Jr., and Robert J. Wood was elected a director to succeed Charles Godchaux. At a meeting of the directors on April 14 the officers were re-elected.

Northwestern Elevated Railroad, Chicago, Ill.—It is stated that the committee composed of Samuel Insull, Ira M. Cohe and E. K. Boisot, which has plans under consideration for merging the elevated railways in Chicago, will make public a plan for leasing the companies to a central corporation on April 30.

Portland Railway, Light & Power Company, Portland, Ore.—An issue of $1,000,000 of three-year collateral trust 5 per cent coupon notes of the Portland Railway, Light & Power Company dated May 1, 1909, and due May 1, 1912, but subject to call on 60 days' notice at 101, are being offered by Bond & Goodwin, New York and Boston, at 99¼ and interest. The Guaranty Trust Company, New York, is trustee of the issue. The notes are secured by deposit at 75 of the general mortgage 5 per cent gold bonds due in 1935.

Public Service Corporation, Newark, N. J.—The Public Service Corporation of New Jersey gives notice to holders of its $6,250,000 convertible notes, dated May 1, 1906, and maturing Nov. 1, 1909, that they may present the notes between April 15 and May 1 for conversion into an equal amount of preferred stock at par, that is, at the rate of 10 shares of preferred stock for each $1,000 note. This is in accordance with the provisions of the issue.

Second Avenue Railroad, New York, N. Y.—Judge Lacombe of the United States Circuit Court has handed down an order in the suit of the Guaranty Trust Company, New York, against the Second Avenue Railroad, extending the time for taking testimony in the suit until July 9, 1909. The complainant is allowed up to and including May 9 to submit testimony in chief. The defendant is allowed from that time until June 9 to submit testimony, and the complainant is given from June 9 to July 9 to submit testimony in rebuttal.

Toledo Railways & Light Company, Toledo, Ohio.—At a meeting of the directors of the Toledo Railways & Light Company held on April 14 the appointment of a stockholders' protective committee was authorized. The mode of selecting the committee was not decided upon. Albion E. Lang, president of the company, denied a report that the protective committee would ask for an extension of the franchise in Toledo. He said that the question was not mentioned during the meeting.

United Railways Investment Company, San Francisco, Cal.—The sale has been ordered by the United States Court, at San Francisco, of the property of the Stanislaus Electric Power Company, Stanislaus Railway, the Tuolumne Water Power Company and the Union Construction Company for May 10. These companies were placed in the hands of receivers several weeks ago, and the present sale is for the purpose of completing a deal by which the Stanislaus water-power properties will come into the possession of the United Railroads of San Francisco, and it is presumed that the United Railways Investment Company will be the only bidder at the sale.

United Traction Company, Albany, N. Y.—Spencer Trask & Company and the Guaranty Trust Company, New York, have purchased $350,000 consolidated mortgage 4½ per cent bonds of the United Traction Company. The proceeds will be used to liquidate certain short-term loans of the company.

Vincennes Traction & Light Company, Vincennes, Ind.—The interest of B. G. Hudnut and his associates in the Vincennes Traction & Light Company has been purchased by S. S. Bush and S. A. Culbertson, Louisville, and others, who are interested in the Rome Railway & Light Company, Rome, Ga.; the Pascagoula Street Railway & Power Company, Scranton, Miss., and the Jackson Railway & Light Company, Jackson, Tenn. New officers have been elected by the Vincennes Traction & Light Company as follows: S. A. Culbertson, president; S. S. Bush, vice-president and general manager; Attilla Cox, secretary and treasurer.

Virginia Passenger & Power Company, Richmond, Va.—The property of the Virginia Passenger & Power Company is advertised to be sold under foreclosure at Richmond, Va., on May 5. It will be offered first as three parcels and then as a whole. Parcel 1 consists of all property covered by the Richmond Passenger & Power Company mortgage of Jan. 1, 1900; parcel 2 of all property included in the South Side Railway & Development Company mortgage, dated July 1, 1899, and parcel 3 of all the property embraced by the mortgage of the Virginia Passenger & Power Company, dated June 18, 1902.

Traffic and Transportation

Passenger Traffic in Brooklyn

The gross receipts of the Brooklyn Rapid Transit Company are from $3,000 to $4,000 a day greater than a year ago, and occasionally are as much as $5,000 a day more than a year ago. Notwithstanding this the gross receipts of the company for the first eight months of the fiscal year are between $350,000 and $400,000 less than the same period of the previous year, and the company has to meet an increase of $258,000 in taxes. Operating expenses have been reduced, however, and other economies have been worked so that there is a slight net improvement over 1908.

E. W. Winter, president of the company, attributes the substantial saving in operating expenses to the extensive additions and improvements that have been made during the last few years. For the six years ended with the current fiscal period the Brooklyn Rapid Transit Company will have expended $40,000,000 for improvements and betterments. Of this amount approximately $5,000,000 has been provided from net earnings and $35,000,000 from bonds. For the first eight months of the current fiscal year the company has spent between $3,000,000 and $4,000,000 for new construction. Perhaps the most important work which it now has in hand is the completion of improvements to the Williamsburg power station, in which turbines are being installed. It is expected that the economies in operation which will result from the installation of the turbines will work materially to the benefit of the company in reducing operating expenses and the cost of power production.

When the subway to Brooklyn was placed in operation by the Interborough Rapid Transit Company, there was considerable speculation regarding the probable effect of the extension on the earnings of the Brooklyn Rapid Transit Company. The morning and evening rush at the Brooklyn Bridge has been reduced materially by the new line, but new centers for the distribution of traffic in Brooklyn have been established at Borough Hall and at Nevins Street and Flatbush Avenue. In regard to the effect of the subway on the Brooklyn Bridge traffic of the Brooklyn Rapid Transit Company, President Winter says:

"At the time the Interborough Rapid Transit Company opened its Brooklyn tunnel extension there was a perceptible decrease in bridge traffic, amounting in the aggregate possibly to 30 per cent, but at the present time I should say that the decrease is only about 12 per cent to 15 per cent. That, however, does not indicate that it has hurt the Brooklyn Rapid Transit Company's business as a whole to the extent mentioned. As a matter of fact, as I predicted before the tunnel to Brooklyn was completed, the ultimate result has been favorable to the Brooklyn Rapid Transit Company, as there has been a perceptible increase in short-haul business in Brooklyn which more than offsets the loss in bridge travel. Another beneficial result of the tunnel to Brooklyn has been that it enables us to operate our bridge trains and cars much more efficiently and the traveling public enjoys a more prompt service than previously was possible. We are able now to run on an average of a train a minute in and out of the New York terminal of the bridge division, there being fewer stops and delays."

Possibilities of Through Trips on New England Electric Lines Discussed

As outlined in the article entitled "Special Excursion Service," which was published on page 569 of the Electric Railway Journal for March 27, 1909, the representatives of 20 electric railway companies in New England met at the Nayassett Club, Springfield, Mass., on April 12 at the invitation of Thomas C. Perkins, vice-president of the Hartford & Springfield Street Railway, and L. S. Storrs, president of the New England Security & Investment Company, to consider excursion traffic in general and the possibilities offered in New England for through traffic, especially the New York-Boston trip.

The meeting was preceded by a dinner. Mr. Perkins explained that the meeting was the first of the kind ever held in New England. He was anxious that the officials should become acquainted with one another. There were many benefits which would come as a result of a common study of the matter of making connections so as to facilitate through travel. For instance, such travel was little understood by the public between Springfield and New Haven, between which cities through travel was soon to become a matter of course, just as it had become a matter

of course between Boston and Worcester. He explained why through travel was more popular in eastern Massachusetts than in the western sections of the State, and pointed out the need for information bureaus and accurate traffic circulars and literature.

H. H. Faulkner, passenger agent of the Boston & Northern Street Railway, declared that there is a natural increase in travel by electric railway, but that traffic should be fostered and encouraged. From practical experience he had found that the principal facts that prospective patrons wished to learn for long-distance travel were the following: Where to change cars, the running time and the fares. The department of which he has charge had produced maps and prepared articles for papers showing how to travel by trolley as far north as Waterville, Me., and as far south as New York City. At the office of the department on Washington Street, Boston, as many as 500 persons had applied for assistance in planning tours in one day.

Taking up the subject of long-distance travel, Mr. Faulkner said that the property with which he is connected is divided into 16 divisions, and that the superintendent of each division is always on the alert to obtain information about long-distance traffic, but that it was a difficult problem. Mr. Faulkner said that he had received by mail a request from a woman teacher for a map which she could exhibit in her schoolroom. A trolley map was a novelty, and it was educational, she said. It is of great interest in the teaching of geography. In a general discussion of long-distance travel the idea of a school map, that of a vacation by trolley and that of wedding tours by trolley came in for much interested scrutiny. Mr. Perkins went into the matter of a general time table for trolleys between Boston and New York.

H. E. Stone, of the Boston & Worcester Street Railway Company, told about the use of a decorated arrowhead as a souvenir. He had distributed these to school children, who wore them as tags in their buttonholes, and at home the souvenirs were made use of for bookmarks. He also said that his company had issued a folder containing distances and schedules for through travel from Boston to New York, and that he had received a request for one of these from a Massachusetts man now in California.

Mr. Perkins outlined a plan for a special trip from Boston through Springfield to New York, on which there should be representatives of the press of the largest cities along the line. This plan included a stop over night at Hartford and a banquet, at which Mayor Hooker would speak. H. C. Page, general manager of the Springfield Street Railway, spoke of the desirability of the trip to Greenfield and Mount Tom in the summer, and explained how this could be made by through passengers from New Haven and Hartford. J. A. Taggart, general manager of the Connecticut Valley Street Railway, brought up the matter of through ticketing and of the interchange of cars. N. D. Winter, president of the Northampton Street Railway, discussed the question of the expense involved in adopting some of the plans proposed and the probable return on the money expended to create traffic. F. H. Hewitt, superintendent of the Middletown Street Railway, and L. S. Risley, superintendent of the New Britain lines of the Connecticut company, also spoke. Mr. Risley advocated the running of through cars.

Funeral Car Operating Agreement in Chicago

The Chicago City Council has approved an operating agreement between the Calumet & South Chicago Railway and the Chicago & Southern Traction Company, whereby these roads will jointly operate funeral cars in the southern part of the city. The principal provisions of the agreement follow:

"The Chicago & Southern Traction Company authorizes the Calumet & South Chicago Railway to operate funeral cars or trains over its lines from the intersection of Vincennes Road and 103d Street, Chicago, to three cemeteries reached by the Morgan Park branch of the company in Cook County. The Chicago & Southern Traction Company shall furnish electrical power and install necessary sidings for trains of funeral car and one trailer—operated by employees of the Calumet & South Chicago Railway. The funeral cars of the Calumet & South Chicago Railway shall be similar to the cars now operated by the Chicago & Southern Traction Company and shall not weigh more than 60,000 lb. No passengers other than members of the funeral party shall be transported over the lines of the Chicago & Southern Traction Company. The Calumet & South Chicago Railway agrees to pay the Chicago & Southern Traction Company $2.30 for each funeral car and $1.20 for each trail car, for each round trip to and from any cemetery; and the Chicago & Southern Traction Company is not to collect or receive any fares from passengers on funeral trains. An accounting for the compensation paid by the Calumet & South Chicago Railway to the Chicago & Southern Traction Company shall be made on or before the fifteenth of each month. The Calumet & South Chicago Railway shall be liable for any negligence of its own employees in regard to the operation of the funeral trains over the tracks of the Chicago & Southern Traction Company. Funeral cars shall be marked 'Through Car' and be run on schedules furnished by the Chicago & Southern Traction Company. The Calumet & South Chicago Railway shall at its own expense defend all actions brought against the Chicago & Southern Traction Company arising from the exercise by the Calumet & South Chicago Railway of the rights granted by the Chicago & Southern Traction Company. The agreement shall remain in force until the expiration of the Chicago & Southern Traction Company's ordinance on May 2, 1913, or until the expiration of any extension of that ordinance which may not prohibit the granting of the privilege."

Accidents in New York in March

The Public Service Commission of the First District of New York has issued the following summary of accidents on the lines within its jurisdiction in March, 1909, as compared with March, 1908:

March.	1909.	1908.
Car collisions	82	148
Persons and vehicles:		
Struck by cars	942	905
Boarding	574	574
Alighting	513	454
Contact electricity	20	27
Other accidents	1,794	2,245
Totals	3,985	4,353
Injuries:		
Passengers	1,550	1,525
Not passengers	520	632
Employees	364	474
Totals	2,434	2,631
Serious (included in above):		
Killed	20	44
Fractured skulls	17	8
Amputated limbs	6	1
Broken limbs	32	33
Other serious	151	101
Totals	226	187

Trespassing on Railroad Tracks in Indiana

As has been previously noted in the Electric Railway Journal, the attempt to secure special legislation at the recent session of the Indiana Assembly to prevent trespassing on railroad tracks failed. In order to assist the movement against trespassing on tracks, the Indiana Railroad Commission has addressed a circular to all the steam and electric railways in the State calling attention to the present statute. The commission comments on the existing law as follows:

"Under this law (Indiana statute, 1908; section 2280) your notification to the public not to walk upon and along your tracks will subject them to the penalties of prosecution, if such notice be ignored. This may be accomplished by erecting bulletins conspicuously warning all persons not to use the tracks as footways. The commission hereby recommends that bulletins be erected by you at all points where the public is likely or is accustomed to trespass upon tracks, and which are especially dangerous by reason of speed of trains, obstructions to the view, numbers of trespassers, time when trespassing occurs, etc. The commission also recommends that you secure as far as possible the co-operation of prosecuting attorneys of districts traversed by your road, bringing to their attention all violations of the above statute, and assisting in securing convictions. Orders should be issued to your employees to maintain a strict lookout for violations of the statute and report the same to their company, with names of violators, and all facts necessary to secure convictions. Notification of your compliance with the above recommendations is requested."

Hearing on Transportation of Military Supplies in Massachusetts.—The Massachusetts Railroad Commission gave a hearing on April 9 regarding the conditions under which it should authorize the transportation of military supplies by street railways, electric railroads and elevated railways as provided in the bill to that effect just passed by the Legislature. No one was present to define the restrictions suggested in the law.

Winona Interurban Railway Files Tariff.—The Winona Interurban Railway, Winona Lake, Ind., filed its tariff schedule with the Indiana Railroad Commission under the new law on April 16. The basis of the rate is 2 cents per mile, with a minimum charge of 5 cents. The charge between points is a multiple of five nearest to the amount produced by multiplying the distance by the rate. Ten cents extra on each trip will be charged passengers who fail to purchase tickets when they board a car at a station where there is a ticket office. Ticket agents are required by law to be in their offices ready to sell tickets for 30 minutes prior to the departure of any passenger car. Where no ticket offices are maintained the regular ticket rate will be charged.

Easter Egg Hunt at Little Rock.—The Little Rock Railway & Electric Company, Little Rock, Ark., conducts an Easter egg hunt annually at its park for the mothers and children of the city, the families of the employees of the company and the orphans from the State and private orphanages in Little Rock, all of whom are the guests of the company for the day. The hunt gives more pleasure to the children than any other celebration during the year, and as the impressions on young people generally are lasting and as the children know that the hunt is given by the company for their benefit, a good opinion is conveyed of the treatment of the public by corporations. The hunt on April 11 was the fifth one of the kind. It took place at 3:30 p. m. Cars to the park followed each other at intervals of 7½ minutes. The eggs were concealed in stumps and in the ground, and some were covered with leaves in a tract of several acres in the east end of the park. The children were admitted on signal to the ground where the eggs were hidden, and in 40 minutes all but three of the eggs had been found. An egg wrapped in gold leaf carried a cash reward of $3 to the finder, and several eggs wrapped in tin-foil carried prizes of 50 cents each. G. J. Griffith, superintendent of the company, distributed the prizes from the band stand.

Circular in Indiana on Switch Stands and Signal Lights.—The Railroad Commission of Indiana has addressed the following circular to all steam and electric railroads in the State: "Complaint has come to the commission that the railroads in this State do not, in all cases, use adequate signal lamps, the same being objectionable because of improper construction, lack of care in maintenance, character of oil used, or from other causes. The commission hereby recommends that specific orders be given to all enginemen, motormen and sectionmen to keep strict lookout for all signal failures, including failures of switch lamps and report the same promptly to their proper officers in every instance, and that the latter follow up such reports with diligence. The commission also recommends that, where switches are located close together, so that their respective signals cannot readily be distinguished, they be indicated by switch stands of different heights, so placed out of range that the danger of confusion will be avoided. It is further recommended that each railroad cause an inspection to be made of the lights in and about their stations, to ascertain if there are any white lights at or near such stations, which, by reason of location or intensity, interfere with the engineer's view of signals."

Service to Coney Island.—The Brooklyn Rapid Transit Company has announced that it proposes to increase the value of its service to Coney Island this summer by diverting express trains from the Sea Beach line to the Brighton Beach line, which has four tracks between Church Avenue, Brooklyn, and Coney Island, a distance of 5 miles, and on which division there are no grade crossings. Trains operated via the Sea Beach line descend to the surface from the elevated at Thirty-sixth Street and Third Avenue, but the section of the city between Thirty-sixth Street and Coney Island has increased in population so rapidly that the company feels it can serve the public more advantageously and protect its own interests better by diverting trains to the Brighton Beach line. The desire of the company to simplify operation to Coney Island has been accomplished gradually. This summer there will be only two railroad terminals at Coney Island—Culver and West End—from which both surface cars and elevated trains will be dispatched. The first step looking to the relief of the situation at Coney Island was taken when the Culver terminal was remodeled two or three years ago and made ample for the needs of the Brighton Beach and Culver elevated lines and the Reid Avenue, Nostrand Avenue, Tompkins Avenue and Vanderbilt Avenue, and Union Street surface lines, which approach Coney Island through Gravesend Avenue. The Sea Beach terminal at Luna Park will be abandoned and Sea Beach trains will run into the rebuilt West End terminal. No change will be made in the service between Coney Island and Sheepshead Bay.

Personal Mention

Mr. E. H. Maggard has been appointed general freight and passenger agent of the Petaluma & Santa Rosa Railway, Petaluma, Cal., to succeed Mr. Fred Whitney.

Mr. Hugh J. McGowan, president of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., who has been abroad for about a year, has largely regained his health.

Mr. W. F. Goble, who has been general foreman of the Los Angeles & Redondo Railway, Los Angeles, Cal., has been appointed superintendent of the mechanical department of the company.

Mr. Franklin L. Lyle, vice-president of the Commonwealth Trust Company, Philadelphia, Pa., has been elected president of the Citizens' Passenger Railway, Philadelphia, Pa., to succeed Charles E. Ellis, deceased.

Mr. John B. Parsons, president of the Philadelphia (Pa.) Rapid Transit Company, has returned to Philadelphia after a six-weeks' trip in Europe with Mr. P. A. B. Widener, a director of the Philadelphia Rapid Transit Company.

Mr. C. N. Kellogg, Jr., who for the last three and one-half years has been manager of the El Paso (Tex.) Electric Company, will hereafter be located in Dallas, Tex., where he will manage a securities department for Stone & Webster, Boston, Mass. Mr. Kellogg will continue as manager of the El Paso Electric Company, however, and will visit El Paso from time to time. During his absence from El Paso his duties will devolve upon Mr. H. S. Potter, general superintendent.

Mr. S. D. Wager has resigned as master mechanic of the Toledo, Port Clinton & Lakeside Railway, Genoa, Ohio. Mr. Wager began his railroad career on April 1, 1891, from which time until Dec. 1, 1903, he was connected with the transportation departments of the Lake Shore & Michigan Southern Railroad, the Chicago, Rock Island & Pacific Railroad and the Missouri, Kansas & Texas Railroad. From Jan. 1, 1903, to June 15, 1906, he was connected with the construction and operating departments of the Toledo & Indiana Railway and the Toledo, Port Clinton & Lakeside Railway. On June 15, 1906, Mr. Wager was appointed chief train despatcher of the Toledo, Port Clinton & Lakeside Railway, and on Nov. 15, 1907, he was promoted to general shop foreman of the company. He was made master mechanic of the company in July, 1908.

Mr. A. P. Lathrop has been elected president of the American Light & Traction Company, New York, to succeed Mr. Emerson McMillin, who has been elected chairman of the board of directors, a newly created position. Mr. Lathrop was formerly vice-president and treasurer of the company, and Mr. J. M. McCarthy, who has been a vice-president, has also been elected treasurer to succeed Mr. Lathrop. Mr. Marion McMillin, who has been assistant secretary, has been elected a vice-president of the company, but will retain the position of assistant secretary. Mr. Lathrop, the new president, was born in Columbus, Ohio, and was educated in that city. He began his business career with the Columbus Gas Company and for several years was secretary of the company. He resigned from the Columbus Gas Company to become manager of the St. Paul Gas Company. He became connected with the American Light & Traction Company soon after it organized.

OBITUARY

Joseph Russell Jones, for many years president of the West Division Street Railway, Chicago, is dead. Mr. Jones had been a resident of Illinois since 1838. He was a personal friend of Presidents Lincoln and Grant and was Minister to Belgium under the administration of President Grant. Mr. Jones was 86 years old.

Charles E. Ellis, president of the Citizens' Passenger Railway, Philadelphia, Pa., a subsidiary of the Philadelphia Rapid Transit Company, is dead. Mr. Ellis was 74 years old and had been a sufferer from neuralagia and rheumatism for some time. He was born in Philadelphia, and previous to the organization of the Philadelphia Rapid Transit Company took an active interest in street railway affairs in Philadelphia.

Charles M. Preston, president of the Kingston (N. Y.) Consolidated Railroad, died on April 16 at Kingston after a lingering illness. Mr. Preston was 61 years old at the time of his death, and had been actively engaged in financial matters for many years. In 1890 he was appointed superintendent of banks by Governor Hill, and held this position for two terms. Subsequently he was successively president of the Equitable Securities Company, the Securities Company and the Kingston Consolidated Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (* indicates a project not previously reported.

RECENT INCORPORATIONS

***Danville, Kankakee & Crescent Traction Company, Crescent City, Ill.**—Incorporated to build an electric railway from Danville to Crescent City and Kankakee. Capital stock, $10,000. Incorporators: E. E. Meyers, George H. Clark, Louis Schwer, F. J. Nassels, U. S. G. Humphries, Henry R. Voigt, Fred. G. Nightingale and J. P. Sterrenberg, Crescent City.

***Cincinnati, Louisville, Lexington & Maysville Traction Company, Frankfort, Ky.**—Incorporated for the purpose of constructing an electric railway between Cincinnati and Lexington and another between Maysville and Louisville. The two lines would thus cross each other at Dry Ridge. They will aggregate about 250 miles in length. Capital stock, $10,000,000. Officers: W. T. S. Blackburn, Dry Ridge, president; J. Glascock, vice-president; John McCoy, secretary.

***Southwestern Ohio Traction Company, Cincinnati, Ohio.**—Incorporated for the purpose of forming a terminal for all the interurban lines entering Cincinnati by the construction of a combined elevated and subway line. The terminal is to be in the vicinity of Third Street and Smith Street, and the elevated section of the line would run from there east over Third Street to Martin Street; then around the hill at Eden Park and through a tunnel that would carry the tracks under Walnut Hills to Norwood. A branch line would connect with the Cincinnati, Georgetown & Portsmouth Railroad and the various branches of the Interurban Railway & Terminal Company which enter the city at Carrel Street. Headquarters, Second National Bank Building. Capital stock, $10,000. Incorporators: George B. Goodhart, Charles C. Benedict, William J. McCauley, C. B. Matthews and Harry T. Klein. John E. Bleekman is the promoter of the enterprise.

***Clinton (Okla.) Street Railway.**—Chartered to build a 10-mile street railway in Clinton. The Clinton Railroad Construction Company, with $10,000 capital stock, has also been chartered by the same people. Capital stock, $50,000. Directors: C. W. Goodwin, R. O. Hunt, M. L. Holcombe, Charles H. Lamb, E. N. Tittsworth, A. N. Curry, E. A. Humphrey and B. A. Little, Clinton, and H. Smith, Arapahoe, Okla.

***California & Centerville Street Railway, California, Pa.**—Application will be made on May 10 for a charter for this company, which proposes to build a street railway from California to Centerville. Applicants for the charter are: M. H. Francis, W. J. Weaver, H. C. Drum, Harris Booker and Joseph McLain.

***Finleyville Southern Street Railway, Finleyville, Pa.**—A charter will be asked for by this company to build a 14-mile electric railway from Finleyville to Bentleyville. The route is practically that of the old Pittsburg Southern Railroad, which was graded and never used. Promoters: A. H. Anderson, S. C. Wilson, F. M. Hayden, T. M. Hayden, J. E. Hayden and H. B. Hayden.

***Nashville & Crocker Springs Rapid Transit Railway, Nashville, Tenn.**—Incorporated to construct an electric railway from Nashville to Crocker Springs, a distance of 12 miles. It will connect with the Nashville Railway & Light Company's line at First Street. Engineers will be put in the field at once to make the surveys and contracts will be awarded within the next 30 days. Incorporators: Lee Guggenheim, president and general manager; W. F. Webb, vice-president; R. B. Jones, secretary; J. A. Witherspoon, James B. Carr, F. Roddy, W. W. Moorehead and Frank B. Marr. Headquarters, 302 First National Bank Building, Nashville.

FRANCHISES

Oakland, Cal.—A. W. Maltby and Joseph Napthaly, representing the Oakland & Antioch Railway, have applied to the Board of Supervisors for an extension of the company's permit to build lines through the Alameda-Contra Costa County tunnel. It is desired that the permit extend for 25 years, for which the applicant agrees to provide the floor, light and place safety gates on both ends of the tunnel. [E. R. J., Feb. 6, '09.]

***Santa Barbara, Cal.**—S. A. Moss has applied to the Board of Supervisors for a franchise for an electric railway from Manzanita station to a point above Coyote Creek.

Omaha, Neb.—The Nebraska Traction & Power Company has applied to the Douglas County Commissioners to extend its franchise so it can lay its rails across the Q Street viaduct over the Burlington Railroad Company's tracks, permitting it to connect its track with that of the Omaha & Council Bluffs Street Railway. [E. R. J., April 3, '09.]

Camillus, N. Y.—The Town Board has granted the Rochester, Syracuse & Eastern Railroad, Syracuse, a franchise to construct its railway across the northerly section of Camillus.

New York, N. Y.—The Board of Estimate and Apportionment has approved the application of the New York & Queens County Railway for a franchise to construct a connection between the tracks on Debevoise Avenue and Jackson Avenue, Queens Borough.

Cobourg, Ont.—The Town Council has granted a franchise to the Cobourg, Port Hope & Havelock Electric Railway to enter Cobourg. [E. R. J., Jan. 30, '09.]

Minot, S. D.—The proposition of granting a street railway franchise to Messrs. Graves and Kempers has been turned down by the people of Minot by a vote of 377 to 141.

TRACK AND ROADWAY

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded a contract to the Great Northern Aluminum Company, Montreal, Que., for 390 miles of aluminum wire.

Los Angeles & Mt. Washington Railway, Los Angeles, Cal.—This company advises that it expects to have its incline railway, connecting Mt. Washington with the Los Angeles street railway system, in operation by May 1. Current is purchased from the Pacific Light & Power Company. The equipment of the station on the summit of Mt. Washington consists of one 30-kw Westinghouse motor, direct connected to a Halliday grip, which in turn operates the cable. The third rail system is being installed. The line is narrow gage and about 3000 ft. in length. Two cars will be operated. The company owns a 10-acre park on the summit, where it will immediately erect a tourist hotel. All contracts for the construction of the railway have been awarded to the Llewellyn Iron Works, Los Angeles, with the exception of the contract for the roadbed, which has been let to the Mercereau Bridge & Construction Company. Office, 140 West Fifth Street, Los Angeles. Capital stock authorized and issued, $150,000. Bonds authorized, $60,000; issued $25,000. Officers: Robert Marsh, president; J. E. Marsh, first vice-president; John Howze, second vice-president; A. St. C. Perry, secretary-treasurer and general manager, all of Los Angeles. [E. R. J. Aug. 8, '08.]

San Joaquin Valley Electric Railway, Stockton, Cal.—This company is perfecting arrangements preliminary to beginning the construction of its proposed line to connect Stockton, Modesto, Riverbank and intervening towns, the idea being to complete the railway during the summer. The franchises and rights-of-way have all been secured, surveys have all been made, and the company will be prepared to receive bids for material about June 1. The line will be 44 miles long, standard gage, and six cars will be operated at first. The details of the power arrangements have still to be arranged. Stockton and Modesto are both trading centers, and it is estimated that upward of 50,000 people will be served by the line. Authorized capital stock, $1,000,000, of which $150,000 of stock has been subscribed; authorized bond issue, $1,000,000. Office, Savings & Loan Bank Building, Stockton, Cal. G. O. Broadhurst, Stockton, chief engineer; Morris L. Brackett, Stockton, Cal., and the Metropolitan Life Building, New York, vice-president. [E. R. J., Nov. 7, '08.]

Shore Line Electric Railway, New Haven, Conn.—This company has awarded a contract to Robert N. Ford, New Haven, for 65,000 ties.

East Pensacola City Company, Pensacola, Fla.—This company announces that it has awarded a contract to the Stone & Webster Engineering Corporation, Boston, Mass., for the construction of its proposed street railway, which is to extend from Pensacola to East Pensacola, a distance of one and one-half miles. Construction work is now under way. John E. Stillman, manager. [E. R. J., Feb. 27, '09.]

Cedarville, Ill.—Henry Richart, Cedarville, who is interested in the proposed 35-mile interurban electric railway from Freeport through Cedarville, Red Oak, Buena Vista and Orangeville, Ill., to Monroe, Wis., advises that a company has not yet been organized to construct the proposed railway. Meetings have been held in Cedarville and Rock Grove and committees appointed to confer with the Freeport Business Men's Association. [E. R. J., June 20, '08.]

Wood River, East Alton & Bunker Hill Traction Company, East St. Louis, Ill.—Announcement is made that this company has completed surveys and procured all rights

of way and franchises for its proposed electric railway, which is projected from Wood River to East Alton, Bethalto, Moro, Bunker Hill, Dorsey, Gillespie and Litchfield, a distance of 30 miles. It has not yet been decided when contracts will be awarded. Headquarters, East St. Louis. Capital stock, authorized, $100,000. Officers: J. T. W. Rudisell, president and general manager; R. E. Maney, vice-president; S. B. Knepper, secretary; R. M. Smith, treasurer; Rude Engineering Company, engineers, all of East St. Louis. [S. R. J., May 23, '08.]

Galesburg & Kewanee Electric Railway, Kewanee, Ill.—It is reported that this company plans to extend its line from Galva to Galesburg, Ill. R. H. Hayward, general manager.

Central Railway Company of Iowa, Clinton, Ia.—This company advises that it is now ready to receive bids on earthwork and bridges for its proposed 83-mile electric railway between Clinton and Dubuque. Thos. J. Wilcox, Clinton, president and general manager.

Iowa City, Ia.—D. A. Ruse, secretary of the Rundell Land & Improvement Company, holder of the local street railway franchise, informs the Electric Railway Journal that a new company, to be known as the Iowa City Electric Company, will soon be organized to construct the proposed street railway in Iowa City. It is probable that construction work will be started during the summer. [E. R. J., Sept. 5, '08.]

Corinth & Shiloh Electric Railway, Corinth, Miss.—Announcement is made that this company is negotiating with capitalists for the construction of its proposed railway, which is to connect Corinth and the United States National Park at Shiloh, a distance of 25 miles. It has not yet been definitely decided what the motive power will be, but is probable that electricity will be used. Officers: A. Rubel, president and treasurer; S. H. Rubel, vice-president and general manager; M. T. Byrum, secretary, all of Corinth.

Moberly, Mo.—Chas. A. Wellman, member of Manning & Wellman, Ottumwa, Ia., confirms the report that this company proposes to build an electric railway in Moberly and an interurban railway from Moberly to Huntsville, making a total of 8 miles. The promoters expect to furnish the sum of $40,000 and will require the same amount to complete the railway. Incorporation papers have not yet been filed. [E. R. J., April 10, '09.]

Nebraska Traction & Power Company, Omaha, Neb.—W. D. Crist, general manager of this company, writes it is planned to have the proposed eight-mile electric railway from Omaha, through South Omaha, Ralston to Pappillion, in operation within 30 days. Power will be purchased from the Omaha Electric Light & Power Company and transmitted to Ralston, where the company will build a substation. Two passenger cars and 10 freight cars will be operated. [E. R. J., April 3, '08.]

Trenton, Lakewood & Atlantic Railway, Trenton, N. J.—A deal has just been consummated by which Charles R. Le Compte, Harry J. Terwilliger, Ernest Le Compte, Nicholas MacDonald, Lakewood; James H. Butcher, J. Arthur Butcher, Ardena; Captain R. A. Clark, Point Pleasant, have taken over the property and franchises of the Trenton, Lakewood & Atlantic Railway. About 4 miles of the railway has been built between Point Pleasant and Lakewood. It is said that the new company will file articles of incorporation and will at once complete the line between Point Pleasant and Lakewood and extend it to Trenton, via Allentown.

Long Island Railroad, Long Island City, N. Y.—This company has recently placed contracts for the following construction work: Two additional tracks from Winfield to Jamaica, 8 miles; two track connections between the main line and Montauk division, 2 miles; freight connection between Montauk division and freight yards at Long Island-City, ½ mile; cross island line of the Huntingdon Railroad from Huntingdon to Amityville, 18 miles. Contracts have also been placed for 50 miles of third-rail construction for electric operation.

Malone, Ft. Covington & Hopkins Point Railway, Malone, N. Y.—A. A. Edwards advises that construction has been started by this company on its proposed 20-mile electric railway between Malone, Westville, Ft. Covington and Dundee, Que. A power plant will be built three miles north of Malone. The repair shops will be located at Malone. Capital stock authorized, $200,000. Officers: J. H. Scott, president and general manager; W. E. Smallman, vice-president; L. C. Haskell, secretary and treasurer; A. A. Edwards, superintendent and purchasing agent; W. Smith, engineer.

New York & North Shore Traction Company, Mineola, N. Y.—This company has filed a certificate with the Secretary of State, announcing the following proposed extensions of its electric railway: From Middle Neck road and North Hempstead turnpike, near Roslyn, to the easterly limit of the Borough of Queens. From Broadway in Little Neck to Tenth Street in Bayside. From Tenth Street and Broadway in Bayside to Bell Avenue, Bayside. From Tenth Street and Broadway, in Bayside, to the former village of Whitestone. The Public Service Commission of the Second District has given its permission and approval to the company to begin construction and operation of its railway in Mineola, and has also approved of a change of its route through that village.

Hickory (N. C.) Railway.—M. E. Thornton writes that preparations are being made for starting construction work on this proposed electric railway within the next two months. Plans are also being completed for the constructin of a hydro-electric plant on the Catawba River. It is the intention to have the railway completed to that point in order to haul the material and equipment for the plant. The railway will connect Catawba Springs, Newton, Brookford, Hildebran and Cliffs. A repair shop will be built at East Hickory. Capital stock authorized, $2,000,000; issued, $25,000. Bonds authorized, $7,000,000. Officers: M. E. Thornton, Box 443, Hickory, president and general manager; L. B. Buchanan, vice-president; B. F. Campbell, secretary; C. M. Blalock, treasurer. [S. R. J., Sept. 7, '07.]

Cleveland (Ohio) Subway Company.—This company has changed its name to the Cleveland Underground Rapid Transit Company, and in addition has asked for franchises which will enable it to connect the present Broadway station of the Nickel Plate Railway with the central part of the city and with the site of the proposed new union station for steam roads. It is rumored that the Nickel Plate tracks will be electrified and used to bring the interurban lines into the city. [E. R. J., April 17, '09.]

Toledo, Wabash & St. Louis Railroad, Toledo, Ohio.—It is stated that Louis Pilliod, Swanton, and Charles H. Nauts, Toledo, two of the original promoters, are forming plans for the reorganization of the company to the end that its purpose of establishing a through line paralleling the Wabash Railway between Toledo and St. Louis may be carried out. Considerable construction work was done in Ohio and between Maumee and Neapolis the grading, bridges and culverts were all completed. [S. R. J., May 11, '07.]

Zanesville & Meigs Valley Traction Company, Zanesville, Ohio.—This company, which proposes to build an electric railway from Zanesville to Beverly, announces that construction work will be started within six months. Estimates are now being made for financial interests. No contracts have yet been awarded. Headquarters, People's Savings Bank Building, Zanesville. E. R. Meyer, Zanesville, president. [E. R. J., Sept. 5, '08.]

El Reno (Okla.) Interurban Railway.—The Oklahoma City chamber of commerce, it is stated, has agreed to raise the sum of $50,000 for the El Reno Interurban Railway which proposes to construct an interurban electric railway between Oklahoma City and El Reno, a distance of 25.5 miles. It is the intention of the company to begin construction work as soon as the $50,000 has been subscribed. Henry Schaefer, El Reno, president. [E. R. J., Sept. 19, '08.]

Sapulpa & Interurban Railway, Sapulpa, Okla.—This company, which proposes to build an electric railway from Sapulpa, via Kiefer to Glenpool, has awarded the contract for grading to P. McNerney, Sapulpa; and the contract for bridges to the Kansas City Bridge Company, Kansas City, Mo. H. E. Clark, president.

***Brockville, Ont.**—At a meeting of the Town Council on April 13, a letter was read from T. M. Kirkwood, Toronto, asking the Council to agree to guarantee the interest on the bonds of a company for 20 years to an amount of $25,000 per mile for an electric railway from Toronto to Montreal.

London & Northwestern Railway, London, Ont.—D. A. Stewart writes that this company proposes to build an electric railway from London to Sarnia, passing through Hyde Park, Melrose, Lobo, Poplar Hill, Park Hill and to Grand Bend, a popular summer resort, a distance of 114 miles. It is the intention to begin work within six months. An application is now before the Ontario Legislature for a charter. The company plans to operate 15 cars and to erect a repair shop at London. The railway will be bonded for $30,000 per mile. Capital stock, $500,000. [E. R. J., Feb. 20, '09.]

Clarion & East Brady Electric Railway, Clarion, Pa.—G. E. Arnold, Clarion, writes that this company is now working on the preliminary survey for its proposed 25-mile electric railway, which is to connect Clarion, Sligo, Rimersburg and East Brady. The surveys are in charge of George S. Baton & Company, Pittsburg. It is the inten-

tion of the company to start the construction of its proposed railway within two months. [E. R. J., Jan. 16, '09.]

York (Pa.) Railways.—This company has recently awarded a contract to John W. Stahle to build the West Borough extension of its West Market Street line. The company is said to have purchased all the material necessary for this extension.

Georgetown Railway & Light Company, Georgetown, S. C.—H. C. Case, 2215 Land Title Building, Philadelphia, president of this company, which has taken over the holdings of the Georgetown Electric Company, writes that it is planned to take up the construction of the proposed local street railway during the summer. A franchise has already been secured. [E. R. J., Jan. 23, '09.]

***Newport, Tenn.**—P. C. Ottinger, Knoxville, is reported to be promoting a plan for an electric railway between Newport and Greenville, Tenn.

Gainesville, Whitesboro & Sherman Railway, Gainesville, Tex.—It is stated that this company will let construction contracts about May 1 for building its line, construction work on which was started two years ago. The line will be operated by gasoline.

Galveston-Houston Electric Railway, Houston, Tex.—This company has filed an amendment to its charter increasing its capital stock from $3,000,000 to $3,500,000. [E. R. J., March 13, '09.]

Ft. Worth, McKinney & Bonham Electric Railway, McKinney, Tex.—J. L. Lovejoy advises that this company has been organized for the purpose of building an electric railway from Ft. Worth to Bonham, via Fresno, McKinney and Blue Ridge. The company has not yet been incorporated. It has not yet been decided when contracts will be awarded. Officers: J. L. Lovejoy, McKinney, president; B. F. Pope, secretary; H. E. Smith, treasurer. [E. R. J., July 4, '08.]

Panhandle Electric Railway & Power Company, Spokane, Wash.—This company has filed amended articles of incorporation which provide for the construction of an electric railway from Priest River, Idaho, to Priest Lake, thence up the river to the Canadian line, while a line from Spokane to Priest River is also proposed. [E. R. J., June 27, '08.]

Wellsburg, Bethany & Washington Traction Company, Wellsburg, W. Va.—Announcement is made that this company has completed plans for a 7-mile extension of its railway from Bethany to across the State line to Avella.

Pan-Handle Traction Company, Wheeling, W. Va.—It is reported that this company has a plan under consideration for double-tracking its railway from Glennova to Wheeling.

SHOPS AND BUILDINGS

Tampa-Sulphur Springs Traction Company, Tampa, Fla.—This company plans to build an addition to its car house to be 80 ft. x 210 ft. It is also considering the purchase of a wheel press and boring machines.

Chicago & Southern Traction Company, Chicago, Ill.—This company advises that it has rebuilt the old power station of the Chicago Electric Traction Company into a car repair shop, fully equipped with tools for all kinds of motor and car repairs. The company expects to purchase one car wheel lathe for turning 36-in. steel wheels.

Delta Electric Light, Power & Manufacturing Company, Greenville, Miss.—This company has just completed a new car house and repair shop.

Schuylkill & Dauphin Traction Company, Williamstown, Pa.—This company has awarded a contract for an extension to its car house to be 40 ft. long.

POWER HOUSES AND SUBSTATIONS

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—This company is considering the purchase of 1150-kw and 1200-kw rotary converters. These will be second-hand and will be two-phase, 60 cycles, 2300-500-volt, direct current.

Western Ohio Railway, Lima, Ohio.—This company has purchased and will shortly install a 1000-kw generator in its power station.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—This company is now erecting a distributing lighting plant at Bethany Heights, which will supply this town with street lighting and also for business purposes. It will probably be completed by May 15. The estimated cost, according to the present plans, is about $4,500.

Long Island Railroad, Long Island City, N. Y.—This company advises that it expects to build three substations, at Huntington, Farmingdale and Winfield. Equipment for these stations has already been contracted for.

Manufactures & Supplies

ROLLING STOCK

Norfolk & Bristol Street Railway, Foxboro, Mass., will purchase four GE-1000 motors in the next few weeks.

Hagerstown (Md.) Railway has ordered one combination passenger and baggage car from the Cincinnati Car Company.

Pacific Electric Railway, Los Angeles, Cal., has ordered 50 50-ton steel underframe flat cars from the Pressed Steel Car Company.

Indiana Union Traction Company, Anderson, Ind., has purchased one 28-ft. closed motor car from the Dorner Railway Equipment Company, Chicago.

Illinois Central Electric Railway, Canton, Ill., has ordered one work car from McGuire-Cummings Manufacturing Company, Chicago.

Schuylkill & Dauphin Traction Company, Williamstown, Pa., has purchased four 10-bench open cars from I. S. Van Loan Company, New York.

Parsons Street Railway & Electric Company, Parsons, Kan., has bought three 10-bench open motor cars from the Dorner Railway Equipment Company, Chicago.

Goldsboro (N. C.) Traction Company, a proposed road, will be in the market shortly for from two to four motor cars. E. T. Oliver, manager, Goldsboro, N. C.

Chicago & Southern Traction Company, Chicago, Ill., has purchased one 4000-gal. sprinkler car from the McGuire-Cummings Manufacturing Company, Chicago.

People's Traction Company, Galesburg, Ill., is in the market for two trailer cars. The order for these cars will be placed through the Knox Engineering Company, Chicago.

Hagerstown (Md.) Railway has purchased one double-truck closed car from the Cincinnati Car Company, to be equipped with New York Car & Truck Company's No. 25 trucks and to be delivered May 1, 1909.

Walla Walla (Wash.) Valley Traction Company, reported in the Electric Railway Journal of Feb. 20, 1909, as contemplating the purchase of two cars, advises that these cars have been bought and are now in service.

Keokuk Electric Railway & Power Company, Keokuk, Ia., mentioned in the Electric Railway Journal of April 3, 1909, as being in the market for three 18 or 20 ft. car bodies, advises that it will purchase second-hand cars.

Sparta Electric Railway & Power Company, Sparta, Wis., through the Western Transportation Company, St. Paul, Minn., contemplates purchasing a General Electric gasoline-electric motor car and a McKeen motor car for use on its line when completed.

Northern Ohio Traction & Light Company, Akron, Ohio, is in the market for one city car and for one 52-ft. private car. The report that the order for the private car had been placed, as mentioned in the Electric Railway Journal of March 27, 1909, is denied.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., mentioned in the Electric Railway Journal of March 27, 1909, as having purchased five cars from the American Car Company, advises that these cars were ordered from the St. Louis Car Company.

Newton Street Railway, Newtonville, Mass., mentioned in the Electric Railway Journal of April 10, 1909, as being in the market for 36 motors, has purchased 30 GE-67 motors from the General Electric Company and six 101-B motors from the Westinghouse Electric & Manufacturing Company.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont., has purchased an additional 25-ton electric locomotive for freight service. It has also contracted to equip its entire rolling stock with Westinghouse automatic air brakes, and to change two of its cars from single-end to double-end cars.

Brooklyn (N. Y.) Rapid Transit Company, has placed an order with the Westinghouse Traction Brake Company, New York, for approximately 1000 AML and ATL air-brake equipments for motor and trail cars respectively. This means that, with the exception of the present compressors and pump governors, every portion of the air-brake apparatus of the equipment of the company will be replaced as promptly as operating and shop conditions permit.

Mason City & Clear Lake Railway, Mason City, Ia., mentioned in the Electric Railway Journal of April 17, 1909, as having purchased three cars, advises that it has

bought only two passenger, smoker and baggage compartment cars from the American Car Company, which are 57 ft. 3 in. over all and equipped with GE-73 motors and type M control. Forsyth curtain fixtures, Pantasote curtain material, Van Dorn No. 18 drawbars, Smith heaters, Winner seats and Brill No. 27-E2 trucks were also specified. Murphy Varnish Company's paint was used. In addition the company has bought three second-hand cars, which will be fitted up for freight service.

Galveston (Tex.) Electric Company, mentioned in the Electric Railway Journal of April 17, 1909, as having purchased 15 cars from the American Car Company through Stone & Webster, has specified the five cars of the Narragansett type to be 37 ft. 6 in. long over all, 30 ft. over corner posts, 36 ft. over dashers, 9 ft. 5 in. wide over all, and to seat 60. Other details of interest are:

Underframe, Z-bar sills, 8 in. x 3 in. x ½ in.	Gongs, P. Wall Mfg. Company
Brakes .... Sterling-Meaker	Motors ..... two GE-81
Ceilings, Indestructible Fiber Company	Paint ..... Masury
Controllers K-10	Registers .... International
Destination signs .. Hunter	Seats ..... Brill reversible
Drawbars, Brill-Hovey pattern	Varnish, Pratt & Lambert and Robt. I. Clark & Company

The other 10 9-bench open cars will be 30 ft. 2 in. long over all, 28 ft. 8 in. over dashers, 22 ft. 8 in. over bodies, 7 ft. ½ in. wide inside, 7 ft. 10 in. wide over all, and will seat 45. They will have a composite underframe and two GE-54 or 81 motors each. Other than the above modifications the cars will be the same as the 5 Narragansett cars.

Tide-Water Power Company, Wilmington, N. C., mentioned in the Electric Railway Journal of April 17, 1909, as having purchased four Brill semi-convertible cars and three closed cars from The J. G. Brill Company, has specified the closed cars to be 51 ft. over all, to have a body length of 40 ft. 6 in., a width over posts of 8 ft. 4 in., and a seating capacity of 68. Other details follow:

Brake Shoes, American B. S. & Foundry Company	Motors, two Westinghouse, No. 112
Bumpers...Brill Angle Iron	Seats .. Brill, pushover type
Ceilings ..... Agasote	Signal bells ..... Retriever
Couplers ..... Van Dorn	Trucks, type and make, Brill, No. 27-E1
Curtain fixtures ..... Acme	Wheels ..... Schoen
Gongs ..... Dedenda	

The semi-convertible cars will have bodies 20 ft. 8 in. long, with a length over vestibules of 30 ft. 1 in. and will be equipped the same as the closed cars except in the following details: Westinghouse 12-A motors, Winner seats, Brill No. 21-E trucks and cast-iron wheels. Besides these changes the four cars will be equipped with Peacock brakes and Dayton brake handles, Consolidated heaters and Neal headlights.

Central Pennsylvania Traction Company, Harrisburg, Pa., mentioned in the Electric Railway Journal of April 17, 1909, as having purchased 10 cars, has bought only 8 cars, which will all be of the semi-convertible type. Five of the cars will be 29 ft. 5 in. long over all, 8 ft. over all in width, will have 20-ft bodies, width inside, 7 ft., wheel base 7 ft., and seating capacity of 28. Other details of interest follow:

Height from top of rail to trolley board, 11 ft. 1 in.	Hand brakes.....Peacock
Body ..... wood	Heating system, Consolidated
Underframe ..... wood	Headlights .. Crouse-Hinds
Brakes ..... Peacock	Motors, Westinghouse 101-C
Curtain fixtures.. Burrowes	Registers .... International
Curtain material..Pantasote	Sanders ..... Dumpit
Drawbars ..... Brill-Hovey	Trucks, type and make, Brill No. 21-E
Gongs ..... Brill	

The three other cars will be 41 ft. 1 in. long over all, 8 ft. 2 in. wide, with a body length of 30 ft. 8 in. and an inside width of 7 ft. 11 in., a 4-ft. 6-in. wheel base and a seating capacity of 44. These cars will be equipped the same as the five cars mentioned above, except for the following: National A-4 air and Brill hand brakes, Brill 27 G-1 trucks, and National wheels.

TRADE NOTES

Case Manufacturing Company, Columbus, Ohio, has recently changed its name to the Case Crane Company.

Frank Ridlon Company, Boston, Mass., has removed its offices from 200 Summer Street to 251 A Street.

Chambers & Hone, New York, N. Y., consulting engineers, have removed their offices from 15 William Street to the 18th floor of 1 Liberty Street.

National Brake & Electric Company, Milwaukee, Wis., has moved its Chicago office from the fifth floor of the First National Bank Building to suite 1344 of the same building.

Picrome Hide Company, Syracuse, N. Y., has changed its name to Quride Company. The office and factory will still be located at Syracuse, N. Y. This company manufactures Quride covering for car seats.

Delta Electric & Manufacturing Company, 304 Commercial National Bank Building, Chicago, Ill., reports that it has received orders for the Universal non-inductive grounding device from some of the largest railways of the country.

Metal Finishing Company, Union City, Conn., has opened an office in New York City at 24 State Street. F. W. Brownrigg and A. M. Stevenson will be in charge. This company manufactures the Beardsley patent insulator pins, brackets, frog switches, etc.

Whiting Foundry Equipment Company, Harvey, Ill., has appointed L. G. Henes, representative of the company for cranes and foundry equipment, covering California, Nevada and Arizona. Mr. Henes will have his office in the Monadnock Building, San Francisco, Cal.

Standard Electric Accumulator Company, New York, N. Y., held a special meeting of the board of directors last week, at which the following officers for the ensuing year were elected: President, Thomas Nelson, Jr.; vice-president, James W. Johnson; secretary and treasurer, C. de Waal.

Duplex Non-Arcing Trolley Company, New York, N. Y., was recently incorporated with a capital of $2,000,000, to manufacture trolley wheels, harps and bases and other mechanical devices. The directors are Arthur O'Leary and Frederick J. Ryan, of Providence, R. I., and Walter R. Lee, of New York.

Liberty Manufacturing Company, Pittsburg, Pa., has discontinued its arrangement with the Advance Packing & Supply Company and made new arrangements with regard to the handling of its goods in Chicago by opening an office at 1201 Manhattan Building, which will be in charge of W. M. Burns and G. M. Porter.

A. M. Gilbert died on April 14, at Santa Barbara, Cal. Mr. Gilbert was formerly president of the Buda Foundry & Manufacturing Company, Chicago, Ill. About two years ago he retired from the presidency of the company and went West for his health. Mr. Gilbert was at one time connected with Fairbanks, Morse & Company, and previously was with the Crane Company.

American Brake-Shoe & Foundry Company, Mahwah, N. J., and Chicago, Ill., has established a manganese steel department in New York City, and is prepared to furnish manganese steel for mine car wheels, sheave rolls, crusher parts, etc. The company is now rolling manganese steel in rounds, flats and other shapes, and has well-equipped foundry, machine and grinding shops devoted exclusively to furnishing manganese steel in any shapes that may be desired.

Crocker-Wheeler Company, Ampere, N. J., has engaged Edmund Lang at its main office in Ampere, N. J., to take charge of its repair department. Mr. Lang was connected for a number of years with the Wheeler Engineering & Condenser Company, and more recently has given attention to other branches of power equipment. The company announces that the Carnegie Steel Company has added to its 1550 hp in Crocker-Wheeler Form W motors at its Duquesne plant three more motors of the same type aggregating 225 hp.

C. & G. Cooper Company, Mt. Vernon, Ohio, shipped on March 4 to the Tennessee Coal, Iron & Railroad Company, Ensley, Ala., a 42 and 78 x 54 cross-compound condensing Cooper Corliss engine which required 15 cars for its transportation. Delivery of this engine was promised in four months, but was made fully 40 days ahead of time. This engine will drive a 2500-kw Crocker-Wheeler alternator. A similar engine now being completed for the Packard Motar Car Company, Detroit, Mich., will drive a 25,000-kw Western Electric d. c. generator.

R. W. Hunt & Company, Chicago, Ill., consulting engineers, have recently announced that they are planning to make a specialty of reports and valuations of steam and electric railroads, light, heat and power plants. These valuation reports are useful in determining stock and bond issues and for the purchase of properties. The organization which R. W. Hunt & Company have built up in their extensive work of inspecting and valuing railroad materials and equipments, and their extended experience with valuation of industrial plants, fits them especially for undertaking the valuation of railway systems.

A. Eugene Michel, who has for the past three years been manager of the Geo. H. Gibson Company, advertising engineers, has just opened new offices at 1572 Hudson Terminal Buildings, New York. Mr. Michel will in future confine his efforts as an advertising engineer to the promotion of steam specialties and apparatus, power transmission appliances and machine tools, and will limit his clientele to the number of firms to whose work he can give personal attention. Mr. Michel is a graduate engineer, associate member of the A. S. M. E., and has had 11 years of advertising and engineering training, which includes practical experience in machine design, testing, etc. Among the accounts which he will handle are the following: The Watson-Stillman Company, the Bird-Archer Company, the Diamond Chain & Manufacturing Company, and James Beggs & Company.

Western Electric Company, Chicago, Ill., reports that its business for March made a better showing than any of the preceding months of the fiscal year, which began Dec. 1, 1908. It is said that in contrast with the period in 1906, when the electrical business reached its greatest expansion, the present rate of operation is still far behind, but in comparison with the same period a year ago the improvement shown is striking. March sales were at the rate of about $48,000,000 a year, and the rate for the four months ended with March was about $45,000,000 a year. The company is still increasing the number of its employees, having added to its force about 2000 men since Dec 1, 1908. It now is employing in all about 17,000 persons. The additions to the Hawthorne plant are being pushed ahead and will be complete this summer. Foreign returns have been received for December and January, but they show a slight increase in comparison with December and January, 1907-'08.

Ward S. Arnold has become connected with the electric railway interests of the Westinghouse Electric & Manufacturing Company in the Middle West, and also the steam turbine sales department of the Westinghouse Machine Company. Mr. Arnold will make his headquarters in Chicago, but he will also assist the Minneapolis, Kansas City, St. Louis, Cincinnati, New Orleans and Dallas offices of the Westinghouse Electric & Manufacturing Company in railway work. Mr. Arnold, who is a brother of B. J. Arnold, the consulting engineer, and of W. L. and R. G. Arnold, of the Arnold Company, has heretofore been connected with the General Electric Company, the Stanley Electric Manufacturing Company and the Bullock Electric Manufacturing Company, always in the railway field. Since 1904 he has been engaged in the contracting business with George Townsend, formerly of Townsend, Reed & Company, of Indianapolis. During the last five years Messrs. Arnold and Townsend have built among other electric roads the Indianapolis & Western, now a part of the Terre Haute, Indianapolis & Eastern, and the Niles-St. Joseph (Mich.) extension of the South Bend & Southern Michigan Railway Company. Mr. Arnold is familiar with all branches of electric railway work, including engineering, construction and financing, and he cannot fail to prove a valuable acquisition for the Westinghouse interests.

Philip G. Gossler, vice-president of the J. G. White Company, is resigning his active connection with that corporation, and from June 1 will be associated with the well-known banking house of A. B. Leach & Co. in a special consulting and administrative capacity. This marks a distinctly new departure in the relations between financial houses and engineers, in that it places with the financial interests as a member of their own organization an engineer capable of passing authoritatively on all the engineering questions that come up in connection with the acquisition, development and operation of public utility properties. Mr. Gossler, ever since his graduation from the Pennsylvania State College in 1890, has been actively engaged in the fields of electric lighting, power and traction, and has made a most enviable reputation. At the beginning of his career, connected with the Edison General Electric Company, he joined the staff, soon after, of the United Electric Light & Power Company of New York City, and took up central station work. In 1895, he went to Montreal, where he became general superintendent and electrical engineer of the Royal Electric Company, whose remarkable growth is one of the features of the electrical industries on this continent, especially with regard to the utilization of water power, long-distance transmission, and original methods of selling current. While in Canada Mr. Gossler was president of the Canadian Electrical Association, and contributed during the period a number of important papers and discussions to engineering bodies. Since his connection with the J. G. White Company he has been actively engaged in consolidating and directing a number of electrical companies. Mr. Gossler will continue his connection with the J. G. White Company and with these various properties, such as the Eastern Pennsylvania Railways Company, as director, etc. The esteem and affection in which he is held by his present associates are attested by the complimentary dinner given him this week by the officers and staff of the White company.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued a list of second-hand electrical machinery which it has for sale.

The Metal Finishing Company, Union City, Conn., has just issued a new bulletin, No. 100, on insulator pins, brackets, etc.

MacGovern, Archer & Company, 114 Liberty Street, New York, has just published its new list of materials on hand for railways, power plants, etc., dated April, 1909.

Dean Brothers Steam Pump Works, Indianapolis, Ind., have printed two interesting color plates illustrating typical simple and duplex pumps of their manufacture.

Wicks Brothers, Saginaw, Mich., show in their April stock list a large variety of steam boilers, engines, heating machinery, condensers, feed-water heaters and electrical machinery.

Ohmer Fare Register Company, Dayton, Ohio, has published in pamphlet form facsimiles of commendatory letters on the Ohmer register received from many prominent electric railways.

Canton Culvert Company, Canton, Ohio, has issued a pamphlet on its "No-Co-Ro" metal, which is especially recommended for culverts because of its strength and non-corrosive qualities.

Arthur S. Partridge, St. Louis, Mo., has printed Schedule No. 28, showing a number of open cars available for immediate shipment, together with lists of engines and generators suitable for railway stations.

Weston Electrical Instrument Company, Newark, N. J., is sending out a novel postcard under the head of Weston Correspondence School, "Course in Economics," and relating to the low maintenance cost of Weston instruments.

Charles F. Johnson, Cleveland, Ohio, has just printed List No. 70, which shows a large amount of miscellaneous generating and motor apparatus for railway purposes, including transformers, electric and steam locomotives, cars and rails.

Allis-Chalmers Company, Milwaukee, Wis., has issued a bulletin on two interurban and electric railways which it has equipped. These are the Winona Interurban Railway and the Indianapolis, Crawfordsville & Western Traction Company.

Joseph Dixon Crucible Company, Jersey City, N. J., has published several interesting articles in its April number of *Graphite.* Among these articles are "The Melting Points of Lubricating Compounds" and "How Graphite Lubricates."

Industrial Instrument Company, Foxboro, Mass., is distributing Bulletin No. 22, describing its standard electric time systems for industrial plants. This company has also printed some pamphlets on its standard gages and the Eclipse oil filter.

Hess-Bright Manufacturing Company, Philadelphia, Pa., is distributing sheets 33 and 34 of series 336 showing respectively the various ball-bearing mountings for automobile-driving sprockets and ball-bearing mountings for electric motors and journals.

Buda Foundry & Manufacturing Company, Chicago, Ill., has just issued the 1909 edition of its comprehensive general catalog No. 127. As in the past, this catalog presents detailed descriptions of a great many railway tools and supplies. It contains more than 300 pages.

Veeder Manufacturing Company, Hartford, Conn., has reprinted in pamphlet form a paper on tachometers, presented at the December, 1908, meeting of the American Society of Mechanical Engineers. This company has also prepared Booklet No. 14, on Form C tachometers.

Duff Manufacturing Company, Pittsburg, Pa., has published a catalog describing the "Duff-Bethlehem" forged steel hydraulic jacks, which are forged entirely of steel. The catalog lists a large number of types and capacities and gives other information for ordering this apparatus.

Rossiter, MacGovern & Company, Inc., New York, N. Y., has just issued their April list of apparatus for immediate delivery to electric railway companies. This issue lists a large number of a.c. and d.c. motors, generators, rotary converters, electrical instruments, transformers, railway motors, steam engines and boilers. The company also has a number of closed and open cars for sale.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MAY 1, 1909 No. 18

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
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Single copies.....10 cents
Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum
CANADA: extra postage.....$1.50 per annum

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Separate Cars for Women

When there is plenty of room for everybody no great delay or detriment to the service of a transportation company results if there are separate accommodations for different classes of passengers, because if any person finds himself in the wrong part of the car or train he can move to the other. But as soon as the car or train becomes crowded, delay and confusion are inevitable in any plan of segregating the passengers. This is shown in the slowness with which the ordinary type of open cars, with cross benches, are loaded, because people run forward and back searching for satisfactory accommodations before entering the car. The same condition will be found in any plan to supply separate cars for women. In a letter which we publish elsewhere in this issue, the author shows that the cars of this kind used on the Hudson & Manhattan Railway are not favored by the women themselves, and in the hearing on the question of requiring the Interborough Rapid Transit Company to operate similar cars in the New York subway, considerable opposition developed from the women themselves. The plan also undoubtedly presents the serious drawback that some men would be more reluctant to give up their seats to women if they knew there was a separate car for them in which there might be seats in the rear of the train. Altogether the proposition does not seem to be particularly feasible, nor one for which there is serious demand.

The Convention at Denver

It is finally settled that Denver will be the convention city for 1909. When Denver was first suggested, a little more than a year ago, as the convention city for the 1908 convention, the plan aroused a great deal of enthusiasm. The National Electric Light Association met in Denver in 1905 and at that time held one of the largest and best conventions in its history. The industrial depression last year, however, made it seem inadvisable to the executive committee of the American Street & Interurban Railway Association to hold the convention so far west, and Atlantic City was chosen for the second time. The members of the convention committee who visited Denver a year ago were greatly impressed, however, with the many advantages which Denver possessed as a convention city as well as the desire of a great many members of the association to hold a convention in the Rocky Mountain district, and the city immediately became a strong possibility for 1909. The visit of the committee last week confirmed all that the previous committee had reported as to Denver. The new auditorium is ideal for the exhibits and for the meetings; the hotel accommodations in Denver are ample; finally, the local railway system is highly efficient and its inspection is well worth a trip across the continent to railway men who wish to study new ideas and methods. The scenic attractions around Denver are unsurpassed by any city of equal size in the country. Although Denver may seem somewhat far away to those on the Atlantic Seaboard, it is no farther distant from the cities in the great Mississippi Valley than is Atlantic City and is practically midway, in point of time, between New York and San Francisco. The 1909 convention should attract not only a very large number of attendants from the Pacific Coast, Southwest and Middle West, but also from the East. The decision to meet in Denver is the best that could be made.

Satisfactory Service on Long Island

The Long Island Railroad was the first steam railroad company to change over a considerable portion of its line to electric power. The electrical equipment has been in operation now about four years, or long enough to determine whether the service is satisfactory. It is gratifying to note therefore that President Peters of the Long Island Railroad Company heartily endorses the system in his report for the year ended Dec. 31, 1908. In addressing the stockholders, he says:

The extension of electric service from Queens to Hempstead was put in service on May 26, and all train service to Hempstead Branch has since been operated by electric power. The results therefrom are very satisfactory both in economy and increased business and it may be here noted, that the general results on that portion of your system which has been electrified fully justify the expenditure made in accomplishing that result.

We regret that the financial and other statistics of the Long Island Railroad are not so divided that it is possible to determine the performance of electrical equipment or the amount of the repairs per car-mile. We trust that next year the detailed information which characterizes the reports of this company will be so divided that the satisfactory results to which Mr. Peters refers will be easily evident.

A Generous System of Transfers

The *Electrical Review* of London, in speaking of the agitation for increased street railway fares in this country, stated in a recent issue: "We think it quite wonderful that the vast street tramway systems of the States have been able to avoid universal bankruptcy under the burden of the 5-cent fare and a preposterously generous system of transfers." To amplify the foregoing statement, it might have been added that some of the systems in this country have failed to avoid bankruptcy and that it has been shown that the tendency of others is plainly toward the same regrettable destination. The reasons why this is so have been stated many times in the issues of the Electric Railway Journal and are familiar to those who have followed closely the development of the urban traction industry from its early simple stages to the present time, when the problems attendant upon operation are many and complex. In some cities, as on Manhattan Island, the transfer privilege has been extended so far during the last few years, as public appreciation of its manifest possibilities for abuse increased, that it has been practically beyond control. While this condition has been remedied in New York City by the segregation of various lines, it is still causing a dissipation of assets on the railway systems of other cities which managers should take pains to terminate before the damage is irreparable.

A Discussion by Judge Gaynor

The solution of the New York transportation problem will not be assisted by the contribution from Judge Gaynor in the current issue of *Pearson's Monthly*, and those who take all of this article seriously will be as misled as were the residents of Brooklyn who some three years ago acted upon the author's advice and tried to ride from Brooklyn to Coney Island for 5 cents. Judge Gaynor thinks that in spite of the fact that the Interborough Company pays the interest on the bonds of the city required to build the subway and also 1 per cent additional to retire those bonds at the end of the 75-year lease, the city will find at that time it is in the possession of a gold brick. He goes on to say: "Napoleon Bonaparte had been dead about 75 years the day the subway was opened," and the changes wrought since that time indicate to the Judge that at the termination of a similar period from the opening of the subway it will be obsolete or practically so. Does the Judge think that people will not wish to travel then? Or will they use aeroplanes? The possession of the only available subway space under the principal artery of travel in New York City ought certainly to be of as great value in 1975 as at present, unless the precedents of other railroad companies and practically every other possessor of real estate in large cities counts for nothing. We wonder whether the New York Central Railroad would surrender its Park Avenue entrance to Forty-second Street for its original cost.

After a contemplation of this and other conditions, Judge Gaynor suggests that governmental control and operation seem the only refuge. But even here, he thinks, there is danger. According to the article, one little ferry to Brooklyn which was recently purchased by the city of New York is being run at an annual loss of $313,000. For the land and appurtenances $750,000 was paid by the city, whereas their assessed value for the purpose of taxation was only $183,000. And he pertinently asks: "Was this property assessed at only one-quarter of its value through official favoritism, or was four times its value paid for it?" We believe that if Judge Gaynor searches farther he will not find the facts of private ownership so black as he has depicted them; that the Third Avenue Railroad, for instance, has some other assets to show for its $48,560,000 of capitalization than 34 miles of track; that the $60,000,000 capital stock of the Metropolitan Elevated Railway Company (we presume he means the Manhattan Railway Company) is not all "paper stock"; that the average ride in American cities per average fare paid compares very favorably in length with that given in European cities, and finally that the arrangement by which New York obtained the construction of the subway when its building seemed hopeless and will secure the property at the end of the lease without any expense for investment or interest, is a profitable one for the city.

Side-Door Cars in New York

The question of whether a side-door car should be used in the New York subway has now been changed to that of which design of side-door shall be used. Precedent does not seem to afford much guide in the matter, partly because the traffic in the New York subway is much greater than in any other, and partly because two different kinds of service are given in the subway. One of these is that on the express tracks and the other that on the local tracks, so that the company has really to provide rolling stock for two double-track roads each having different conditions. The most important of these differences is the shape of the station platforms. Those of the express stations between Ninety-sixth Street and the Battery are so nearly straight that it is possible to use a center-door car at them, but at many of the local stations between and beyond these points

the use of center-door cars is out of the question because the platforms are curved. The company and the commission's engineers have then to decide: (1) whether a standard car should be adopted to give improved loading and unloading facilities at all stations or (2) whether only the express service need be considered. It is not until this question is settled that the problem of the best type of car can be determined. As readers of this paper know, the railway company advocates the center-door car on the theory that if the crowding and length of station stops at the express stations are reduced the principal part of the problem is solved. Mr. Arnold, on the other hand, still favors the double end-door car, partly because it can be used at all stations, and partly because he considers it more desirable even for the express tracks.

The new center-door train, which has been built by the Interborough Company and was put into service this week, will be of interest to car designers everywhere because it differs radically from the Boston, Brooklyn Bridge, or any of the European center-door cars. The first change from previous models is that a barrier waist-high will extend to the aisle from the middle of the center opening on each side. The effect of this barrier is in a sense to divide the car into two compartments, each with a door near the center of the car; the object of the plan is to discourage persons from standing in the doorway. The company has found that where there is a wide doorway some passengers insist upon standing on each side of it and thus make it of little or no greater practical value than if it was narrower. But with two narrow center openings, anyone who attempts to stand in the passage when the car stops will be apt to find himself carried out on the station platform by the departing crowd. Another point in which the car will differ from some center-entrance cars is that no attempt will be made to differentiate between entrances and exits. Barriers will not be erected in all of the cars of the experimental train, however. One car will have a single wide center door to test its serviceability.

Education and Industrial Progress

Two of the most striking developments of the past few years in educational matters have been the increased interest taken in education by the technical associations of the country and the close relations which exist between the large industrial and public service corporations of the country and the technical schools and colleges. The present conditions reflect the changes made during the past 20 years in business conditions and in scholastic methods. These changes can be briefly summarized as follows: (1) The schools have established curricula which far better adapt their graduates to the requirements of industrial life than ever before. (2) Business methods themselves have come to be conducted on a more scientific basis and engineering problems now constitute a very important part of practically every line of industry. Finally (3), it is by no means uncommon now to find in positions of responsibility of the large organizations of the country men who have graduated from technical schools during the past 20 or 30 years, or since instruction in engineering problems and methods has become general. These men realize the value of being surrounded and assisted by others who have acquired the mental discipline and knowledge which the technical school or college gives. Hence a degree from either of these institutions is now a larger asset than ever before in any application for employment; indeed in some cases it is a pre-requisite. The day when it was a common saying that the graduate must forget all he learned in college, before he was any good in business, has passed.

The recognition of such a training as a desirable preparation to business life extends even to mercantile enterprises in a way which would not have been thought possible 40 years ago, when theology, law and medicine were considered the only learned professions. One of the most important recent acts of President Eliot of Harvard was the establishment, at that ancient seat of learning, of a post graduate course in "business." The principles upon which this course is patterned are very similar to those followed in the study of engineering at the leading technical schools of the country.

The engineering professions and schools, however, were naturally the first to secure the benefits of this happy close alliance between the institutions of learning and the active workers in the field, between the theoretical and the practical, and the technical associations have become the medium by which these two branches have been and are being brought together. Practically all of the important technical associations have now special committees on education and devote meetings to papers and discussions dealing with educational subjects. The work of the committees is to arrange for these meetings and also to keep the members of the association alive to the vital relation between their work and that of the schools. In this line of endeavor the American Institute of Electrical Engineers has perhaps gone further than any other body. Its last meeting on education was held April 16, when the subject of industrial education was discussed, and at the coming convention an entire afternoon will be given over to the same subject.

The Electric Railway Committee on Education

The establishment of apprenticeship courses by the steam railroad companies of the country shows that they have recognized for a long time the value of training a corps of men to take responsible positions in their operating organizations. Among those who are now directing the affairs of steam railroad companies there are many who are graduates of the railroad courses established at Altoona and elsewhere. It was on account of the successful results attained through these courses as well as in the electrical and gas industry that the American Street & Interurban Railway Association, at the suggestion of President Goodrich, decided last year to appoint a special committee on education. There is every reason to believe that the scope of this committee's work in the electric railway industry will be as broad and the advantage to be secured from it as great, if not greater, than in any of the other fields mentioned. The committee presented a preliminary report last year and is now actively preparing to make a good showing at the coming convention.

A tangible evidence of the work of the committee is the data form which has just been sent to the members. This is the result of a careful consideration of the relations

of the railway companies, their employees and the schools. The members of the committee believe that it is financially profitable to all if all of the elements are understood. Even more important is the spirit of co-operation and loyalty which is fostered when the employees feel that their employers desire to increase their efficiency and promote their general welfare. As the data blank indicates, there are two more or less distinct classes among the ambitious employees in a railway organization: (1) That comprising young men who have the qualities for executive work and who need only the proper training to bring them to the full possession of their faculties; and (2) that comprising young men who are naturally adapted to mechanical pursuits and who aim to be as perfect in their trades as possible. It is the highest kind of wisdom on the part of general managers and superintendents to encourage every ambitious young man in their employ to make the utmost of himself. Such encouragement will reflect on the man who gives it and it will create the strongest ties between his subordinates and himself.

As the committee on education understands its duties, these are to formulate such plans as seem to its members expedient and practicable and to carry out those which appeal to the association as most desirable under existing conditions of finance and executive force. At present the most promising field of activity appears to be in stimulating interest in some kind of apprentice or cadet corps such as have been found so profitable by the manufacturing companies. Something has been accomplished in this field, as the annual report of the committee will show. But the cadet corps is limited in its possibilities. Its function is to produce executives, and only a limited number of these are needed. Further, but a comparatively small proportion of the young men in such corps will have the talent for executive work. There still remains the larger problem of assisting and stimulating the rank and file of the coming electric railway mechanics and operatives. For these the committee tentatively suggests a correspondence course similar in purpose to that of the American Gas Light Association. This is based upon the belief that the every-day surroundings of the shop, the power house, the car house, etc., may be made to furnish a substitute for the laboratory and the school drafting room. All that is needed is intelligent observation and suggestive direction. Willing and competent teachers are available in foremen, superintendents and better-educated fellow-workmen. If a disinterested agency, such as the association, can be used to furnish the external stimulus needed, the other agencies mentioned will do the rest. Of course, there are practical difficulties in the way of this plan, but undoubtedly if the members think it should be done these difficulties can be overcome. At any rate, the plan deserves consideration before, during and after the convention.

A. C. vs. D. C. Again

The May *Proceedings* of the American Institute of Electrical Engineers contain the now somewhat belated report of the discussion of Mr. Murray's paper on the New Haven electrification, read before the Institute Dec. 11. A synopsis of the oral discussions was printed in the Electric Railway Journal for Dec. 19, but the published report shows several additional contributions to this discussion which did not appear in the technical press at the time because they were sent in after the meeting. Among these late contributors are advocates of both the direct- and alternating-current systems, who hasten to throw another wreath (or shaft) before the tourney lists are closed. Three contributions to the discussion come from abroad: two from Great Britain and one from Sweden.

We shall not attempt here to discuss all of the points brought out by these latest remarks on the subject of this paper, the most actively debated of any before the Institute for many years. In reading them over, however, we cannot but feel that some of the critics of alternating current apparatus, in condemning its lapses, have failed to recall the early traction experience with direct-current apparatus. All that is now more than a score of years ago and time has softened many blows. To the best of our recollection, however, the victory was not won without blood and occasional retreat and the burial in the scrap heap, "unwept, unhonored and unsung," of many a device sent to the front with confidence and cheers. Indeed, had the engineers of divers early electric street-car lines set down the whole unvarnished truth in an open log book and appended to it a rigorous statement of costs, we greatly doubt whether electric traction would be as far advanced as it is to-day. It is no reflection upon the courage, ingenuity and ability of the engineers of all of those pioneer railways, and detracts no jot or tittle from the credit and honor which are due them to say this, or to admit that the record of those days would show a line of troubles at least equal to any that Mr. Murray has yet been able to report. The times when "Drop a nickel in the slot and see the trolley come off" was a common gibe have happily passed away and things go more smoothly, as we trust in due season they will go—in fact, largely have gone—on the New Haven railroad.

There is no dodging the fact that the a.c. motor of the commutating type is heavier for its output than a d.c. motor. But that in other respects it cannot be made thoroughly effective we are disposed to doubt. The trouble most to be feared, bad commutation, seems not to have developed and the general motor troubles show no signs of being more numerous than would be expected with any radically new type of machine and none of them is in the least grave so far as has yet appeared. That the whole New Haven locomotive equipment is intricate and costly admits of no dispute, but this is mainly due to the necessity of having to equip for d.c. operation in the terminal territory. The actual extra cost of the a.c. equipment as such is a far less serious matter. The New Haven electrical equipment is steadily getting into smoother operating form and the service shows very satisfactory improvement. So far as reliability is concerned it is already superior to the steam operation that it has supplanted. It has proved a serious task to bring it into operative condition and perhaps some of those who have criticised the system could have foreseen and avoided some of the difficulties, yet the system has to all appearances come to stay. That it needs improvement and will be improved we have no doubt, but not by the way of substituting in its place direct-current equipment.

Improvements in Air Brakes

At the last meeting of the New York Railroad Club W. V. Turner and S. W. Dudley presented a very voluminous paper outlining the improvements which have been made recently in air-brake apparatus for high-speed trains. While the authors dealt especially with the types of equipment designed for steam passenger trains, some of the facts presented are interesting to electric railway managers, because the improvements made have appreciably increased the braking power at very high speeds and make it possible to maintain this power to the end of the stop. The authors emphasize the point that brakes are more than a mere safety device. Their function is as important as the function of the locomotive or other propelling power. Modern high-speed brake apparatus is vastly more powerful than any steam locomotive or electric locomotive which has yet been built. The brakes will absorb and dissipate the energy of a train moving at 60 m.p.h. in about one-twentieth the distance required for the train to accelerate from rest to that speed. The prediction is made in the paper that it will not be long before electric locomotives are built which will accelerate an ordinary passenger train to a speed of 60 m.p.h in not more than one minute. If it is worth while to consume tremendous amounts of power in accelerating thus rapidly and to build locomotives of the weight and size required to give this acceleration, it is equally worth while to work further improvements in the braking apparatus. A gain of one second in accelerating to a given speed is worth no more than a gain of one second in bringing the train to a stop.

Aside from their effect in shortening running time, powerful brakes are, of course, one of the best and most indispensable safety appliances. Their value in preventing collisions can be measured in tenths of a second. The improvements outlined by the authors of the paper have resulted in bringing about a reduction of 320 ft. in the distance required to bring a 10-car train to a stop from a speed of 84 m.p.h. The resulting gain is perhaps more strikingly presented by the statement that at the point where a train with the new apparatus would be stopped a train with the old brake equipment would still be running at a speed of 30 m.p.h.

The new equipment described makes possible an average retardation of 2.8 m.p.h. per second from a speed of 84 m.p.h. The retardation at the end of the stop has about reached the maximum possible with the usual ratio of braking force to braking weight of 90 per cent, running up to 9 m.p.h. per second. Room for further improvement seems to lie only in improving the efficiency of the brakes at the beginning of the stop, when the coefficient of friction between the brake shoes and the wheels is less than half that at the end of the stop and the retardation is correspondingly low. If it were not for the necessity of making air-brake apparatus "fool-proof," much higher braking pressures might be employed to advantage, at least at the beginning of the stop. It will be remembered that the standardization committee of the Central Electric Railway Association last year recommended a maximum ratio of braking force to braking weight of 240 per cent. The members of this committee had in mind, presumably, some plan of bleeding off the pressure in the brake pressure as the speed decreased, in order to reduce this ratio to something near 100 per cent at the end of the stop. So far as we know, no experiments of this kind have yet been tried by any members of the committee.

Classifying and Indexing Technical Information

Several recent articles in this paper on the subject of classifying and indexing the articles published in technical papers have elicited two interesting letters, which are published in our correspondence department this week. As Mr. Herrick says, next best to knowing something is to know where to find it and this is the object of all systems of indexing. The better they assist in locating information, other things being equal, the better they are.

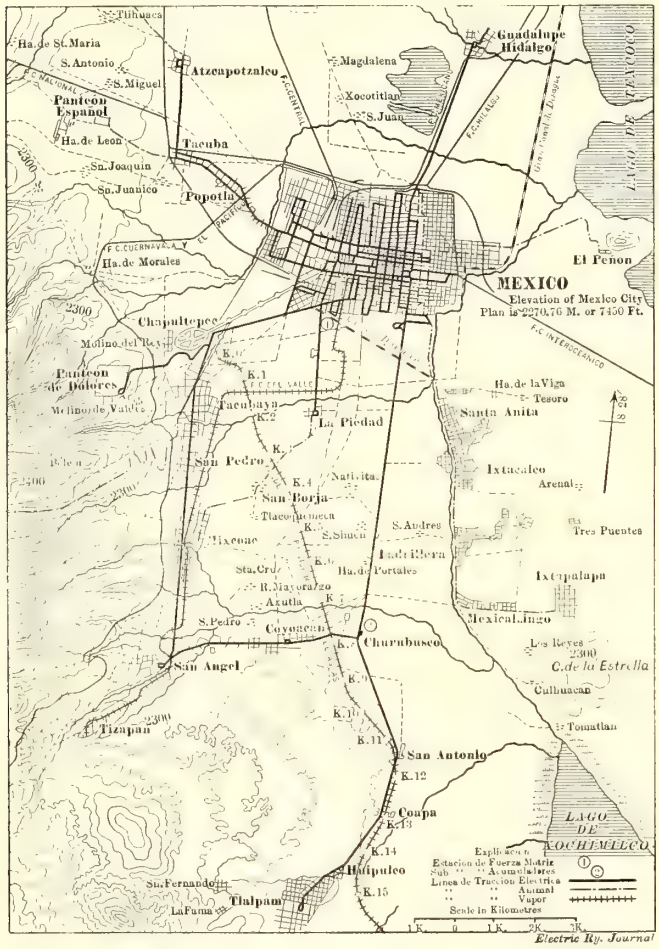
The electrical industry is growing so rapidly that for authoritative literature on the subject one is forced to look to technical papers. As with any industry in which the conditions are rapidly changing, a book can hardly be published before it becomes obsolete. Hand books with furmulæ, dimensions and weights of equipment and other fundamentals can be made of fairly permanent value, but even they have to be frequently revised to be anywhere near up to date. Books on practice possess even more of an ephemeral character. New methods and new apparatus are constantly being devised to take the place of the old, and while acquaintance with the latter is often necessary, complete knowledge requires familiarity with the present as well as the past. It is this constantly changing element in electrical matters which makes a record of events and progress essential to the up-to-date manager and engineer.

Mr. Herrick refers at some length to the Dewey decimal system of classification. This system, as is generally known, has been adopted in most libraries and is a method of classifying all knowledge by numerals. Its chief advantage is that it is capable of indefinite expansion by the use of suffix numbers to distinguish the subdivisions in the main Dewey classification. It may not, however, be generally known that the International Railway Congress, with headquarters at Brussels, Belgium, has elaborated the system to cover steam railroad operation and that the engineering department in the University of Illinois has done similar work in the electrical field. Mr. Herrick has applied the Dewey system to his methods of classifying clippings in the electric railway field and by this means has secured 1600 index heads with, of course, an opportunity of increasing this number without disturbing the general plan. He has also employed a system for filing clippings which is novel.

In addition to the methods described, it might be said that most large firms of consulting engineers provide, as part of their operating organizations, facilities for digesting and recording the technical literature relating to the subjects in which they are most interested. Many financial institutions and manufacturing companies follow the same plan. Individual methods of conducting this work will necessarily vary as they are shaped to suit individual conditions. But the fact that both correspondents this week have developed the elaborate systems which they describe indicates that there is a demand for some purposes for a more complete record than can be supplied by combining the publishers' indices or by the indices of current engineering literature now on the market.

CONDITIONS OF ELECTRIC RAILWAY OPERATION IN MEXICO CITY

Some of the first impressions made upon the visitor to Mexico City soon after his arrival at that capital are that he has been taken back to medieval times, when men rode astride of asses, carried their burdens on their backs



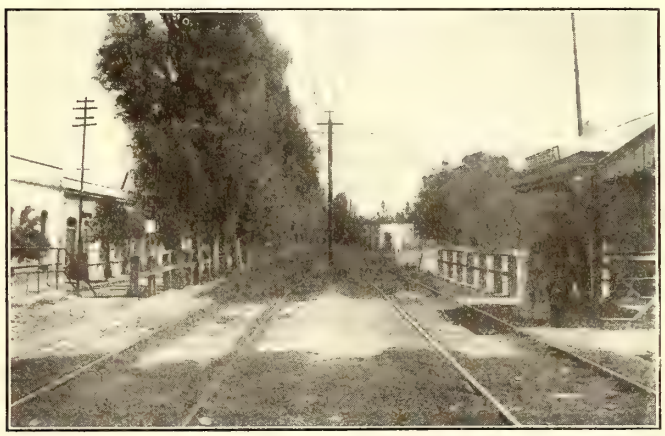
Mexico City Tramways—Map of City and Suburban Lines

and lived in mud huts, for it is a fact that the lower classes of Mexico still practice these and other customs which are hallowed by age. A closer inspection, however, will show the traveler that he is in a modernized ancient city, that most of the people ride in up-to-date electric cars, and that freight, especially building material, is largely carried by electric cars which run over the same tracks as the passenger cars. Even the funerals are in charge of the tramways company. In fact, the electric railway in Mexico City enters more intimately into the life of the citizens of the Aztec capital than probably any other of the improvements which have been introduced into this ancient modern city within the last 100 years. The Mexican is dependent upon the tramway in his daily business life; it enters into his pleasures because it conveys him to and from his bullfights, his chief source of amusement; it enables him and his family to attend any or all of the innumerable festivals in honor of the saints; he uses it when moving for the transportation of his household goods and domestic animals, and, finally, it is the electric tramway that takes him to his last resting place after death. Thus the Mexico City tramway system performs more important functions in the daily life of the people than fall to the lot of city railways elsewhere. Notwithstanding the part which the street railway system, the telephone and other enterprises of the foreigners play in the daily life of the city, the natives look with suspicion on the "gringoes," or outsiders, who have flocked to Mexico City in large numbers and who are the leaders in all business and engineering pursuits.

CHARACTER OF POPULATION AND RIDING

The City of Mexico is both the political and industrial center of Mexico, and consequently has a large percentage of foreign residents. The German, English, American, Belgian, French, Italian and Spanish nations all have large colonies, and mining, railroading, manufacturing, and even farming, have received a new impetus from them. These foreigners have each their own casinos or clubs, schools and churches, but they mingle constantly in the business life of the country. They live well and have been largely responsible for the development of the suburbs. Naturally, the tramways and lighting companies have benefited by the activities of these progressive aliens.

The Americans constitute the largest colony, and they devote their energies chiefly to the development of large engineering enterprises, such as electric power, railway and mining projects; the Germans control the hardware and drug trades; the French are leaders in silk and dry goods and the Spaniards in groceries. The English colony is interested in much the same lines of business as the Americans. The chief industries of the city are tobacco factories, grist mills, ore refining and foundries.



Mexico City Tramways—Station at Condesa on One of the Interurban Lines



Mexico City Tramways—American Country Club and Station on the Tlampam Line

The population of the City of Mexico proper is about 400,000, but the population of the outlying cities and villages of the surrounding federal district which are also served by the city tramway system brings the total up to

800,000. The habit of riding is not so highly developed as in most cities of the United States. The 650,000 inhabitants of St. Louis, Mo., for example, pay annually for passenger traffic alone about four times the amount received by the Mexico Tramways Company for every kind of traffic. There is a considerable amount of hack and carriage riding, but motor bus service did not prove a financial success in the one instance where it was tried.

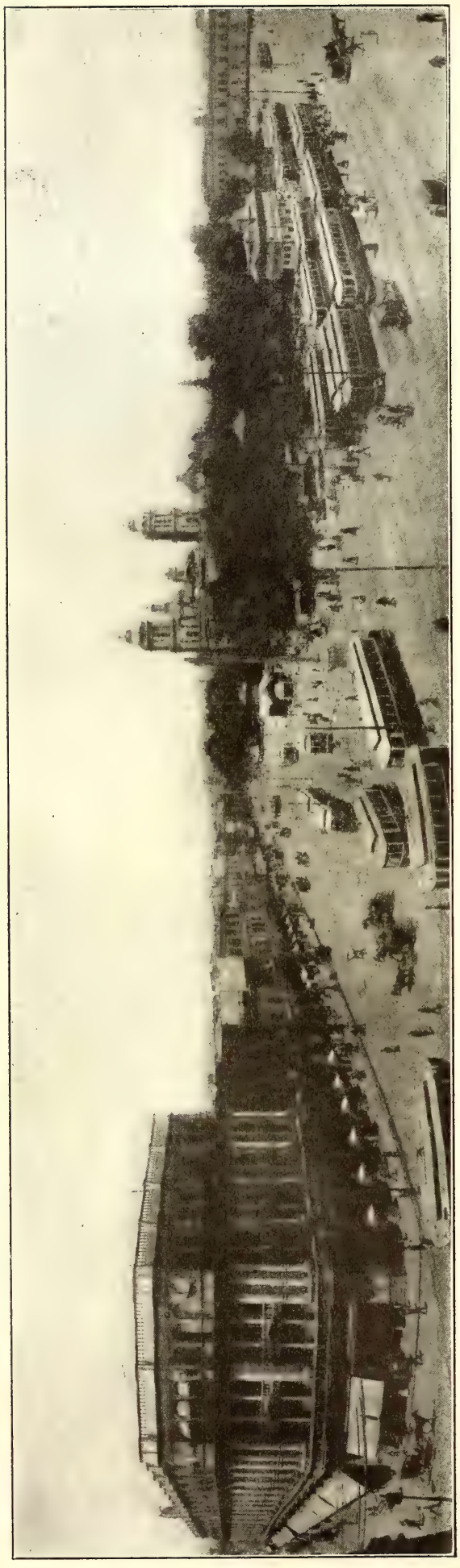
The streets in the older portion of the city are narrow, but by using reverse curves in some places in rounding



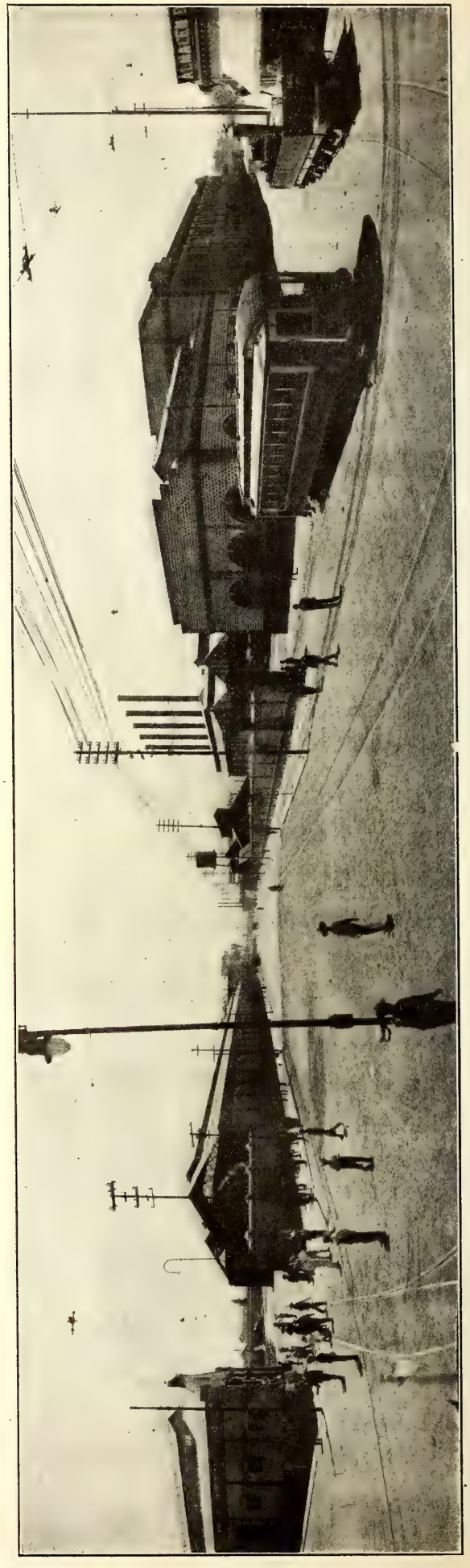
Mexico City Tramways—San Juan de Letrán, One of Mexico's Busiest Thoroughfares



Mexico City Tramways—Cars Leaving the Postoffice with Mail Matter



Mexico City Tramways—View of Cathedral Square in the Center of the City



Mexico City Tramways—General View of Shops, Car House and Power House at Indianilla

corners it has been found possible to run double-truck cars everywhere. Within the past few years the physical and sanitary conditions have been greatly improved in many quarters by laying out wider streets, improving the sewerage system, and pumping pure water to the city from a spring 18 miles away.

FEATURES OF THE TRAMWAY SYSTEM

About two years ago Dr. F. S. Pearson, of New York, the pioneer electrical engineer, and of late well known by his foreign enterprises, took over the control of the tramway system from German interests, and began improvements. To-day it is fast approaching the high standard of service and equipment attained by the best American electric railways. It has many distinctive features which are not common in American systems. Among these features is, first, the fact that Americans are successfully operating a tramway system in a foreign country, dealing with officials and employees who speak only Spanish, and speed within certain limits, which make it necessary to have high and low-speed controller handles and change them at fixed stations; the extensive second-class baggage and freight traffic and its complicated tariff; the extended use of special private and presidential cars; the graded fare system and absence of transfers; the lack of heater equipment; the loop system of car operation and centralized car barns and dispatching systems; the giving of free baths and barber service to the employees; the general custom of running cars in trains, both for first-class passengers and for mixed classes.

ORGANIZATION

The officers and heads of departments of the tramway company are nearly all foreigners. The operations of the company are in charge of R. C. Brown, managing director, who handles important questions of policy, deals with the government and directs new projects. Harro Harrsen, general manager, who speaks several languages,



Mexico City Tramways—Well-Armed Guardians of the Peace Assisting in the Transportation of Passengers from the Plaza del Torro or Bull Ring

doing it under conditions which to some would seem extremely difficult and almost impossible, and to others quite easy and ideal. The second feature worthy of mention is the use of class distinctions in transporting passengers, there being first and second-class cars and two rates of fare. The third departure from American methods is the noonday siesta, during which business is at a standstill, stores are closed up, and the people return to their homes. A fourth is the intermixture of funeral and freight traffic with the passenger cars. The fifth is the absence of any appreciable night passenger traffic. The sixth is the conductor and ticket inspection system of fare collection. Other novel features which can be enumerated are the use of mirrors to enable the motorman to see the rear platform and to start without signal from the conductor; the absence of fare ringing; the strict regulations as to

including Spanish and the Mexican patois, has charge of the operation of the system, and is assisted by a corps of able lieutenants, superintendents, etc. Both of these gentlemen are Americans. Others of the same nationality fill the offices of treasurer (A. S. Palfrey), purchasing agent (George J. Troop, Jr.), supervisor of traffic (E. H. Bellamy), master mechanic (G. M. Murray), electrical engineer (W. H. Fiske), civil engineer (V. L. Havens), auditor, building inspector, division superintendents, superintendent of employment, chief draftsman, storekeeper, transitmen and superintendent of track construction and some positions of foremen. The secretary of the company, Pedro Mendez y Mendez, is a prominent Mexican, and the heads of the legal and claim departments, the head of the funeral department, the chief dispatcher and the supervisor of trainmen are also Mexicans. The interrelation

of all departments is clearly shown on the accompanying organization diagram.

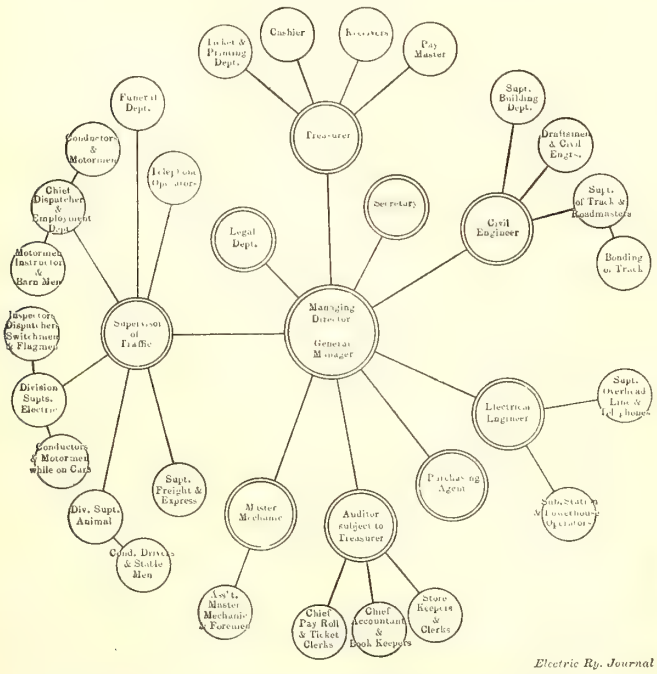
EXTENT OF THE SYSTEM

The tramways system as a whole consists of a network of lines covering almost the entire area of the city proper, with many branches extending out into the Federal District and to the foothills of the surrounding mountains. In



Mexico City Tramways—Scene at Guadalupe Cathedral

all there are about 133 miles of track operated by electricity and 31 miles operated with animal traction. These lines are soon to be electrified, and the various extensions and new lines contemplated will make a system comprising about 200 miles of track. The principal suburban or interurban lines, some of which reach cities of large size, are those to Tlalpam, Tacubaya, Coyoacan, Mizcoac,

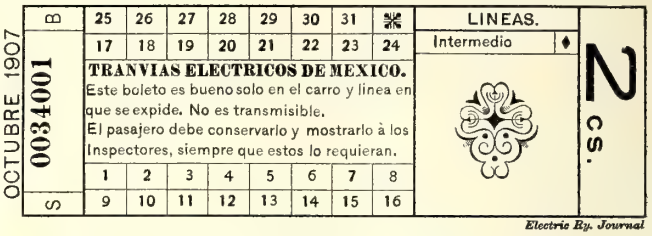


Electric Ry. Journal

Mexico City Tramways—Diagram of Organization

San Angel, Tlalnepantla, Atzcapotzalco, Guadalupe, Hidalgo, Tacuba, Ixtapalapa and Ixtacalco, varying in population from 6000 to 53,000. Practically all lines center in Mexico City at the main plaza, or Cathedral Square, also called the Zocalo, near the site of the old city. There are loops on all four sides of the plaza, the cars coming in on one street and going back on another paralleling it. This is necessary because many of the city streets are so narrow as to permit only one track, but the numerous exits from the plaza prevent congestion.

The handling of traffic in Mexico City is complicated at times because of the large amount of extra service demanded on the numerous feast days for patron saints and



Mexico City Tramways—Fare Receipt

during the bullfighting season. The two bull rings at times draw crowds of 37,000 people at both rings. When a bullfight is going on in one part of the city and some saint's day celebration in another, the transportation department is kept busy switching cars from one line to another.

SIGHT-SEEING SERVICE

The "Seeing Mexico City" service, which was begun in 1907, has proved a success. The service is handled with one or two cars, according to the demand for accommodations. Two different trips are offered, one in the morning

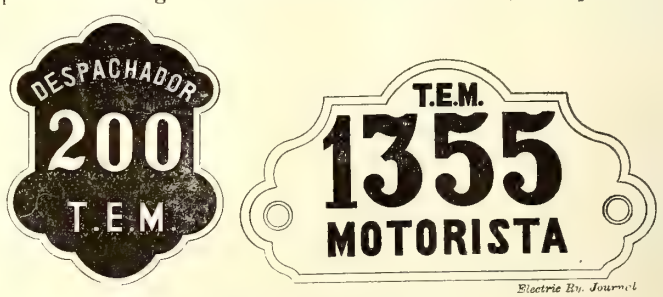


Mexico City Tramways—Fare Receipt

and the other in the afternoon, each of which requires about three hours' time. The charge for each trip is $2 Mexican money, and visitors who take both of them see practically everything of historic and scenic interest, including Chapultepec and the Mexican-American battle ground. A native Mexican, who speaks excellent English and is well posted on historic spots, acts as guide and points out all the places of interest in the city.

RESORTS, AMUSEMENTS AND PARKS

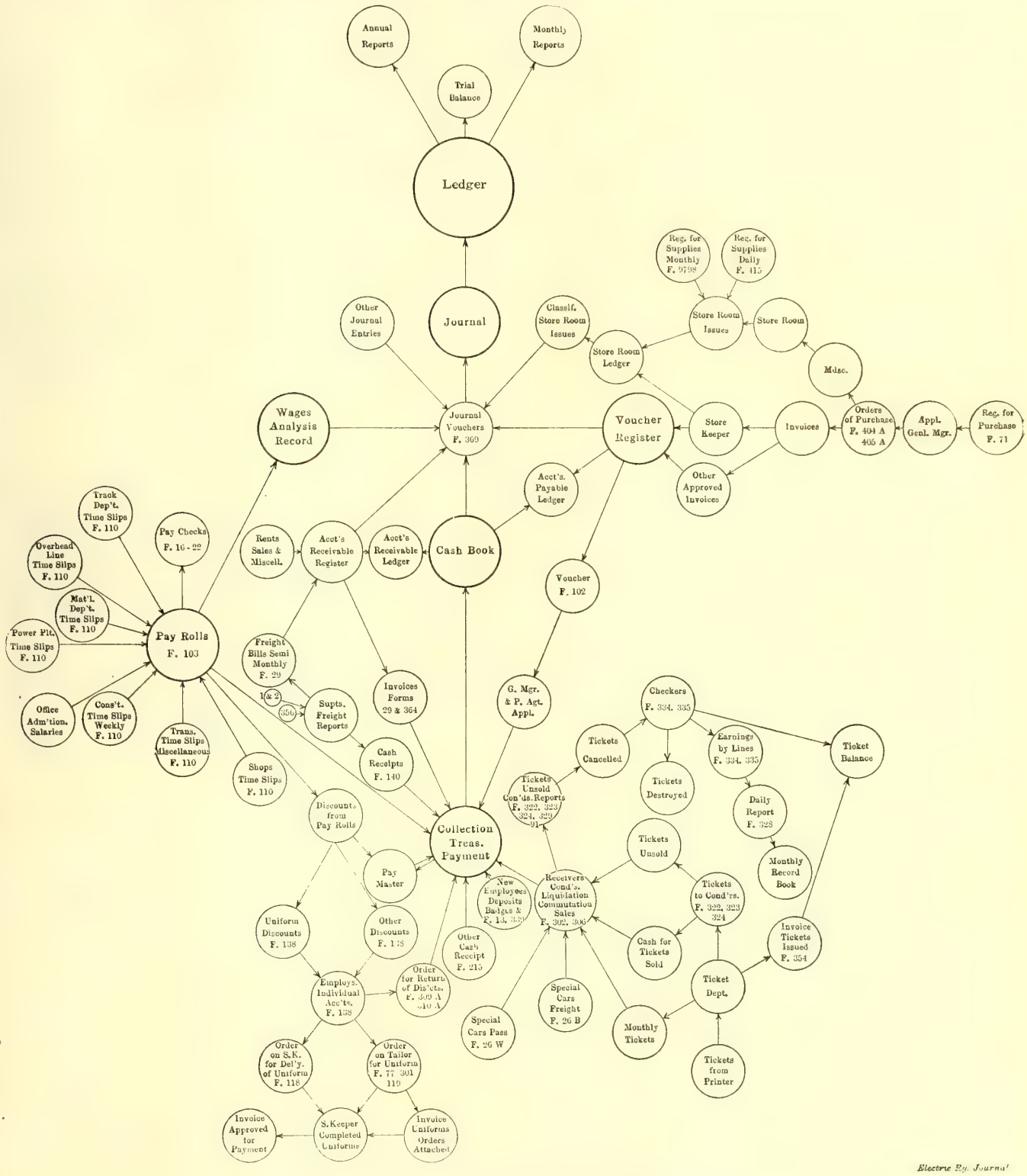
As stated before, the tramways company has very little pleasure riding of the kind Americans know, except dur-



Mexico City Tramways—Employees' Badges

ing the tourist season and in connection with the sightseeing cars. The Mexicans have not yet developed the craze for amusement parks. Some time ago Luna Park was laid out and equipped. It has all the usual attractions, is in the best part of the city, yet it has not been a success, although many schemes were tried to get the people out. The evenings in Mexico City are quite cool, the ther-

mometer registering about 50 deg. Fahr., and the people cannot be induced to come out. They go very little even to the theaters, of which there are many in the city. The best paying amusements are moving picture shows. There are one or two other amusement grounds besides Luna Park that do a small business in certain seasons. Many



Electric Ry. Journal

Mexico City Tramways—Diagram of Accounting System

of the suburban trolley rides are attractive and are beginning to be well patronized. The trip to the American Country Club, along the Tlalpam line, is full of interest, and the attractions there for members and guests are very popular. The San Angel Inn and grounds, once a monastery, are also very attractive to the foreign population. Chapultepec Park, with its historical surroundings, castle, military school, Greek hemicycle, lakes, immense and ancient trees, its restaurant and drives, its springs and battle monuments, its views and associations, is a most attractive spot. It is 2 miles from the plaza, and the line runs along handsome boulevards. The tramway company does a good business over this line on feast days and holidays, maintaining a special loop at the park. The Plaza and Alameda are attractive parks in the city, and on feast days are lined with native booths, to which people come from far and near to buy and sell. The bullfights in the two great rings, one an immense concrete and steel structure, seat-

ing 18,000 people, tax the company's capacity for special service. The shrines at Guadalupe and the Viga Canal and Floating Garden rendezvous are good drawing cards



Mexico City Tramways—Siding on the Double-Track Tlalpam Division



Mexico City Tramways—Tacubaya Station on the San Angel Line

on certain days. The Viga Canal is always busy, and the company, although now only operating one electric line part way and a mule line the balance of the distance, is planning to extend the electric line to Lake Zochimilco. This promises to be a very attractive and good-paying route. There is considerable interest in athletics, but principally by foreigners who have their outdoor and indoor clubs, while the natives have their cockfights. All the suburban feasts, fairs and fights, as well as those in the city, are carefully attended to by the electric railway company. As the number



Mexico City Tramways—Motor and Trail Car for Extraordinary Service



Mexico City Tramways—Junction of Tacubaya and San Angel Lines at Tacubaya

of feast days throughout the year is very large, the revenue from this special riding forms a large proportion of the tramway company's gross receipts.

FUNERAL SERVICE

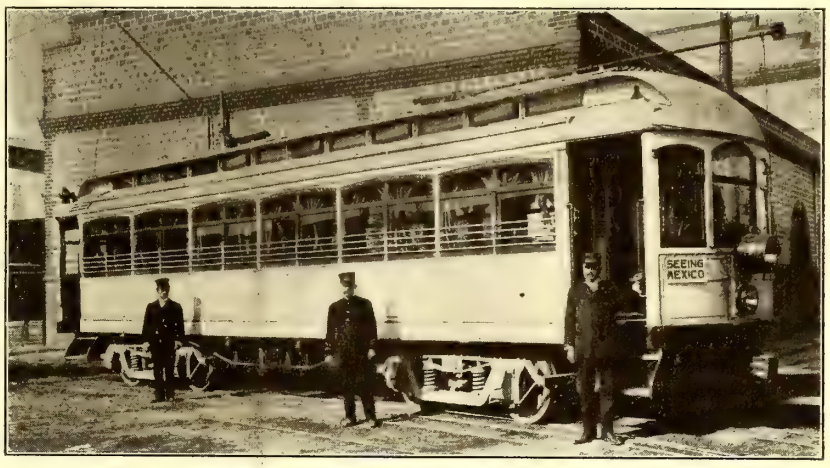
The returns from the Mexico City Tramways funeral service now amount to between 3 per cent and 4 per cent of its total traffic. The company, in fact, conducts all the city funerals, even to furnishing the hearse and trailer cars for mourners. In accordance with a clause in its city concession all corpses of paupers are carried free. There are a number of types of funeral cars which can be secured at a wide scale of prices. The business is done principally through undertakers who have a special arrangement with the company. Their patrons indicate the amount which they can pay and the tramway company is prepared to furnish cars and decorations for any grade of funeral, from Government official to pauper. The cemeteries are so far away, the country roads so difficult for vehicles to traverse and the general scarcity of vehicles not engaged in public carriage service around the city is so pronounced, that the advantages of the more showy method of carrying the corpse on a catafalque car and the mourners in passenger cars behind outweigh all other considerations. On receipt of a call the company sends the cars to an appointed place on a car line nearest the home of the deceased and then the casket is carried to the "caroso" or funeral car, which has a canopied top. Masses of flowers and floral designs are spread over the casket, the mourners enter the passenger car and the train proceeds. While delays in passenger traffic may occur, the movements of funeral trains are timed to interfere with the passenger service as

little as possible. In general, the lines of least traffic are used for funeral traffic and in some instances special tracks are run to the cemetery. Some of the types of



Mexico City Tramways—First-Class Train of Two Motor Cars for Suburban Service

funeral trains are shown in the accompanying views. They vary in price from $3.75 to $140 for a funeral. There are electric and mule "carosos," two-horse and four-horse hearses with wheels that will run on roads or rails, and combination funeral cars. The trailer cars vary from the common mule car to the white and gold passenger car of up-to-date design. Nothing is more depressing than the continual presence of these special evidences of death, yet the people are used to them and seem to prefer this method. The most pathetic scene is the frequent foot procession led by a peon carrying a child's white coffin on his head, the mourners following on foot, all bearing the signs of extreme poverty.



Mexico City Tramways—The "Seeing Mexico" Car with Crew

EMPLOYEES

All the rank and file of the tramway company forces are native Mexicans, who make very satisfactory employees. They are good students and learn rapidly. The company



Mexico City Tramways—A First-Class Funeral Train, Consisting of a Motor Hearse and Two Trailers

pays careful attention to the wants and personal appearance of its men. It gives them free baths, barber service, amusements and instruction besides furnishing without cost fine uniforms and distinctive badges for each class of employee. Thus motormen, conductors and inspectors wear blue uniforms, but inspectors wear silk caps while those of the trainmen are of cloth. Again, the conductors' caps have straight visors, while those of the inspectors and motormen are bell-shaped. In addition, the inspectors wear lapel badges to denote their rank.

Motormen receive from 17 cents to 24 cents (silver) an hour, the higher rate being paid to instructors. Conductors of all grades receive 15 cents (silver) an hour. Applicants must pass a satisfactory examination by the company's physician and are then placed on a school car, where they are instructed in the details of car apparatus. Later, the student motorman is turned over to the motorman instructor of the particular city or suburban line on which he is to be employed. Carmen having good records for a year or more are eligible for promotion to the position of inspector, dispatcher and chief inspector.

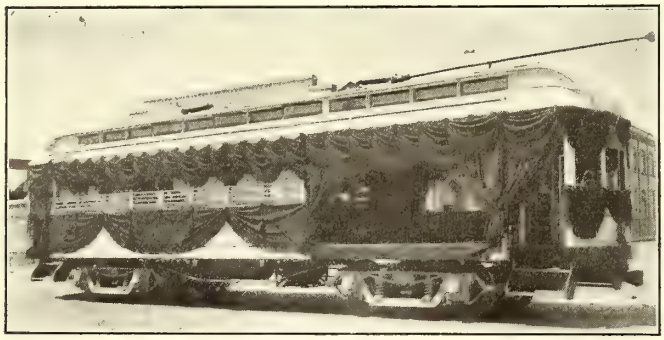
The natives engaged in the transportation, line, track, power and other departments, have proved efficient employees even though they are slower to learn than the average American. There is no employees' association, but the company itself has done considerable welfare work and has especially concentrated its efforts on attaining high standards of cleanliness and keeping the men away from influences of saloons.

FARES AND TICKETS

All of the lines in Mexico City have one uniform first-class fare of 6 cents (Mexican coin) for the shortest ride. As this requires the use of two coins, the 5-cent piece and the 1-cent piece, it is not so convenient as in the United States. The maximum ride in the city is about 5 miles. The single or lowest fare carries one through the "intermedio" or inner zone in any of the cities. For other distances, which must be stated when paying fare, the charge is greater and in proportion to the distance.

The first-class fare on the interurban lines averages 3 cents (Mexican money) per mile and the second-class fare is usually 40 per cent less. First-class and second-class

commutation tickets are issued on all suburban lines. These entitle the holder to an average of three or four round trips a day. On one line where the one-way first-class fare is



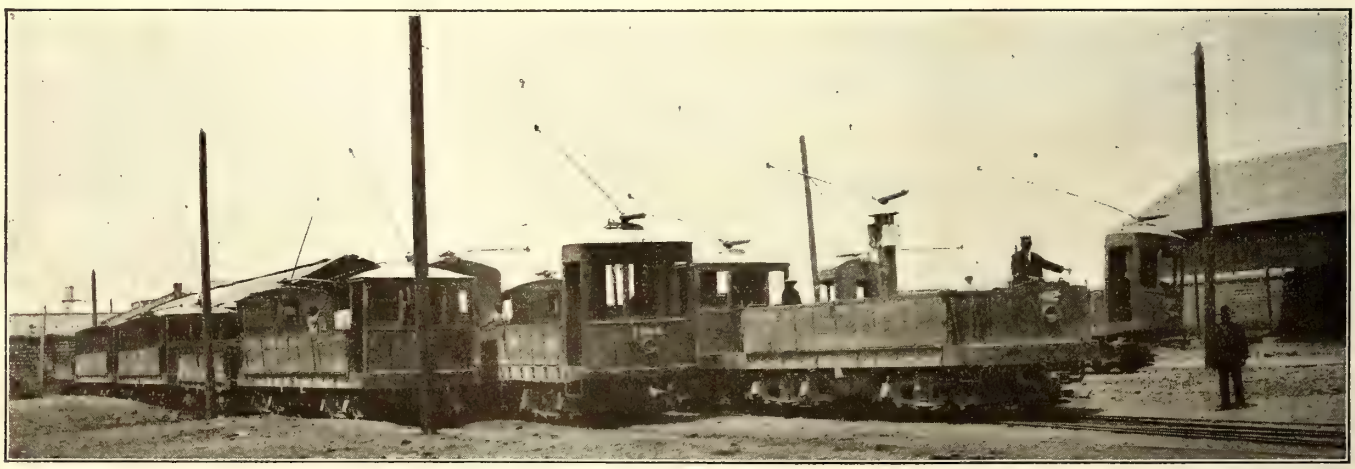
Mexico City Tramways—First-Class Funeral Car, with Coffin Compartment

10 cents (Mexican money) a monthly commutation ticket costs $5.75. This represents an enormous reduction from the regular fare, as four round trips a day would cost 80 cents, or $24 a month. This proportion, however, is subject to variations in accordance with the franchise conditions. The company prints all classes of tickets issued, and varies the colors every day to avoid counterfeits. The lottery system is not now used by the company, but when it was in use, some time ago, it was customary to offer prizes in connection with the tickets exchanged for fares.

Fare registers have not been found practicable. The conductor is therefore obliged to use the European system of fare receipts, which are viséd by inspectors, who tear the ticket, thus cancelling its value for further use. The inspectors are virtually uniformed traveling auditors, who examine all receipts and tickets on both city and interurban lines to see that the proper fare has been paid, and if not the conductor is called and made to collect the fare. In this way many fares that would otherwise be missed are taken.



Mexico City Tramways—Chunubusco Substation and Passenger Depot



Mexico City Tramways—One of the Freight Yards of the Company

There are about three inspectors to five conductors, and they are a picked body of trusted men with previous experience as conductors or motormen. They have certain rendezvous from which they board cars, and in view of the attitude of the upper classes toward the peon conductor their presence in their distinctive uniform prevents much trouble. The inspector enters a car at the front, and taking a number which has been given the conductor for his trip before starting, he compares all receipts presented to see that they are not wrongly numbered, out of date or the wrong color. All passes or "abonos" (commutation tickets) must be punched, and at irregular intervals their numbers are taken down by the inspectors for checking the amount of free and reduced rate riding and locating the holders of passes.

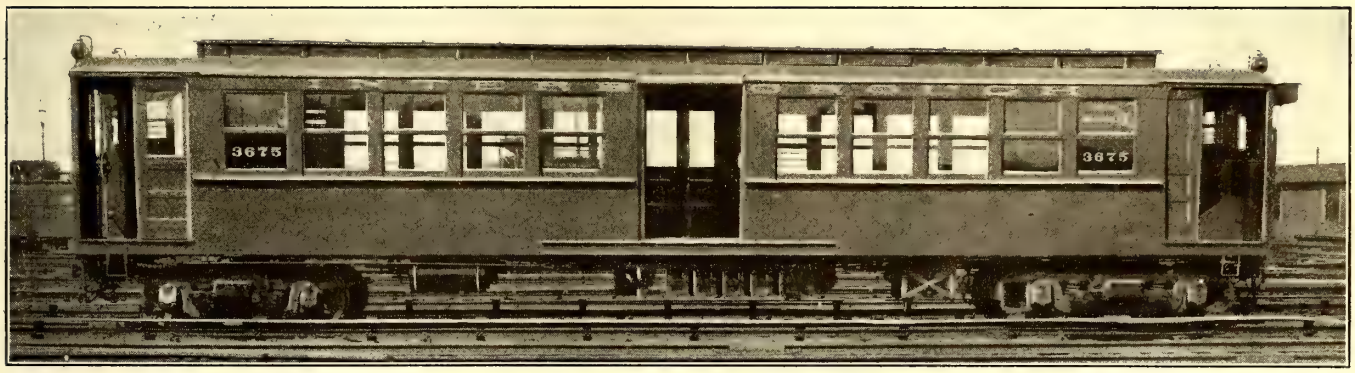
For the information from which this article was prepared this paper is indebted to Harro Harrsen, general manager at Mexico City, and H. P. Quick, of the engineering staff in the New York office of Dr. Pearson. A second article on the Mexico City system will be printed in a subsequent issue and will describe the track and line construction, power equipment, the modern car shops and the methods of car operation.

CENTER-DOOR TRAIN ON TRIAL IN THE NEW YORK SUBWAY

On midnight of Tuesday, April 20, the Interborough Rapid Transit Company, New York, made a non-passenger experimental run over the express station stops with an eight-car center-door train. Regular operation of this train was begun on Monday, April 26. These center-door cars were designed by the railway company in the belief that they will alleviate loading and unloading conditions at express station platforms better than the Arnold end side-door cars, described in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1909. It will be recalled that these end side-door cars, which were tried at the request of the Public Service Commission of the First District, had a side door at each end as well as the original end doors, which were used for entrance only. Both doors were 38¾ in. wide and were operated by the train guard. The entrance door was operated by the original hand equipment and the exit door by pneumatic means. After being in service from Feb. 16 to Feb. 27, the Arnold train was taken off so that a number of changes could be made. Before these changes were completed the Interborough Rapid Transit Company offered to experiment with an express train made up of eight center-door cars of the design shown in the accompanying illustrations. The new center door is 50 in. wide and, like the original end doors, is used for both entrance and exit. The striking feature in connection with the center door is the use of a barrier to permit two streams of passengers to enter or leave without interfering with each other. This barrier does not extend far enough into the body of the car to prevent free passage from one end to another. The company was led to try the barrier through observations made on the standard subway cars, some of which have 40-in. doors and other 50-in. doors. It was found that in most cases the wider doors were really no better than the narrow doors because in the wider vestibules passengers would stand alongside the doors, thus reducing the entrance width, say 20 in. The division of the new center door therefore is made on the assumption that two unimpeded exits are better than one which is wide but is subject to blockades by standing passengers. It is expected that those who attempt to stand in the narrow aisles of the new car will be bowled out of the



Interior of Car, Showing Barriers



Center Side Door Car for New York Subway



Experimental Train of Center Side Door Subway Cars

way by the rush of incoming or outgoing passengers. For purpose of comparison, one car in the experimental train will have no barrier at the center doors.

The center door will be arranged so as to be operated by the guard on the car platform by pneumatic door openers, and as the barriers are only waist high the guard can see the shoulders and heads of the passengers on the other side of the partition. Iron tubing carried up from the partition to the roof serves to keep the barrier in place. When the door on one side is not in use, folding longitudinal seats are let down to minimize the loss in seating capacity.

The cars which make up this train are modifications of the type illustrated in the Street Railway Journal of March 14, 1908. At that time ultimate center-door operation was provided for by extra-wide side posts in the center and by angle iron and plate reinforcement in the carline over the new doors as far as the first window on each side. A 6-in. outside channel, which was also provided in the original plan, is placed on the side sills under the doors, and is of the same length as the carline reinforcement. The Interborough company decided to build subway cars for eventual center-door operation over two years ago.

SIDE DOOR HEARING IN NEW YORK

The hearing before Commissioner Eustis of the Public Service Commission of the First District of New York on the operation of side-door cars in the New York subway was continued on April 22. Bion J. Arnold, consulting engineer of the commission, said that he had carefully considered the testimony of the Interborough Rapid Transit Company in connection with the trial runs of the double end door as recommended by him and that he did not find any facts in them to lead him to alter his previously expressed opinion that "the double end door possesses the elements of maximum comfort, decency and capacity which can be attained with cars that are operated in the present subway."

In comparing the records of the company and the commission regarding the length of stops of the side door train at stations, Mr. Arnold said that in nearly 50 per cent of the cases the records did not agree by from 4 to 10 seconds. Tables showing the combined records were presented by Mr. Arnold. To emphasize the differences between the records of the company and his own, Mr. Arnold had a blue ring drawn around all figures where they varied from 4 to 7 seconds, inclusive, and a red ring where they varied from 8 to 11 seconds, inclusive. Of 477 comparative statements he said that 48 per cent showed a difference of 4 seconds to 7 seconds between his figures and those of the commission and that 28 per cent showed a difference of 8 seconds or more. The records of the total elapsed time of the train from one end of the run to the other, Mr. Arnold said, showed that the train was often on time, and that "a careful comparison of the record fails to show that the special train suffered any serious delays which were not shared by the trains immediately preceding and following it." Mr. Arnold saw no reason, after carefully reconsidering the data, to change his conclusion to the effect that where the trains were heavily and equally loaded the side door train would be able to save from 10 seconds to 15 seconds of the time required by the trains of regular cars.

Mr. Arnold said he regretted very much that the guards on the train had been changed by the company so often. He had kept only a partial record of the numbers of the men who manned the special train, but said that about 200 different men had been used on the train. The figures on which he based this estimate were submitted as evidence. Reiterating statements made in his report on the subway car issued in February, 1908, Mr. Arnold said that he was familiar with the advantages of the center door car and appreciated the degree of success it had attained in service on the Brooklyn Bridge, in the tunnel of the Hudson & Manhattan Railroad, and in the Boston subway. Continuing, Mr. Arnold said:

I am satisfied, no matter what type of car I had recommended, if it involved any change from the present type, that it would have been opposed by the Interborough Company with the same degree of opposition that the double end side door type of car which I did propose met. In my judgment the center side door type of car is the most vulnerable one for attack, not only from the standpoint of lack of safety in operation at stations having curved platforms, but for other reasons, such as the elimination of cross seats and the inability of the passengers to circulate rapidly from the end to the center, in case the circulation principle is adopted, which principle it seems to me will give the greatest comfort to the passengers when entering and leaving the cars.

It seemed, therefore, advisable to devise some type of car which would not introduce the dangers incidental to the use of the center side door type, and which would be applicable to not only the express tracks but also to the local tracks, thus making a car universally applicable to the entire subway, which the center side door type of car is not, as admitted by the Interborough officials, for they propose to use it only upon the express tracks.

Since the type of car which I recommended has been developed and put into service, the Interborough officials seem to have completely reversed their attitude toward the center side door type of car, and have now asked permission to try a train thus equipped.

I am very glad to have this disposition shown, and hope that it will result in the development and adoption of some type of car which will relieve the present unbearable conditions in the subway during the rush-hour periods. If the Interborough officials are willing to assume the responsibility for the dangers incidental to the operation of the center side door type of car it will relieve the commission from the necessity of having to order the adoption of the type of car opposed by the Interborough Company, and place the responsibility for the successful operation of the center side door type of car upon a company who advocates it, and under these conditions it ought to succeed, if success is possible. I am still of the opinion, however, that the type of car that I have recommended, viz., the double end side door type, will, if the conditions that I have outlined for its successful operation are given it, prove preferable in the present subway, as it will give all of the advantages that the center door type of car can give, without the necessity of extending the station platforms, and be equally applicable to the local as well as to the express tracks. In other words, it should be recognized by the commission and the public that if the center side door type of car is now adopted it means that a car is adopted which cannot be used upon the local tracks, and this fact will be used by the Interborough Company in the future to prevent the elimination of the present type of cars from the local tracks. Furthermore, the center side door type completely eliminates the cross seats, which have been heretofore thought to be desirable, and increases the standing capacity of the car, while the type of car which I propose retains all of the advantages of the present cross seats, and, as previously stated, makes a car which is universally applicable to the entire subway, although should it be found that the center side door type of car can be operated without unnecessary danger the supplemental doors of the car I have recommended could be moved somewhat nearer the center, thereby combining the advantages of this type of car with those claimed for the center side door type.

I wish to state that I have no desire that the particular car which seemed to me best should be adopted if any other type of car can be proved better for the service, as the only object I have had in suggesting changes in the present

type of car now used by the Interborough Company has been to get introduced into the subway some type of car which would not only reduce the time now lost in station stops, but also make it more comfortable for passengers to enter and leave the cars.

A. A. Gardner, counsel for the Interborough Rapid Transit Company, in going over the tabular exhibits of Mr. Arnold, discovered that the columns of figures on one of the sheets had been inadvertently transposed and at Mr. Gardner's request Commissioner Eustis agreed to have the sheet corrected and to submit a new table to the company on April 24. Asked how much time would be required further to consider the data, Mr. Gardner said about a week, and the hearing was adjourned until April 29.

Frank Hedley, general manager of the Interborough Rapid Transit Company, then outlined the plans of his company for operating the experimental center side-door train. He explained that the last cars purchased by his company had been especially designed with a view to their ready conversion to cars of the center-door type. Eight cars for use as an express train are now fitted with center doors and arrangements are being made for placing them in service on Monday, April 26, at 6 a. m. on the same run as the end-door trains.

Mr. Hedley said that it had taken about a month to equip the train, but that this record in car reconstruction was largely due to the fact that the door operating mechanism of the end-door train and other fittings had been used on the center-door train. He explained that this was done purely to expedite matters, and that duplicate equipments had been ordered for the end-door cars and had been promised by the manufacturers for delivery by May 1. Mr. Hedley said he did not think that the public could be educated up to the idea of "circulating" and that the end doors and the center door of the center-door car would all be used for entrance and exit. The center doors will be arranged for pneumatic operation, but guards will be stationed at all express stations to assist the trainmen. Records of the operation of the car will be made by the company and the commission.

TESTS OF ENERGY CONSUMPTION OF CARS IN MILWAUKEE

In the account of the hearing of the Milwaukee case, published in a recent issue of this journal, reference was made to some tests of power consumption conducted by Messrs. Rau and Olds, of the company's engineering force. The voltmeter-ammeter method of determining the power consumption was used, with readings every five seconds. The cars ran on their regular schedules and carried passengers. The object of the test was to see which motor equipment under test conditions gave the best results. The figures obtained were as follows:

An interurban car 51 ft. 6 in. long, weighing 55,000 lb., having four 60-hp motors, consumed 3000 watt-hours per car-mile.

A city car 41 ft. long, weighing 43,300 lb., having four 40-hp motors, consumed 2580 watt-hours per car-mile.

A city car 41 ft. long, weighing 38,500 lb., with two 35-hp motors, consumed 1665 watt-hours per car-mile.

Two motors were taken off this car to demonstrate what it would do in competition with the car with four motors. The two cars are therefore the same.

The a.c.-d.c. interurban car, 53 ft. 4 in. in length, weight 82,000 lb., with four 75-hp motors, consumed 3895 watt-hours per car-mile.

TROLLEY MAIL BOXES IN WILMINGTON, DEL.

At the request of the United States mail authorities, the Wilmington (Del.) City Railway Company started a trolley mail box service on one of its lines on March 17. The scheme met with the immediate favor of the public. As many as 2008 letters have been deposited in five car boxes in one day. Some of these letters, in fact, were transferred by carriers from street boxes to save time. Another evidence of confidence in the new service was the insertion of special delivery letters in the car receptacles in preference to the street boxes. The company now has an average of six boxes in daily operation on cars running at about 10-minute intervals from 8 a. m. on its principal double-track line. One-third of this line passes through the principal business street (Market Street), and the balance traverses a residential section. Most portions of the latter have but two regular collections of mail daily, and the farthest point is 2½ miles from the post office.

In Wilmington the cars stop at the far side of the intersecting streets to load and discharge passengers. As the company's rules require slowing up when approaching a crossing, the instructions issued by the post office authorities are that a person not wishing to ride, but only to mail a letter, is to take the near side and hold up the letter for



Mail Box on Trolley Car in Wilmington, Del.

insertion when the motorman is slowing down to, say, 2 m.p.h. to 4 m.p.h. It has been found easy to deposit letters even at a speed of 8 m.p.h. Consequently, it is believed that there is no appreciable delay to the operation of the cars, and certainly no more than is required to induce a driver to clear the track.

The post office authorities have a collector one square from the office, at a place which happens to be one of the junction points. Here the boxes are emptied once per round trip. The longest time yet noticed for this work was 13 seconds, but the average is 7 seconds. There is practically no delay here, as the cars are required to stop for passengers at this point on at least 90 per cent of their trips. The collector, upon emptying a box, takes the mail matter to the office, and has ample time to return before the next car arrives.

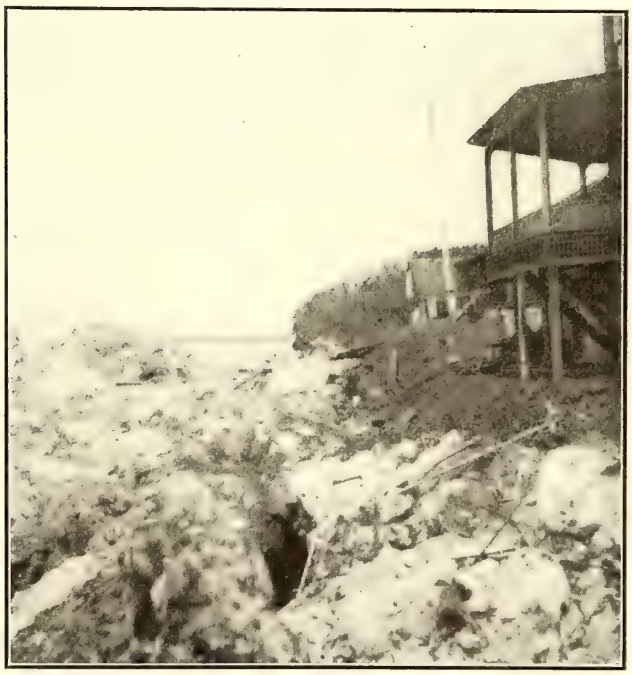
The drop box, which is of metal, is attached to the side of the car as shown, and is about 24 in. wide, 34 in. deep and 5 in. thick. The open top, or mouthpiece, is V-shaped, 4 in. wide at the top, ¾ in. wide at the bottom and 5 in. deep. The special feature of the box is the provision for excluding rain and snow. The front of the lower half is provided with a hinged locked door, through which the mail is removed by the post office collector. The boxes are attached to the forward right-hand end of the car body by hangers which hook over a bar fastened to the bottom of the car body and by a bolt on either side of the box, fitting into a slotted plate on the underside of the

water table strip. The boxes were made for easy detachment, as it is necessary to transfer them from one side of the car to the other every round trip. This operation takes about 20 seconds.

The Wilmington City Railway Company receives no compensation for this experiment, but, of course, it would not have all cars equipped to carry mail matter, with its attendant responsibilities, without remuneration. The management believed that great benefits would accrue to the post office department, the public and to itself from a fair trial, and therefore was willing to assist in the test of the new system. The trolley mail cars certainly have cut down the greatest delay in the first step of mail transportation, namely, the collection and distribution in the local post office. Acknowledgment is due S. S. Hoff, general manager of the Wilmington City Railway Company, for the data in this article.

APPROVAL OF RULES BY RAILROAD COMMISSIONERS SOUGHT

It will be remembered that at the last meeting of the Transportation & Traffic Association at Atlantic City a proposed code of rules covering the operation of high-speed interurban railways was submitted by the committee on interurban rules. During the discussion which ensued it was considered desirable to submit this proposed code to the various boards of railroad commissioners as well as to various operating officials throughout the country and obtain the criticisms and suggestions of these gentlemen. The committee has decided that a conference of these men



Ice and Débris 30 Ft. High Near Lewiston Terminal

would be of the greatest advantage in formulating a code which could be adopted as standard by all of the companies operating high-speed interurban railways.

With this end in view, J. N. Shannahan, chairman of the committee of rules for interurban railways of the American Street & Interurban Railway Transportation & Traffic Association, has invited the attendance of one or more representatives of each of the railroad commissions of the different States at a conference to be held at the New Willard Hotel, Washington, May 25, at 10 a. m.

REPAIRING NIAGARA GORGE RAILROAD

George R. Ricker, chief engineer of the Niagara Gorge Railroad, Niagara Falls, N. Y., has made a thorough inspection of the roadbed of the line through the lower Gorge since the subsidence of the ice jam and reports the roadbed in good shape and that beyond the destruction of the poles and wires no serious damage was done. The steel trestlework between Giant Rock and Devil's Hole is intact and uninjured. The washouts are few and are along the outer



Niagara Gorge Railroad Under 25 Ft. of Ice

track. The repairs were delayed by the second rising of the ice, but no further damage was done and the officials of the company now expect to have all repairs completed and the road again in full operation by May 15, or in time for the opening of the Niagara Navigation Company's line of steamers between Lewiston and Toronto on May 17. The principal work and delay in reconstruction will be the removal of ice which still lay in masses many feet high over the tracks and roadbed on April 27.



Looking Upstream from Above Lewiston Bridge

The conditions on the Niagara Gorge Railroad and at Niagara were described in the article on page 794 of the Electric Railway Journal of April 24, 1909. The work of restoring the railroad was well under way when the second jam occurred, and while the statements in the article of the height of the water and the ice served to convey an excellent idea of the state of the gorge and rapids, the accompanying illustrations supplement the description contained in the previous article by showing conditions at various points along the line. In one instance the effect

of a washout on the roadbed is illustrated. In another the tracks are under 25 ft. of ice, the protruding trolley poles being the only visible mark of identification of the railroad. The third photograph shows the ice and débris piled many feet high and gives an idea of the work that is before the company in removing the ice before the tracks are reached so that work can be done on them.

ELECTRIFICATION OF THE STATE RAILWAYS OF ITALY

A recent issue of *The Engineer* contains a summary of the progress of electrification of the steam railways of Italy and a synopsis of the program of electrification up to the year 1912. The only two lines which have been converted to electric traction and which are now in operation are given in the table below:

Date of opening.	Name of line.	Nature of service.	Form of power.	Miles in operation.
Oct. 16, 1901..	Milan-Varese, Porto Ceresio,	Local suburban	Steam	46
Sept. 4, 1902..	Lecco-Colico, Sondrio-Chiavenna.	Country, local tourist	Water	66
Total mileage of lines for suburban and local traffic in operation up to December, 1908.....				112

From the opening of the Lecco-Chiavenna line in September, 1902, there was a long period of cessation from active work. Several projects have been under way for the last two years, however, and are rapidly nearing completion. The Government budget calls for the conversion of a total of 186 miles by the end of 1912, and a large part of this mileage is well under way. The two centers of the government's activity in electrifying its steam railway system are Genoa and Milan. Around Milan four projects have been started. The first is 16 miles of the Milan-Ceresio suburban line from Gallarate to Avona Junction, which is a new single-track railway running along the west shore of Lake Maggiore, connecting with the Simplon tunnel line at Domodossola. Another project is 20 miles of the road from Gallarate to Laveno on the St. Gotthard line. North of Domodossola it is proposed to electrify the remaining 11 miles up to the mouth of the Simplon tunnel at Iselle, on which the ruling grade is 2½ per cent. Still another project is the electrification of the suburban lines northeast of Milan connecting Lecco, Usmate, Colozio, Ponte San Pietro, having a total length of 50½ miles.

In southern Italy the Naples-Salerno line, together with a short branch line, totaling 31.6 miles, is to be operated electrically if suitable water-power can be developed for generating purposes.

Several small projects, comprising in all 32 miles, will be completed in northern Italy by the end of 1911. These consist chiefly of short sections on heavy grades in the Ligurian Alps. One of the longest of these lines is the section from Savona to San Giuseppe di Cairo, which is 12 miles long. No work has yet been done on these lines, but the plans have been completed.

The most important electrical project of the Italian State Railways is the conversion of the line from Genoa to Busalla, on the road to Milan and Turin, in connection with the proposed electrification of the entrance tunnels in Genoa. This project will involve the conversion of nearly 20 miles of track. This will be the first line in Italy on which electric traction will be employed under conditions closely approaching main line traffic, as the trans-Alpine service is conducted on Swiss territory. The new road will be used very largely for freight traffic. The road to be electrified was formerly part of the main line between Genoa and Milan. The grades were excessive, and there was one long tunnel near the summit. Several years ago another line was built, having much easier grades, and this new line, at the present time, carries the major part of both freight and passenger traffic. The old line, which is being electrified, has been used only as a relief track when congestion was severe on the new line.

Current for operating the electric locomotives will be generated in a steam power station in Genoa. Two Westinghouse steam turbo-generators of 5000-kw normal capacity have been installed, and a third unit will be added when the underground lines in Genoa are electrified. The generators deliver three-phase, 15-cycle current at 900 r.p.m. The generator voltage is 13,000, and current is transmitted at this voltage over transmission lines to four substations equipped with static transformers, to reduce the potential to 3000 volts between phases on the line. The two trolley wires have each an area of 100 sq. mm, which is slightly less than 0000 B. & S. wire gage. The rails are electrically bonded for the return current.

The three-phase electric locomotives which will be used on this line are of the Westinghouse type, and are remarkable for their great weight. They have five driving axles coupled together, and each locomotive carries two 800-hp motors which are connected to the wheels by a system of rods and cranks. The two motors are of the three-phase type and have eight poles. With a frequency of 15 cycles they are designed to drive the locomotive at a constant speed of 28 miles per hour when running in parallel, or 14½ miles per hour when connected in cascade. The locomotives have an adhesion weight of 60 tons, which can be increased to 75 tons by adding ballast. It is the intention to operate one of the locomotives at the head of a freight train and another in the rear, and it is believed that it will be possible to run trains of 20 freight cars, having an average weight of 20 tons, or a total train weight of 550 tons, at a constant speed of 28 m.p.h. up the long grades, which exceed 3½ per cent. As the line is divided into three block sections, it is expected that it will be possible to haul 1680 cars over the line in 20 hours, allowing a 10-minute interval between trains.

Traffic on these lines, of course, is heavy in both directions, and the adoption of three-phase locomotives makes it possible to utilize much of the energy expended in hauling trains to the summit by regenerating current and feeding it back into the line as the locomotives and trains descend the grade into Genoa. Provision has been made whereby a maximum of 4000 kw regenerated by trains descending the steep grade can be absorbed at the power house through an automatic rheostat.

PROTECTING SHOPMEN AT WORK UNDER CARS

A very useful precaution for protecting shopmen at work under cars has recently been adopted in the car houses by one of the large Eastern electric railway companies. When a shopman starts to work on a disabled car he fastens his individual flag on the operating end as a sign that he has begun his labors. No one but this shopman is permitted to remove the flag and in the meantime all other employees must refrain from operating the car on any pretext whatever. Cars in the shop for general overhauling or for other purposes which take them out of the control of the transportation department are usually indicated by "out of service" signs, but the special employee's flag is added whenever anybody is at work under the car or train. Movements of damaged equipment are permitted only in exceptional cases and must be made under the direction of the men whose flags are on the cars.

HEARING BY PUBLIC SERVICE COMMISSION ON SCHENECTADY FARES AND SERVICE

A hearing on the action of the Schenectady Railway in discontinuing the sale of six tickets for 25 cents and making certain changes in interurban and commutation fares and on various matters of service affecting the company took place before the New York Public Service Commission, Second District, at Albany, on Monday of the present week.

After brief statements regarding the reasons for the complaint made before the commission Lewis E. Carr, general counsel for the Schenectady Railway, stated its position: First, that the commission was without power so far as commutation rates were concerned; second, that the rates of the company were reasonable.

DOUBTFUL AS TO POWER OF COMMISSION

Chairman F. W. Stevens, of the commission, said that ever since the commission took office it had had presented to it in one form or another the question of regulating general commutation rates, school commutation rates and excursion rates. It had never made any decision as to whether or not it had the power to regulate such rates. Under the statute existing it was a grave question whether this power regarding these rates did rest with the commission. The commission had suggested amendments to the law making it perfectly clear in this respect. A bill containing the amendments had been passed by one branch of the Legislature and the understanding of Mr. Stevens was that the bill had been reported to the other branch. If the bill was passed the question would be simplified; if not, the matter would be left where it is now, with the same doubt existing, and would be taken to the courts to determine whether in law the commission had power over such rates. The commission had reached the unanimous conclusion that it would be better not to take up school or general commutation rates or excursion rates until the question of jurisdiction was settled. It would be a waste of time to take up the subject of rates of this character in the Schenectady case until more was known about the acts of the Legislature, as the power of the commission had been questioned so seriously. The principal question in all the cases affecting the Schenectady company involved the power of the commission to fix commutation, school and excursion rates. An act of the Legislature on the subject would avoid long and costly litigation and the commission thought it better judgment to wait and see if that issue could not be eliminated.

Mr. Carr said he did not see why the sale of six tickets for 25 cents was not the same as a commutation rate.

MATTERS OF SERVICE

Arguments and testimony relating to matters of service were then presented by Jacob W. Clute, Alderman August Tinnerholm, George R. Lunn and other citizens of Schenectady. It was stated by members of the citizens' committee that Horace E. Andrews had said in conference with them that he was perfectly willing to have a committee of reputable men examine the books of the company. Mr. Andrews was quoted as having said also that he was ashamed of the service the company was giving, but that it could not do better without higher rates of fare.

The complaints related largely to headway during rush hours and to the interurban waiting-room at Schenectady, which was criticised as inadequate and generally unsatisfactory.

Mr. Carr said that if the members of the committee would sit down with E. F. Peck, general manager of the company so that he could have a clear understanding of what they wanted in addition to the present service, the railway would do the best it could to accommodate itself to their desires. This arrangement would avoid taking up the time of the members of the commission and of others. Practically the same condition during rush hours existed at Schenectady as at other places. Crowds traveled during the morning and evening rush hours and probably the noon hours also to some extent. It was not possible, however, to avoid this crowded condition. As to the waiting-room, he would like to have the commission make suggestions as to what could be done to improve it. The company did have a very satisfactory plan that would have effected improvement, but the city authorities were unwilling to have the arrangement made. The company owned only a small strip of land where the waiting-room stood and it could not acquire more by condemnation. The waiting-room was not one that he could approve and he thought the subject should be taken up seriously and some good advice given by the commission.

Chairman Stevens said that if a better waiting-room was needed it should be provided.

Mr. Carr said there was no justice in the use of the waiting-room by passengers on local cars. There was not the slightest objection to examination of the books. The subject of commutation rates could be held until it was ascertained what would be done by the Legislature. If the amendments to the law were passed and there was no question as to the power of the commission the subject could be brought up, involving the reasonableness of the rates.

A REASONABLE RATE

Chairman Stevens asked what constituted a fair rate.

Mr. Carr said it was fairly well agreed, or ought to be, that a company should obtain enough to meet its operating expenses, fixed charges and a reasonable return by way of a dividend on the stock.

Chairman Stevens asked if that would not depend on what the stock represented.

Mr. Carr said the stock represented property to the fullest extent.

Chairman Stevens said that the courts in their decisions had gone into the question of the value of the property used in the service; that would naturally require an appraisal.

Mr. Carr said he could not say how he should go about it. The subject opened a very wide field. In some form the question must be determined. He assumed that the commission would not determine it as a guess or speculation; but it must be determined in some reasonable way. The extent to which an inquiry might go might be more limited in some cases than in others.

Chairman Stevens said it was a question of applying the law to the facts of the case. The commission would like to be informed why the company had departed from the usual custom, giving a discount on tickets sold in quantities.

Mr. Carr said the scheme had been tried as an experiment and now discontinued. The company was entitled to a 5-cent fare. When the transfer traffic was added the company was carrying its passengers for an average of just a fraction over 4 cents per passenger. If the public wished to have the 4-cent fare without transfers the company and the public would not be very far apart.

A discussion regarding service followed. Francis K. Kernan, of counsel for the company, said he thought the railway was using its trackage to the fullest extent. The

city of Schenectady had refused to give extra trackage rights that were needed.

Mr. Peck explained the plan of the company to have the terminal for its interurban lines separated from the central district terminal for the city lines, which was rejected by the city authorities. He said that in the rush hours the headway in the congested district was practically one minute. Out of 17,000 people employed by the General Electric Company at Schenectady 5000 had to be carried away in 20 minutes when they stopped work in the afternoon.

Chairman Stevens said the commission would take the matter of rates under consideration and see what it could do and what it ought to do. The commission had full power to investigate questions of capitalization; it was very largely a question of how to pay for such investigation. The question would be different if plenty of money had been appropriated for the commission.

A suggestion was made by Chairman Stevens that the citizens' committee write to the commission making specific suggestions respecting the waiting-room and arrangement of tracks. These matters then will be taken up with the company by the commission.

Adjournment was then taken, the commission holding the cases open without fixing a day for a subsequent hearing.

ELECTRIC RAILWAY FIRE INSURANCE CHANGES PROPOSED

A number of interesting matters have recently occurred in connection with the subject of fire insurance on the properties of electric railway, light and power companies and gas plants. At present the rates on these properties in different sections of the country are fixed by different rating organizations, of which there are some 50 or more, each having jurisdiction over a different territory. The result is that there is no uniformity either in rates or regulations covering improvements in risks, a condition which has resulted in great confusion. Where the ownership of widely distant railway properties has become united, as in a number of cases, this difference in rules and rates has become very apparent and has resulted in great dissatisfaction.

To remedy this evil a number of the leading insurance companies have thought that it would be desirable if the power to fix rates and unify the conditions regarding improvements from a fire-protection standpoint should be invested in one central bureau. This is the plan followed in the case of the steam railroads. The condition of the electric railways is coming to be largely the same, because the executive offices of many of the largest electric railway companies are now in New York and it has been thought that a central rating bureau in New York could deal directly and much more efficiently with this problem than if these matters were left to the local rating bureaus.

In consequence the following series of resolutions has been introduced for ballot at the periodical meetings of a number of the rating organizations throughout the country:

Whereas, The concentration of financial control of electric railway properties and allied classes has produced conditions which threaten the gradual loss of the business to stock companies under present methods of control by the various underwriting associations, be it

Resolved, That this exchange hereby delegates all jurisdiction over rates, rules and forms having to do with electric traction and allied properties, also electric light and power stations and gas works to a central rating committee to be made up of duly authorized representatives of this and other organizations hitherto having jurisdiction over such risks in various parts of the country and this exchange agrees to bear its pro rata proportion of the expenses of said central committee.

Resolved, That this exchange reaffirms and declares to be mandatory all existing rates and rules, both specific and general, governing such risks until changes and alterations in the same shall be duly promulgated by said central rating committee and that all rates, rules and forms promulgated by said central rating committee as hereinafter provided shall thereupon immediately be binding upon all members of this exchange. It being understood that all changes and alterations in the rates, rules and forms governing such risks in the territory of this exchange shall be promptly communicated to members by the said central committee through the manager of this exchange by promulgation on rate cards and circulars.

Resolved, That this exchange names its manager as its representative on such central rating committee.

Resolved, That the foregoing resolutions are to become effective May 1, 1909, or as soon thereafter as the said central committee shall have been formally organized.

This resolution has been adopted by some half a dozen various exchanges and it is thought will be adopted by all of them. It has, however, created some opposition, particularly among the local fire insurance agents, some of whom are protesting against the change proposed. The following circular letter voicing the opposition has been sent to the members of the National Association of Local Fire Insurance Agents:

We believe it is for your interest to be advised that the Eastern Union has requested rating organizations in territory under its jurisdiction to relinquish control of rates on street railways, electric light, power and gas plants. The apparent object is to have the rates made from a central bureau in New York and the insurance written therefrom.

The Springfield, Mass., local board, at its regular monthly meeting April 12, adopted the following vote:

"Voted: That the influence and help of the National Association of Local Fire Insurance Agents be invoked to assist us in obtaining from companies assurance that any change in the method of handling street railway insurance will not result in the overhead writing of these lines and the disregard of territorial rights of local agents."

At the same time it was voted to file a protest with the New England Insurance Exchange against any action permitting the overhead writing risks. The Fall River board has since taken similar action and other boards will do the same.

You are also advised that the Boston Board of Fire Underwriters has declined to accede to the request of the Eastern Union to throw off rates on the property named. It may interest you to know that there is a bureau established in New York City comprised of some 40 companies, the apparent object of which is to secure insurance on the street railways on the plan adopted by the so-called steam railroad syndicate.

Coincident with this movement there is a disposition on the part of some companies to take street railways and other similar risks out from under the overhead writing rules of the National Association of Local Fire Insurance Agents. Brokers handling those lines are urging companies to adopt this course in the writing of these risks. We shall be glad to have you advise this office of any action which may be taken in your locality regarding this matter.

The natural result of a central rating organization would be to put the insurance of electric railway properties on a more economical and scientific basis than under the present somewhat chaotic condition, and the proposed move seems to be in the interests of the electric railway companies.

The Rensselaer Polytechnic Institute, Troy, N. Y., which recently received a bequest from Mrs. Russell Sage of $1,000,000, has announced that the money will be used to build laboratories for the new departments of mechanical engineering and electrical engineering.

OPERATION OF CONVERTIBLE PAY-AS-YOU-ENTER CARS BY THE THIRD AVENUE RAILROAD COMPANY, NEW YORK

The Third Avenue Railroad Company, New York, has just begun the operation of some of the 200 convertible pay-as-you-enter cars ordered in January of this year. The company's first pay-as-you-enter cars were of the closed type, with 6-ft. platforms and longitudinal seats, and were so satisfactory that F. W. Whitridge, receiver of the company, was desirous of applying the prepayment idea on open cars. As this would have been impossible on the ordinary open car, the problem was solved by combining the Brill convertible car with the pay-as-you-enter platform. The appearance of the new cars in both summer and winter dress will be noted from the accompanying illustrations. In making the conversion to summer service no changes are required on the platforms except the substitution of a folding gate for the doors on the controller side. The sash and supporting panels removed from the body make way for storm curtains and a metal screen of sufficient height to prevent passengers from boarding or alighting except by way of the platforms.

The new car affords what seems to be a very satisfactory substitute for the ordinary open car. The latter, of course, is very popular in New York, as elsewhere in the East, but with a crowded running board and many openings is exceptionally dangerous on Third Avenue because the elevated pillars are so close to the street railway tracks. The free and easy open cars. Cross-seats with a center aisle have not been used to any great extent on the New York surface cars, but it is thought that this feature will attract many passengers, especially during the summer months.

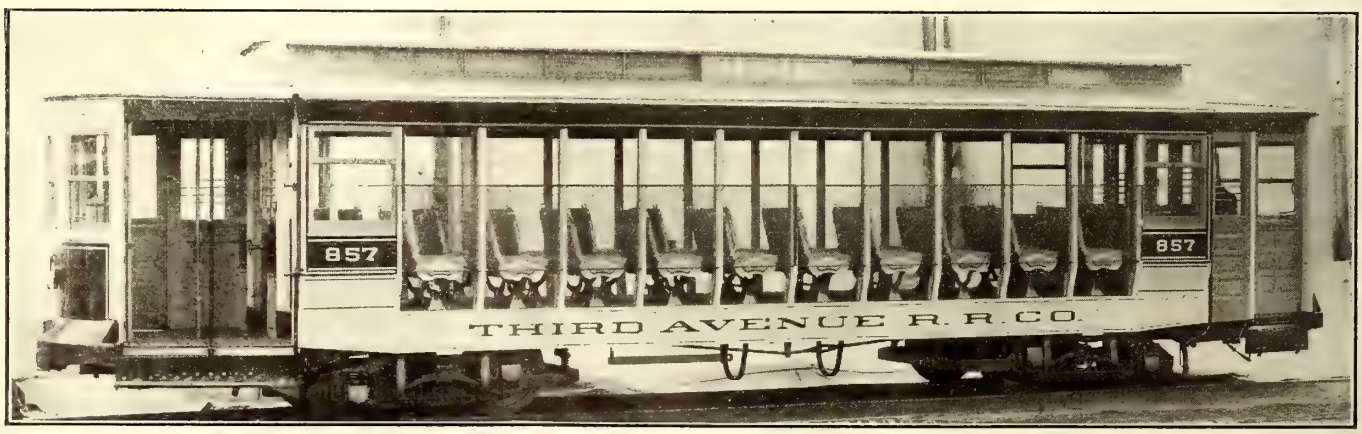


Convertible Pay-As-You-Enter Car—Head-On and Part Side View

The cross-seats, which are 36 in. wide, will not impede passenger movement, as the center aisle is 26 in. wide, and short longitudinal seats with folding ends are placed at the body doors.



Convertible Pay-As-You-Enter Car—Sides in for Winter Service



Convertible Pay-As-You Enter Car—Sides Removed for Summer Service

pay-as-you-enter convertible car will reduce accidents from this source to a minimum, as the conductor and motorman will be able to give close attention to the entrance and exit of the passengers. It also provides the security in regard to collection of fares which is not possessed by the

The platforms of the new cars are about 6 ft. long and, like the ordinary closed cars, are fitted with removable benches. The body is 30 ft. 1 in. long, and has a maximum width of 8 ft. 3½ in. over all and 8 ft. 2 in. at the window posts. A detailed description of this design was

published in the Jan. 23 issue of the ELECTRIC RAILWAY JOURNAL. In all, the Third Avenue Railroad Company will soon be operating a total of 350 pay-as-you-enter



Convertible Pay-As-You-Enter Car—Interior View with Sides Removed

cars, 150 of the closed type and 200 of the convertible type. All of these cars were ordered from The J. G. Brill Company under license of the Pay-As-You-Enter Car Corporation.

CONFERENCE WITH INTERSTATE COMMERCE COMMISSION ON STANDARD CLASSIFICATION OF ACCOUNTS

A meeting was held at the New Willard Hotel, in Washington, D. C., April 22 and 23, for the purpose of considering answers to the questions propounded to the Interstate Commerce Commission and to the Accountants' Association regarding the working of the standard classification of accounts, which has been adopted as standard by the Interstate Commerce Commission and the Accountants' Association. Those present were: C. A. Lutz, chief examiner of accounts; F. W. Sweeney and C. I. Dawson, representing the Bureau of Statistics and Accounts of the Interstate Commerce Commission, and W. F. Ham, chairman; H. L. Wilson, W. B. Brockway and W. H. Forse, Jr., of the committee on standard classification of accounts, and R. N. Wallis, president, representing the American Street & Interurban Railway Accountants' Association. Upward of 75 cases were considered and agreed to in the light of the classification.

In regard to future questions it was decided that electric railways doing an interstate business should, in case doubts arise as to the proper distribution of accounts, write the Bureau of Statistics and Accounts of the Interstate Commerce Commission, and before formally deciding the matter, the questions are to be submitted to the standard classification committee of the Accountants' Association so that the answers will be in harmony with the opinions of the bureau and of the Accountants' Association. All roads not doing an interstate business may address their questions to W. F. Ham, comptroller, Washington Railway & Electric Company, Washington, D. C., chairman of the standard classification committee of the Accountants' Association, and before the decision is rendered they will be submitted to the Bureau of Statistics and Accounts in order that its views may be had.

The Bureau of Statistics and Accounts will publish from time to time all of the questions and answers that are submitted to either the bureau or the Accountants' Association and in this way a complete understanding will be obtained by the electric railways of the interpretation placed upon such matters as will be brought up.

A uniform system of numbering the accounts of the three classifications in such a way that companies using either classification B or C may use account numbers in harmony with the account numbers of classification A was considered and preliminary steps were taken to bring out such a suggested plan of numbering.

The Accountants' Association proposes to publish immediately the complete classification of revenue, construction and operating accounts in pamphlet form.

COST OF ROLLING STOCK MAINTENANCE OF THE MARION, BLUFFTON & EASTERN TRACTION COMPANY

The Marion, Bluffton & Eastern Traction Company operates a high-speed interurban railway 31.57 miles long, connecting Marion, Ind., and Bluffton. The line was opened for operation on Dec. 15, 1906, with five passenger cars, Nos. 325, 330, 335, 340 and 345; one express car, No. 264, and one work car, No. 278. One additional passenger car, No. 350, was put in service late in 1908. The passenger cars are 45 ft. long and weigh about 30 tons each. They are mounted on Taylor trucks and are equipped with four Westinghouse 93-A motors, geared to 50 m.p.h., K-14 controllers and straight air-brakes. The roadbed consists of 70-lb. rail laid on ties well-ballasted with gravel. There are no grades outside of towns which exceed 1.5 per cent, and only one short-radius curve. All other curves are of large radius and in the 31 miles of track there are two tangents each 6 miles long, and two tangents each 5 miles long. These conditions, of course, are favorable for low maintenance costs for the rolling stock.

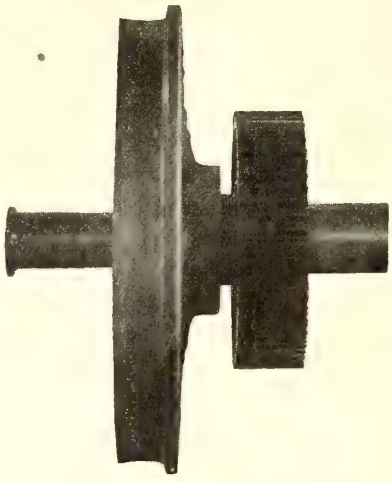
The following table shows the mileage each car has made since they were put in service up to Jan. 1, 1909; it also shows number of car miles run, number of direct-current kw-hours used per car mile, watt-hours consumed per ton mile, cost of oil, brake shoes and trolley wheels per 1000 miles for the year 1908, compared with the year 1907. The table also shows the mileage of steel-tired wheels.

Car No.	Car miles run. 1907.	Car miles run. 1908.	Total car miles for each car.	Mileage of steel tires before turning.
325....	69,508	53,102	122,610	3 Pair 69,508 1 Pair has not been turned 100,000
330....	78,390	87,224	165,614	
335....	88,084	84,060	172,144	3 Pair 100,080 1 Pair has not been turned 101,043
340....	77,578	86,518	164,096	
345....	28,336	7,091	35,427	Have not been turned
350....	.....	8,211	8,211	Have not been turned
264....	49,124	26,230	85,354	Have not been turned
278....	15,286	14,384	29,670	Have not been turned
	406,306	376,820	783,126	

	1907	1908
Total car miles run	406,306	376,820
Direct-current kw-hours used in year	1,039,262	1,022,130
Direct-current kw-hours per car mile	2.56	2.71
Watt-hours per ton mile	80	85
Cost per 1,000 car miles for oil and gear shield	$0.35	$0.19
Cost per 1,000 car miles for brake shoes	1.02	.60
Cost per 1,000 car miles for trolley wheels and supplies for same	.42	.32

The average mileage for the steel-tired wheels is very large. The accompanying engraving shows the condition of one of a pair of wheels which had made 195,525 miles

before they were turned. The diameter of these wheels when new was 34 in.; when taken out for turning they calipered 33½ in., showing ½ in. wear on the treads. After they were turned they calipered 33 in., showing a loss of but 1 in. in diameter. The wheels are Railway Steel-Spring Company's manufacture, with Midvale bolted type tires 2½ in. thick, 3¼-in. tread and 1⅛-in. flange. Up to the present time no motor armatures have been rewound and no motor or axle bearings have been changed.



Steel-Tired Wheel After Running 195,525 Miles

This paper is indebted to C. W. Clark, superintendent of the Marion, Bluffton & Eastern Traction Company, for the information and photograph.

DENVER SELECTED FOR CONVENTION CITY

As a result of the visit of the committee on location of the convention of the American Street & Interurban Railway Association and the American Street & Interurban Railway Manufacturers' Association to Denver last week, a decision was reached to hold the next convention of the association in Denver during the week commencing Oct. 18. The names of the gentlemen composing the two committees were published last week. On arrival at Denver they found the conditions there excellent for convention purposes. The conditions included facilities for holding the meetings, for making the exhibits and the hotel accommodations for the attendants at the convention.

The meetings and the exhibits will be held at the new auditorium, which is a beautiful brick and concrete structure built to accommodate national political conventions and other large assemblies which desire to meet in Denver. This auditorium contains an open area of 50,000 sq. ft., which will be available for exhibit purposes. It also contains several halls suitable for the meetings of the American association and its affiliated organizations. Electric current can be supplied exhibitors at 500 volts direct and 220-110, 60-cycle alternating. There is also steam at 100 lb. pressure. The space available for exhibit purposes is by no means confined, however, to the hall itself. Arrangements have been made by which additional exhibits, especially the larger apparatus and equipment, like cars, can be placed on the streets adjoining the auditorium. The streets are asphalted and the area thus occupied will be closed off from regular traffic and roofed over, so that it is certain that sufficient space can be had for all manufacturers desiring to make exhibits of apparatus and material next October.

While in Denver Mr. Beggs acted, by unanimous consent, as joint chairman and spokesman of the two committees. The committees were received and courteously entertained by W. G. Evans, president of the Denver City Tramway Company, as representative of the Denver City Tramway Company, which owns the city railway system and a number of the interurban systems around Denver, and also by the Denver Convention League, of which W. F. R. Mills is chairman. It was through the co-operation of these gentlemen that the arrangements for the Convention Hall, already outlined, were made. At a dinner given to the committees, at which the Governor of the State and other prominent city and State officials were present, the representatives of Denver expressed themselves as very enthusiastic over the selection of that city for the convention and assured the committees that all who should attend the convention would receive a most cordial welcome. Regrets were expressed that John A. Beeler, vice-president and general manager of the Denver City Tramway Company, was not able to be present at the dinner on account of illness.

En route to and from Denver the committees visited Milwaukee, Kansas City and Chicago, and at each of these cities fulfilled the enjoyable duty of presenting a badge to a past-president of the American association. It will be remembered that in January of the present year, at the annual banquet extended to the executive committee of the American association by the Manufacturers' association, similar badges were presented to those ex-presidents of the association who were in attendance. Badges also were prepared for all living ex-presidents of the association, and it was the request of President Shaw that members of the executive committee of the Manufacturers' association should present these badges in person to those ex-presidents who were not in attendance at the banquet in New York. The first badge thus presented was that given to John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light Company. Later on the trip presentations of badges were made to Walter H. Holmes, who was president of the American Street Railway Association, 1900-1901, and to Capt. Robt. McCulloch, president of the United Railways Company, of St. Louis. Captain McCulloch was president of the American Street Railway Association in 1896-1897. On the return to Chicago, at a luncheon at the Union League Club, the final badge with which the committee was intrusted was presented to John M. Roach, president and general manager of the Chicago Railways Company. Mr. Roach was president of the American Street Railway Association in 1899-1900.

During its trip the committee of the Street Railway Association had opportunity to learn the sentiment of a great many managers of the electric railway companies in the Middle West and Far West upon the plan of meeting at Denver. They found all with whom they discussed the matter very enthusiastic over the prospect.

The German Government is said to have drawn up plans for electrifying sections of the main line of the State railway system between Magdeburg and Zerbst, Bitterfeld and Leipsig and Leipsig and Halle.

There is a complete system of narrow-gage railways connecting many of the small villages and towns in Belgium with the larger cities. All of the 136 lines, which aggregate 2055 miles, are owned and operated by one company, the Société Nationale des Chemins de Fer Vicinaux. The tracks are laid along the country roads and sometimes across the fields. Most of the lines are still operated by steam locomotives, but the change to electric traction with overhead trolley is progressing rapidly. Already about 120 miles have been converted.

ANNUAL CONVENTION IOWA STREET & INTERURBAN RAILWAY ASSOCIATION

A very successful annual meeting of the Iowa Street & Interurban Railway Association was held at Cedar Rapids, Ia., April 22, 23 and 24. The Iowa Electrical Association held its convention at the same time and the supply men displayed an interesting exhibit of machinery and materials for railway and lighting plants. P. P. Crafts, general manager, Iowa & Illinois Railway Company, Clinton, Ia., and president of the Iowa Street & Interurban Railway Association, was in the chair. The following officers were elected to serve during the coming year: President, P. P. Crafts, general manager, Iowa & Illinois Railway Company; vice-president, E. M. Walker, general manager, Citizens' Railway & Light Company, Muscatine, Ia.; secretary and treasurer, L. D. Mathes, manager, Union Electric Company, Dubuque.

A brief abstract of the president's annual address presented by Mr. Crafts follows:

Considering existing conditions the Iowa properties made an excellent showing during the past year. Several lessons were taught which should remain firmly fixed in our memories. The results accomplished by the association have been widespread and beneficial. During the past year there were introduced before the general assembly a number of bills seriously affecting the railway interests, but no very harmful measures were passed.

City and interurban managers more and more realize that proper service and not low fares induce traffic and therefore during the past year they have devoted more time and money to the maintenance of accurate train schedules and the better up-keep of equipment and tracks with correspondingly good results in net earnings. By this policy not only are earnings increased, but the good will of the general public, which is so necessary to public-service corporations, and which many corporations have not enjoyed in the past, is being gradually won and in many cases has been restored after long and trying dissensions.

All these improved conditions have a strong tendency to increase the faith of the investor in electric railway securities. The increasing number of proposed interurban lines in Iowa indicates the truth of this statement. Many of these proposed lines will never be constructed, but a number, which because of the example set by operating properties, can confidently be expected to produce good results, will be built when the conditions of the money market improve. It is probably safe to predict that within a few years the State of Iowa will have as many or perhaps more miles of interurban railways for its population than any other State of the Union. The resulting benefits will be felt by existing as well as by the new properties, both city and interurban roads.

With regard to the gaining of public confidence, with shining examples to follow, many of us are too reticent and secretive about our business, give too little attention to small complaints, do not demand sufficient courtesy from our employees toward our patrons, and in many other ways fail to properly fulfil our obligations to our customers—the public. If a patron makes a complaint don't pass him down the line or keep him waiting. Don't give him an evasive answer or a reason which leaves him unsatisfied. Don't be mysterious. Don't hurry him away. Don't try to make him believe that your road is perfect and that mistakes never occur; he won't believe you.

Take him in hand promptly. Show an interest in his complaint. Acknowledge that mistakes occur. Look for the cause of his complaint while he is there if possible. Show a desire to correct the mistake. If you cannot give him an explanation then obtain his address and write him an explanation later. Do something, do it then, and many times you will turn a possible enemy into a stanch friend for your road and he will make other friends for you. After a while the public will believe that you want their patronage and support and will show a more friendly spirit to your interests. They will be less prone to listen to the buncombe of the ward politician and the latter's day of harmfulness will have passed.

At the 1908 convention your attention was directed to the fact that the Iowa Railroad Commission would probably adopt the report forms of the Interstate Commerce Commission. This prediction has been fulfilled, and such of our companies as are under the jurisdiction of the Iowa Railroad Commission have been obliged to change their accounting systems to conform. In the limited time allowed the change has proved a burden, but once in effect the new system was found easy to maintain and far superior to some of the old methods. The trend of the times is toward government supervision of public utilities, as evidenced during the recently adjourned General Assembly of the State. Although a commission was not created during the past session, it may come during the next. Such a commission might have jurisdiction over street railways and would in all probability adopt the accounting system of the Interstate Commerce Commission. Permit me to urge upon you, therefore, the importance of adopting the Interstate Commerce Commission system of accounting without alteration or addition.

The day of the so-called interurban road, whose small cars meandered slowly along one side of the public highway without much regard for schedules, is past. We are now operating heavy rolling stock at steam-railway limited-train speed, and, generally speaking, on closer headway. In addition nearly all interurbans are operating freight trains, from the single-car trains to those of several cars each, under varying conditions of schedule and speed. Not more than two interurban railways in the State operate under the same code of rules. City roads have various codes in use, probably no two of which agree in their general application. No doubt some have tried standard steam railway rules and finding them unsuitable in many respects for use on electric railways have altered them to fit peculiar local conditions. There is urgent need for standardization in this field.

The annual report of the secretary and treasurer showed the business affairs of the association to be in a healthy state. Every road but one in the State of Iowa is a member of the association.

OPERATING RULES

A paper on "Operating Rules for Street and Interurban Railways" was presented by J. A. Du Bois, chief dispatcher, Cedar Rapids & Iowa City Railway & Light Company. An abstract of this paper will be found on page 835.

F. J. Hanlon, Mason City & Clear Lake Railway, did not agree with Mr. Du Bois in his argument that a comprehensive set of rules similar to those used by steam roads should be adopted by a small interurban railway. For an extensive interurban system, however, the comprehensive rules were ideal. Mr. Hanlon formerly had been connected with a steam road and appreciated the value of the rules of the American Railway Association for a large road. His road, however, was less than 20 miles in length and operation by time card for a number of years had been so satisfactory that he did not feel the need of an elaborate code of rules. With the passenger trains operating on time cards and the freight trains keeping out of the way of the passenger trains there have been so few delays that the expense of a dispatcher did not seem warranted.

C. B. Fairchild, Jr., *Electric Traction Weekly*, suggested that the greater frequency of trains on electric lines would necessitate most careful study of any rules to be adopted. He recommended that a committee from the Iowa association be appointed to discuss train rules in conjunction with the committee of the American Street & Interurban Railway Association.

P. P. Crafts outlined his experience in formulating train rules for the Iowa & Illinois Railway. When this road started operation rules were adopted which then were thought satisfactory, but as the traffic grew these rules

were found not to cover every situation and therefore Mr. Crafts studied the rules proposed by the American and the Central Electric Railway associations with the purpose of formulating rules as closely as possible in line with steam railroad practice, but better suited to interurban conditions. Mr. Crafts called attention to several criticisms which he would make in the American Street & Interurban Railway Association rules. These suggestions had been embodied in a letter to the secretary of the association for the use of the rules committee of that association. It was his principle to make the unusual condition rather than the usual condition an excuse for issuing a train order. He did not feel that the American Street & Interurban rule regarding the protection of a train was as complete as it should be and therefore he had adopted the rule covering this situation as used by the Chicago & Northwestern Railway. This rule definitely states what each man shall do in protecting a disabled train between stations and includes instructions for moving a disabled car on a curve to straight track or to a place where the disabled car can be seen from both directions. The method of receiving a train order required by the rules on his road, he thought, offered every possible check against mistakes. This rule requires that the motorman shall call up the dispatcher outside of the hearing of the conductor, receive and write out the order on a triplicating machine which locks up one copy beyond the control of the dispatcher and the trainmen. After the motorman has written down the order the conductor, who in the meantime has not heard it, is required to repeat the order to the dispatcher. This method offers a double check against misinterpretation of wording or transcribing and against the possibility of the order being repeated from memory by the conductor.

J. D. Wardle, Cedar Rapids & Iowa City Railway, described the train rules used by his road. These rules approached very closely to steam railroad practice and provide for all contingencies. He had found under the usual interurban rules that there were situations in which the traffic would come to a standstill. The steam rules, however, provided for these emergencies. Mr. Wardle favored the adoption of standard rules for the Iowa roads so that with the exchange of men there would be no probability of misinterpretations of rules. One point in favor of the standard steam rules used by the Cedar Rapids & Iowa City Railway was that in the past it had been possible for this interurban road to send steam trains and crews of the Chicago, Rock Island & Pacific and the Chicago, Milwaukee & St. Paul railroads from end to end of the line in addition to the regular interurban service with only the customary pilot.

Regarding the keeping of copies of orders Mr. Du Bois said that all train orders were made in triplicate and the lowest copy was deposited in a locked box. The dispatcher wrote the orders in ink in a copy book and no erasure was permitted.

INTERSTATE COMMERCE COMMISSION ACCOUNTING SYSTEM

A paper on the "Application of Interstate Commerce Commission System of Accounting with Regard to Street and Interurban Railways" was presented by H. E. Weeks, secretary and treasurer, Tri-City Railway, Davenport, Ia. This paper will be found in abstract in the Electric Railway Journal for April 24, 1909, page 785.

Methods used in the adoption of these rules were outlined by C. L. Wight, auditor, Interurban Railway and the Des Moines City Railway, Des Moines, Ia. The city and interurban companies used the same classification with 88 accounts for the city property and 34 for the interurban. The addition clerical assistance required in the auditing office since the adoption of the new classification had been only one man. The accounting for the items of demurrage, mileage and per diem charges were more complete than formerly. Expense items were not subdivided except on the vouchers. When a company was to adopt the new classification Mr. Wight would suggest getting a new set of forms. A new set of books would not be necessary, but would be advisable. The adoption of the new system might make difficult a thorough comparison of operating items with those as kept in the past, but this was not a serious objection because the electric roads were growing so fast that the records of more than one or two years back were not worth much for comparisons of operation. The Des Moines companies had found much less difficulty in adopting the new classification than had been anticipated. In redistributing the accounts typewritten distribution sheets have been given to department heads and where these were not fully understood the doubtful points were discussed in conference. Mr. Wight recommended the adoption of the interstate classification by all electric railways in Iowa.

F. J. Hanlon stated that the Mason City & Clear Lake Railway had adopted the interstate classification beginning July 1, 1908. It was the practice of this road to use parts of the classifications for the roads falling under classes A, B and C. This furnished most complete operating statistics and when the report was made to the commission it was an easy matter to reduce the items to the class C classification under which this road was required to present its accounts.

Mr. Weeks stated when questioned that the matter of the disposition of discount on securities had been discussed repeatedly and that a committee of the Accountants' Association was endeavoring to get a conference with the Interstate Commerce Commission so that a decision might be rendered on this point.

F. J. Hanlon and H. E. Weeks had found in changing over to the interstate classification on the Mason City and the Des Moines roads practically no additional expense was incurred except for stationery.

L. E. Gould, Electric Railway Journal, outlined the discussion presented on the subject of changing accounts by the Wisconsin Street & Interurban Railway and other associations recently in session at Sheboygan, Wis. This discussion was abstracted in the Electric Railway Journal for April 24, 1909, page 773. Those Wisconsin roads which had adopted the new classification had done so with practically no additional office expense and it was thought in many instances that the very complete system of accounts would be of great value to the roads for managerial purposes.

H. B. Noyes, Omaha & Council Bluffs Street Railway, stated that he was not connected with the accounting department of his company, but knew that while the adoption of the new classification had required some additional men the results obtained from the new accounts had been of considerable value to the electrical and mechanical department of which he was the head. Mr. Noyes had put into effect a system of estimates and job orders for handling work in the mechanical department. Before beginning a new job the subheads of the department made estimates which were checked by him and approved by the general manager. Copies of these estimates were then sent to the auditing department. With such estimates on record there was available a means of urging the men to do work at a

low cost. This method also encouraged the shop assistants to be careful about wasting labor and material.

DEVELOPMENT OF TRAFFIC

A paper on the "Recent Development of Street Railway Traffic" was presented by E. M. Walker, general manager, Citizen's Railway & Light Company, Muscatine, Ia. This paper will be found elsewhere in this issue.

H. B. Noyes, Omaha, told of new cars which were being built in Omaha in which a sacrifice in carrying capacity had been made with a view of offering the passengers additional conveniences. One of the improvements in these cars was the installation of cross-seats.

I. B. Smith, traffic manager, Cedar Rapids & Iowa City Railway, thought that the most effective way to encourage traffic for an interurban road was by being persistent in soliciting business by letter.

Mr. Walker had obtained good results as regards reducing accident claims by using a recently published lithograph showing the right and wrong ways to get off cars.

Mr. Fairchild mentioned the present wave of publicity through the newspapers carried on by large city railways.

H. W. Garner, general manager, stated that the Oskaloosa Traction & Light Company in the past had supported a baseball team and he was satisfied that this was a good means of increasing traffic. The 15 extra cars required to handle the baseball crowds were manned by linemen and other employees that could be called upon.

L. E. Gould called attention to the desirability of encouraging the settlement of suburbs. An electric railway might very profitably devote considerable attention toward the development of suburban property in cities of moderate size where the haul was not unduly long. He described a scheme which a number of railway managers in the North Central States have entered into whereby a magazine will be issued monthly bearing the name of the local road. The contents of the magazine will include articles bearing on the value of small garden plots, the healthfulness of suburban life and the possibilities of making good investments in home properties outside of the crowded city districts. Mr. Gould also called attention to the great need for operating cars in small towns exactly on schedule. He described the plan followed by the Sheboygan Light, Power & Railway Company. This company printed many thousand schedules for city distribution showing the time at which cars on each route would pass closely spaced time points. The management exerted special efforts and brought about extreme accuracy in the maintenance of city schedules. As a result the short-haul traffic had been greatly increased.

F. J. Hanlon described how a shortening of the headway of the cars serving a suburban district near Mason City had not only developed a property in which the road was interested, but had more than doubled the earnings in that particular section. The short headway cars had encouraged people to move out of town and where a few years ago there were but 10 houses when cars were operated 30 minutes apart, there are now 300 houses and cars are run 15 minutes apart. This road uses time-tables with five-minute intervals for the convenience of its passengers and the convenience to the passenger of knowing exactly when a car will pass a time point has greatly increased short riding.

Mr. Crafts described his earlier experience with a city property which, when he took it in hand, did not have a very reliable schedule. An effort was made to run cars exactly on time and time cards with two-minute spacing points telling where each car would be every two minutes served greatly to increase the short riding.

On motion the chair appointed the following committee to consider standard rules for the Iowa roads and to confer with the rules committee of the American Street & Interurban Railway Association: C. D. Cass, general manager, Waterloo, Cedar Falls & Northern; J. A. Du Bois, Cedar Rapids & Iowa City; C. P. Wilson, Des Moines City Railway and Interurban Railway Company.

DEVELOPMENT OF INTERURBAN TRAFFIC

A paper on "Recent Development of Interurban Traffic" was presented by C. M. Cheney, general freight and passenger agent, Waterloo, Cedar Falls & Northern Railway. This paper was printed in abstract in the ELECTRIC RAILWAY JOURNAL for April 24, 1909, page 786.

F. J. Hanlon stated that the Mason City & Cedar Lake Railway depended very largely for its success on its freight traffic. This company has just carried out a novel enterprise for obtaining freight traffic. A large icehouse has been built on the shore of a lake close to one end of the line. During the past winter this house was filled with an excellent quality of ice and it is proposed to put out a salesman during the summer who will take orders for ice. He stated that the freight revenue alone from this enterprise would be between $20,000 and $25,000 during the present season in addition to which there would be a profit on the ice sold.

Mr. Crafts outlined his methods of handling chartered car service. The Iowa & Illinois Railway Company makes a charge of $50 for a motor car and $40 for a trailer during regular operating hours and an additional charge of $5 per hour for the use of a car after midnight. No limit is placed on the number of passengers that can be carried. This service is found to be profitable.

C. D. Cass thought that a flat rate for a car as offered by Mr. Crafts promoted the use of such cars because the organizations contracting for them could know how much the service would cost.

L. D. Mathes, Dubuque, mentioned the fruit special operated by the Spokane & Inland Empire System, an article regarding which was presented in last week's issue of this paper on page 790.

C. M. Cheney thought it more profitable for a small road to handle its heavy carload freight in trains drawn by steam locomotives, as was the practice on the Waterloo, Cedar Falls & Northern Railway.

J. D. Wardle stated that the Cedar Rapids & Iowa City road had an excellent location for freight handling with but one short 2 per cent grade and a few grades of 1½ per cent. Over this line, 28 miles long, a 35-ton electric locomotive with four Westinghouse No. 56 motors could economically handle a 300-ton train. It was a serious question, however, as to how to make time with the heavy trains and not overload the power station so that the passenger schedules might not be deranged. Mr. Wardle asked for information as to the best rule for determining when to install a siding for some source of traffic, such as a local manufacturing plant along the route.

Mr. Cass stated that in some instances the shipper served by the siding could be encouraged to pay for the cost of building a side track. He explained that the courts had ruled it lawful for the road to make a contract with the user of the siding and deduct from the freight bills proportionate amounts until the siding had been paid for.

Mr. Crafts described the methods of soliciting freight used by the traffic representative of the Iowa & Illinois Railway. Freight is solicited all the year round and the traffic representative also devotes part of his time in the

summer to encouraging passenger travel. This work is supplemented by having the officers of the company make friends at clubs and public gatherings.

INSPECTION AND MAINTENANCE OF ROLLING STOCK

A paper on "Inspection and Maintenance of Rolling Stock," by W. F. Raber, general manager, Ottumwa Railway & Light Company, was read by Charles E. Fahrney, superintendent of the same company. This paper was printed in abstract in the Electric Railway Journal of April 24, 1909, page 782.

L. D. Mathes, Dubuque, emphasized the importance of clean cars. It was advisable to make certain that all the cars were cleaned whenever in service. A clean car unconsciously had a good effect on the passengers. The Dubuque road had about 65 cars and painted each of them every year so that at the beginning of the season they looked fresh and clean. Three men were required in the paint shop, a painter at $75 per month and two helpers at $50 per month. This company had used a blowing outfit for cleaning the hidden corners in cars, but on account of the dust raised a suction machine had been substituted. This machine was an essential part of the car-house equipment. For car washing a floating crew made up of men from the track gangs called in in wet weather was used. Often 8 or 10 men were thus utilized in cleaning all the cars within a short period at the time the streets were dirty. The cleaning of box cars in the winter was found to be a serious problem. The company had tried to use brushes with a continuous discharge of water flowing through the handle, but had found that these brushes marred the varnish and so the box cars are now all cleaned by hand. An occasional fumigation of the car interiors made a good impression on the passengers.

B. Bohnson described the car-cleaning methods of the Clinton Street Railway. All cars were cleaned at night by two men. No washing was done during the day, and these men, who were paid $2 a night, cleaned an average of four or five cars per night. They worked seven nights in the week. The exteriors of the cars were cleaned with soap and water and the interiors were disinfected. Cars were inspected in rotation.

H. B. Noyes described the car-cleaning methods in Omaha. One-sixth of the cars in service were taken in each day for inspection and the cars were cleaned in the daytime. The management did not believe that this work should be done at night. Each car was overhauled and varnished every 12 months.

F. J. Hanlon had experimented with the use of spar varnish. He had varnished one-half of a car with spar varnish and the other half with the best high-grade coach varnish. The results with the spar varnish were not satisfactory. Mr. Crafts found spar varnish satisfactory.

E. M. Walker stated that the Muscatine road employed a carriage painter to paint the cars by contract. Mr. Hanlon stated that the Mason City & Clear Lake Company employed a painter the year round, but used him as a conductor in the summer after all the work at car painting had been finished.

Mr. Mathes favored planning painting work so that it would be distributed over the year. Men thus steadily occupied would produce better results. The Union Electric Company when buying new cars had them delivered in the white and finished them at Dubuque. When cars were finished at the car builder's they were often damaged in transit and needed touching up. The builders allowed $50 per car for finishing.

A RAILWAY STORAGE BATTERY

F. W. Laas, chief engineer and chief electrician, Cedar Rapids & Marion City Railway, presented a paper describing the successful load regulation on the lines of that company by the use of a storage battery. This paper is presented elsewhere in this issue.

L. H. Flanders, chief engineer, storage battery department, Westinghouse Machine Company, emphasized the value of the storage battery floating on a railway feeder system. Such a battery provided not only against stoppage of the current supply by engine breakdowns, but also exercised an important function in cutting down the peaks in the curve of the load carried by the engine.

ACCIDENT CLAIMS

A paper entitled "Handling Accident Claims" was presented by A. G. Rippey, attorney claim department, Des Moines City Railway Company and Interurban Railway Company. (See Electric Railway Journal of April 24, 1909, page 783.)

In discussing Mr. Rippey's paper Mr. Walker stated that the Muscatine company this year had offered a reward of $10 to each crew that at the end of the year showed a clear accident record. In four months since this offer was made there had been none but trifling accidents while in the same period a year ago several accidents had happened of a more serious nature. This prize offer had not decreased the number of accident reports made because it was understood that even in event of accidents if the crew was not liable it still would be eligible for the prize.

Several members of the association discussed the best methods for getting witnesses and accident statements.

BRAKES

A paper on "Brakes," by F. D. Miller, National Brake Company, was read by title and ordered published in the *Proceedings*. (See Electric Railway Journal, April 24, 1909, page 781.)

Through the courtesy of the local street and interurban railway companies at Cedar Rapids enjoyable entertainment was provided for those in attendance at the convention. The executive committee announced that the annual convention in 1910 would be held at Sioux City, Ia.

An instructive exhibit of railway and lighting materials was displayed in the auditorium during convention week. The following supply firms were among those represented which exhibited articles of interest to railways:

Atlas Railway Supply Company—Rail joints.

Rooke Automatic Register Company—Hand register and stationary fare register for pay-as-you-enter cars.

Walcott & Murray Manufacturing Company—Block signal installation.

Electric Service Supplies Company—Overhead materials, controller regulators and general supplies.

Handlan-Buck Manufacturing Company—General supplies.

O. M. Edwards Company—Window and car fittings.

American Steel & Wire Company—Wires, cables, rail bonds and bonding machinery.

Ohio Brass Company—Overhead fittings and general railway supplies.

Westinghouse Electric & Manufacturing Company—Railway supplies, lightning arresters, meters, etc.

J. B. Terry Company—General electrical supplies.

International Register Company—Fare registers.

General Electric Company—Railway supplies and materials.

W. R. Garton Company—Railway and line supplies.

W. N. Matthews & Brother—Line and railway supplies.

Everstick Anchor Company—Guy anchors.

National Lead Company—Paint supplies and bearing metal.

RECENT DEVELOPMENTS IN STREET RAILWAY TRAFFIC*

BY E. M. WALKER, GENERAL MANAGER CITIZENS' RAILWAY AND LIGHTING COMPANY, MUSCATINE, IOWA

The factors in the promotion of traffic are, first, the people to be served, and second, service. Under the latter head come the transportation facilities, including the layout of the tracks, rolling stock, the operators, and the convenience of schedule. The rate of fare has been pretty well standardized, and it is doubtless the exception where a limit of fare to be charged is not specified in the contract with the municipality. Therefore, the potentiality of the rate of fare as a factor in the upbuilding of traffic is more apparent than real.

Riding in cars is a matter of necessity, or a matter of habit, and under the stimulus of first-class service the former becomes merged into the latter. Habits must be formed, however, and this habit of car-riding takes years to develop. Indeed to the truth that it takes longer to develop a good habit than a bad one any street railway man will attest very quickly, after subjecting himself to a little introspection and noting how readily he takes on a bad habit and then how slowly his neighbor welds himself to the good habit of patronizing the cars.

In many cases the size of cars has been reduced, as it has been found that smaller cars operating at more frequent intervals have made possible a vastly improved service and at the same time a reduced car-mile cost of operation.

Much thought has been expended on what may be the most useful schedule, that is to say, the schedule which will reach the needs of most of the traveling public. That schedule is most useful that will deliver the mechanic at the factory, and the professional man at the office, or the traveler at the railroad station with the utmost economy of time. These are all features which enter into schedule making, and they appear in infinite variety wherever street railways are operated. It is, moreover, the writer's opinion that the regular schedule should be as closely as possible strictly adhered to, and that it is a mistake to yield the right of track to spasmodic traffic such as baseball and amusement park traffic, classes which too often cost more than they are worth.

That it is the rule rather than the exception to have rates of fare fixed by franchise has already been alluded to, and this is the case in one of our companies in Eastern Iowa. The franchise under which this company operates provides for: A maximum 5-cent fare; six tickets for a quarter; a 3-cent fare between 6 and 8 a. m. and between 5 and 7 p. m., and a 3-cent unconditional fare for children aged 6 to 12. The 3-cent time limit fare was primarily designed by those who granted the franchise to protect the man with the dinner-pail. Yet it has not worked out that way, as a large majority of the regular passengers of whatever sex or station in life carry both classes of tickets and in paying fare use the ticket best adapted to the time of day. The result of this discrimination has been to crowd the cars uncomfortably at the so-called rush hours of the day, whereas a fixed and uniform rate of fare would distribute the loading and would no doubt accommodate just as many passengers.

Furthermore, the thoughtful man fails to see why it should be worth more to ride in a car at 4:45 p. m. than at 5:15 p. m. Under the system, too, there are constant requests to stretch the limit, first, by school teachers, who wish the time limit to be moved down to 9 a. m. and up to 4 p. m., then by the retail clerks, who want the privilege of the low rate between 12 m. and 1 p. m. It appears, therefore, that this system of a low rate of fare at certain hours of the day or on certain days is a potential mill-stone, and it is pretty fairly well established that the surest way to get to shake hands with the receiver is to try to prove that you can carry passengers for a 3-cent fare.

The best and most complete development of traffic will follow not so much on reduced rates of fare as by having established an adequate and uniform rate of fare, coupled with a constant effort on the part of the traction company to make the purchasing power of the fare unit higher and higher in the way of improved equipment, improved rolling stock, improved schedules, more extended trackage, and higher-class employees.

The development of traffic through periodic or spasmodic media. such as amusement parks, baseball, picnics, etc., depends almost wholly upon localities and size of towns, as well as upon a considerable floating or transient population, which supplements the pleasure-seeking home population; and all these elements must combine to make profitable development possible through these means. Experience has shown even in our own little circle that some traction properties could not exist without their amusement parks, while others could not exist with them.

The development of the freight, express or parcel delivery feature of street railway traffic is more or less dependent on local conditions, and in a great many cases is even made a matter of franchise restriction. Some railways are so located that they might make a very profitable addition to their traffic by transferring the package freight from the freight depots to the houses in the business section of their towns, while in others this is not possible. Parcel delivery also has in many cities great possibilities.

There is one idea which seems to possess great possibilities for the development of traffic, especially as our towns and cities continue to grow and become more and more congested; and that is, the development of suburban living. It needs no argument to establish the advantages of a home just on the outskirts of the town. The only problem to the householder is that he may be assured of a ready, reliable and reasonable means of transportation from his home to his work; and therein lie the manifold advantages to the street railway industry. Missionary work along this line would be well expended, as in this way a considerable body of regular patrons would be created to whom the street railway facilities would be just as much a daily necessity as they may have hitherto been a luxury.

*Abstract of paper read before the Iowa Street & Interurban Railway Association, Cedar Falls, April 22-24, 1909.

OPERATING RULES FOR INTERURBAN RAILWAYS*

BY J. A. DU BOIS, CHIEF DISPATCHER, CEDAR RAPIDS & IOWA CITY RAILWAY & LIGHT COMPANY

When the interurban line of the Cedar Rapids & Iowa City Railway & Light Company was opened for operation on Aug. 13, 1904, a so-called standard code of rules was put into effect. After working under these rules for four years, it was found that there were certain rules which were objectionable and could not be carried out to the letter in practice; also that there were situations arising which were not covered by the rules. On Jan. 1, 1909, there was put into effect the book of rules adopted by the American Railway Association in 1906. These rules are complete and can be used for either steam or electric railways. In the writer's opinion they are far ahead of any interurban rules yet proposed. They are the result of years of experience, and interurban railways might profit by this experience, and not adopt some rules which were discarded as bad practice 25 or 30 years ago. Some of the interurban lines are now running steam trains in addition to electric cars, and the time is coming when there will be more or less interchange between the steam and electric lines. Therefore, the standard steam railway rules should be adopted and trains operated accordingly.

A comparison of the American Street and Interurban Railway Transportation and Traffic Association rules presented at the convention in October, 1908, and the standard code of rules as adopted by the American Railway Association in 1906 may be of interest. In making this comparison only the most important rules will be taken up.

The rule regarding new timetables as given in the interurban code provides that when a new timetable goes into effect "a train of the preceding timetable thereupon loses both right and class and can thereafter proceed only by train order." This rule is radically wrong. It is one that was used on steam roads years ago and proved unsatisfactory. The standard code makes the following provision:

*Abstract of a paper read before the Iowa Street & Interurban Railway Association, Cedar Rapids, Iowa, April 22-24, 1909.

Each timetable from the moment it takes effect supersedes the preceding timetable, and its schedules take effect on any division at the leaving time at their initial stations on such division. But when a schedule of the preceding timetable corresponds in number, class, day of leaving, direction and initial and terminal stations with a schedule of the new timetable, a train authorized by the preceding timetable will retain its train orders and assume the schedule of the corresponding number of the new timetable.

Schedules on each division date from their initial station on such division.

Not more than one schedule of the same number and day shall be in effect on any division.

This rule, as will be noted, makes a provision whereby certain trains may assume the same schedule on the new timetable under the conditions as stated.

The interurban code provides that: "Scheduled trains in either direction have superior right over trains of the same class in opposite direction, but will meet trains as per timetable, unless otherwise ordered by the superintendent or other designated authority." This rule is similar to the rule regarding change of timetable in that it was abolished years ago as impracticable on steam railways. If trains become late and the dispatching wire is down so the train dispatcher cannot get orders out to trains, trains will not only become later, but may be tied up indefinitely. The rule should read "Trains in the direction specified in the timetable are superior to trains of the same class in the opposite direction," and should also provide that "Direction is superior as between trains of the same class."

The writer does not approve of the rule in the interurban code: "Extra trains are of inferior class to all scheduled trains of whatever class, and have no rights except those conferred upon them by train order." The reason for disapproving this rule is that extra trains have no class whatever. A train to have a class must be shown on the timetable.

Rule 203 of the interurban code states: "Where train registers are maintained, if the motorman or conductor cannot reach train dispatcher, the train will proceed on timetable rights, then call from all succeeding telephone stations until he has succeeded in reaching the dispatcher." This is entirely unnecessary and causes delay. If the timetable under which trains are operated is made up correctly there is no necessity whatever of calling the dispatcher, but simply proceed. If the dispatcher wishes to get in communication with the train crew, there would be operators available through which they can be reached.

Rule 210 provides that "Trains running in same direction must keep not less than 3000 ft. apart." It would be better to specify "three or five minutes" apart, as the conditions of each individual road require to insure safety.

Rules 212 and 213 contain a provision that when the telephone is out of commission "All extra trains will lose their rights as extra trains and such trains whose movement is essential to the maintenance of the passenger service will become sections of regular schedule trains, all other extras clearing main track and remaining clear until telephone service is restored." If the timetable is made up correctly there is no necessity of delaying extra trains simply because the telephone is out of commission. There is no reason why they should not proceed as before and clear the time of all regular trains 5 minutes as required by rule.

The rule in the interurban code referring to delayed trains says "All regular trains, or sections of a regular train, when becoming — minutes late, must report to the dispatcher and will also report for each successive — minutes late. After they become — minutes late, such trains will lose their time-card rights." This is another cause of delay to trains which is unnecessary. The only rule recognized by the standard code provides: "Regular trains 12 hours behind either their scheduled arriving or leaving time at any station lose both right and schedule and can thereafter proceed only as authorized by train order." The dispatcher will know from the reports he receives from operators how late a train is running, and it would only cause more delay to require trains to stop and telephone at every station when they continued to lose time.

In the matter of handling train orders the interurban code does not provide that the conductor shall sign any order to obtain "complete" on it, but only that he sign the order after "complete" has been given. This gives the dispatcher nothing whatever to show that the order has been delivered. The standard code provides for a "31" order which is used to restrict the rights of trains and a "19" order which is used only to confer rights upon trains. A "31" order is handled as follows in the standard code:

When a "31" order has been transmitted operators must, unless otherwise directed, repeat it at once from the manifold copy in the succession in which the several offices have been addressed, and then write the time of repetition on the order.

Each operator receiving the order should observe whether the others repeat correctly.

Those to whom the order is addressed, except enginemen, must then sign it, and the operator will send their signatures preceded by the number of the order to the train dispatcher. The response "complete," and the time, with the initials of the train dispatcher, will then be given by the train dispatcher. Each operator receiving this response will then write on each copy the word "complete," the time and his last name in full, and then deliver a copy to each person addressed, except engineer. The copy for engineman must be delivered to him personally by the conductor.

No. 19 train orders are handled in exactly the same manner except that no signatures are taken from the train crew or the person addressed, but "complete" is given by the dispatcher when the order has been repeated correctly by the operator. This provides for a signature from the person or train addressed in a "31" order which gives the dispatcher something to show that the order has been delivered and thereby provides a protection for him.

The rule in the interurban code regarding second sections says: "Trains running as sections of any train must report when the opposing train is to be met at a point other than the schedule meeting point, or a meeting point made by order, and must not attempt to follow preceding section without an order from the dispatcher to do so." This is wrong, as each section of a train should have equal timetable authority.

Train orders should be given in as few words as possible, but should be plain. The example of an order as shown in the interurban code reads "Train No. 10, Car 106 and Train No. 9, Car 105 will meet at Cedar Rapids." This order should be shortened down to read "No. 10, Eng. 106, meet No. 9, Eng. 105, at Cedar Rapids." This is a saving of time both in putting the order out and to trainmen when reading it over. The words engine and engineer have been used in several places in this discussion. The definition of engine as given by the standard code is "A locomotive propelled by any form of energy." In order to meet the requirements a little more fully this definition was changed in the rules adopted by the Cedar Rapids & Iowa City to read "A locomotive or motor car propelled by any form of energy."

The form of work train orders and the holding order are plainer and better in the new standard code of the American Railway Association than is the interurban code.

The writer has tried to explain the importance of adopting rules which have been tried and proven to be the best for the operation of trains, and also the necessity of avoiding unnecessary delay to trains. The public demands better transportation facilities than ever before and adherence to schedule is a very important matter. Avoid all delays possible. Many lines advertise making connections with other steam and electric lines, and if these connections are not made regularly, the public is quick to find it out and withdraw its patronage. The writer would like to see some definite action taken toward having each road in the State adopt the American Railway Association's code of rules.

AUTOMATIC LOAD REGULATION ON TRACTION SYSTEMS BY STORAGE BATTERIES*

BY F. W. LAAS, CEDAR RAPIDS & MARION CITY STREET RAILWAY COMPANY

In general, the results from the use of a storage battery installation on the Cedar Rapids & Marion City Street Railway have been positive and satisfactory. The degree of regulation over the very widely fluctuating ranges of load has been all that could be desired. The steam plant has been entirely relieved of light load running, and its operation under load rendered more efficient. An increase in generating capacity has been avoided, with even greater insurance against break-downs than if extra generating capacity had been employed, and the net commercial result

*Abstract of a paper read at the meeting of the Iowa Street & Interurban Railway Association, Cedar Rapids, Iowa, April 22 to 24, 1909.

of the installation represents a balance considerably in favor of the storage battery system under the conditions of service at Cedar Rapids.

In order fully to appreciate the conditions under which this installation was made, a few words of description are necessary. This plant is equipped as follows: One 18-in. x 36-in. x 42-in. cross-compound Allis-Corliss engine direct-connected to a 450-kw, 550-volt Bullock d.c. generator, and one 22-in. x 42-in. simple Allis-Corliss engine belted to a 300-kw, 550-volt General Electric generator. Both engines are connected to surface condensers. The boiler plant consists of one 385-hp Erie City, and one 335-hp Erie City water-tube boiler (based on the usual 10 sq. ft. heating surface per horse-power rating). The steam pressure carried is 150 lb. The fuel used is a poor grade of Iowa slack, containing 20 per cent to 28 per cent ash, 5 per cent to 15 per cent moisture and a large per cent of volatile matter.

LOAD CONDITIONS

Increasing year by year, the load had finally reached a point where the peak, due to the sudden fluctuating railway demand, greatly exceeded the capacity of the smaller unit. It then became a problem to decide on the proper apparatus to install to act as a reserve unit. The location of the power station and grounds being so situated that there could be no extension, it would have been necessary to install a unit of at least 800-kw capacity to avoid the necessity of replacing a smaller unit after a short period of time. As the company now operates only one boiler at a time, to change the load from the 450-kw unit to the 800-kw unit contemplated in case of emergency peak, would certainly call for an unusual demand on the boiler. And in cleaning fires, handling cars during peak hours, and for park and certain amusement purposes, the larger unit would be equally disadvantageous to the boiler room. The fact that one unit would be standing idle the entire time would mean a large interest charge.

There was this fact to consider also: The cars run from 5:30 a. m. to 1:15 a. m., after which time the necessary lighting was obtained from the local lighting company. If any work were to be done on the line, extra cars sent out, such as the salt car or snow plow, the plant had to operate under very unfavorable circumstances.

The variable load, which would range from 100 amp to 1500 amp within three seconds, brought about numerous operating difficulties, such as "looping" of the indicator cards, either in the high or low-pressure cylinders (depending on the receiver pressure and the load carried, part of the time engine not "cutting off") raising the water level in the boiler, loss of vacuum, etc.

After considering all of these factors, the decision was made to install a storage battery to absorb the excess energy on light load and return it to the line on the heavy peaks, thus allowing the company to retain the 300-kw unit, which is of ample capacity to carry the average load. For this purpose a Westinghouse battery comprising 272 cells, with a capacity of 540 amp hours, and a momentary discharge rate of 960 amp, together with the necessary booster and Westinghouse automatic relay load regulator to control the charge and discharge, was selected.

OPERATION

The method of operation is as follows: At 5:20 a. m. the battery is switched on the line and all cars run off the battery until 6 a. m. The generator is then run in parallel with the battery and the regulator set to carry the average load in the generator. At 12:30 a. m. the generator is cut out and the battery again operates the cars until all are in the barns, and it is then used to furnish the lighting in the barns and cars the balance of the night.

ECONOMIES

Several important economies result from this method of operation. First and most important, both engine and boilers may be operated at substantially a constant load, which is the condition for obtaining the very best economy. The Wheeler condenser pump may be run at a definite speed corresponding to the highest vacuum with the highest practical temperature of hot well. The boiler feed pumps may also be run at a practically constant speed. The receiver pressure may be adjusted at the proper point for a given load. Feed water temperature remains constant at 204 to 210 deg.

The firing of the boiler may be done under a fixed load condition best suited to economical operation. In cleaning fires under a boiler working up to its capacity, there is some drop in steam pressure. This is avoided by giving the load regulator one-third turn and allowing the battery to carry the greater part of the load. If a grate becomes "stuck," the same course is followed.

There has been some saving in fuel on the plant, ranging from 3 per cent to 5 per cent. The battery builders, however, did not claim any saving in fuel in this particular case at the present time, for the reason that the load factor remains practically the same, for while the simple engine may be operated with a high load factor, yet the difference in economy of the compound unit even at a low load factor slightly overbalanced the economy of the simple unit, while the booster and battery losses nearly balance the gain due to the steady load on the engine. While the battery was primarily installed to allow the smaller unit to act as a reserve in carrying the load in a very few years it will serve the same purpose with the larger unit.

COMMERCIAL RESULTS

From a commercial standpoint the results are as follows: The company was able to dispense with the services of one man at the car barns, as there are now lights in the cars all night, so the men can handle their work with less delay. This represents a saving of $600 per year. The lighting bill was formerly $200 per year. There was also a reduction in the premium on the insurance on the car barn. The difference in interest charge between the cost of the storage battery and a new 800-kw unit will alone pay the maintenance charge on the battery, as the builders installed this battery under a 10-year guarantee that the renewals and maintenance would not exceed a certain per cent.

In other words, the chief value of a storage battery in a plant of this description is not so much in the fuel saved as in the reduction of fixed charges, wear and tear on machinery, the readiness to serve in an emergency, and, finally, the capability of the plant being operated with a maximum economy due to the fact that every phase of the situation can be studied under fixed conditions and the necessary steps can be taken to secure the best results.

OTHER USES

The battery has been used for several unusual purposes. The railway company has a tie line running from the switchboard to the switchboard of the local electric light company, which operates an interurban line 27 miles in length with three substations. There is also a 550-volt d.c. local power circuit operated from a 200-kw d.c. generator. It has happened that this generator has been out of commission and the substation has been called upon to supply the commercial circuit.

The drop in voltage on the line from the substation, due to the distance, was so serious that the service given was very unsatisfactory. Now, whenever necessary, the battery is connected in parallel with the substation through the tie line and maintains a constant voltage on the circuit.

A Thomson integrating wattmeter is placed in the line between the two power stations, running in one direction when the railway company is taking power and in the opposite direction when the electric company is taking power. The aim is to keep the interchange of power even by one company or the other pulling the extreme light loads. This 200-kw generator at the electric light station is belted to a 180-kw a.c. generator, which is operated as a synchronous motor. The set was formerly brought to synchronism with one engine, but the engine has been taken out and the set is now started from the d.c. end, taking current from the railway company.

BATTERY OPERATION

The condition of the battery is determined by the daily record of a pilot cell selected for this purpose. For all normal conditions the aim is to maintain the specific gravity of the pilot cell between 1.18 and 1.19. Between full discharge and full charge the specific gravity ranges from 1.15 to 1.2. High voltage and high specific gravity indicate an overcharge of the battery, resulting in poor efficiency, and low voltage with low specific gravity shows over-discharge of the battery, which, if allowed to exist for any length of time, will cause rapid depreciation. Occasionally the battery has had to carry the entire load.

DISCUSSION ON MR. MURRAY'S PAPER

The May *Proceedings* of the American Institute of Electrical Engineers contains the text of the discussion on the paper by W. S. Murray on the New Haven electrification, presented at the Institute Dec. 11, 1908. A synopsis of the oral discussion was published in the Electric Railway Journal for Dec. 19, 1908. The *Proceedings* contain some additional contributions made by letter. These are abstracted below:

MR. DAVIS' LETTER

Minor M. Davis refers to the effect of single-phase current upon telephone and telegraph wires. Transformers do not completely correct the trouble, although they are beneficial to some extent. The transformers introduced to correct this trouble on the New Haven road were applied only to single-wire operation and did not neutralize the disturbing effects of the single-phase current sufficiently to permit the operation of duplex, quadruplex and printer circuits upon the wires to which Mr. Murray referred. The pilot wires and transformers necessary for this protection, mentioned by Mr. Murray as being "not costly," really involve considerable expense, and are an additional cost which the use of single-phase current entails.

MR. PARSHALL'S LETTER

The letter from H. F. Parshall, the English electrical engineer, said that the relative merits of a.c. and d.c. apparatus were very thoroughly discussed in 1901, at the time of the selection of the proper system for use in the London tunnels. Mr. Parshall at that time advocated direct current, and nothing since then had occurred to justify him in departing from his original conclusion in favor of the d.c. equipment. He continued:

"From the nature of things the a.c. motor is inherently heavier and more complicated and must be more expensive as regards first cost and vastly more costly to maintain than the d.c. motor. The sole advantage incident to the use of an a.c. motor is in the supposed saving in the first cost of the collector system; but when a high-tension system is safely installed it must be more expensive than a third-rail system, consequently the whole reason for the existence of an a.c. system disappears in the final result.

"The perfected a.c. motor weighs about 40 per cent more, has all the objectionable features of the d.c. motor and practically twice over on account of the construction of the stator. The air gap of this motor in practice may not exceed 60 per cent of that of an efficient and well-designed d.c. motor and higher armature speeds have generally been found necessary. With the features above mentioned inherent to a.c. motors, the first cost of a train equipment, as also the maintenance, must be nearly double that of a d.c. equipment of a like capacity. Further, I doubt in the heaviest class of electric traction installation, such, for instance, as that in the New York subway, whether the a.c. motor can be made to do the work satisfactorily at all over a period of time. In addition to the above well-known features of the a.c. motor, the use of a train transformer has to be considered. What ultimate size and form this transformer may take in heavy high-speed work remains to be determined, since with a jumping contact the strains on this transformer are practically incalculable. I think it must be conceded by all that the a.c. train equipment, per se, is inferior as regards cost and maintenance to a d.c. train equipment, and that it gives no tractive advantage. The advantage then must be external to the train and confined to the system of transmission, or more properly, the collector system, since the transmission system would naturally be the same either with d.c. or a.c. As a matter of experience it has been found that the cost of a high-tension overhead system properly installed is greatly in excess of that of a third-rail system, and having regard to the exceedingly numerous difficulties as put in evidence by Mr. Murray's paper it cannot be contended that the action of an overhead high-tension system is anything like as satisfactory as the third-rail system. Considering all that has gone on in the New Haven system up to Sept. 5, 1908, which appears to be the termination of Mr. Murray's log, there is absolutely nothing to indicate that during 1909 some such series of occurrences are not again to be expected.

"The absolute lack of commercial data as regards the cost of the installation, cost of operation and cost of maintenance vitiates any conclusion that may be drawn other than that the system when compared with such a system as has been installed by the New York Central is entirely unjustified by the practical results. Some two years ago I was shown a diagram of the feeders and electrical system of the New Haven Railroad. I could only state that it transgressed every established principle as to safe and reliable working and that if the system as a whole was to be in any way justified there was no excuse for starving the system of feeders to such an extent and mixing up what might be properly termed the collector system with the transmission system. In my judgment many of the troubles that have been experienced would have been avoided had the a.c. system been installed in accordance with accepted a.c. practice, with a high-tension system of transmission, say, from 20,000 volts to 30,000 volts with substations at the different sections and a trolley voltage not exceeding 5000. The cost need not have been greater and the system would have been far and away safer in that the different sections could be independently controlled. Further, the volume of stray current in the earth causing electrolysis and induction troubles would be greatly lessened.

"Looking at the a.c. system broadly, it seems to be that its advocates are more interested in the electrical than the mechanical aspects of electric traction field and its opponents are those who have had the longest experience in traction matters and are not inclined to experiment with the fundamental elements of a traction system considering the sole and total advantage that can seriously be suggested in cheapness. Why a railway should spend its tens of thousands per mile endeavoring to make a system as safe as possible and then attempt to effect a minor saving by the introduction of a system bringing with it fatal and most experimental elements is beyond my comprehension. Mr. Murray states that there have been no fatalities so far as the public is concerned, nor would one expect such fatalities considering the short time the system has been in operation and the overhauling to which it has been subjected. In the fulness of time, however, there may be collisions, derailments or some such occurrence in which the overhead system will be disarranged at the same time as passengers debouch from the trains.

"No amount of rules and regulations will ever suffice to make a system having inherent fatal elements safe to the employees, in fact, having regard to the exigencies that have occurred in normal railway practice, rules and regulations in general may be taken as existing in form and not in substance. I regret to have to make use of Mr. Murray's expression in stating as my conclusion that his paper furnishes conclusive material of how not to install a traction installation, and it appears to me the only way he could possibly justify his belief as regards the commercial usefulness of the system would be by the publication of such commercial data as would show that the a.c. system as regards first cost and cost of operation has such material advantages over the d.c. system that all such occurrences as are recited in this paper are as nothing considering the proved commercial advantages.

"Having regard to the history as regards reliability and freedom from trouble with a third-rail system as also the wider field over which it is applicable on account of recent improvements, I am of the opinion that so far as the working of passenger services over the widest districts is concerned the direct-current system of electric traction is superior to the a.c. system for dense traffic movements and in the majority of cases in which electricity can properly compete with steam. That there are problems in connection with freight haulage over long distances in which the multiphase system possesses commercial advantages, I do not feel in a position to deny, although an examination of the individual cases which have been submitted to me has not in my judgment made this an indisputable fact. As regards the single-phase a.c. system there may be special applications to which it is commercially applicable. I have given the deepest study and thought to various problems, but in each case the use of the single-phase system has proved illusory. I do not wish to go further than to state that I have not found a problem to which it is properly applicable considering all the facts as I now see them. I

have recently very thoroughly investigated railway matters in the United States and my conclusion is that the d.c. system of electric traction is superior to all others and is likely to remain so for many years to come."

MR. LYFORD'S LETTER

O. S. Lyford, Jr., gave some particulars of the Erie Railroad single-phase equipment at Mt. Morris. This line has been in operation for 18 months with 34 miles of track and six cars. There has been one fatality of an employee, who lost his life during the first few days by coming in contact with the trolley wire. There have been no other personal injuries to employees or to the public due to the electrical equipment.

In October, 1908, there were no detentions chargeable to the electrical equipment. In November there were four detentions of this character, one due to control trouble, two due to hot motor bearings, one due to breakage of air-compressor crankshaft. Three of these detentions were of a character preventable by more rigid inspection. In December there had been no detentions up to the date of the meeting. It should be noted that only one detention was due to a strictly electrical cause, and none was due to high voltage or to the single-phase features of the equipment.

It is believed that this record of nearly 2.5 months will compare favorably with any other electrically operated road. This record, however, was obtained only after the equipment had been in process of "tuning up" for many months. In the 12 months ending Oct. 31, 1908, there were 120 detentions chargeable to the electrical equipment, which detentions totaled 4800 minutes. These include a number of serious detentions due to the 90-mile, 60,000-volt transmission line over which power is received from Niagara Falls for the operation of this road. The record is much better than that of the steam equipment replaced.

There have been no transformer troubles, either on the cars or in the substations. Motor troubles have been very few. No mechanical troubles with the contact wire. The wear on this wire up to August, 1908, was from 0.004 in. to 0.009 in., at which rate it would be between 20 and 30 years before the wire would be worn back to the supporting clips. Stretch of the copper wire and abnormal wear at hard spots will no doubt result in a life materially less than this. There has been no apparent deterioration of the galvanizing of the messenger cable and other galvanized parts, but such painting as was done on the overhead work has not lasted. There have been no material troubles or expense caused by locomotive gases. The life of the pantograph shoes average about 15,000 miles.

The operating cost under the usual transportation and maintenance headings of the Interstate Commerce Commission classification averaged during last summer about 18 cents per car-mile. Multiple-unit service with trains of more than two motor cars shows up better than single-unit service, owing to the fact that many of the faults of car equipment can occur without causing detentions, the other equipment carrying the train through on time.

Some schedules are operated under conditions well within the speed limit of the equipment, so that time can be made up after a detention. On other roads the schedule is practically up to the speed limit. Equipment troubles increase with the speed, particularly troubles with the moving contact.

In an anaylsis of the troubles which actually occur in electrical operation, whether d.c. or a.c., it is apparent that the power station, transmission lines, substations and distribution system, whether third-rail or overhead, cause but a small proportion of the train detentions. The record of the third-rail is especially good in this particular. Most of the detentions are due to trouble on the cars, and of these by far the largest proportion results from defective control.

In the light of this experience it is believed by the writer that the New Haven troubles will soon be confined mainly to the locomotives, and these will not be serious. The forced use of the combined alternating-current and direct-current systems is an abnormal burden on this operation. In view of the fact above stated, that is, that most of the train detentions are caused by the control, it may be anticipated that the New Haven operation will not do quite as well in the long run as a straight single-phase service The use of multiple-unit motor cars will help to improve the log. The Erie record above quoted gives no indication that detentions due to locomotive troubles with a straight single-phase system will be materially greater than with the direct-current system. The maintenance cost is another matter. The greatly increased cost of the electrical equipment of the locomotive or motor-car must necessarily involve greater cost of repair and maintenance. The savings effected in other parts of the system must carry this burden.

MR. SMITH'S LETTER

W. N. Smith pointed out that while the greatest number of train detentions on the New Haven system were due to trouble with car operation, the detention due to line or other arrangements of the power station are of far greater average duration than those due to car failures. Mr. Smith believed that the boldest feature of the New Haven installations was the adoption of a previously undeveloped line construction. The means adopted by the New Haven engineers to overcome the trolley difficulties seem to have been successful, although further improvement is probable. The apparently simple yet fundamental problem of improving the contact system still presents a field for the exercise of inventive genius.

MR. DAWSON'S LETTER

Philip Dawson presented some particulars of the overhead system of the London, Brighton & South Coast Railway, which is of the double catenary construction. An abstract of the information given by him follows:

The form of construction is the double catenary, details of which are shown herewith. The illustrations show the trolley wire after it has been put up and while it is only temporarily supported, before being finally fixed to the clips and droppers which support it from the two cate-

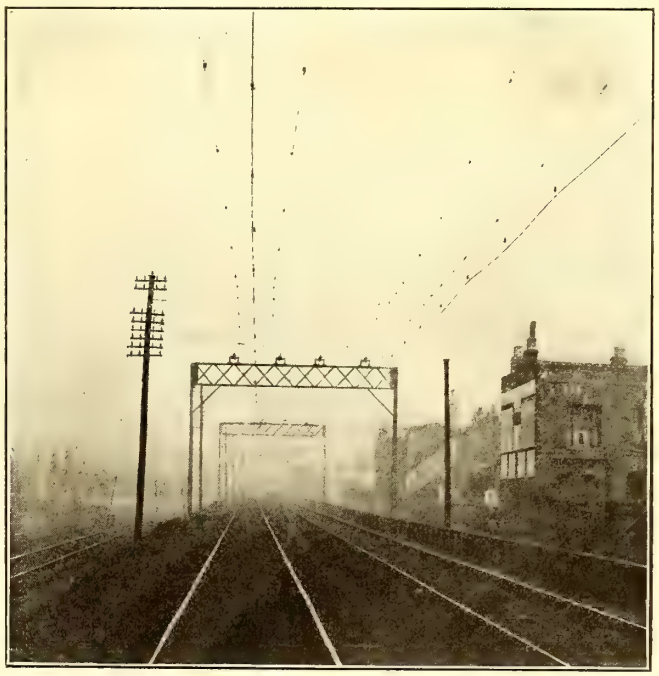


Fig. 1—London, Brighton & South Coast Railway—Overhead Line During Construction

naries. The droppers are solid sherrardized steel wire, the shorter ones having a loop at each end, the longer ones consisting of two parts looped in the middle. This arrangement gives great flexibility in the vertical plane while insuring great stability in the horizontal plane for the trolley wire. The catenaries are of galvanized steel wire cable ⅜ in. in diameter. Each catenary is independently fixed by means of a turnbuckle and insulator, and supported from a saddle-piece resting on the top of the main insulator. The sag in the catenaries is calculated so as to produce absolute balancing at the supports. The principal insulator has to bear a dead weight which amounts to 850 lb.

All of the insulators are of the best quality porcelain.

All of them have been tested, the principal ones to 65,000 volts and the secondary ones to 25,000 volts for 30 minutes; 10 per cent of the insulators were tested mechanically. The whole construction of the catenaries, girder bridges, insulators, etc., is calculated so as to result in a factor of safety of 10.

The trolley wire itself is round, with sharp grooves at the sides, into which mechanical clips fix, and its area is 0.197 sq. in.; its tensile strength being in all cases superior to 49,280 lb., or 22 English tons, per square inch. To prevent the hammer blows from which the New Haven line has suffered, the whole construction has been designed so as to make the clips and the droppers from which the clips are supported as light as possible in comparison to the weight of the trolley wire itself. Three years ago, at the time the London, Brighton & South Coast Railway installation was planned, the writer made the most careful investigation, and then decided on the flexible system instead of the rigid one originally adopted by the New Haven line.

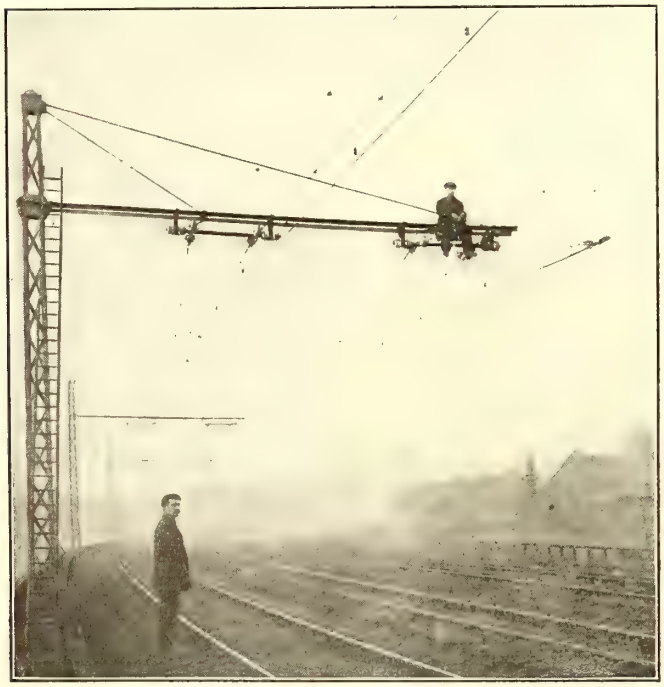
The greatest span so far is 195 ft. The vertical projection of the sag of the catenary wire at 50 deg. Fahr. for this span corresponds to 6 ft. Contrary to Continental practice, the trolley wire is drawn up and anchored at both ends with due regard for the lowest temperature to which it may be subjected, so that in the coldest weather the elastic limit should not be exceeded in the wire. The wire is staggered 18 in. altogether, or 9 in. on either side of the center line of the track, and at points has been diverted so as to go as far as 13 in. from the center line. The normal height of the wire will be between 16 ft. and 17 ft., while in the two terminal stations the height is 21 ft. At some of the lowest bridges the wire descends to a height of 13 ft. 10 in., or only 4 in. above loading gage. The train service which will operate over this line at present is of a purely local character, and it is not likely that for the present a speed of 45 m.p.h. will be exceeded.

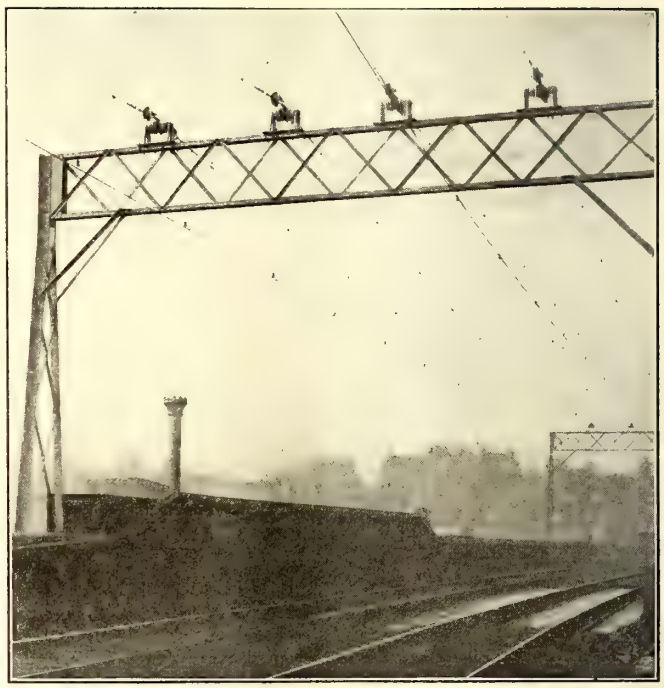
The extensions that will be proceeded with as soon as satisfactory results are obtained on the first portion, now nearing completion, may, however, involve the operation not only of multiple-unit local trains, but of trains hauled by electric locomotives, which, of course, may obtain speeds considerably higher than at present contemplated.

Careful consideration led the writer not to adopt the pantograph type of collector, but to adopt a type of trailing bow collector. This collector consists of a tubular frame, the top of which is fitted with two bows, one forming the rigid portion of the frame itself while the other is hinged and sprung from it. It is believed that this method will insure sparkless running and operating with a pressure of from 12 lb. to 15 lb. between the collector strip and the contact wire. There are two bows, one for operating in each direction. On the top of the collector bows are fixed renewable grooved aluminum strips, as it is believed that by this means the wear of the wire will be localized on the contact strip, virtually no wear of the trolley wire taking place. Furthermore, owing to the form of strip and to the low pressure exercised by it against the trolley wire, the writer thinks that the cost of the strip itself will not be a very large item in the working expenses.

MR. OFVERHOLM'S LETTER

Ivan Ofverholm, of the Swedish government railways, gave some details of the experimental single-phase road installed by that government. Owing to the strains upon the generator in cases of short circuits, the engineers installed a weak coupling between the generator and turbine designed to break when a severe short circuit occurred. The catenary construction was not used on the Swedish railways, but the bow pressure was so adjusted that the resultant stress in the contact wire (the sum of the normal stress in the contact wire and the bending stress resulting from the bow pressure) never exceeds the elastic limit. He thought that the steel-working conductor on the New Haven line would be more affected by the locomotive gases than bronze wire. In the Swedish locomotives two bows, 6 meters or more apart, are used.





Figs. 2 and 3—London, Brighton & South Coast Railway—Views of Overhead Line During Construction

MR. EVELETH'S LETTER

C. E. Eveleth referred to the oil circuit breakers used on the New Haven feeders and gave some particulars of some tests conducted by him and Mr. Hewlett in 1902 with oil switches under short circuits at 75,000 volts with and without transformers, transmission lines, etc. Simultaneously with these tests investigations were conducted concerning the requirements of reinforcement of the end windings of generators. In 1904 he built an oil circuit breaker which opened repeatedly on a single break current of 20,000 to 25,000 amp at 2200 volts without throwing the oil or otherwise damaging the switch. He believed that it would have been better to have used single-phase generators for the operation of the system than polyphase apparatus and to have supplied polyphase generators for the operation of the shops and direct-current substations.

MR. MURRAY'S REMARKS

Mr. Murray in closing the discussion replied to both the oral and written remarks. The following abstract relates only to the points brought out by the written communications mentioned above.

He said that while probably it would be possible to design generators of the voltage and capacity used in the Cos Cob station capable of withstanding short circuits, it might have been advisable to use low-voltage generators (say, 2300 volts) and step-up transformers. In regard to the type of generators, one reason that two-phase generators were not selected was owing to the location of the power station, which is about 18 miles from one terminal of the electrified track and 3½ miles from the other. If two phases divided at the power station had been used they would have been very much unbalanced and it would have been impossible to keep the voltage of both phases constant. With its three-phase generators the company regulates the voltage of the propulsion phase and the copper-clad rotors of the generators smooth out to a great degree the unbalanced voltages of the other two phases.

In referring to M. M. Davis' suggestion, he said that the paper had touched only lightly upon matters other than traction. He did not see any occasion, however, to change his remarks in regard to the effect on telephones and telegraphs except to say that Mr. Davis' position possibly enabled him to judge better than the speaker in regard to the cost of the transforming equipment necessary to effect the voltage compensation described.

Mr. Parshall's decision in 1901 was previous to development of the modern type of single-phase motor and the subway conditions in London and New York have little relation with those on the New Haven railroad. The alternating-current motor does not weigh as much more than the direct-current motor as assumed by Mr. Parshall. High armature speeds are an advantage rather than a disadvantage, and the speaker did not think that the cost of an overhead system properly installed would be greatly in excess of that of a third-rail. Even if more expensive in first cost, the system might be more economical to operate. The operating cost of the New Haven locomotives on the direct-current zone is 40 per cent greater than on its a.c. zone. The speaker did not think the faults found previously with the a.c. system would be repeated.

Referring to Mr. Dawson's description of his overhead system Mr. Murray stated it might be quite possible that the clips to be used on the Brighton & South Coast Railway will be sufficiently light to prevent kinks in the trolley wire and probably no trouble will be experienced at speeds of 45 m.p.h. or less, but he did not think this construction suitable for the New Haven line. His preferred construction for an overhead line was, briefly:

1. One single steel stranded messenger cable with deflection corresponding to economical values fixing distance of span.

2. One horizontal solid copper conductor supported from steel messenger at intervals of 10 ft. with light tension on same.

3. One horizontal solid grooved steel (contact) wire supported by light clips (weight not greater than 9 oz.) from the solid copper wire at mid-points between messenger hangers. The tension in this wire not to exceed the elastic limit of the steel at lowest temperature.

Mr. Ofverholm's experience with the deterioration of steel contact wire from the smoke of the locomotives has not been duplicated on the New Haven line.

The Melbourne (Victoria) Tramway & Omnibus Company on April 1 declared a dividend on its capital stock at the rate of 15 per cent per annum.

The Stone & Webster Engineering Corporation has contracted for the design, construction and equipment of an interurban electric railway between the cities of Galveston and Houston, Tex. The distance is about 50 miles and the road will be designed for high-speed operation. The engineering work includes the final surveys, determination of right of way, design of bridge structures, the working out of the most economical car schedules and the selection of types of rolling stock best adapted to the conditions. The contract includes the design and construction of the power station, transmission lines and substations.

COMMUNICATIONS

METHODS OF CLASSIFYING CLIPPINGS FROM TECHNICAL PAPERS

PUGET SOUND ELECTRIC RAILWAY
TACOMA RAILWAY & POWER COMPANY

TACOMA, WASH., April 7, 1909.

To the Editors:

I have read with interest your editorial in the ELECTRIC RAILWAY JOURNAL of April 3 on the "Size of Technical Papers." In view of the fact that I clip and file all articles from the various railway magazines in a much more elaborate manner than is generally customary among readers of the magazines, an account of the method followed will perhaps be interesting.

I subscribe to all the papers in duplicate. Upon receipt of the copies each week I put them in order and remove the advertising matter and the clips which bind them together. Then I put them in a paper cutter which cuts them all to the standard size. These loose pages are then sorted so that duplicates are together, and, starting with the first page, I clip out all articles of short length, and if extending into more than one column, bind the parts together with paper clips. Whenever possible, I retain the loose page as a whole, drawing a red line through the article clipped from the duplicate page.

After having completely clipped the paper, I date all articles with a rubber stamp and then sort them according to the following classification:

1. Management.
2. Transportation.
3. Traffic.
4. Parks.
5. Claim and Legal Depots.
6. Purchasing and Stores.
7. Electrical Engineering.
8. Power Plants, Overhead and Bonding.
9. Track Maintenance, Construction and Structures.
10. Shop Construction and Shop Operation.
11. Rolling Stock.
12. Accounting and Auditing.

For each of these general subjects I use a letter file with the interior folders removed and others substituted that are made from tag paper folded to form a folder with a projecting tab. There is one of these folders for each subdivision of the general subject, and in each I place the clippings on that subject from the pile on that general subject.

When these clippings have accumulated sufficiently I prepare them for binding permanently. I take the letter file on the subject to be bound and remove the folders and sort the clippings according to my detail index. Clippings which are less in size than that of a whole page or which have to be clipped from a duplicate page are pasted on sheets of good bond paper cut to the standard size page and are arranged in order of date and of importance. When all the loose pages and clippings have been properly arranged in order, beginning with the first page on top, they are numbered in consecutive order with a numbering stamp. Then an index of the articles is typewritten on standard sheets, a front title page is lettered, and the whole is turned over to a local binder for a regular book binding. He returns to me a fine-looking book which is of great value for reference.

I have used this method for preserving the subject mat-

ter in the various railway magazines since 1902 and have found that it was not a very difficult way of solving a perplexed problem. As a result, I have a set of books of great value to myself and my friends for reference purposes when it is desired to look up what other companies are doing in some particular detail of electric railway operation.

J. Russell Morse.

New York, April 24, 1909.

To the Editors:

Next to knowing a thing is to know where to find it. To expand the horizon of our knowledge and to aid memory nothing is more important than an accurate and exhaustive classification and indexing of the material belonging to the subject.

The method which I have employed for 10 years in my office for the classification of matter pertaining to the electric railway industry may prove of interest. Every article which has appeared in the Electric Railway Journal for the above period, for example, has been classified according to this method until the subdivisions have reached some 1600 heads, under which over 18,000 cuttings are arranged.

From this mass of matter has been evolved the following general classification: First, the financial and then the engineering. The latter begins at the foundation structure, then passes out of the power station, over the transmission system to the trolley, includes the equipment and the rail and is then carried back to the ground at the negative bus, thus completing the cycle. All divisions and subdivisions are numbered by the Dewey decimal system, first employed in cataloging and indexing the volumes in the Columbia College Library. The system is so elastic that it permits the interpolation of any number of items, divisions or subdivisions, without the change of any original number. The index can thus be expanded indefinitely, and no index made upon this principle can become obsolete.

The general index is, in part, as follows:

.10 Finance.
.11 Franchises.
.12 Stocks and bonds.
.13 Cost of installation.
.14 Accounting.
.15 Cost of production.
.16 Depreciation.
.17 Expenditures.
.18 Purchasing department.
.19 Forms and blanks.
.20 Statistics of electric railway systems.
.21 Power station.
.215 Substation.
.22 Terminal stations.
.24 Rates of charging.
.25 General description of railway systems.
.26 Legal decisions.
.27 Legislation.
.28 Insurance.
.40 Station buildings.

The classification is carried out in this way for 118 main divisions, which are again subdivided into minor divisions. For example, take the subject of trucks. The first number, 2, always appears opposite any article on trucks and the minor details follow, as seen below:

2.16 Trucks: General information.
2.160 Repairs; cost of and maintenance of.
2.1601 Single, compared with double trucks.
2.1602 Types of.
2.1603 Tests of.
2.1605 Single.
2.161 Double.
2.1612 Maximum traction.
2.1613 Radial.

This division is carried further to seven other subdivisions, which cover, specifically, everything which has been published about trucks in the principal technical journals during the last eight years. The matter thus collected and classified amounts to some 240 clippings, of over 12,000 words.

The value of assigning a decimal number to all articles, and even to all paragraphs, in a general discussion, is that the subject matter is often foreign to the title of the article. In that case as we read over our technical literature the number of each article or paragraph can be written on the margin of the sheet opposite to the subject indexed. Even an office boy is then able to make the clipping and place it in the file where it belongs. For quick reference as to subject, headings are again alphabetically arranged in a card index which gives filing number and cross-references.

The only method by which a title alone can be filed is alphabetically by the subject matter, as indicated by the title. Often the valuable part of an article is not included within the scope of the title and, not infrequently, remarks made upon related topics are of great value and are exactly those things it is difficult to find when needed. This classified indexing system, however, is inexhaustible, in that all the information of a kind that has been published is gathered together under one head and can easily be referred to.

The index can also be developed geographically. It is very often necessary to ascertain where certain apparatus is used or to find out everything that has been published about an electric railway system in a certain place. This information can easily be reached by means of an alphabetically arranged index which has been made of all the towns in the United States and Canada of 5000 population and over. These are numbered consecutively, are divided by States and the towns in each State are arranged alphabetically. All general information is arranged, not only as to its classification, but also as to its geographical location in that class. We have thus at hand a quick means of locating information as well as complete cross-references. For instance, in looking up the material under the number 2.1613, which refers to radial trucks, it is found by means of the cross-reference card that at Harrisburg, Pa., and at Boston, Mass., these trucks are used, and in the general description of the system we find matter pertaining to the use of radial trucks.

The method of classification can be carried still further by adding reference letters to cover specific details. Thus, in the writer's index the small *"d"* always stands for dimensions and *"c"* for operating conditions. At a glance we can therefore know whether the cross-reference would probably give the specific information of which we are in search. The letter suffixes may or may not be used, as they are rather a matter of personal convenience than a necessary part of the system.

The actual method of filing employed was the outcome of considerable experience. A number of methods were tried and rejected because they proved clumsy and too complicated for use by an ordinary assistant. An attempt was made to use the envelope system, the cutting being placed inside, the indexed number written on the left-hand outside corner of the envelope and the title across the top. The name and date of the periodical in which the enclosed matter had appeared was also affixed. It was found impracticable to use this method as the cuttings sometimes became misplaced. Long cuttings are now pasted to a folder, 6⅛ in. x 3½ in., with a slot across the top. The title of the article

projects through this slot. The cross-reference numbers are written on the outside of the folder below the title. Small cuttings are pasted on cards, the same size as the folder, down the front and up the back. If too long for this treatment folders are used as described. In all cases the titles are visible when filed.

The actual filing case is a cabinet of drawers each deep enough to hold the cards and the folders, both being of the same dimensions. Each drawer is divided by partitions so as to form a place for three rows of the folders and cards. A case, 42 in. x 60 in., with 18 drawers, will hold 12,000 clippings; the front of each drawer is labeled by both index number and title of contents. So that the approximate date of the articles may be known at a glance, all the clippings of each year are placed in folders or on a card of a particular color or tint. This plan has proved very useful. A card showing the colors used for each year is affixed to the filing cabinet. By this means the date of the information is roughly indicated.

This method of classifying data has proved of real value, especially because it is a perpetual system growing more valuable as time goes on. The index can be introduced into the Dewey system in any library, a system generally used to-day in all libraries, by prefixing the Dewey number 621.33.

The authors of articles cannot, of course, be found by this system, as all data are classified strictly as to subject matter.

It is with the hope that this brief explanation of a system worked out through years of practice may be of help to co-laborers in the field of electrical engineering that it is here given. ALBERT B. HERRICK.

SEPARATE CARS FOR WOMEN ON THE McADOO LINE

NEW YORK, April 20, 1909.

To the Editors:

Among the various suggestions that have been made to render subway traffic in New York less disagreeable to women, none has been more strongly advocated than setting aside one car in each train for their exclusive use. The theoretical advantages of it have been strongly urged, and have been supported by a good many people who are not acquainted with the actual problems of handling large numbers of people during rush hours. The theory is nice in writing, but those who have watched its practical trial by the Hudson & Manhattan Railway, operating a subway service between Hoboken and Twenty-third Street, New York, have observed that actually the reserved car for women is an absolute failure.

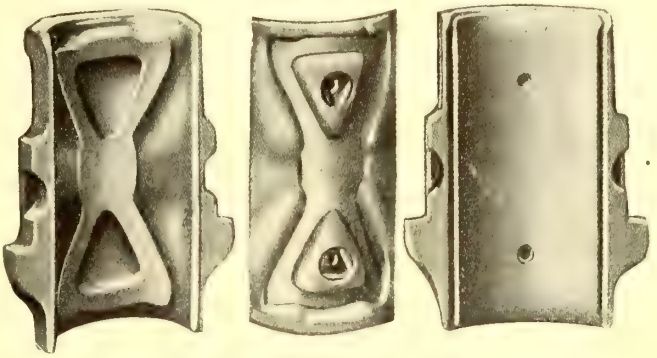
Ever since the plan was put in operation by the company mentioned I have watched the reserved car carefully. It is now rarely filled, a third of the seats being often empty, although women may be standing in the "mixed" cars of the same train. On the other hand, these latter cars are more crowded than before. Consequently the practical result of the experiment has been to overcrowd all cars but one, and haul that only partly filled. Only a very small percentage of the women traveling on the line pay any attention to the reserved car, which really seems to be a fizzle from the point of view of at least nine-tenths of the women.

LACKAWANNA COMMUTER.

The Prefect of Oran, Algiers, is asking for applications for concessions to construct and operate electric railways 18 miles in length in that city.

A TWO-PART JOURNAL BEARING

The Paragon Metal Company, Chicago, Ill., has placed on the market a journal bearing known as "Two in One," which, as the name implies, is made up of two parts, one serving as a shell and the other as the lining of the bearing. The shell, as shown in the accompanying illustration, is provided with ribs on its inner surface which fit into

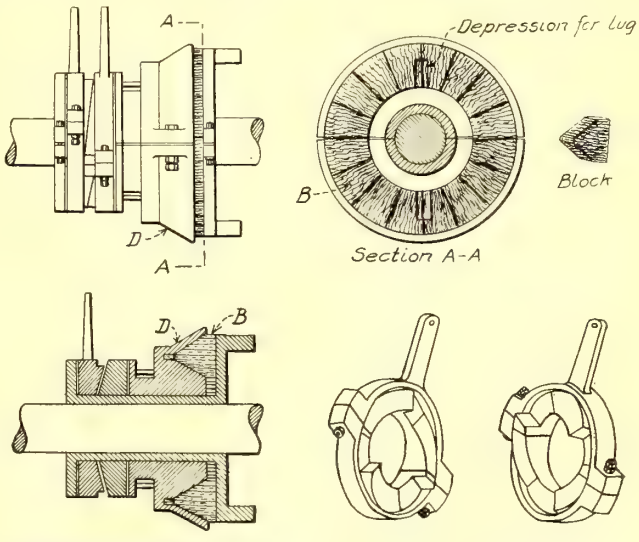


Two-Part Journal Bearing

grooves of the lining and are intended to give it practically the same strength as that of the standard M.C.B. solid bearing. This portion of the bearing is of bronze, and is designed to receive the removable lining, so that both form a practically integral structure. The lining is made of an anti-friction and lubricating white metal. These bearings are manufactured in all the M.C.B. standard sizes, and as the two parts are interchangeable, the linings can be furnished separately for replacements.

A NOVEL MOMENTUM BRAKE

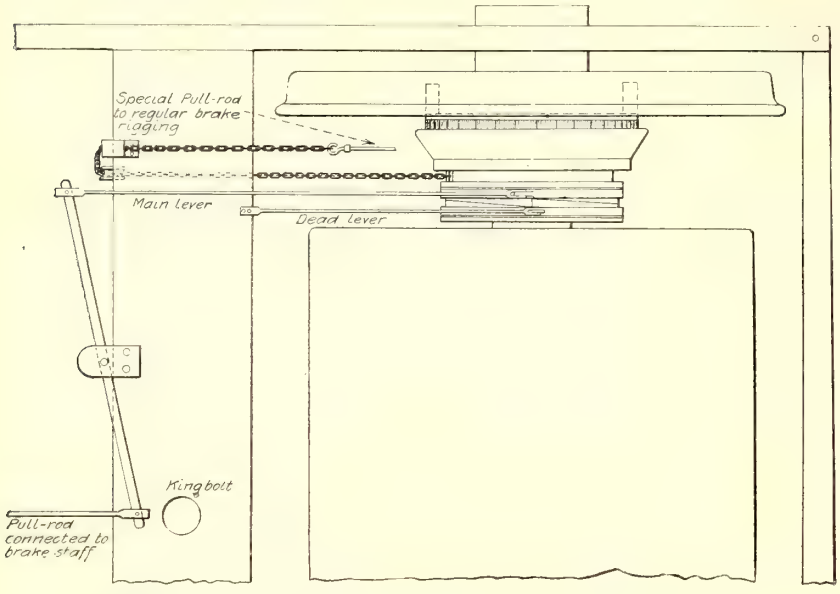
For the past two months one of the large electric railways near New York has had on trial under a car in regular service a momentum braking equipment supplied by the Momentum Automatic Brake Company, New York.



Momentum Brake—Details of Single-Truck Equipment

This device differs from other momentum brakes in not depending upon anything outside the regular brake shoes for stopping the car. The momentum principle is applied simply to cause the revolution of a drum, which, in turn, actuates the ordinary brake rigging as if hand, electric or air power had been applied from the platform. The entire mechanism is so simple and compact that its weight for the double-truck car under test does not exceed 80 lb. The

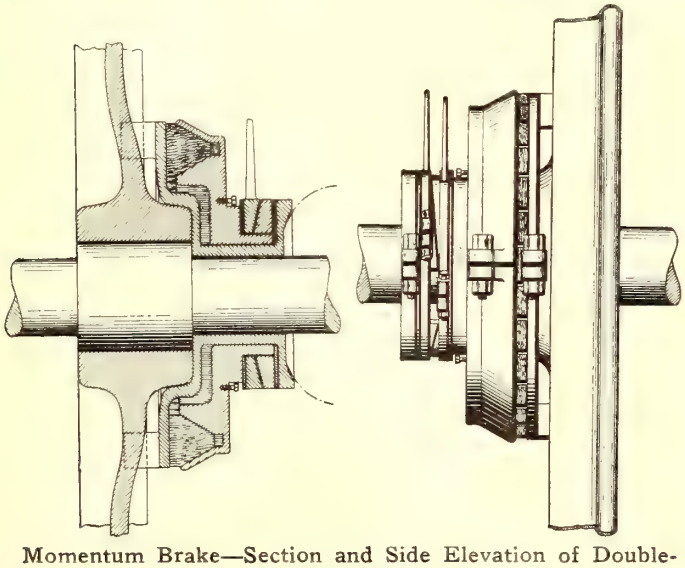
car which carries this equipment weighs about 15 tons, empty, and has longitudinal seats for 40 passengers. It is being operated on several routes under different crews, so that its effectiveness can be determined under all the diverse conditions prevailing in a crowded hill city. In fact,



Momentum Brake—Plan of Equipment for Double-Truck Car

many of the stops must be made near sharp curves at the base of long grades.

The operation of this brake can be made clear from the accompanying drawings and description of a complete braking movement. Since no great leverage is required on the platforms, the motorman's brake handle is no larger than that used with an air brake. This handle, on being moved a couple of inches, turns a 1-in. staff. The latter



Momentum Brake—Section and Side Elevation of Double-Truck Equipment

operates the pull-rod and through a bell-crank movement pushes a main lever connected to the lug of a movable wedge plate loosely attached to a sleeve on the car axle. When the main lever pushes over the movable lug it makes the wedge plate ride over and away from a second wedge plate whose lug is connected to the dead lever, causing a gradual increase of pressure against an adjacent cast-iron drum, which, in turn, comes into contact with a set of revolving blocks made of hard end maple. These blocks are loose with respect to each other. They are in constant rotation when the car is running, because they have two depressions to take lugs on the vertical portion of the sleeve bearing against the car-wheel hub. As the drum is brought against these backs, it revolves and draws up a chain which pulls forward a special pull-rod connected to the regular brake rigging, and thereby applies the brake shoes simultaneously on all the wheels.

The gradual application and release is obtained from the angle of the blocks and the shape of the wedges. Each of these wedge plates has three wedges, each wedge being 5 in. long, with the thickness graduated from practically zero to 1 in.; i.e., it takes a 5-in. movement of the movable wedge plate to get a 1-in. spread. The amount of pressure derived from the momentum of the car and used to operate the brake shoes against the wheels is gaged by inches and fractional parts of an inch, rather than by pounds.

The braking effect depends on the speed of the car and on the distance the brake handle is moved. In an emergency application the greater movement of the wedge plate will induce a greater peripheral movement of the drum. The brake may be released either gradually or instantaneously. The drum naturally is subjected to considerable heat during the braking period, but the rise in temperature is not great enough to carbonize the blocks.

To prevent automatic action on curves, the bell-crank lever is set on the truck framing within a few inches of the kingbolt. The pull-rod connection to the bell-crank lever is therefore about the same distance from the kingbolt at all times, so that all the brake rigging must remain in the same relative position and tend to turn around the kingbolt. None of the braking equipment is attached to the car body. Variations in this momentum brake are, of course, required for different classes of cars. On a single-truck car, for instance, no dead lever is used, the lug of each wedge plate being connected to the opposite bell-crank levers, which, in turn, are connected to each end of the car. By this arrangement the braking movements are the same in either direction. Turnbuckle adjustments are provided for any kind of equipment, but the braking mechanism is not likely to require attention more than once or twice a year.

The question of space needed on the axle by this brake is of particular importance. If all the equipment is mounted on the axle between the motor and car-wheel hub fully 6 in. would be required—a distance too great on double-truck cars. Provision, therefore, is made to carry as much of the vertical sleeve, blocks and drum above the wheel hub as may be necessary.

GE-205 MOTOR

A short account was published in the Electric Railway Journal for April 17 of the GE-205 1200-volt motor used on the lines of the Central California Traction Company. Further particulars of this motor are now available.

It is designed to run at approximately the same revolutions per minute as the company's standard railway motors of similar capacity. The commercial rating is 75 hp. The number of commutator bars is approximately double that of the company's standard practice for 500-600-volt motors.

The motor is fitted with commutating poles, and on 1200 volts, which is the maximum operative potential guaranteed, the commutation is said to be very good. The creepage distances on the commutator and brush holders are practically double that of the standard 500-600-volt motor.

The field is wound with wire and insulated in the same way as the standard 600-volt, wire-wound field coil, with the exception that about twice as much insulating material is used. The frame is of the box type, having a solid magnetic steel shell with bored openings in the ends. These ends are fitted with frame heads, which carry the armature bearings. The lubrication is of the standard oil and wool description.

PROTECTION SLEEVE FOR SPAN WIRE POLES

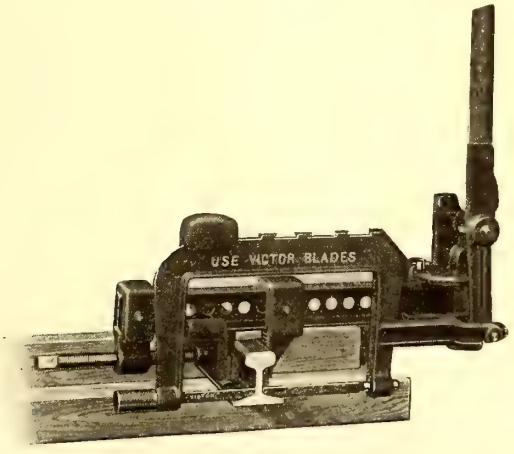
The point of greatest strain in a tubular steel span wire pole is at the ground line, and this is also the point of most active corrosion. Many poles which have been in the ground only a few years have been found to be corroded at the base to such an extent that they were a menace to life and property, while above the ground they are perfectly sound and capable of giving good service for many more years. Ornamental bases such as are commonly used with bracket-arm trolley poles and electric light standards protect them in a large measure from corrosion, but span-wire poles usually are not finished off in this manner. To protect and strengthen its standard types of steel span-wire poles the Pittsburgh Pole & Forge Company, Pittsburgh, Pa., has recently originated the idea of swedging by its patent hot process a sleeve 24 in. long on the poles at the ground level. Half of the length of the sleeve projects above the ground and half is buried. The sleeve is made of the same thickness of metal as the lower part of the pole itself and in the swedging process is practically welded to the pole. It is claimed that the addition of this sleeve doubles the strength of the poles, and by preventing any corrosion of the pole itself more than doubles the life.



Protection Sleeve on Pole

PORTABLE HACK SAW

The accompanying illustration shows a portable hack saw recently placed on the market by the Massachusetts Saw Works, of Chicopee, Mass. This machine weighs about 90 lb. and can easily be operated by one man who should be able to cut a 9-in. I-beam in from 20 minutes to 30 minutes without resting. The saw takes a 14-in. blade and makes a clean straight cut, and as the saw is held in a frame, the danger of breaking the blade is reduced to a minimum.



Portable Hack Saw

The principal object sought by the manufacturer of this machine was to construct a device which was so light that it could be easily transported and so simple that it could be set up and operated by one man. The manufacturers make a special blade which is particularly adapted for this saw.

POWER STATION EQUIPMENT IN MINNEAPOLIS

Edward H. Scofield, mechanical and electrical engineer, Twin City Rapid Transit Company, lectured before the senior electrical engineers of the University of Minnesota, Wednesday, April 7, upon "The Development of the Power System of the Twin City Rapid Transit Company." Beginning with the days when cars were drawn literally by horse-power, Mr. Scofield outlined the various steps in the development of the power houses to meet the ever-increasing demands for power. In the early days of the system small electrical generators were driven by triple expansion Corliss engines through long lines of shafting, the 150-hp generator being the largest obtainable at that early day. Triple-expansion engines were used because of the high economy of steam obtained by them in running under favorable conditions. The violent fluctuations in the load which characterized electric railways were found to make such high efficiencies unattainable, and the violent changes of load were found to be destructive to the engine, involving heavy repair and maintenance expenses. The triple-expansion engines were succeeded by compound vertical Corliss engines. The latest additions to the steam plant have been steam turbo-generators. The economy of water-power was early recognized, and the "lower dam" was built half a mile below St. Anthony Falls, where the maximum of 10,000 hp became available. As one result of the control of the Mississippi River by the government reservoirs, the flow has been more uniform, so that it has been possible to develop more power at St. Anthony Falls. Twelve thousand horse-power is available at this new plant during times of normal water and on Sundays, when many of the mills are closed. The establishment of the main steam plant close to the river and adjacent to the railroads, together with the installation of modern coal-handling and stoking apparatus, has rendered possible the substitution of slack coal for the more expensive grades formerly used. Fortunately, there is plenty of water during the months when slack coal is scarce.

For the last 10 years the demands for power have increased at the nearly constant rate of 20 per cent annually. The extension of the system, including suburban lines, has required the adoption of alternating current for transmission and distribution to the numerous substations where the power is changed to 600-volt direct-current for the trolley circuit. Detailed descriptions of the equipment of the power stations and substations were given in the proceedings of the American Institute of Electrical Engineers for February, 1907.

A new electric railway is to be built this year between Buda Pesth and Waitzen, 30 miles. It is to be equipped for single-phase operation, using 10,000-volt, 15-cycle current on the trolley. The rolling stock will consist of 11 motor cars each carrying two 120-hp motors and four 500-hp locomotives.

LONDON LETTER

(*From Our Regular Correspondent.*)

Perhaps the most important item of tramway news of Great Britain this month is the abandonment by the London County Council of the surface contact system which had been installed between Aldgate and Bow. The highways committee has also recommended that the lines be reconstructed, partly on the conduit and partly on the overhead systems, but whether it will be possible to secure permission for the overhead system is a matter of doubt. This has been an unfortunate experiment. When the surface contact system was completed and the first efforts were made to put it into service some 9 or 10 months ago, it was decided to discontinue running the cars as complaints of sparking and of live studs were frequent. Later, at the request of the Council, W. M. Mordey, president of the Institution of Electrical Engineers, was called in to suggest some remedy, and at his recommendation experiments were conducted on a section of the track, and he suggested that the live studs could be remedied by installing a condenser on the cars. The Board of Trade, however, after witnessing the experiments on cars as amended by Mr. Mordey, refused to approve of the working of the tramways until completed, so that nothing was left for the London County Council to do but to abandon the line or put the modifications over the whole of the line already installed. As no guarantee could be secured that after re-equipping the line as suggested it would be approved by the Board of Trade, abandonment has seemed the better course.

Some interesting figures were given by Hayes Fisher, chairman of the finance committee, in the annual budget of the London County Council, presented recently. It is estimated that the surplus on the tramways for 1909-10 will be £44,557, after meeting a deficiency of £43,695, caused by the working of some of the lines by horses, and after providing all interest and sinking fund charges and two-thirds of a penny per car mile for renewals. This may be considered quite satisfactory. The total capital expended on the London tramways up to March 31, 1909, was nearly £9,500,000, the debt outstanding was £8,150,000, as a considerable portion of the debt has been repaid. The estimated expenditure on capital account in prospect, apart from new proposals now before Parliament, amounts to £3,250,000, about half of which will be expended in 1909-10.

It is interesting to note that for the purpose of coping with heavy traffic at certain periods of the day, the London County Council is endeavoring to obtain permission to run trail cars such as are used on the Continent and in the United States. In several instances the Board of Trade has sanctioned trailers, and the commissioner of police is prepared to consider their application for London, provided their use is limited to early morning and evening at times of congestion.

It seems probable, after a long period of discussion, that the bridge house estates committee of the City of London Corporation will soon recommend the entire reconstruction of Southwark Bridge, as the present hog-backed nature of the structure prevents its use by heavy traffic. The width of the bridge will doubtless be increased from 40 ft. to about 80 ft. This will leave ample room for constructing a double-track tramway, and in this way a valuable addition to the "across-river" tramway traffic will be made. In the event of the bridge being rebuilt, the London County Council has agreed to pay rent for the privilege of a tramway service over the bridge, as in the case of Blackfriars Bridge, the widening of which is now approaching completion. The total cost of the new bridge will probably be about £1,000,000.

C. W. Mallins, general manager of the Liverpool Corporation Tramways, seems to be prolific in inventions of modern tramway devices. His latest device consists in arranging a visible sign near the driver of the car by which the driver is made aware that a passenger wishes to descend from the car without having to wait for a communication from the conductor, who might be at the time on the top of the car, and consequently unable to see the passenger. A footboard on the car is worked on a hinge, so that when a passenger steps on it, it makes an electric connection by which a lamp is lighted near the controller in the front of the car.

The Blackpool & Fleetwood Tramroad has at last gained a well-deserved victory over the Urban District Council of Thornton, which assessed the company as a tramway and not as a railway. The company maintained that it was a railway within the meaning of the act entitling the company to assessment on the basis of one-fourth the full net annual value. The House of Lords decided in favor of the company. Lord MacNaughten, who delivered the leading judgment, stated that it seemed to him that this was none the less a railway because the promoters called it a tramroad.

The City of York has not yet definitely settled its tramway problems, although the corporation is now operating the old system of horse trams, during which time the receipts have increased. The tramway committee has secured tenders from 18 contracting firms and is now aware that the complete electrification of the York tramways will entail an expenditure of more than £109,000, including street widening and the purchase of the old trams. Opinion is divided, however, as to whether the city should operate the lines itself or lease them to a company. Doubtless the citizens will eventually have to decide this matter by poll.

A son of Colonel Thys, to whom the construction of the well-known railway from Matadi to Leopoldville is due, has gone to Africa to examine the rapids and falls of the Lower Congo in order to decide whether it would be possible to obtain sufficient hydraulic power to operate the railway electrically. It is reported concerning the line now under construction on the Upper Congo to the Great Lakes, for which an additional capital of £1,000,000 has lately been raised, that the first section from Stanleyville to Ponthierville, 125 km in length, has been completed, and the temporary bridges have been replaced by permanent structures. The second section, extending a distance of 340 km, between Kindu and Kongolo has been fully surveyed and laid out for 300 km. As soon as Kongolo is reached, the further portion of the navigable Upper Congo for a distance of 640 km will become available for navigation of boats of 500 tons burden. It is hoped that all will be ready by the end of 1910.

The decision of the Leeds tramways committee to have the employees of the tramway inspected medically seems to have led to the same kind of trouble that a similar decision gave rise to about a year ago in London. There have been so many avoidable accidents in England lately that tramway managers have come to the conclusion that it is necessary that employees should be thoroughly examined as to their physical fitness for the exacting requirements of tramway service. The men contend that an ordinary examination of their hearts, hearing and sight is sufficient.

Some months ago the Bournemouth Town Council called upon J. B. Hamilton, the general manager of the Leeds tramways, to report on the condition of the Bournemouth tramway system and the methods by which the system could be made more remunerative. Among the many suggestions made by Mr. Hamilton was one that the council should appoint a general manager. This the committee has done, Charles William Hill, chief assistant and electrical engineer to the Birmingham Corporation Tramways Department, having received the appointment.

It would appear that the attempt to introduce first-class cars on the Garston route of the Liverpool Corporation Tramways has not proved as successful as was hoped and the committee has decided in future to adopt a penny outside fare and also reduce the inside fares. By this method these cars will only be first class hereafter insofar as the inside is concerned.

The borough engineer of Edinburgh has reported to the tramway committee of the Town Council in favor of railless electric traction for the suburban districts of the city. The engineer proposes a route commencing at Tollcross, the center of a large population, extending along Earl Grey Street to Fountainbridge, Dundee Street, down Henderson Terrace, to tap the Gorgie tramways, along Slateford Village and Colinton to Juniper Green. This is a total route of 2¼ miles within the city and 2¾ miles without. The capital cost would be £20,000.

The sub-committee appointed by the Dundee Town Council to inquire into the use of the trackless trolley system has again reported in favor of an experimental equipment along the esplanade at an estimated cost of £5,000. The manager of the tramways undertaking has expressed the opinion that the venture would be a financial success.

A collision happily without serious consequences occurred recently on the tramway from Llandudno to Great Orme's Head, two of the cars getting onto the same line at a passing loop about midway on the very steep gradient. The cars are worked by cable from the top, so that when the upward car by some mischance got onto the downward loop a collision was unavoidable.

It is expected that a start will shortly be made with the construction of an important tramway in Central Lancashire, as the Preston and Wigan corporations and the Lancashire & Yorkshire Railway have withdrawn their opposition to the Preston, Chorley and Horwich tramways bill. This proposed tramway will connect the industrial towns of Preston and Bolton, passing through Chorley and Adlington and linking up with the Bolton system at Horwich.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

The greater part of the week ended April 24 was taken up by discussions of the interurban question by the City Council and the representatives of roads entering Cleveland. The conditions contained in the revised draft of the proposed ordinance were insisted upon by Mayor Johnson, while the railway men contended that the administration had placed the cost of operation per car-mile too high and that the extent of control was too great to allow the management of the roads to operate to advantage either in the city or on their lines outside. The proposed subway project was also discussed in connection with this matter. The interurban companies desire the privilege of making arrangements for subway terminals if they find it to their advantage, but Mayor Johnson has intimated that he would like to make it compulsory for the roads to use the subways in case a system is built.

The cost to the Cleveland Railway of operating interurban cars also received attention. Representatives of the interurban companies reiterated that they are willing to pay the full cost of operating their cars over the city tracks and make an allowance to the interest fund besides, but said that they should not be asked to pay an exorbitant price in order that citizens of Cleveland may enjoy a reduced fare. J. T. Ross, chief engineer of the Lake Shore Electric Railway, presented a schedule which he had prepared of the cost of operation per car-mile, with the individual items entering into it. The 38 general subdivisions which went to make up the operating cost per car-mile were divided into four general groups as follows:

Group No. 1.—Those that, in the accounting of the Cleveland Railway, are in direct proportion to the total car-miles.

Group No. 2.—Those that are caused solely by, and are chargeable to, the city service in proportion to the city car-miles.

Group No. 3.—Those which are not increased or decreased in the same ratio as the mileage, but which might be increased to some extent by increasing the mileage of city cars or by the mileage of the interurban cars.

Group No. 4.—Those which are fixed and would be the same regardless of the mileage of either the interurban or city cars.

In addition to this operating charge there was added to the total cost per car-mile taxes and interest. The proportionate division of taxes and interest for each group was based on the values by which the capitalization of the Cleveland Railway is fixed. These subdivisions, together with taxes and interest, were shown in a separate schedule. The average cost for all the cars operated on the city company's tracks was shown in cents per car-mile for each subdivision in the column of the groups to which they belong. The total of Group No. 1 was 12.04 cents; of Group No. 2, 4.96 cents; of Group No. 3, 1.18 cents, and of Group No. 4, 4.90 cents. This made the total cost per car-mile for all cars 23.08 cents.

The representatives of the interurban companies assert that the items in Groups No. 1 and No. 3 represent the actual cost of operating their cars on the city tracks and that if more is paid it will go to reduce the fares for all who travel on the city cars. The sum of Groups No. 1 and No. 3 is 13.22 cents, while Mayor Johnson claims that the cost of operating interurban cars in the city is about 31 cents. By combining the expense represented in Groups No. 2 and No. 4, with which the interurban companies claim they are not concerned, the cost of operating all cars is 23.08 cents per car-mile. The officers of the interurban companies say that the cost shown in these columns would be the same if the interurban cars did not come into the city. They are willing to pay 18 cents per car-mile for the right to operate in the city and feel that even at that compensation they are contributing 4.78 cents toward the reduction of the general fare.

The interurban companies through their representatives say that the current for their cars can be measured and the actual cost of the power used can be ascertained and charged against them. Power consumption tests will be made with both city and interurban cars. Mayor Johnson and the officials of the Cleveland Railway argue that the depreciation of tracks and special work is greatly increased by the operation of the heavy interurban cars over the city lines. On April 23 it was decided to employ experts to consider this question and report their findings.

Horace E. Andrews, president of the Cleveland Railway, proposed that the wage clause be eliminated from the ordinance under discussion and that the company be allowed to treat with the men as circumstances demand at the time. The Mayor said that the only provisions in which the city is interested are the dead-head list and the question of seniority. While he has receded from the stand at first taken, that the city should have something to say regarding wages in relation to the effect on fare, he still wishes to be able to dictate what shall be done with men appointed to the company during the control of the Municipal Traction Company by the city. President Andrews stated that 100 new cars should be secured at once. This is 30 more than was suggested by J. J. Stanley, vice-president of the company. He also said that a new power house should be built, but that the construction of this plant might be deferred for some time without serious consequences.

The subject of subways came before the meeting on April 22. W. R. Hopkins, of the Cleveland Subway Company, recently incorporated, said that no effort would be made to finance the company until a franchise had been granted. Mayor Johnson said he favored disposing of the franchise by bid to the company that offered the best terms and Mr. Andrews intimated that the Cleveland Railway might be a bidder for the right to construct the subway.

When the question of fare was brought up on April 22 President Andrews stated that he believed that matters would be greatly simplified if the Mayor would admit that he is mistaken regarding his assertions that a 3-cent fare will pay. Mr. Johnson said again that he believed that 3 cents with a charge of a penny for a transfer will pay the operating expenses and interest on the investment.

At the meeting on April 23 Mr. Hopkins went further into the subway plans. From what he said they include the electrification of the Nickel Plate Railroad and possibly the Lake Shore & Michigan Southern Railroad. This would be in addition to routing the interurban cars over the tracks of these companies into the city.

At the meeting on April 23 President Andrews stated that there must be a maximum fare of at least 4 cents with 1 cent for transfers without refund if a settlement is to be made on the Tayler plan that will attract capital. The maximum of seven tickets for 25 cents, as voted by the City Council, will not be sufficient. He said that the property might as well be left in the hands of the receivers if the fare is not made at least 4 cents, as another receivership would be sure to follow. City Solicitor Baker summed up the important points that are still unsettled as follows:

Valuation of property—waiting on report under preparation by Superintendent Bemis, of the water-works department.

Maximum rate of fare—to be discussed some time this week.

Right of the city to name a purchaser and when the nominee may exercise the option—to be discussed this week.

Car-mileage rate for cost of operation—to be taken up when the schedules forming the basis of charge are completed.

Interurban companies—experts are at work endeavoring to determine the wear on tracks and the amount of current used.

Data Sheet on Education

The committee on education of the American Street & Interurban Railway Association has sent out the letter and data sheet below to all member companies. The letter is signed by the members of the committee, H. H. Norris (chairman), R. E. Danforth, H. F. Grant, D. C. Jackson and A. S. Richey:

The letter and data sheet follow:

Your Committee on Education held a meeting on Wednesday, March 10, 1909. As a result of this meeting and of the experience gained by the committee during the preceding year, the following decisions were reached:

(1) That the committee divide its activities into two parts; (*a*) Those designed to assist the companies in preparing thoroughly trained young men for executive positions, and (*b*) Those designed to increase the efficiency of young men for high grade work in special departments.

(2) That, as the results of the experiments made during the past year with the apprentice plan previously outlined by the committee have been highly successful, the committee should endeavor to interest the membership at large in this work.

(3) That the committee should ascertain the practice of the member companies relative to efforts made for the training of young men in their employ.

(4) That the committee should ascertain from the membership to what extent a correspondence course, as outlined below, would be favorably received.

APPRENTICE COURSE. The apprentice plan outlined in the 1908 Convention report of this committee has been put into operation by the Public Service Railway Company with satisfactory results. An account

of this work will be presented to the 1909 Convention. The committee desires to include also an account of similar work accomplished by other companies.

Correspondence Course. The committee suggests a correspondence course somewhat along the lines followed by the American Gas Light Association. It is proposed that question sheets be sent out at regular intervals to young men in the employ of member companies. The replies to the questions are to be worked out by observation, reading and consultation with foremen and superintendents. The replies will be examined by competent, practical railway men and returned for revision. It is suggested that companies place a few books and periodicals at the disposal of the young men.

In conclusion the committee desires to point out that the expense of educational work done for the benefit of young employees will bring the very best financial returns. The expense of this work is not considerable. Young men receiving such a training are glad to work for the wages of an ordinary helper, as they feel that their compensation is not all in the money paid them. A loyal, efficient corps is built up by such means, and a spirit of co-operation is sure to result. Your committee therefore desires to assist you in every possible way, and is willing to undertake any plan which will bring about the desired results.

In order that the committee may properly serve the members of the Association, it is necessary that each should reply to the accompanying questions, which have been carefully reduced to a minimum number and made as explicit as possible.

PART I—Questions Relating to Graduates of Technical Schools.

(1) Do you employ technical gradutes? (2) If so, how many at present? (3) Of these how many have been in your employ (a) one year? (b) two years? (c) three years or over? (4) Of the number named, how many hold regular positions of responsibility in some department? (5) Are any of these heads of departments or chief officers? (6) In what line of work in general are the remaining men engaged? (7) What is the average pay of technical graduates in your employ? (8) Have you adopted any systematic plan for training technical graduates or for adjusting them to your work? (9) What is your scheme for recruiting your executive and engineering force? (10) If you have no plan for taking technically trained men into your organization, would you consider some plan for this purpose? (11) What plan do you advise as best adapted to your system for getting technical men into the organization?

PART II—Questions Relating to Young Men Without Technical Education.

(1) Have you young employees who would be interested in a correspondence course like that outlined? (2) If so, about what number? (3) Would such a plan be of advantage to the company? (4) Does this plan appeal to you as reasonable? (5) Will you make such suggestions in regard to this or any other plan which you think would be of benefit to your employees?

Convention of Southwestern Electrical & Gas Association

The program of the fifth annual convention of the Southwestern Electrical & Gas Association, to be held in Dallas, Tex., on May 20-22, has just been made public. The headquarters of the association will be at the Southland Hotel, where the meetings will also be held and the exhibits shown. Those desiring space for exhibit purposes should address the assistant secretary of the association, D. G. Fisher, 300 Commerce Street, Dallas, Tex. Other hotels in Dallas are the Oriental, St. George, Park and Imperial. Reservations for hotel accommodations should be made through O. E. Turner, chairman committee on hotel accommodations, Scollard Building, Dallas.

The executive committee has adopted a standard badge for the association, with the idea that this badge will remain a permanent one and be used at future conventions. All members and member companies will be entitled to one badge free of charge. All extra badges will cost 50 cents each. A departure from the past policy of the association has been made in the issue of the "Question Box." Advance copies of this book will be published and bound in with the souvenir program, and copies will be distributed on the first day of the convention. Arrangements have been made for reduced railroad fare on trains due to arrive in Dallas before noon of May 20, with final return limit of May 24. Round trip rates of practically one and one-third fare will be given from points within 90 miles of Dallas. Beyond this point in Texas the charge will be one fare, plus 20 per cent, for the round trip. Delegates from the East can take advantage of the one-week excursion tickets, good for 21 days, and on sale Tuesday, May 18. These rates provide round trip transportation at one fare, plus $2. Those desiring additional information should confer with James P. Griffin, transportation committeeman, 300 Commerce Street, Dallas. Those from the East should confer with Sam A. Hobson, St. Louis, Mo., or to Manton Mill, room 539 Frisco Building, St. Louis, Mo.

The entertainment program includes an automobile ride for visiting ladies, luncheon and theater party for the first day; luncheon and entertainment for the ladies and entertainment for the gentlemen by the "Sons of Jove" on the second day, and a visit to the public utility plants and points of interest in the city on the third day. On the evening of Friday, May 21, there will be a grand rejuvenation of the "Sons of Jove" at Turner Hall.

The following papers have been prepared for the convention: Producer Gas Plants for Small Central Stations, by W. B. Head, Stephenville, Tex.

Scope of Legal and Claim Departments and Their Relation to Each Other, by H. S. Cooper, Galveston, Tex.

Organization and Operation of a Claim Department, by W. C. Forbes, Fort Worth, Tex.

Lamps for Residence Illumination: Their Characteristics and Comparative Economy of Operation, by Prof. Arthur Curtis Scott, Austin, Tex.

Low-Pressure Turbines, by Fred. M. Lege, Jr., Galveston, Tex.

High-Pressure Gas Distribution for Commercial Purposes, by H. M. Moore, Austin, Tex.

A Method of Determination of Total Sulphur in Gas, by L. B. Morehouse, San Antonio, Tex.

Preparation of Purifying Material, and the Purification of Gas, by Clark F. Farmer, Austin, Tex.

Economies That Can Be Made in the Operation of a Small Central Station, by Thomas Cook, Waxahachie, Tex.

Association Meetings

Massachusetts Street Railway Association, May 12.

Arkansas Association of Public Utility Operators, Little Rock, May 12, 13 and 14.

Southwestern Electrical and Gas Association, Dallas, Tex., May 20, 21 and 22.

Central Electric Railway Association, Fort Wayne, Ind., June 3.

Elevated Entrance to Indianapolis Discussed.—At a meeting of the representatives of several electric railways entering Indianapolis on April 23 the advisability of elevating the tracks leading into the terminal station was informally considered. Traffic congestion is increasing rapidly in Indianapolis, and besides the time ordinarily consumed in operating within the city, interurban cars are subjected to frequent delays through extraordinary circumstances, which at times completely upset their operating schedules and the schedules of companies with which they connect. An elevated entrance to the city would also obviate the necessity of stopping for passengers at cross-streets. Within a short time Indianapolis will be connected with Chicago, Cincinnati and St. Louis by electric railway, and some such entrance for the interurbans as has been suggested will be necessary.

Hearing on Terms for Extension of the Hudson & Manhattan Railroad.—The Public Service Commission of the First District of New York held a hearing on April 23 to determine the form of the contract for the extension of the Hudson & Manhattan Railroad from Sixth Avenue and Thirty-fourth Street to the Grand Central Station. That the time was past for objecting to the extension of the Hudson & Manhattan Railroad was made plain by Chairman Willcox in an opening speech limiting the hearing to the form of the contract. Alfred A. Gardiner, counsel for the Interborough Rapid Transit Company, asked about the intentions of the commission as to granting station territory to the Hudson & Manhattan Railroad on the north side of Forty-second Street. Commissioner Willcox said that further opportunity would be given to the Interborough Rapid Transit Company to file its views if any changes were made in the station sites of the Hudson & Manhattan Railroad, such as might interfere with the arrangements of the Interborough Rapid Transit Company and the Steinway tunnel.

Municipal Ownership Proposed in San Francisco.—The Board of Supervisors of San Francisco has voted to pass to print a bill providing for the reconstruction of the Geary Street Railroad and operation by the city. The proposed ordinance reads: "It is hereby determined and declared that the public interest and necessity demand the acquisition or construction by the city and county of San Francisco of a public utility, namely, a municipal street railway over, upon and along the following streets, to wit: (Route given in detail.) The board of public works is hereby directed to procure, through the city engineer, and file with the Board of Supervisors plans and estimates of the cost of original construction and completion of such public utility. This ordinance shall be published for two weeks in the official newspaper and shall take effect immediately." Following the passage of the ordinance and the submission of the required plans and estimates, the board proposes to call a special election for June, at which the electors of San Francisco will be asked to vote on the question. It will require a two-thirds vote to carry the proposal.

Meeting of the Massachusetts Street Railway Association.—The regular monthly meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, on April 14. William A. Murphy of Boston delivered an interesting address on street railways and the General Court of Massachusetts. Mr. Murphy discussed at some length the political situation and sketched the doings of the Legislature in a witty vein. Later he stated that the policy of the square deal is working out to the advantage

of the public service corporations and the public as represented in the Legislature, and that a better understanding of mutual purposes is close at hand. He pointed out that while some corporations have not been blameless in the past, the public gained nothing when it heeded the appeals of demagogues and jumped to the conclusion that all corporate management and policies are reprehensible. The corporation is the creature of the times, made necessary by the inability of the individual to accomplish what civilization demands. Anti-corporation attacks have sometimes been inspired by men of sound motives, but lack of appreciation of the conditions has made much trouble. Street railway men are now educating the public to a better appreciation of the problems which have to be solved. The majority of legislators are honest, according to the experience of the speaker, and work in many cases overtime for the public good for absurdly small compensation. Mr. Murphy paid glowing tributes to President Sullivan of the Boston & Northern Street Railway and Old Colony Street Railway and to Hon. Bentley W. Warren, counsel for those roads, for their fair-minded and straightforward work in administrative and legal circles, with reference to public relations. In conclusion Mr. Murphy referred to the power of the press for good or ill, and urged the value of a right and open course in the conduct of corporate business.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Massachusetts.—Governor Draper has sent a special message to the Legislature recommending that the so-called railroad merger question shall be solved by the creation of a Massachusetts corporation to hold the stock of the Boston & Maine Railroad, giving to any of the other large railroads incorporated under the laws of the State the power to finance the holding organization. State control of future sales of stocks is a feature of this message, which points to a constructive solution of the transportation problem in New England, leading toward a concentration of interests in that section. Closely related to the question of joint steam railroad ownership and operation is the future of steam and electric railway relations in Massachusetts. It is anticipated that if the Legislature acts favorably upon the Governor's message a possible result may be the later authorization of electric railway developments in western Massachusetts by the New York, New Haven & Hartford Railroad. It is felt that while the Railroad Commission and the courts have exhibited all proper diligence in interpreting the laws, a somewhat broader policy may be inaugurated in the event of a satisfactory adjustment of steam railroad relations. Although the bills to permit the Berkshire section to be developed electrically through the ownership of electric railways by the New York, New Haven & Hartford Railroad have so far failed to pass, favorable action on the Governor's message will indirectly tend to provide the electric railway facilities which are so generally desired in the western part of the State. An effort was made to refer the Governor's message to the committees on railroads and street railways, sitting jointly, but the former committee secured jurisdiction. The committee on railroads has voted in executive session to report a bill to incorporate the East Boston Railroad to handle freight in East Boston. Electricity may be used as a motive power if desired. The committee on street railways has reported that no further legislation is needed on the part of the Railroad Commission's annual report dealing with street railways. The House has accepted the "leave-to-withdraw" report of the committee on metropolitan affairs on the Bryant bill, which aimed to change the Boston terminus of the Cambridge subway from Park Street to Scollay Square. The bill to authorize the Connecticut Valley Street Railway to fund its floating debt has been passed, to be engrossed and sent up for concurrent action. A resolve has passed the first stage in the House directing the Railroad Commission and the Boston Transit Commission to investigate and report upon the terms of the proposed consolidation of the Boston Elevated Railway and the West End Street Railway. The committee on street railways has reported in favor of the extension of the Boston Elevated Railway into Medford. The bill to regulate and define the purposes of street railway stock and bond issues has been given its third reading in the House.

New York.—Both houses have passed the Travis-Robinson bill, which contains the amendments to the Elsberg rapid transit measure desired by the Public Service Commission of the First District of New York, making possible the construction of additional rapid transit lines in New York by either the city or private capital. The bill by Senator Wagner providing for a 5-cent fare to Coney Island over the lines of the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad was defeated in the Senate on April 23 by a vote of 22 to 15. The vote on this measure was reconsidered on April 28 in the Senate and the bill was passed. Senators Cobb and Hinman opposed the measure on the ground that rates should not be fixed arbitrarily. A 5-cent fare bill was passed last year, but Governor Hughes vetoed it. Assemblyman Phillips' public service law amendments bill, as desired by the Public Service Commissions, and as finally amended in the Assembly by Chairman James S. Parker of the railroad committee, was reported favorably in the Senate on April 23 by the judiciary committee, with further amendments made by that committee. Senator Cullen objected to the bill going to a third reading, and it was referred to the committee of the whole. The Senate judiciary committee has also reported favorably the consolidated railroad law, introduced by Assemblyman Phillips. The Senate committee reported this bill as it came from the statutory consolidation commission. It has been advanced to a third reading. The Senate has passed the bill providing for a 5-cent fare over the lines of the New York Central & Hudson River Railroad within New York City. A final hearing was given on April 20 by the Senate judiciary committee on the Davis-Parker bill for the purpose of giving the members of the Public Service Commissions an opportunity to show why the Public Service law should be amended as proposed by the new measure. The new act is drawn to define the powers of the commission clearly regarding fares, joint rates, etc. In reply to the statement that the Commission of the First District by its acts had deterred and repelled capital in New York City, Chairman Willcox cited the offer of the Interborough Rapid Transit Company to spend $50,000,000, the proposal by the Bradley-Steers-Gaffney Company to build the Lexington Avenue subway at a cost of $50,000,000, and the desire of the Hudson & Manhattan Railroad to construct an extension in New York, and spend $8,000,000 in improvements in the city. The Senate has passed the Waddell bill providing that proceedings for the review of special franchise tax assessments shall be heard before extraordinary terms of the Supreme Court instead of the referees. About $41,000,000 is involved in pending litigation. The Assembly has passed a concurrent resolution providing for the appointment of legislative committees to investigate the advisability of extending the jurisdiction of the Public Service Commissions to telephone and telegraph companies and the adoption of the proposed New York City charter. Each committee is to be composed of three Senators and five Assemblymen, and to have $1,000 for expenses, and to report to the next Legislature.

Pennsylvania.—Governor Stuart was inclined to resent the action of the Legislature in placing upon him the responsibility of cutting down appropriations aggregating about $67,000,000, covering a period of two years, so that they can be met by revenues for this same period which are not expected to exceed $47,000,000. While he could sign all these appropriation measures as they were passed before final adjournment on April 15, thus making it necessary for an extra session to provide new revenue to meet the additional $20,000,000 appropriated, it is expected that he will work economies necessary to bring about the reduction. In all the Legislature considered 1912 measures, 1272 of which were introduced in the House and 640 in the Senate. Among the first bills signed by the Governor were those providing for an executive controller and requiring street railways to transport United States mails upon demand. The bulk of the bills introduced, however, never reached the dignity of final passage, half of them being killed in committee. Among the measures which did not get out of committee was that enabling street railways operating in whole or in part on a public highway to straighten, relocate and otherwise improve their lines and to lay additional sidings and prescribing the proceedings to compensate the owners of land thus taken. Another important measure which failed of passage was the Reynolds bill giving electric power companies the right of eminent domain. The efforts of the State Railroad Commission to obtain authority to regulate stock issues of transportation corporations were without avail. The measure taxing the real estate of corporations for local purposes, which was vigorously opposed by the Pennsylvania Street Railway Association, and the Dunmore 2-cent and 2½-cent railroad fare bills were also defeated. Among the more important measures reaching the Governor were the Stuart bill providing for a State highway from Philadelphia to Pittsburgh, carrying an appropriation of $5,000,000; the constitutional amendment permitting Philadelphia to borrow money for the construction of subways, which can be leased to transportation companies; the Murphy bill, allowing steam and electric railways to connect their tracks; the Shields bill empowering street railway companies to carry all kinds of freight franchises to be revocable in 10 years, and the bill providing for the incorporation of motor omnibus companies in cities.

Financial and Corporate

New York Stock and Money Market

April 27, 1909.

The stock market to-day was dull, with a tendency that resulted in price losses for almost every issue. The week's trading has been professional and colorless, and at top figures there was considerable evidence of profit taking. Traction issues have been fairly active and prices have advanced to a limited extent. Brooklyn Rapid Transit broke sharply to-day on the announcement that the Senate at Albany had passed the Coney Island 5-cent fare bill, but at the close of the market had almost entirely recovered.

Money continues to be easy, and several considerable offerings of bonds that were made during the week were at once absorbed. Quotations to-day were: Call, 1¾ to 2 per cent; 90 days, 2¾ to 3 per cent.

Other Markets

In the Boston market, Boston Elevated and Massachusetts Electric have both been prominent, but price changes have been insignificant. West End preferred has been moderately active.

In the Philadelphia market, 20,000 shares of Rapid Transit were traded in to-day with the price advancing to 36, a new high level. Union Traction has moved up to 58.

There has been little trading in traction securities in the Chicago market. The only issue of the Chicago Railways that has been in evidence is the Series 2, and this has been much less in demand than formerly. A few lots of Northwestern Elevated and Metropolitan Elevated have been sold.

In the Baltimore market, United Railways 4s are selling at 87¼, the incomes at 55⅛ and the funding 5s at 80.

At the sale of securities at auction in New York last week the following transactions were recorded: $15,000 Newburg Electric Railway 5 per cent bonds, at 62½; 20 shares Dubois Electric & Traction temporary certificates, $100 each, $7 per share.

Quotations of various traction securities as compared with last week follow:

	Apr. 20.	Apr. 27.
American Railways Company	46	45
Aurora, Elgin & Chicago Railroad (common)	*a39	a38¼
Aurora, Elgin & Chicago Railroad (preferred)	*a90	a88
Boston Elevated Railway	131½	131
Boston & Suburban Electric Companies (common)	*15	*15
Boston & Suburban Electric Companies (preferred)	*70	*70
Boston & Worcester Electric Companies (common)	15	12
Boston & Worcester Electric Companies (preferred)	a58	56
Brooklyn Rapid Transit Company	76⅝	76¾
Brooklyn Rapid Transit Company, 1st ref, conv. 4s	85⅜	85¾
Capital Traction Company, Washington	*a137½	a138½
Chicago City Railway	*a190	a190
Chicago & Oak Park Elevated Railroad (common)	*a4½	*a4½
Chicago & Oak Park Elevated Railroad (preferred)	*a11	*a11
Chicago Railways, ptcptg. ctf. 1	*a112	*a110
Chicago Railways, ptcptg. ctf. 2	*a41	*a40
Chicago Railways, ptcptg. ctf. 3	*a28½	*a27
Chicago Railways, ptcptg. ctf. 4	*a11½	*a11
Cleveland Electric Railway	*a78	*a78
Consolidated Traction Company of New Jersey	a77½	a77½
Consolidated Traction Company of New Jersey, 5 per cent bonds	a106½	a106½
Detroit United Railway	57	*57
General Electric Company	158	158
Georgia Railway & Electric Company (common)	82	82
Georgia Railway & Electric Company (preferred)	*85	82
Interborough-Metropolitan Company (common)	15⅛	15⅝
Interborough-Metropolitan Company (preferred)	44⅛	44⅜
Interborough-Metropolitan Company (4½s)	78¾	78⅞
Kansas City Railway & Light Company (common)	*a44	a47¾
Kansas City Railway & Light Company (preferred)	*a83	a82
Manhattan Railway	143¼	143¾
Massachusetts Electric Companies (common)	14	13½
Massachusetts Electric Companies (preferred)	71	71¾
Metropolitan West Side, Chicago (common)	a18	a19
Metropolitan West Side, Chicago (preferred)	a52	a50½
Metropolitan Street Railway	*23	26
Milwaukee Electric Railway & Light (preferred)	*a110	*a110
North American Company	83½	82
Northwestern Elevated Railroad (common)	*a23	a24
Northwestern Elevated Railroad (preferred)	*a68½	a70
Philadelphia Company, Pittsburg (common)	42	41½
Philadelphia Company, Pittsburg (preferred)	42¼	41½
Philadelphia Rapid Transit Company	35	35¾
Philadelphia Traction Company	93	93½
Public Service Corporation, 5 per cent col. notes	a100¼	a100¼
Public Service Corporation, ctfs.	a81	a81½
Seattle Electric Company (common)	*91½	a91
Seattle Electric Company (preferred)	*a98	a98
South Side Elevated Railroad, Chicago	*a56	a56
Toledo Railways & Light Company	12⅝	12
Third Avenue Railroad, New York	30¼	32¾
Twin City Rapid Transit, Minneapolis (common)	103½	*103½
Union Traction Company, Philadelphia	56¾	57⅛
United Railways & Electric Company, Baltimore	12¼	11
United Railways Investment Company, San Francisco (common)	*a37½	*37½
United Railways Investment Company, San Francisco (preferred)	56	56
Washington Railway & Electric Company (common)	*a43⅛	a42¾
Washington Railway & Electric Company (preferred)	*a92	a92⅜
West End Street Railway, Boston (common)	97½	98
West End Street Railway, Boston (preferred)	*a110	111
Westinghouse Electric & Manufacturing Company	82½	81⅞
Westinghouse Electric & Manufacturing (1st preferred)	119	*119

a Asked. * Last sale.

Annual Report of the General Electric Company

The seventeenth annual report of the General Electric Company, that for the year ended Jan. 31, 1909, was made public this week. President Coffin reports that the profits of the company for the year (including $35,912.48 from securities sold and $1,453,942.63 from royalties, dividends, interest, etc.), after deducting all patent, general and miscellaneous expenses, fixed charges and allowances for depreciation and losses, and writing off $1,524,295.32 from factory plants, were $4,802,252.67
Paid in dividends during the year 5,214,026.00

Deficit charged to surplus account $411,773.33
Surplus at the end of last fiscal year 16,513,836.14

Total surplus Jan. 31, 1909 ..... $16,102,062.81

He continues: "The year of 1908 was marked by severe and continued depression in the business of your company. During the period very few new enterprises requiring apparatus for the generation and distribution of electricity were brought out, and in consequence the business of your company since the last report has largely depended upon current renewals and supplies, with occasional additions to plant on the part of the older and more prosperous companies. The result has been that the orders received by your company during the year were only 70 per cent of those received for each of the two previous years, and the shipments to customers were only 63 per cent of the shipments for 1907.

"Business conditions are slowly improving, and with a resumption of normal activity throughout the country the present unemployed factory facilities of your company and its large accumulation of cash will, it is hoped, be profitably used."

Vice-President Lovejoy reports that the total number of separate orders and contracts received during the year was 248,384, as compared with 236,864 last year, an increase of 11,520, while the average value per order was 30 per cent less. The terms of payment secured for the year compared favorably with the four previous years, as shown by the following statement:

	1904 per ct.	1905 per ct.	1906 per ct.	1907 per ct.	1908 per ct.
On Shipment	13.0	16.3	13.7	17.8	16.6
30 Days	68.5	63.1	68.6	68.5	68.0
60 Days	9.0	12.7	10.1	9.7	6.0
90 Days	5.7	5.3	3.0	2.5	3.9
Over 90 Days	3.8	2.6	4.6	1.5	5.5

Some of the more important contracts received were:

Chattanooga & Tennessee River Power Company, Chattanooga, Tenn.: 60,000 kw capacity in generators and transformers, stepping up to 44,000 volts for transmission to Chattanooga, Tenn.

Connecticut River Power Company, Brattleboro, Vt.: Five 2500-kw generators with switchboard and complete transformer equipment stepping up to transmission potential of 66,000 volts.

Washington Water Power Company: For a new plant at Little Falls, on the Spokane River, two 5000-kw generators, together with necessary transformers, stepping up to 63,000-volt transmission line.

Hudson Tunnels Company, New York: Additional car equipments. All of the cars operated in the various tunnels owned by this company connecting Manhattan with New Jersey are equipped with motors of the company's manufacture.

Southern Pacific Railroad Company, Oakland, Cal.: Rotary converter apparatus to be used in supplying current for its 1200-volt direct-current car equipments.

Great Western Power Company, San Francisco, Cal.: One 10,000-kw generator and 10 transformers additional to the apparatus previously purchased from the company for the power company's 100,000-volt, 165-mile hydro-electric transmission plant, now in operation.

In speaking of the 1200-volt direct-current system, Mr. Lovejoy says:

"The continued successful operation of our 1200-volt direct-current railway apparatus fully demonstrates the reliability of this most valuable system which fulfills the requirements of railway companies for extensions and for interurban service beyond the economical limits of 600-volt distribution, avoiding the complications incident to single-phase alternating-current equipments when operated over direct-current lines."

ENGINEERING

Of the company's engineering progress, Vice-President Rice says:

"Experience in the use of the high electric pressures of from 60,000 to 100,000 volts, needed for the economical distribution of electricity over very long distances, has been so satisfactory that higher pressures up to 150,000 volts are being considered in pending propositions. In this connec-

tion it is an interesting fact that the sales of transformers of 60,000 volts and over in 1908 were nearly double those in 1907.

"We have made many improvements in our switches for the control of high-tension circuits, and have designed and placed in commercial operation switches capable of controlling 110,000 volts, which is the highest voltage now in practical operation.

"Two of the 14,000-kw turbines mentioned in my last report have been placed in operation in Chicago and two in New York. These have proved satisfactory in every respect, and orders for additional units of the same size have been placed with us. Our engineers have completed the design of a number of turbine generators for operation by low-pressure or exhaust steam. Important turbines of this character have been designed up to 5000-kw capacity.

"Our new type commutating pole railway motor, mentioned in previous reports, has proved most satisfactory in practical operation, and large numbers have been sold. Several new sizes have been developed during the year. Our 1200-volt railway system has been further perfected, and the installations already made have proved an unqualified success.

"The 35 electric locomotives sold the New York Central for operation of its New York terminal and tunnel have made an unequaled record for reliability and low cost of maintenance, and we have just completed an order for 12 additional locomotives of similar design. The electric locomotives sold the Great Northern Railway Company for its Cascade Tunnel Division have been completed and satisfactorily tested and shipped. They will be in operation this summer, and are notable as possessing the greatest tractive power of any electric locomotives built to date.

"The vertical type of rotary converters of our design, mentioned in previous reports, has continued to give satisfaction, and many additional installations have been made during the past year. They are of particular value, because of the saving in space afforded by the compactness of design. We are building a number of these vertical rotaries of 2500 kw capacity, which are the largest rotaries ever constructed."

The consolidated balance sheet of Jan. 31, 1909, follows:

ASSETS

Patents, Franchises and Good-will	$ 1.00
Cash	22,233,671.29
Stocks and Bonds	21,922,189.21
Real Estate (other than Factory Plants)	85,124.66
Notes and Accounts Receivable	18,873,057.63
Work in Progress	607,276.59
Merchandise Inventories	18,393,899.40
Factory Plants	13,900,000.00
Copper Mining Investment	3,174,580.76
	$99,189,800.54

LIABILITIES

5 per cent Gold Coupon Debentures of 1892	$ 41,000.00
3½ per cent Gold Coupon Debentures of 1902	2,047,000.00
5 per cent Gold Coupon Debentures of 1907	12,875,000.00
Accrued Interest on Debentures	107,633.36
Accounts Payable	2,836,834.51
Unclaimed Dividends	1,469.86
Capital Stock Issued	65,178,800.00
Surplus	16,102,062.81
	$99,189,800.54

The consolidated profit and loss account of Jan. 31, 1909, was as follows:

EXPENSES

Cost of Sales (inc. depreciation of Plants $1,524,295.32)	$41,649,573.13
Interest on Debentures	716,643.61
Profit for the current year	4,802,252.67
	$47,168,469.41
Dividends paid in Cash	$ 5,214,026.00
Surplus at Jan. 31, 1909, carried forward to next year	16,102,062.81
	$21,316,088.81

EARNINGS

Sales	$44,540,675.57
Profit on sales of Stocks and Bonds	35,912.48
Royalties, Dividends, Bond Interest, and Sundry Profits	703,942.63
Surplus Earnings Manufacturing and other Companies	750,000.00
Interest and Discount	1,137,938.73
	$47,168,469.41
Surplus brought over from last year	$16,513,836.14
Profit for the year ending Jan. 31, 1909	4,802,252.67
	$21,316,088.81

Annual Report of Twin City Rapid Transit Company

Total earnings from operation of the Twin City Rapid Transit Company in the year 1908 amounted to $6,399,510, of which $6,333,297 came from passenger travel and $66,213 from miscellaneous sources. The increase in total gross earnings over the preceding year was 5.68 per cent. The charges to operating expenses aggregated $3,166,056, representing an increase of $185,620, or 6.23 per cent over the previous year. Of this increase, approximately $50,000, the report states, was due to the higher scale of wages authorized in June, 1907.

The expenditure for operating expenses as shown amounted to 49.47 per cent of gross earnings. The expenditures for maintenance aggregated $496,675, or 7.8 per cent of gross earnings. There was appropriated for renewals, however, from the surplus remaining after provision for the dividends on the preferred and common stocks, the sum of $544,000.

The cost of operation of the power plants was $516,418, or 8 per cent of gross earnings, as compared with $513,867, or 8.5 per cent of gross earnings in the preceding year. The cost of "car service" was $1,480,495 in 1908, or 23 per cent of total gross earnings from operation, comparing with $1,340,962, or 22.1 per cent of gross, in 1907. The number of car-miles run increased 7.41 per cent.

The receipts and expenses for the two years, 1907 and 1908, compare as follows:

RECEIPTS.

	1908.	1907.
Passenger earnings	$6,333,297	$6,020,542
Miscellaneous earnings	66,213	35,201
Total earnings	$6,399,510	$6,055,743

EXPENSES.

Maintenance of way and structure	$ 205,624	$ 192,209
Maintenance of equipment	291,051	269,748
Operation of power plants	516,418	513,867
Car service	1,480,495	1,340,962
General expenses	388,694	412,518
Injuries and damages	235,774	203,132
Insurance	48,000	48,000
Total operating	$3,166,056	$2,980,436
Net earnings from operation	$3,233,454	$3,075,307
Interest on debt and taxes	$1,359,363	$1,223,171
Surplus available for dividends and depreciation	$1,874,091	$1,852,136
Dividends preferred stock	$ 210,000	$ 210,000
Dividends common stock	1,005,000	1,005,000
Total dividends	$1,215,000	$1,215,000
Surplus from operation	$ 659,091	$ 637,136
Appropriated for renewals	544,000	506,000
Income account, surplus	$ 115,091	$ 131,136
Per cent total operating (including taxes and renewal appropriations) to total earnings	64.35	63.84

The annual report to shareholders states:

"There was an increase in net earnings of $158,147. Owing, however, to an increase in taxes of $28,824 and in bond interest of $107,368, together with a larger appropriation to renewal funds, this increase in net earnings for the year was more than absorbed, so that the net surplus is $16,045 less than the previous year.

"Considering the business depression that was experienced during the year, your directors feel that the results attained may reasonably be regarded as gratifying, and would seem fairly to indicate what might be expected under favorable business conditions. A review of the comparative statement of expenses shows that the larger surplus from operation has not been secured at the expense of adequate maintenance. These expenses have, in fact, been increased by $34,718, and the property of the company maintained at a high standard of efficiency. The service afforded the public has been extended and improved.

"In addition to the maintenance charges of $496,675, renewals have been made during the year and charged to the renewal fund to the amount of $256,006. The direct appropriation to the fund for the year was $544,000 and interest to the amount of $29,800 was further added to it, an increase of $50,300 on the appropriation of the previous year. The renewal fund now amounts to $1,173,714, of which $1,173,500 is invested in 5 per cent bonds of the company. The conservative policy of setting aside funds to provide for renewals was inaugurated in 1904. The following statement shows how the provision for maintenance and renewals has been gradually increased, and the relative percentage that the appropriation for these purposes for each year bears to the gross earnings:

Year.	Maintenance and renewals.	Per cent of gross earnings.
1903	$328,833.49	8.09
1904	488,224.24	11.33
1905	587,253.46	12.34
1906	917,253.34	16.25
1907	985,456.92	16.27
1908	1,070,475.56	16.73

"The insurance fund has been increased to $107,246.74 by the addition during the year of $22,503.38. Of the total fund, $107,000 is invested in the 5 per cent consolidated bonds of the company.

"There was expended in new construction during the year $1,131,868.51, distributed as follows:

Additions to power plant		$386,285.40
New shops at midway		26,592.90
Car equipment		449,606.68
Track —		
Minneapolis	$152,644.36	
St. Paul	23,805.19	
Suburban	41,738.19	
		218,187.74
Selby tunnel		18,577.36
Buildings and fixtures		3,064.17
Big Island and Tonka Bay		29,554.26
		$1,131,868.51

"Of the Minneapolis Street Railway Company's 7 per cent bonds, $20,000 were redeemed on May 1, 1908. An equivalent amount of first consolidated mortgage bonds may be issued in place of them. There were issued during the year $1,643,000 of the consolidated 5 per cent mortgage bonds, due 1928. Of these, $343,000 were acquired for renewal and reserve fund investments."

Gross Earnings of Third Avenue Railroad Increase

Frederick W. Whitridge, receiver of the Third Avenue Railroad, New York, recently issued a statement to the effect that for the year ended April 1, 1909, the gross receipts of the company had increased more than $500,000 over the previous year. Commenting on this extraordinary showing, Mr. Whitridge is reported to have said:

"A number of causes have combined to bring about the increased business. Times are better, the service of the road is better, the cars are cleaner, the system by which they are operated through the different sections of the city has been improved, better time is now made, there is no 'knocking down' fares by conductors, and few passengers ride for nothing. The last two improvements are directly caused by the installation of the new pay-as-you-enter cars, but as they have been in service only for the last four months of the fiscal year, and as this installation is being accomplished gradually, and is not yet completed, obviously all the credit cannot be placed with them.

"Undoubtedly, the loss of fares has been reduced to a minimum by the new cars. I never believed that conductors filched thousands of dollars of any street railway's earnings, but I do believe that the total number of fares 'knocked down' by dishonest men amounted to a considerable item in the course of a month. Another loss was occasioned by passengers on crowded cars keeping their nickels in their pockets and deliberately stealing rides. This item, I believe, was, and is still, the cause of a much heavier loss than that which is attributed to the conductors.

"On the new cars every passenger that enters has to produce his fare or he cannot ride. Moreover, the fare goes into a box in plain view of the passenger, and the only way the conductor can possibly get a 'rake-off' is when the passenger gives him by mistake more than 5 cents. So you can see that the loss in the collection of fares has been reduced to an almost infinitesimal leakage. The company gets almost every nickel paid in by the riding public.

"If the pay-as-you-enter cars had been put on all at once, and were all on to-day, there would be some means by which we might get at the proportionate income increase they have contributed. I cannot say that they are largely responsible for the increased earnings any more than I can say that increased earnings were caused by the canceling of transfers. As a matter of fact, the transfer changes had very little, if anything, to do with it.

"In the first three days after the stoppage of the transfers the road lost 60,000 passengers. Then gradually we changed our lines, and we have now overhauled our system of operation so that the lines of the Third Avenue Railroad run direct to places heretofore covered by transfers."

Reorganization of Camden & Trenton Railway Adopted

The Camden & Trenton Railway, Camden, N. J., which went into the hands of a receiver on Feb. 18, 1908, after defaulting on the interest on its first mortgage bonds on Nov. 1, 1907, will shortly be reorganized under a plan prepared by the protective committee representing the first and general mortgage bondholders. A new company, to be known as the Riverside Traction Company, will be formed to take over the property. It will be managed by A. Merritt Taylor, president of the Philadelphia & West Chester Traction Company, who is chairman of the protective committee of general mortgage bondholders of the Camden & Trenton Railway, as president.

The new company will have an authorized bond issue of $1,500,000 and capital stock of an equal amount, consisting of $400,000 preferred and $1,100,000 common stock. The committee representing the original first mortgage bonds, of which there are $710,000 outstanding, nearly all of which were deposited with the committee, will receive for their constituents new first mortgage bonds to the amount of 80 per cent of their holdings, minus the coupons for the first year, and preferred stock for the remaining 20 per cent.

The committee representing the general mortgage bondholders is required to pay in $120,000 in cash, receiving a like amount in par value of preferred stock of the new company and $747,000 common stock, 80 per cent paid in. Of this common stock the committee will distribute $311,250 to the holders of the general mortgage bonds. The remainder, $435,750, will be given as a bonus to purchasers of the new preferred stock at the ratio of 3½ shares of common to one share of preferred stock, and the general mortgage bondholders will be given first right to subscribe to this preferred stock in the proportion of 20 per cent of their bond holdings. The holder of a general mortgage bond who accepts this provision will thus acquire total common stock of $1,200, on which $1,000 is paid in, and $200 preferred stock for each bond.

Berkshire Street Railway, Springfield, Mass.—A hearing will be held before the Massachusetts Railroad Commission on May 10 on the application of the Berkshire Street Railway for authority to issue bonds and stock amounting to $250,000 for improvements.

Central Crosstown Railroad, New York, N. Y.—On May 1, 1909, $2,250,000 of three-year 5 per cent collateral notes of the Central Crosstown Railroad mature. The notes are guaranteed by the Metropolitan Street Railway as lessee of the Central Crosstown Railroad. In view of the maturity of the notes and the fact that the Metropolitan Street Railway is in the hands of a receiver, the following protective committee has been organized under an agreement dated April 9, 1909, and requests the deposit of the notes with the United States Mortgage & Trust Company, New York, the depositary, before April 26, 1909, or the City Trust Company, Boston, as agent for the depositary: C. C. Cuyler, chairman; Chas. Francis Adams, 2d, Allen Curtis, Herbert L. Griggs and Paul M. Warburg, with Julius M. Mayer as counsel and Calvert Brewer as secretary.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—It was reported in Chicago recently that Kansas City interests were negotiating for the purchase of the property of the Chicago & Milwaukee Electric Railroad. The attorney for the receivers of the company, however, is said to have stated that he knows nothing about the proposed sale to the interests mentioned. Negotiations in regard to the organization of the property are still pending, but no definite plan has been proposed.

Georgia Railway & Electric Company, Atlanta, Ga.—The Georgia Railway & Electric Company has filed for record at Atlanta its new mortgage to the American Trust Company, Boston, Mass., as trustee, to secure an authorized issue of $20,000,000 of 40-year 5 per cent bonds, dated Jan. 1, 1909. Of the bonds, $1,500,000, it is stated, are to be issued at present; about $10,000,000 will be reserved to retire the outstanding underlying bonds and the remainder will be issued from time to time to provide for improvements and extensions.

Helena Light & Railway Company, Helena, Mont.—The Helena Light & Railway Company has declared a dividend of 1 per cent on its $561,000 of common stock, payable May 1. This action by the company resumes dividends on the common stock, the last disbursement on this issue being 1 per cent, paid on Nov. 1, 1907. The regular quarterly dividend of 1¼ per cent on the preferred stock is also payable on May 1.

Las Vegas Railway & Power Company, Las Vegas, N. M.—The recent sale of the property of the Las Vegas Railway & Power Company under foreclosure was confirmed on April 13 by District Judge McFie, at Santa Fe, N. M. The property was purchased by J. M. Cunningham, president of the San Miguel National Bank, Las Vegas, for $65,000. The purchaser, it is stated, represents Denver capitalists. There were outstanding $300,000 of first mortgage 5 per cent bonds, of which the Trust Company of St. Louis County, Clayton, Mo., was mortgage trustee. An appeal from the order confirming the sale has been taken by bondholders of the company, who are said to be dissatisfied with the terms under which the property was sold.

Southern Street Railway, Chicago, Ill.—The Southern Street Railway has made its new first mortgage to the First Trust & Savings Bank, Chicago, Ill., as trustee. The amount of the issue, as in the case of the Chicago Railways and the Chicago City Railway first mortgages, is limited only by the company's requirements under the city ordinance for retiring the old bonds and for financing additions and improvements present and future. It is unofficially stated that the rehabilitation of the property will require that about $1,500,000 of the bonds shall be issued within the next year.

Traffic and Transportation

Hearing on Separate Cars for Women

On complaint of the transportation committee of 50 of the Women's Municipal League a hearing was held before Commissioner Eustis of the Public Service Commission of the First District of New York on April 23 on the question of the reservation of the rear car on subway express trains for the exclusive use of women. L. E. Opdyke appeared as counsel for the Municipal League and T. L. Waugh as counsel for the Interborough Rapid Transit Company.

Mr. Opdyke in opening said that the complaint was not a critical or a hostile one, and concluded with a tribute to the efficiency of the employees of the Interborough Rapid Transit Company, which operates the subway. He said that the complaint had been carried to the commission because the president of the league had been told by the company that it considered that the cars could not be operated successfully on its lines, whereas subsequent trial of the separate car for women by the Hudson & Manhattan Railroad, according to Mr. Opdyke, appeared to indicate that the cars might possibly be run successfully by the Interborough Rapid Transit Company.

Despite the fact that Mr. Eustis, for the commission, told Mr. Opdyke that the commission and the company fully realized that conditions in the subway during the rush hours work a serious hardship on women passengers, Mr. Opdyke called as witnesses the president of the league, a physician, a trained nurse and several business women, all of whom recited in detail their experiences in the subway, which were quite the average of all women passengers. All the testimony was to the effect that despite the efforts of the guards of the company to control the passengers, there was a great deal of crowding and discomfort at rush hours.

Mr. Willcox said that any change in the operation of cars which would decrease the carrying capacity of the subway would work to the detriment of all the people using the subway, and asked Mr. Opdyke to show, if possible, that the separate cars could be run without decreasing the efficiency of the service. One woman said that her experience was largely in chaperoning parties of young ladies, and was told by Mr. Waugh for the company that in all such cases special accommodations would be provided if the company were apprised in advance of the time and the place of the starting of a large body of passengers. The report of the general inspector of the Public Service Commission regarding the operation of separate cars by the Hudson & Manhattan Railroad was admitted as evidence. This report was abstracted and published in the ELECTRIC RAILWAY JOURNAL of April 17, page 752.

The principal witness for the Women's Municipal League was E. T. Munger, general superintendent of the Hudson & Manhattan Railroad. Mr. Munger reviewed his previous railroad experience, especially that with the Metropolitan West Side Elevated Railway, Chicago. He said that on that road trains were not so long as in the subway and that there was practically no comparison between the volume of business on the Metropolitan West Side Elevated Railway and the subway. Mr. Munger had been asked by W. G. McAdoo, president of the Hudson & Manhattan Railroad, for his opinion regarding the advisability of operating separate cars on that road for women, and advised that they be given a trial. He added that the cars were an experiment and that it had not yet been decided to make their operation permanent. He explained that the station men on his line were re-assigned when the separate car for women were placed in operation, and that no additional men had been hired to assist in operating trains since the cars had been in service. The expense of trying the experiment, Mr. Munger said, was confined to the printed signs for the cars and the station platforms directing women to the cars for their use. He said that the company is now preparing records of the operation of the trains to which the separate cars for women are attached. Employees of the company pass through the cars while they are under the river and count and record the passengers on each of the five cars making up a train.

According to Mr. Munger, the trains to which the separate cars are attached are being stopped so as to bring the women's car nearer to the entrance to the stations. This is possible because the stations were built for eight-car trains, whereas only five-car trains are now in service. Subsequent questioning brought out the fact that the trains of the Hudson & Manhattan Railroad are operated under a three-minute headway, whereas trains in the subway are operated under a headway of 1 minute 48 seconds during the rush hours. Asked as a railroad man by Mr. Eustis for his opinion of the experiment with separate cars for women on his line, Mr. Munger said that women appear to understand traffic conditions pretty well, especially those who travel during the rush hours, and that they have shown a willingness to co-operate with the company in its trial of the cars. He repeated, however, that the evidence so far obtained regarding the separate cars was not conclusive.

A Mrs. Herzog, who represents the Equality League for Self-Supporting Women, with a membership of 17,000, was called as a witness by the Interborough Rapid Transit Company. She said that none of the many women members of the body that she represented with whom she talked had complained to her about uncivil treatment in the subway. Mrs. Herzog also said that she herself was a frequent patron of the subway and the elevated, but that her experiences were only such as ordinarily would be incident to the handling of so many passengers. She said that absolute segregation of the sexes was necessary if the plan of separation were to be adopted at all. Reserving the rear car of an eight-car express train for women, Mrs. Herzog pointed out, would necessitate a long walk by them to reach their car, and that this effort to reach the car might be fraught with greater dangers than under the present plan.

Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, said that his experience and that of his associates in the company indicated that the separate cars for women could not be run with success in the subway. Of course, if the commission issued a formal order for a trial of the cars the company would place them in service. He said that George Keegan, his assistant, had explained the company's attitude to the president of the Women's Municipal League. Mr. Hedley was of the opinion that the league could do its best work by devoting its energies to instructing women in boarding and leaving trains and especially in instructing working girls in acting courteously. According to Mr. Hedley, the female employees of the department stores who use the Fourteenth Street station are offenders in that their conduct in forming cliques and taking trains by storm, as it were, is as bad, if not worse, than is ever resorted to by men in their efforts to board a train. He said that these girls and young women disregard the right of members of their own sex. Mr. Hedley also said that women, without the restraining influence of men, were liable under any but ordinary circumstances to become panicky, and that on account of their temperament it would be inadvisable to separate the sexes. In conclusion Mr. Hedley said that more than 800,000 people are handled daily in the subway at this time of the year, and that the minimum is about 600,000 a day during July and August. It might be possible, Mr. Hedley said, to try the experiment if not more than 500,000 persons were carried daily.

The commission will consider the evidence and announce its finding later.

Electric Railway Connections Advertised by Lehigh Valley Railroad

The Lehigh Valley Railroad has issued a booklet showing connections made by its trains with electric railways. The booklet mentions the service of the following lines from points reached by the Lehigh Valley road: Public Service Railway of New Jersey; Easton & Washington Traction Company; Easton (Pa.) Transit Company; Northampton Traction Company, Easton, Pa.; Philadelphia & Easton Electric Railway; Lehigh Valley Transit Company; South Bethlehem & Saucon Street Railway; Allentown & Reading Traction Company; Blue Ridge Traction Company; Carbon Street Railway; Eastern Pennsylvania Railways Company; Lehigh Traction Company; Wilkesbarre & Hazleton Railway; Schuylkill Railway; Shamokin & Mt. Carmel Railway; Lackawanna & Wyoming Valley Railway; Wilkesbarre & Wyoming Valley Traction Company; Waverly, Sayre & Athens Traction Company; Elmira Water, Light & Railroad Company; Cortland County Traction Company; Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company; Rochester & Eastern Rapid Railway; Auburn & Syracuse Electric Railroad; Auburn & Northern Electric Railroad; Rochester Railway; Rochester & Suburban Railway; Rochester, Syracuse & Eastern Railroad; International Railway.

The introduction to the booklet states:

"To the Public.—The information contained in this folder has been compiled for the convenience of the traveler over the Lehigh Valley Railroad whose final destination may be some interior point not reached direct by the lines of this company, but for which connection may be made via electric lines divergent therefrom. It is given as furnished by the companies operating such electric lines, and due care has been exercised to have it correct, but this company does not hold itself responsible for any errors or changes which may occur.

"Service.—Unless otherwise noted, it will be understood that electric cars are operated between the hours of 6 a. m. and 10 p. m.

"Baggage.—Personal baggage is handled by several of the electric lines shown herein, the charge being same as passenger fare for ordinary-sized trunks, etc., unless otherwise noted. Baggage will be checked by the Lehigh Valley Railroad only to point of connection with electric line.

The following shows the manner of presentation of the information regarding the different properties:

FROM GENEVA, N. Y.

Via Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company:

(Baggage Handled.)

Half-Hourly Service.

Cayuga Lake Park	20c
Waterloo	10c
Seneca Falls	20c

Via Rochester & Eastern Rapid Railway:

(Personal Baggage, not over 250 lb., 25c per Piece.)

Hourly Service, 6.30 a.m. to 11.15 p.m.

	FARE	ROUND TRIP
Litigation Hill	8c	10c
Seneca Castle	11c	19c
Spangle Street (Cross Road)	17c	29c
Freshours	20c	35c
Canandaigua	28c	48c

Express Service Between Fall River and Newport.—The Old Colony Street Railway, Boston, Mass., has announced that on May 1 a special express service will be established between Fall River and Newport in connection with the through passenger service.

New Wabash Valley Schedule.—The Wabash Valley Traction Company, Fort Wayne, Ind., will put a new schedule into effect on May 1, which provides for two additional trains daily. A through car to leave Fort Wayne at 3:30 p. m. for Lafayette will also be a feature of the new schedule. The operation of through limited cars to Indianapolis via Bluffton has not been fully decided upon.

Advice to Passengers.—With the idea of educating patrons to avoid arguments with conductors, the Twin City Rapid Transit Company has recently had the attached notice printed in large type and put in the front of each of its cars: "In all cases of dispute with conductor regarding fares or transfers, passengers will please pay conductor's claim and report facts promptly for adjustment to general superintendent. Conductor has no discretionary power in such matters but is governed by rules, which he is not authorized to change."

Revision of Fare on Michigan Road.—On Feb. 1, 1909, the Michigan United Railways, Jackson, Mich., revised the local rates on its line between Battle Creek and Kalamazoo on the basis of 2 cents per mile, but gave patrons the privilege of purchasing a 1000-mile ticket, good on all divisions, for $15, limited to one year from the date of sale, good for bearer or for one or more persons, and a 52-ride ticket between any two points between Jackson and Kalamazoo at 1 cent per mile, limited to one month from date of sale, and to the individual use of purchaser.

Interurban Conductor Sentenced for Stealing.—Robert St. Clair Moody, alias William E. Ellis, a conductor in the employ of the Washington, Baltimore & Annapolis Railway, Baltimore, Md., was sentenced on April 19 by Judge Gorter, in Part II of the Criminal Court, to serve one year in jail for the embezzlement of $1.40 from the company. Moody was arrested as the result of an investigation begun by J. N. Shannahan, general manager of the company. He is said to have been an old offender and at one time to have been discharged from the employ of the United Railways & Electric Company, Baltimore, Md., for a similar offence.

Freight Service on the Springfield & Eastern Street Railway.—The officers of the Springfield & Eastern Street Railway, Palmer, Mass., have been in conference with the officers of the Boston & Albany Railroad, looking to the establishment of a freight service for towns south of Palmer on the Springfield & Eastern Street Railway, which connects with the Boston & Albany at Palmer. The franchise of the Springfield & Eastern Street Railway permits the company to operate trains of four cars or less. Provision for the interchange of traffic between the Springfield & Eastern Street Railway and the Boston & Albany Railway, it is said, will be made a part of the agreement between the companies.

Hearing on Lower Car Steps in Toronto.—A hearing was held on April 19 before the Ontario Railway and Municipal Board on the application of the city of Toronto to compel the Toronto (Ont.) Railway to adopt a uniform height for the steps of all its open summer cars. Duncan Campbell, of the Preston Car Works, testified that he thought that standards of 15 in., 14 in. and 11 in. would make ideal side steps. H. S. Osler, for the Toronto Railway, said that the company had lowered the steps of one of its cars for the purpose of experimenting with the car in service, and it was decided by the board to adjourn the case until May 26 so as to have the benefit of the experience that would be gained in the meantime with the new car.

Limited Service Between Toledo, Lima and Springfield.—The Ohio Electric Railway, Cincinnati, Ohio, inaugurated limited service between Toledo and Lima and Lima and Springfield on April 25. The running time between Toledo and Lima, 72 miles, is 2 hr. 15 min., or about the same as the schedule over the Cincinnati, Hamilton & Dayton Railroad. Six cars will be operated in this service. It will also be possible to make the trip between Toledo and Columbus, although not on a direct line, in 5½ hr.; between Toledo and Dayton, 166 miles, in 5 hr. 15 min., and between Toledo and Fort Wayne, Ind., 134 miles, in 4 hr. and 10 min. The Ohio Electric Railway and affiliated companies operate 600 miles of line in Ohio and Indiana. The new station of the company at Avondale Avenue and Belmont Avenue, Toledo, was opened for business at the time the limited service was started.

Accident on Chicago, Lake Shore & South Bend Railway.—Particulars of the accident which occurred on April 12 on the Chicago, Lake Shore & South Bend Railway, South Bend, Ind., indicate that it was not so severe as at first reported. The crews were composed of experienced steam railroad men, but for some reason one crew misunderstood the meeting point with the other. The collision occurred on a curve whose entire length was in full view of both car crews. There was a heavy rainstorm when the collision occurred. The motorman of one car saw the car approaching from the opposite direction and stopped, but the motorman of the other car did not see the car approaching him until it was too late for him to stop, thus one of the cars had been brought to a standstill when the cars collided. Only three passengers were seriously hurt, a leg fracture being the most serious injury.

Limiting the Number of Passengers to a Car.—Under date of April 2, 1909, the United Traction Company, Albany, N. Y., issued the following notice, signed by Charles H. Smith, superintendent, to the conductors of its Pine Hills line: "On and after Monday, April 5, 1909, and until further notice, the following orders are issued in relation to the cars running on the Pine Hills line: Conductors must not allow more than forty (40) passengers on the '400' type of box car at one time, or not more than thirty-five (35) passengers on the smaller type of box car at one time. Whenever a car has the above number of passengers, the conductor will give 'two bells' to the motorman after the car is started, which shall be the signal to the motorman that he is not to stop for passengers, and to stop only on signal from conductor. If, when the car stops to discharge passengers on signal from conductor, additional passengers get on the car to the requisite number, the conductor must again give the signal 'two bells' after the car is started. If the motorman does not receive 'two bells' after starting his car, he will stop for passengers at regular stations as usual. No passengers must be allowed to ride on the rear platform of any Pine Hills car while this order is in effect."

Pittsburg Railways Refuse to Increase Wages.—The agreement of the Pittsburg (Pa.) Railways with its employees expires on May 1, and the men have asked for an increase in wages of 3½ cents over the present scale. The company has replied that industrial conditions do not warrant an increase at this time, but has signified its willingness to renew the agreement between it and the men under the terms that now apply. The opinion has been expressed by the men by ballot that a strike should be ordered if the demands are not complied with by the company. On April 18 the company issued this statement: "A short conference was held at 2 p. m. on April 17 between officials of the Pittsburg Railways and representatives of the men. The committee asked Mr. Callery to reconsider the wage rate and working rules which have been posted at the various car houses. Mr. Callery stated that the company had granted the most liberal concession it was possible to make in view of the prevailing business conditions and the uncertain outlook, and that the company's final position was the rate and conditions as posted at the car houses." On the committee's referring to the embarrassing position in which it was placed by having nothing to take back to the men, Mr. Callery reminded the members that at the previous conference he had offered to withhold posting the last year's working rules until the committee had taken up the question with the men, provided the committee would agree to recommend to the men the acceptance of said agreement, but that the committee had positively refused to make such a recommendation.

Personal Mention

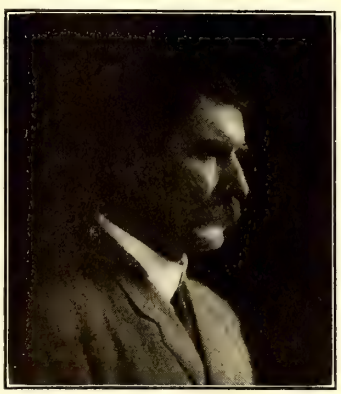
Mr. Charles B. Scott has been appointed assistant general manager of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Light Company, New Albany, Ind., a position recently created. Mr. Scott was formerly claim agent for both companies.

Mr. T. T. Snell has been appointed private secretary to Mr. William McCarroll, of the Public Service Commission of the First District of New York, to succeed Mr. F. L. Perine, resigned, who has become connected with the advertising department of the Standard Oil Company. Mr. Snell is a graduate of the Columbian Law School, Washington, and has recently been connected with Fraser & Usina, New York.

Mr. A. M. Robertson has been elected second vice-president of the Minneapolis (Minn.) Street Railway and the St. Paul (Minn.) City Railway and will act as assistant to Mr. C. G. Goodrich, president of the companies. Mr. Robertson has filled the position of assistant to Mr. Goodrich for the last three years, and the title of second vice-president is conferred to give him identity and to show his official relation with the companies. Mr. Robertson received his education and business training in Minneapolis, and has a large acquaintance among the business men in Minneapolis, St. Paul and the Northwest.

Mr. Wilhelm Wechmann, chief electrical and mechanical engineer of the Royal Prussian Railroad, Berlin-Charlottenburg, Germany, is in this country on a visit to inspect the recent electric railway installations here. He will spend about three months in this country and will go as far as the Pacific Coast during his visit. Mr. Wechmann is taking particular interest in single-phase lines. In speaking of the progress of the single-phase system in Germany, he said that the most important single-phase line now under construction in Germany is that connecting Halle and Magdeburg. This line is about 60 miles in length and is to be equipped with a 10,000-volt overhead system and will be operated by 15-cycle single-phase locomotives. Another 15-cycle line is under construction between Basel and Zell. This line will also be equipped with 10,000-volt locomotives. Current in this case is derived from a water-power station.

Mr. William D. Williams, Fort Worth, Tex., has been appointed a member of the State Railroad Commission of Texas by Governor Campbell and has entered upon the duties of his new office. At the time of his appointment Mr. Williams was Mayor of Fort Worth, having been recently elected to that position. Mr. Williams is a lawyer by profession. He entered politics about eight years ago, and was elected to the lower branch of the Legislature, where he attracted attention as the author of the intangible assets law, which was passed by the Legislature four years ago, while he was serving his second term as a member of the House. Mr. Williams was a candidate for Railroad Commissioner in 1905, but was defeated. His recent appointment was made to fill the vacancy caused by the recent death of L. J. Storey, chairman of the commission. Mr. Williams will be a candidate for election to the office in 1910.



W. D. Williams

OBITUARY

Frederick P. Olcott, formerly president of the Central Trust Company, New York, and a well-known financier, died at his home, Bernardsville, N. J., on April 15. Mr. Olcott was 68 years old at the time of his death, but had not been engaged actively in business for several years. He was born in Albany, N. Y., and was educated at the Albany Academy. In 1884 Mr. Olcott became president of the Central Trust Company, and held this position until August, 1905, when he retired from business. During his connection with the Central Trust Company Mr. Olcott became interested in many street railway and railroad projects, and was connected at one time or another as a director or officer with the Denver City Cable Railway, Brooklyn Elevated Railroad, Third Avenue Railroad, New York, and the Delaware, Lackawanna & Western Railroad. Mr. Olcott is survived by a widow, a son and a daughter.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (* indicates a project not previously reported.

RECENT INCORPORATIONS

***Glendale & Eagle Rock Railway, Los Angeles, Cal.**—Incorporated to build a 2½-mile street railway from Eagle Rock to Glendale. The motive power will be gasoline or electricity. Capital stock, $25,000. Directors: E. D. Goode, R. E. Goode and George Benson.

***Coos Bay, Oregon & Idaho Railway, Marshfield, Idaho.**—Incorporated in Oregon to construct a railway to be operated by steam or electricity from Coos Bay, Ore., east via Roseburg, to Boise, Idaho. Headquarters, Marshfield. Capital stock, $25,000. Incorporators: William Grimes, Henry Sengstacken, J. V. Pugh, J. C. Gray, John R. Smith and P. Hennessey.

Lakewood & Seashore Railroad, Lakewood, N. J.—Incorporated, as the successor to the Trenton, Lakewood & Atlantic Railway, to build an electric railway from Lakewood to Point Pleasant, 10 miles. Capital stock, $300,000. Headquarters, Lakewood. Incorporators: Charles R. Le Compte, Ernest E. Le Compte, Nicholas MacDonald, Harry J. Terwilliger, Lakewood; James H. Butcher, J. Arthur Butcher, Ardena; Roderick A. Clark, Point Pleasant. [E. R. J., April 24, '09.]

***Defiance, Napoleon & Wauseon Railway, Wauseon, Ohio.**—Incorporated for the purpose of building a railway, to be operated by electricity or steam, between Wauseon and Defiance. The projectors have not stated their intentions as yet. Capital stock, $1,000. Incorporators: Charles E. Bennett, J. Walter Bennett, Jay H. Miller, W. W. Campbell and Henry Rohrs.

Rapid Transit Subway Company, Pittsburgh, Pa.—Application has been made for a charter for this company to construct an underground passenger railway in Pittsburgh. The applicants are: F. W. Mueller, W. E. Kusen, Paul H. Mueller, John A. Staley and John F. Mueller, Pittsburgh. [E. R. J., March 27, '09.]

***Chillisquaque Connecting Railway, Sunbury, Pa.**—Chartered to build a 2½ mile street railway from Lewisburg to the Pennsylvania Railroad. Capital stock, $18,000. Directors: W. H. Lyons, Sunbury, president; Boyd A. Musser, J. C. H. Newcomer, C. M. Clement and Guy Webster.

***Montandon & Milton Electric Railway, Sunbury, Pa.**—Chartered to build a 9-mile street railway from a point in West Chillisquaque Township to Milton, via Montandon and Chillisquaque. Capital stock, $54,000. Directors: W. H. Lyons, Sunbury, president; Boyd A Musser, J. C. H. Newcomer, C. M. Clement and Guy Webster.

***Sunbury, Lewisburg & Milton Electric Railway, Sunbury, Pa.**—Chartered to build a 10-mile electric railway from a point in Monroe Township to Lewisburg via Winfield. Capital stock, $60,000. Directors: W. H. Lyons, Sunbury, president; Boyd A. Musser, J. C. H. Newcomer, C. M. Clement and Guy Webster.

***Washington-Marianna Street Railway, Washington, Pa.**—Application will be made on May 17 for a charter for this company, which proposes to build a street railway from Washington to South Strabane Township. Applicants for the proposed charter are: C. B. Coldwell, J. W. McKay, M. J. Hosack, E. B. Hartman, Jr., and Roger Knox.

FRANCHISES

Birmingham, Ala.—The Board of Revenue has granted a franchise to the Birmingham Railway, Light & Power Company to extend its North Highlands line from North Haven to the pipe shops, a distance of about 1¼ miles.

Little Rock, Ark.—The City Council has passed an amendment to the franchise of the Little Rock Railway & Electric Company, which provides for the extension of the Union depot line along Water Street from Cross Street to Chester Street.

***Tehama, Cal.**—Application has been made to the Town Trustees by J. J. Worthington for a franchise for an electric railway on D, E and Second streets in Tehama.

Sacramento, Cal.—The City Trustees have granted the Central California Traction Company, San Francisco, a franchise which provides that the Northern Electric Railway, the Vallejo & Northern Railway and two more such railroads shall be permitted to use the tracks the company will lay on X Street and Eighth Street.

Warsaw, Ind.—The City Council has granted J. A. Barry, representing the Wabash & Northern Traction Company, a franchise to construct an electric railway in Warsaw.

Creston, Ia.—The City Council has granted to the Des Moines, Winterset & Creston Electric Railway a year's extension of its franchise. The proposed railway will extend from Des Moines to Winterset, Macksburg and Creston, a distance of 60 miles. [E. R. J., Jan. 30, '09.]

Ann Arbor, Mich.—Application has been made to the City Council by the Ohio & Michigan Southern Railroad for a franchise through the city, to enter on Geddes Avenue and leave by North Main Street. [E. R. J., Feb. 6, '09.]

Grand Forks, N. D.—The County Board has granted to the Grand Forks Street Railway a franchise to construct a street railway to the fair grounds and the cemetery. [E. R. J., Feb. 6, '09.]

Cincinnati, Ohio.—John E. Bleekman, New York, president of the Southwestern Ohio Traction Company, which was recently incorporated, has applied to the City Council, Cincinnati, for a franchise for an underground and elevated railroad system extending from the heart of the city to Norwood, a suburb. [E. R. J., April 24, '09.]

Xenia, Ohio.—The Greene County Commissioners have granted Thomas L. Ferneding a franchise for an electric railway following close the right-of-way of the Rapid Transit division of the Dayton & Xenia Traction Company from Xenia to a point 3 miles west where it connects with this line which is to be followed the remainder of the distance to Dayton. It is said that the franchise will be transferred to the Dayton, Springfield & Xenia Southern Traction Company, which was organized some months ago to extend these lines to Washington C. H.

Portland, Ore.—The City Council has adopted a resolution releasing the United Railways from the provision of its franchise, which prohibited it from running cars until the line is connected with Hillsboro and Mount Calvary Cemetery.

Portland, Ore.—The City Council has granted to the Portland Railway, Light & Power Company a blanket franchise to construct and operate several new lines, spurs and switches in Portland.

Roseburg, Ore.—It is stated that Kendall Bros. have withdrawn their application for a franchise for a street railway in Roseburg. [E. R. J., April 3, '09.]

***Knoxville, Tenn.**—The County Court has granted Charles Dawes a franchise to build an electric railway from Knoxville to Bearden. Branches are to be built to Concord and Lyons View.

***Seattle, Wash.**—E. L. Blaine has applied to the County Commissioners for a franchise to build and operate an electric railway between Renton and Issaquah, a distance of 10 miles.

***South Bend, Wash.**—The County Commissioners have granted a franchise to the Ilwaco General Electric Company, which proposes to light the cities of Ilwaco and Long Beach, and build an electric railway from Ilwaco to Stackpole Harbor on Willapa Bay, a distance of about 20 miles.

TRACK AND ROADWAY

Modesto (Cal.) Interurban Railway.—This company advises that it has awarded contracts for the grading of its proposed standard-gage railway and the construction of a bridge over Dry Creek at Modesto. The line will connect Oakdale, Waterford, Empire, Turlock, Newman, Crow's Landing and Modesto. Construction work has already been started. The motive power has not yet been definitely decided upon. Capital stock, authorized, $200,000, of which $60,000 has been subscribed. Principal office, Modesto. Officers: T. K. Beard, president; George Perley, vice-president; L. L. Dennett, secretary; G. P. Schafer, treasurer, all of Modesto. W. A. Cooper, 1370 Franklin Street, Oakland, chief engineer. [E. R. J., April 3, '09.]

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—It is stated that this company is making preliminary arrangements for extending its line to Calistoga. Negotiations are now under way to secure the necessary rights-of-way for the proposed extension.

San Diego & El Cajon Valley Interurban Railway, San Diego, Cal.—E. Fletcher, a director in this company, is quoted as saying that preliminary surveys have been completed for this proposed electric railway from La Mesa to Lakeside, 15 miles. Practically all of the field work has been completed and portions of the right-of-way have been secured. [E. R. J., Feb. 27, '09.]

Visalia (Cal.) Electric Railroad.—It is stated that the Visalia Electric Railroad plans to construct an extension running out to the Woodlake district, and connecting with the Naranjo district, provided the right of way for the railway can be secured without cost to the company.

Tampa Sulphur Springs Traction Company, Tampa, Fla.—L. Brill, general manager, advises that this company expects to place contracts during the next two weeks for the construction of 3 miles of new track.

***Gainsville, Ga.**—It is reported that Col. T. G. Dorrough, Elberton, is interested in a plan to build a street railway in Gainesville.

St. Louis & St. Libory Railway, Belleville, Ill.—This company has filed with the Illinois State Trust Company, as trustee, a mortgage to secure an issue of $600,000 of 6 per cent, 25-year gold bonds. The company proposes to build an electric railway from East St. Louis to St. Libory. E. L. Thomas, Belleville, president. [E. R. J., Oct. 24, '08.]

Chicago & Oak Park Elevated Railroad, Chicago, Ill.—It is stated that this company is planning to extend its line from Harlem Avenue to Elmhurst, a distance of 4 miles.

Illinois Light & Traction Company, Streator, Ill.—This company expects to place contracts during the next two weeks for the construction of 1 mile of new track.

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—This company is reported to have started construction work on its proposed electric railway from Bluffton to Celina, Ohio. The section between Bluffton and Celina, 18 miles, is to be completed during the summer. Geneva has raised $75,000 by subscription and election, and the sale of $150,000 in preferred stock has been placed in the hands of local promoters, this amount forming the basis of construction. Fred Davenport, chief engineer. [E. R. J., Oct. 17, '08.]

Evansville & Southern Indiana Traction Company, Evansville, Ind.—At a meeting of the directors of this company, April 20, it was voted to expend $60,000 for ballasting the roadbed this year. The matter of extending the line from Poloka to Hazleton was not considered.

Wabash & Northern Traction Company, Warsaw, Ind.—It is stated that this company's engineers are at work surveying and preparing estimates for its projected electric railway between Wabash, North Manchester and Warsaw, and that the company will soon be ready to receive bids for the grading of the line. J. A. Barry and W. L. Moyer are said to be interested in the company.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—It is stated that this company will immediately begin work on the extension of its railway from Augusta to Hallowell, 3 miles.

Peninsula Traction Company, Cambridge, Md.—It is stated that this company, which proposes to build an electric railway from Claiborne to Ocean City, Md., about 85 miles, and from Cambridge, Md., to Seaford, Del., will begin construction early this summer. The McCay Engineering Company, Baltimore, has made surveys for the line, the backers of which are not yet disclosed. From Claiborne and Cambridge the promoters of the railway propose to establish steamboat routes to Baltimore. The main power station will be located at Cambridge. Four substations will be built: One between Easton and Hurlock, one at Vienna, one at Hurlock and another at Berlin. The railway will serve a population of about 100,000. [E. R. J., March 27, '09.]

Twin City General Electric Company, Ironwood, Mich.—Work was started by this company on April 19 on the extension of its street railway from Ironwood to Bessemer, Ramsay and Wakefield. Work on the Jessieville extension was begun at the same time. [E. R. J., Jan. 30, '09.]

***Breckenridge, Minn.**—Joseph Gunn, Breckenridge, and his associates have about completed arrangements to construct a railway between Breckenridge and Wahpeton, N. D. The line will be equipped with gasoline electric cars.

Delta Electric Light, Power & Manufacturing Company, Greenville, Miss.—This company is engaged in building 1½ miles of additional track to its present system. Material has already been purchased for this work. The company has just placed in operation a 1½-mile extension to the new city park.

Hattiesburg (Miss.) Traction Company.—This company has awarded a contract to A. M. Hewes, Monadnock Building, Chicago, Ill., for the rehabilitation of about 6 miles of track and erection of overhead work. It is expected that these improvements will be finished by Aug. 15.

Blue Valley Traction Company, Kansas City, Mo.—At a meeting of the directors of this company the following officers were elected: M. M. Sweetman, president; C. W. German, secretary, and J. M. Lowe, treasurer. The company proposes to build an electric railway from Sheffield south through Manchester and across the Blue River to

Swope Park, then east to Raytown. Eventually it is to be extended to Sweet Springs. [E. R. J., April 17, '09.]

Hornellsville Electric Railway, Hornell, N. Y.—This company expects to place contracts during the next two weeks for the rebuilding of 2000 ft. of track.

Burgrahaw Interurban Company, Burlington, N. C.—This company, which proposes to build an electric railway which will connect Burlington, Graham and Haw River, has completed the grading between Burlington and the Graham Depot. The line will run on the north side and almost parallel with the Southern Railway from Burlington to Haw River, and a spur will be run from Graham, a distance of about 1 mile. An amusement park and a baseball park are being arranged by the promoters in the suburbs of Burlington along the line and will be completed before the railway is put in operation. The Southern Power & Traction Company, recently chartered with an authorized capital stock of $350,000, and which has been granted franchises by Burlington, Graham, Reidsville, Wentworth and other towns, is being promoted by the same interests who are engaged in the building of the Burgrahaw Interurban Railway. [E. R. J., Jan. 23, 09.]

Illinois Central Electric Railway, Canton, Ohio.—This company is building a 5-mile extension to its system from Canton to Norris. W. D. Plattenburg, secretary.

Hocking Valley Railroad, Columbus, Ohio.—It is reported that this company is considering the feasibility of electrifying the Puritan Railroad and extending the electric service between Wellston and Hamden, Ohio.

Bellefontaine & Sidney Traction Company, Bellefontaine, Ohio.—Plans are being made by this company for the construction of a railway to connect Bellefontaine and Sidney. It is said that prominent business men of the two towns have arranged to donate the right-of-way through Logan and Shelby counties to the company. Gen. R. P. Kennedy, Bellefontaine, and Gen. Asa W. Jones, Warren, Ohio, are said to be interested in the matter. Judge Hugh T. Mathers, Sidney, president. The advisability of operating straight gasoline motor cars is being considered. [E. R. J., Dec. 19, '08.]

***Guthrie, Okla.**—It is reported that H. M. Dougherty, Columbus, Ohio, is interested in a plan to build an electric interurban railway from Guthrie to Norman.

Shawnee-Tecumseh Traction Company, Shawnee, Okla.—This company has placed a contract with the Illinois Steel Bridge Company, through its general agents, Hughes & Hammond, Kansas City, Mo., for the erection of a 95-ft. steel span bridge and the reconstruction of its present trestle across the Canadian River.

Toronto, Ont.—The Kearney High-Speed Railway Company, London, England, is said to be endeavoring to interest the city in an underground railway. G. W. C. Kearney has written to the city engineer suggesting two lines. One would run from some point in part of the city under Yonge Street to the Custom House. The other would start in East Toronto and run under Queen, Dufferin and Dundas Streets to Toronto Junction.

Chester, Concordsville & West Chester Electric Railway, Concordsville, Pa.—Joseph Shortlidge, Concordsville, recently addressed the Chester Board of Trade in the interest of this proposed electric railway, which is to extend from Chester to West Chester. The matter was placed in the hands of the committee on transportation, and it has been recommended that the board co-operate with and support the company. [E. R. J., Nov. 14, '08.]

Clairton, Pa.—It is stated that construction work will be started within 30 days by the Jefferson & Wilson Street Railway, and the Peters Creek Street Railway on the proposed 5-mile street railway which is to connect Glassport, Coal Valley, Wilson, Blair and Clairton. A steel bridge, 1500 ft. in length, with a 500-ft. span, will be built across the Monongahela River. All the necessary right-of-way has been secured and franchises have been granted by the boroughs through which the new line will pass. Connection may be made with lines of the Pittsburg Railways. Officers: W. G. Wilson, Dravosburg, president; W. G. Weimer, secretary. [E. R. J., March 20, '09.]

Donora & Eldora Street Railway, Donora, Pa.—This company has filed for record an amendment to its charter which authorizes it to extend its line to Webster, West Newton, West Elizabeth and Monongahela. B. M. Hanna, Pittsburg, president.

Central Pennsylvania Traction Company, Harrisburg, Pa.—It is stated that this company will soon begin work on improvements to its line. It will extend its Market Street line to Whitehall Street, thence to Prospect Street, enabling the company to handle the Reservoir Park traffic during the summer months more expeditiously. Tracks on Third and Fourth Streets will be relaid.

Slippery Rock & Grove City Electric Railway, Grove City, Pa.—This company announces that it will be prepared to let contracts about July 15 for the construction of its broad gage electric railway between Slippery Rock and Grove City, a distance of nine miles. A power station will be built near Grove City. The proposed railway will reach Barmore Lake, an amusement resort, one and one-half miles from Grove City. Power for lighting will be furnished to the State Normal School also in Slippery Rock. Bonds authorized, $200,000. Officers: J. P. Barr, Grove City, president; James A. Joliffe, Slippery Rock, secretary; J. H. Pizor, Slippery Rock, treasurer; S. L. McClure, Grove City, general manager and purchasing agent. [E. R. J., April 3, '09.]

Schuylkill & Dauphin Traction Company, Williamstown, Pa.—This company has placed contracts for the construction of two new turn-outs and the erection of a 100-ft. steel bridge.

Austin (Tex.) Electric Railway.—W. J. Jones, president, writes that this company plans to add 1 mile of new track to its railway during this year.

Rockdale, Tex.—J. F. Coffield, Rockdale, confirms the report that he and associates are promoting the construction of a broad-gage electric railway between Rockdale and Florence, 60 miles. Capital stock will be $1,000,000. It is the plan to build a power plant and repair shop at Rockdale. Power will be furnished for lighting. A company has not yet been incorporated. [E. R. J., April 17, '09.]

***Stamford (Tex.) Street Railway.**—The ELECTRIC RAILWAY JOURNAL is advised that this company has been organized for the purpose of building a 5-mile street railway in Stamford, which is to extend to the College Heights addition. It is proposed to start work on this line in the early part of the summer. It is being financed by local capitalists. L. M. MacArthur, Stamford, chief engineer.

Everett & Tacoma Railway, Snohomish, Wash.—It is officially announced that this company has made surveys and secured practically all right-of-way for its proposed electric railway from Everett to Snohomish, Issaquah, Seattle and Tacoma, 110 miles. Capital is practically obtained and construction contracts will be let about June 1. Headquarters, Snohomish. Officers: O. E. Crossman, president; E. Colburn, vice-president; J. F. Taylor, treasurer; C. A. Barren, secretary; E. Lloyd Colburn, assistant secretary; C. A. Barron, general manager; E. Colburn, chief engineer. [E. R. J., Feb. 20, '09.]

Grafton (W. Va.) Street Railway.—It is stated that this company has decided to extend its line west to Flemington, a distance of 10 miles.

Okanogan Electric Railway, Spokane, Wash.—Official announcement is made by Col. Albert M. Dewey, Spokane, president of this company, that French capitalists have taken over a bond issue of $3,000,000, the proceeds from which will be used to build an electric railway from Nighthawk to a point near the head of navigation on the Columbia River, 75 miles. It will pass through Loomis, Okanogan, Ophir, Malott, Brewster and Riverside, and will connect at the north end with Victoria, Vancouver & Eastern extension of the Great Northern Railway, thus giving it Spokane connection on the east and the Sound cities on the west. It will also be extended east to Spokane and west to Seattle, making a system of more than 500 miles, for the construction and equipping of which ample capital has been secured. Engineers have been in the field several months, running preliminary surveys for the line from Spokane to Seattle, and the company is now looking for a feasible pass through the Cascade Mountains near the west fork of the upper Methow River. The company already has a 50-year franchise, right-of-way and charter. [E. R. J., March 20, '09.]

POWER HOUSES AND SUBSTATIONS

Hattiesburg (Miss.) Traction Company.—A contract has been awarded to A. M. Hewes, Monadnock Building, Chicago, Ill., by this company for the erection of a new power station building to be equipped with 1500-kw and 1325-kw direct-connected units and a 150-kw motor-generator set. It is expected that the above work will be completed by Aug. 15.

Cincinnati (Ohio) Traction Company.—This company's power plant on Eastern Avenue, Cincinnati, was damaged by fire on April 16 to the extent of $7,000. Service on 12 of the main lines was tied up for over two hours.

Chatham, Wallace & Lake Erie Railway, Chatham, Ont.—This company has recently placed contracts for two Gould storage batteries, one for the north end and the other for the south end.

Manufactures & Supplies

ROLLING STOCK

Ocean Electric Railway, Far Rockaway, N. Y., is in the market for four double-truck cars.

Portland, Eugene & Eastern Railway, Portland, Ore., has ordered one car from the Danville Car Company.

Kanauga Traction Company, Gallipolis, Ohio, is reported to have ordered one car from the Jewett Car Company, Newark, Ohio.

Toledo Railways & Light Company, Toledo, Ohio, is reported to be contemplating the purchase of 50 city cars early in the summer.

Boston & Northern Street Railway and Old Colony Street Railway, Boston, Mass., contemplate purchasing 40 new cars. Specifications have not been drawn.

Oklahoma Midland Electric Railway, Hobart, Okla., a proposed electric road, is in the market for two small gasoline motor cars for city service, to seat from 12 to 25 passengers.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., has purchased two 15-bench, open, second-hand cars fully equipped from John B. Watson, Philadelphia.

Colfax Springs (Ia.) Electric Railway has purchased one second-hand, 16-ft. closed car equipped with two GE-62 motors from the Dorner Railway Equipment Company, Chicago.

Defiance (Ohio) Street Railway has ordered one 10-bench, open, second-hand car equipped with Westinghouse 12-A motors from the Dorner Railway Equipment Company, Chicago.

Central Pennsylvania Traction Company, Harrisburg, Pa., mentioned in the Electric Railway Journal of April 24, 1909, as having purchased 8 cars, has placed the order with The J. G. Brill Company.

Manor Valley Railway, Irwin, Pa., is in the market for two 45-ft. double-truck and two 30-ft. single-truck passenger cars and one single-truck baggage car. C. A. Thompson is the general manager.

Huntsville, Chattanooga & Birmingham Railway, Light & Power Company, Huntsville, Ala., has bought two second-hand, 10-bench open cars equipped with Westinghouse No. 49 motors from the Dorner Railway Equipment Company, Chicago.

Oak Bluffs (Mass.) Street Railway, mentioned in the Electric Railway Journal of March 20, 1909, as contemplating the purchase of one or more cars with gasoline motors, advises that it will not place its order for rolling stock until the fall.

Norfolk City & Suburban Railway, Norfolk, Va., will purchase two interurban cars either new or second-hand, with Brill 27-G or 27-G1 trucks, four GE-57, 80 or 90 motors, to seat about 50. Address Box No. 920, Norfolk, Va., by mail only, with prices.

Houston (Tex.) Electric Company, mentioned in the Electric Railway Journal of Feb. 20, 1909, as having bought 15 cars, has not purchased these cars. Some equipment will soon be ordered, however, through Stone & Webster, general managers, Boston, Mass.

Chicago & Milwaukee Electric Railway, Chicago, Ill., mentioned in the Electric Railway Journal of March 27, 1909, as contemplating the purchase of 12 cars, has purchased pay-as-you-enter cars from the St. Louis Car Company, St. Louis, and has specified McGuire 20-A trucks.

People's Traction Company, Galesburg, Ill., mentioned in the Electric Railway Journal of April 24, 1909, as being in the market for two trailers, through the Knox Engineering Company, Chicago, has purchased two second-hand closed trail cars from the Dorner Railway Supply Company, Chicago.

Syracuse & Suburban Railway, Syracuse, N. Y., mentioned in the Electric Railway Journal of April 10, 1909, as having specified Brill 27-E trucks for the three cars purchased from the G. C. Kuhlman Car Company, it is learned specified American Locomotive Company's type B M.C.B. trucks for these cars.

Jacksonville (Fla.) Electric Company has been licensed by the Pay-As-You-Enter Car Corporation to operate pay-as-you-enter cars on its lines, and will start this service shortly. It is reported the company will purchase some new rolling stock for this use through Stone & Webster, general managers, Boston, Mass.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y., reported in the Electric Railway Journal of April 17, 1909, as contemplating the purchase of some single-truck cars, has ordered three closed, single-truck cars from the Wason Mfg. Company, through Meikleham & Dinsmore, N. Y. They will be the same as the other cars bought (described in the above-mentioned issue) except for the following: Length of body, 22 ft. 7 in.; platform, 4 ft. 6 in.; wheel base, 7 ft. 6 in; H. & K. seats; GE-216 motors and hand brakes.

Chicago & Southern Traction Company, Chicago, Ill., mentioned in the Electric Railway Journal of March 27, 1909, as having ordered four interurban trailers from the Niles Car & Manufacturing Company, has specified the cars to be 47 ft. 10 in. over all, 8 ft. 7½ in. wide over all. They will be equipped with Hale & Kilburn 99-A rattan seats, with a capacity for 50, Pantasote curtain material and Edwards 13-O sash fixtures. The cars will weigh 24,000 lb. and will be mounted on Baldwin Class 60-20 trucks, with Symington journal boxes.

Salt Lake & Ogden Railway, Salt Lake City, Utah, mentioned in the Electric Railway Journal of April 10, 1909, as being in the market for 12 motor cars, has placed an order with the Jewett Car Company, Newark, Ohio, for 10 three-compartment interurban cars. These cars are to be of the steam coach type, 56 ft. in length over all, 44 ft. bodies; width over all, 9 ft.; height sill to trolley base, 9 ft. 7 in., and are to have a seating capacity of 60. The following special equipment has been specified: Solid bronze car trimmings; Symington center bearings; Janney radial couplers; Curtain Supply Company's curtain fixtures; Pantasote curtains; Agosote headlinings; pneumatic air gongs; Peter Smith heaters; combination arc and incandescent headlights; Hale & Kilburn pressed steel seats; Wood's side-bearings; Globe ventilators.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., mentioned in the Electric Railway Journal of March 6, 1909, as contemplating the purchase of two cars, has ordered two interurbans from the St. Louis Car Company, St. Louis, Mo., for May 1, 1909, delivery. The cars will be 45 ft. long over all, 9 ft. wide over all, will have a body length of 34 ft., an inside width of 8 ft. 4 in., will weigh 26 tons, have a 6-ft. wheel base and seat 52. Other details of interest are:

Height inside.....8 ft. 6 in.	Headlights ...Crouse-Hinds
Sill to trolley base, 9 ft. 4 in.	Motors ..... GE
Body ..... wood	Registers ..... Ohmer
Underframe, wood and iron	Sanders, Ohio Brass Company
Air brakes, National Brake & Electric Company	Trolley retrievers, Knutson
Gears and pinions... Nuttall	Trucks ..... St. Louis
Hand brakes.....St. Louis	Varnish .....Standard
Heaters ..... Consolidated	

The company has also purchased four new GE-1000 motors from the Dorner Railway Equipment Company, Chicago.

Emigration Canyon Railroad, Salt Lake City, Utah, mentioned in the Electric Railway Journal of Feb. 27, 1909, as having purchased two motor and two trailer cars from the American Car Company, advises that the Danville Car Company will construct this rolling stock, and that they will all be closed cars, 34-ft. body length, and 43 ft. 5 in. over vestibules, weight, 25 tons, and seat 48. Other details of interest follow:

Body ..... wood	Hand brakes.....Brill
Underframe ..... wood	Headlights, Electric Traction Supply Company
Air brakes, Westinghouse AML	Motors, 4 Westinghouse 93-A2
Brakes ..... Brill	Sanders ..... Dumpit
Control system, L-4 Westinghouse	Seats ..... Winner
Couplers ..... Brill	Step treads ..... Mason
Curtain fixtures, Curtain Supply Company	Trolley attachments, U. S. No. 1
Curtain material, Pantasote	Trucks ..... Brill
Gongs ..... Brill	Varnish ..... Murphy

The company also purchased 12 gondola flat-cars from Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio.

East St. Louis & Suburban Railway, East St. Louis, Ill., mentioned in the Electric Railway Journal of April 17, 1909, as having purchased five interurbans from the St. Louis Car Company, writes that these cars will be double-truck closed cars with smoking compartment, 45 ft. 4 in. long over all, 8 ft. 8 in. wide over all and are being built by the American Car Company. The body length will be 33 ft. 4 in., length over vestibule, 44 ft. 4 in. The cars will

each weigh 53,800 lb. and have a seating capacity of 46. Other specifications follow:

Height, sill to trolley base, 10 ft.	Gongs and bells, two Brill each
Height from top of rail to sills, 3 ft.	Hand brakes ..... Ratchet
Body ..... wood	Heating system, Consolidated
Underframe ..... wood	Headlights, GE luminous arc
Brake shoes ..... Walsh	Markers .....Handlan-Buck
Car trimmings..solid bronze	Motors .....four GE 216-A
Control system, GE multiple unit	Paint ... Sherwin-Williams
	Registers ..... Ohmer
Couplers ..... Tomlinson	Seats ..... Hale & Kilburn
Curtain fixtures, Curtain Supply Company	Trolley retrievers, Earll No. 5.
Curtain material..Pantasote	Trolley poles, Shelby Seamless
Destination signs ...Hunter	Trucks ..... Brill 27-E 1½
Fenders, company's own make	Varnish ..... Murphy

The cars will be practically the same as the 15 purchased last fall for Belleville service.

TRADE NOTES

Chicago Mica Company, Valparaiso, Ind., elected M. L. Kohler, of Philadelphia, president at its annual meeting held April 14 at Chicago.

Weston Electric Instrument Company, Newark, N. J., will move its New York office from 74 Cortlandt Street to 114 Liberty Street on May 1.

Rail Joint Company, New York, N. Y., announces that James A. Greer is now acting as its representative in San Francisco, in place of W. E. Clark, who has been transferred to the New York office.

McKeen Motor Car Company, Omaha, Neb., has received an order from the Northern Pacific Railway for one 55-ft., all-steel gasoline motor car which will have passenger and baggage compartment.

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—This company advises that it expects to give free concessions to riding devices for its Island Park, which will be opened on May 24. R. V. West, manager.

Massachusetts Chemical Company, Walpole, Mass., announces that its Chicago office has been moved from Room 464, Monadnock Block, to suite 429-30 in the same building. On account of increasing business this change in quarters was found necessary. Arthur E. Ducos is in charge of the office.

Electric Service Supplies Company, Philadelphia, Pa., has just closed a contract with the American Railways Company to equip all of this company's cars with Automotoneers. This will include its entire equipment in Scranton, Pa.; Springfield, Ill.; Dayton, Ohio; Altoona, Pa., and Bridgeton, N. J.

Barrett Manufacturing Company, Chicago, Ill., has purchased through Samuel H. Bingham, president of the company, a 24-acre tract of ground on Sacramento Avenue, Chicago, on which it is reported the company will erect a large plant for the manufacture of its roofings, paints, building paper and paving materials. The Barrett Manufacturing Company has two manufacturing plants in Chicago and other plants in several large cities.

Hurley Tracklaying Machine Company, Chicago, Ill., has recently closed a second contract with the Erie Railroad, whereby it has leased one of its machines for laying the track on the Genesee River Railroad in New York. The work is expected to start from Cuba, N. Y., the latter part of April. The Erie Railroad was much pleased with the results obtained with the Hurley machine used last summer in laying the track on the Erie & Jersey Railroad, and is now using it wherever available.

Automatic Car Coupler Company, Los Angeles, Cal., the incorporation of which was noted in the ELECTRIC RAILWAY JOURNAL of April 17, 1909, has elected the following officers: President, Frank R. Bonney; vice-president, Frank H. Norwood; secretary, Karl Elliott; treasurer, C. H. Wills. The company will manufacture and sell the Norwood-Bonney car coupler which has been applied on a number of interurban cars of the Los Angeles & Redondo Beach Railway. It is said that the company has also received an order to equip 100 cars of another railway with this coupler.

Fire Protection Company, Indianapolis, Ind., has been organized by T. M. Goodloe, for 12 years manager of the Indianapolis Fire Inspection Bureau, and M. DeF. Sample who, in addition to general fire inspection work, has made a specialty of hydraulic and electrical engineering from an insurance standpoint and who has been connected with various large industrial concerns. The Fire Protection Company will act as manufacturers' agent for equipment covering the entire field of fire protection and fire fighting, and will furnish and install fire-fighting devices subject to the approval of the underwriters having jurisdiction.

W. H. Dayton, who for several years has been connected with the Railroad Supply Company, Chicago, Ill., and recently with the New York office of that company, has taken up his residence in St. Louis and will be associated with E. W. Hodgkins in the railway supply business under the firm name of Hodgkins & Dayton, who will represent the following well-known companies as sales agents for St. Louis and Southwestern territory, with offices in the Security Building, St. Louis, Mo.: Railroad Supply Company; Dressel Railway Lamp Works; Paul Dickinson, Inc.; Chicago Bridge & Iron Works, and Wyandot Refineries Company.

Willans & Robinson, Rugby, Eng., will shortly take up the manufacture of water turbines from designs prepared by Jens Orten-Boving. It is their intention to proceed at first with the manufacture of turbines for high heads of the Pelton type, and afterward to take up low-pressure wheels. In the manufacture of the latter, Willans & Robinson will be assisted by the experience of Messrs. Verkstaden, of Kristinehamn, Sweden, with whom Jens Orten-Boving has been connected. Messrs. Verkstaden have supplied the complete hydraulic plant for some 250 hydroelectric stations, and have also made turbines for some 1500 other plants.

ADVERTISING LITERATURE

Corrugated Bar Company, St. Louis, Mo., has distributed ith March bulletin discussing special problems met with in the design of reinforced concrete conduits and sewers.

F. Bissell Company, Toledo, Ohio, is sending out a leaflet illustrating and quoting prices on Fletcher mast arms, pole brackets, reflectors, clusters and iron-pole bands for railway service.

Hyatt Roller Bearing Company, Newark, N. J., announces a new bulletin, No. 300M, which describes the company's high-duty bushings. The description is accompanied by tables of dimensions and safe loads.

American Engineering Company, Traction Building, Indianapolis, Ind., has prepared for distribution a large blue print map showing all the interurban lines in operation and under construction in the Central West.

American Carbon & Battery Company, East St. Louis, Ill., has issued several pamphlet sheets calling attention to the advantages of its American graphite, American special and American Diamond "A" carbon brushes.

Ohio Brass Company, Mansfield, Ohio, has just issued its April bulletin, and in addition to the usual interesting descriptions of railway materials it contains a series of caricatures of the most popular American in Africa.

Allis-Chalmers Company, Milwaukee, Wis., has printed a descriptive bulletin No. 1059 on d.c. engine-type generators of the following sizes: 12 kw to 500 kw 120 volts; 12 kw to 1000 kw, 240 volts; 90 kw to 850 kw, 525 volts.

H. W. Johns-Manville Company, New York, N. Y., has supplemented its catalog of "Noark" fuses published in 1905 with a new catalog which covers the improvements made in the "Noark" fuses since the first catalog appeared.

Schutte & Koerting Company, Philadelphia, Pa., has just issued Catalog No. 5, Section B, illustrating and describing the Koerting multi-jet eductor condenser. Although this condenser is new to the United States, it is in general use abroad.

Paint Manufacturers' Association, Philadelphia, Pa., is distributing two pamphlets, one entitled "Why Paint Peels," and the other "Paint Modernism." Copies may be obtained by addressing the publicity bureau of the Association, Room 623, The Bourse, Philadelphia.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4657, devoted to the subject of searchlight projectors for commercial use, and Bulletin No. 4656, in which is described a transformer for use in connection with the measurement of large amounts of current.

J. W. Jones, Harrisburg, Pa., has issued a catalog of the appliances manufactured by him for railways, printing and allied trades. A feature of the publication is a page showing examples of receipts, coupons and transfers, illustrating the Jones system for cash street railway fares, transfers and for merchants' advertising mediums.

Allgemeine Elektricitats-Gesellschaft, Berlin, Germany, announces that hereafter it will send to others on request its house organ known as the "A. E. G. Zeitung." This monthly was formerly published for the information of employees only. It is devoted principally to describing applications of the company's large line of electrical apparatus.

TABLE OF MONTHLY EARNINGS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1 " Mar. '09	150,684	86,720	63,964	43.803	20,161
	1 " " '08	129,659	81,273	48,386	43,953	4,433
	3 " " '09	435,083	251,971	183,112	131,486	51,626
	3 " " '08	375,086	241,631	133,454	131,595	1,860
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Feb. '09	30,745	19,235	11,510	8,790	2,721
	1 " " '08	27,569	16,001	11,568	7,623	3,945
	12 " " '09	366,238	212,880	153,358	101,381	51,977
	12 " " '08	359,805	202,256	157,550	90,425	67,124
BINGHAMTON, N Y. Binghamton Street Ry. Co.	1m., Mar. '09	25.554	15,185	10,369	9,187	1,182
	1 " " '08	22,339	13,363	8,976	8,287	689
	3 " " '09	75,908	42,820	33.088	27,502	5,586
	3 " " '08	66,138	41,924	24,214	24,852	†638
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Mar. '09	181,818	*114,204	67,614	44,787	22,827
	1 " " '08	177,003	*112,686	64,317	42,863	21,454
	3 " " '09	551,615	*342,287	209,328	134.356	74,972
	3 " " '08	522,091	*348,338	173,753	130,168	43,586
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Mar. '09	60,394	*39.636	20,758	13,917	6,841
	1 " " '08	61,497	*40,664	20,833	13,817	7,016
CHICAGO, ILL. Chicago Rys. Co.	1m., Jan. '09	945,856	*549,694	396.162	160,390	235,772
	1 " " '08	813,274	*633.88c	179,394	135,243	44,151
	12 " " '09	11,037,071	*7,725,95c	3,311,121	1,739,684	1,571 436
	12 " " '08	10,560,571	*7,392,40c	3,168,171	1,566,158	1,602,012
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1m., Mar. '09	20,345	*10,729	9,616	8,311	1,305
	1 " " '08	20,709	*11,146	9,563	7,946	1,617
	3 " " '09	55,813	*31,839	23.974	24,557	†583
	3 " " '08	56,355	*31,957	24,398	23,854	544
Lake Shore Elec. Ry. Co.	1m., Feb. '09	60,471	*44,019	16,452	34,520	†18,068
	1 " " '08	63,675	*40,633	23,042	31,009	†7,968
	2 " " '09	134,062	*89,593	44,469	68,912	†24,443
	2 " " '08	134,553	*87,423	47,130	61,874	†14,744
DALLAS, TEX. Dallas Electric Corporation.	1m., Feb. '09	94,588	57,953	36,636	28,772	7,863
	1 " " '08	84,650	57,725	26,926	29,183	†2 257
	12 " " '09	1,193,006	784,913	408,093	346,490	61,603
	12 " " '08	1,134,078	753.199	380,880	331,472	49,408
DETROIT, MICH., Detroit United Ry. Co.	1m., Feb. '09	530,314	*348.711	181,603	154,457	27,146
	1 " " '08	469,839	*332,046	137,793	135,122	2,671
	2 " " '09	1,101,321	*703.407	397,914	308,159	89,755
	2 " " '08	984,519	*671,519	313.000	271,168	41,832
EL PASO, TEX El Paso Elec. Co.	1m., Feb. '09	45,373	27.864	17,509	7,911	9,598
	1 " " '08	43,863	29,682	14,181	7,148	7,033
	12 " " '09	540,443	381.217	159,226	88.357	70,870
	12 " " '08	523,757	374,279	149,478	72,904	76,574
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Feb. '09	28,534	11,555	16,979	12,306	4,673
	1 " " '08	27,161	11,303	15,858	11,500	4,358
	2 " " '09	60,067	24,745	35,322	24.635	10,687
	2 " " '08	58,164	24,408	33,756	23,001	10,755
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Feb. '09	99.235	58,290	40,945	.....	.....
	1 " " '08	97.455	56,680	40.775	.....	.....
	2 " " '09	208,909	122,563	86,346	.....	.....
	2 " " '08	200,475	114,177	86,298	.....	.....
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Feb. '09	82,661	48,090	34,570	17,190	17,381
	1 " " '08	71,311	44,227	27,083	14,435	12,648
	12 " " '09	1,106,663	645.103	461,560	195,406	266,154
	12 " " '08	1,064,221	595,002	469,220	161,073	308,147
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Feb. '09	82,552	53,388	29,164	21,561	7,603
	1 " " '08	74,715	48,252	26,463	20,414	6,049
	12 " " '09	1,107,104	641,021	466,084	247,965	218,119
	12 " " '08	1,061,866	626,414	435.452	230,275	205,178
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Feb. '09	21,869	15,346	6,523	5,297	1,227
	1 " " '08	17,336	13,036	4,300	4,767	†467
	12 " " '09	274,992	153,664	121,328	60,628	60,700
	12 " " '08	254,783	144,601	110,182	57,311	52,871
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Feb. '09	36,793	23,076	13,718	8,185	5,533
	1 " " '08	31,378	20,764	10,614	8,116	2,498
	12 " " '09	441.329	257,647	183,683	99,342	84,341
	12 " " '08	394,898	234,511	160,387	81,106	79,281
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Feb. '09	505,813	283,633	222,181	150,460	71,721
	1 " " '08	464,119	251,390	212,729	151,050	61,678
	9 " " '09	4,849,120	2,750,549	2,098,571	1,390,602	707,968
	9 " " '08	4,639,178	2,391,635	2,247,543	1,379,072	868,471
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m., Mar. '09	47,131	*24,158	22,972	11,483	11,489
	1 " " '08	46,522	*23,251	23,270	11,623	11,647
	3 " " '09	139,215	*71,428	67,787	34.450	33.337
	3 " " '08	128,017	*73,346	54,672	34,469	20,203
LITTLE ROCK, ARK. Little Rock Ry. & Elec. Co.	1m., Mar. '09	56,589	*27,549	29,040	11,023	18,017
	1 " " '08	56,552	*28,220	28,326	8,191	20,136
	3 " " '09	171,031	*82,189	88,842	32,784	56,058
	3 " " '08	163,509	*81,439	82,070	27,500	54.570
MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Mar. '09	133,151	*84,512	48,639	35,489	13.150
	1 " " '08	128,857	*83,705	45,152	34,836	10,316
	3 " " '09	379,712	*246,331	133.382	106,340	27,042
	3 " " '08	360,264	*237,464	122,799	103,786	19,013
MONTREAL, CAN. Montreal St. Ry.	1m., Mar. '09	298,728	206,832	91,896	35,901	55.995
	1 " " '08	288,674	202,39c	86,284	38,119	48,165
	6 " " '09	1,813,342	1,166,384	646,959	181,243	465,716
	6 " " '08	1,747,137	1,145,866	601,271	186,253	415,018
OAKLAND, CAL. Oakland Traction Co.	1m., Feb. '09	205,101	102,258	102,842	45,367	57.475
	1 " " '08	210,591	110,303	100,288	45,831	54.457
	2 " " '09	419,685	211,288	208,396	90,734	117,661
	2 " " '08	435,676	229,208	206,468	91,662	114,807
San Francisco, Oakland & San Jose Cons. Ry.	1m., Feb. '09	68,591	33,151	35,439	23,142	12,297
	1 " " '08	68,407	35,464	32,943	20,852	12,092
	2 " " '09	138,784	67,288	71,495	46,284	25,211
	2 " " '08	138,433	72,235	66,199	41,704	24,496
PADUCAH, KY. Paducah Traction & Light Co.	1m., Feb. '09	17,807	11,069	6,739	7,034	†296
	1 " " '08	18,455	12,215	6.240	7.033	†793
	12 " " '09	225,099	131,797	93,301	82,574	10,727
	12 " " '08	237,712	151,769	85,943	82,598	3.345
PENSACOLA, FLA. Pensacola Electric Co.	1m., Feb. '09	19,081	10,124	8,958	4,366	4.591
	1 " " '08	15,378	13.929	1.448	4,134	†2,686
	12 " " '09	214,515	140,448	74,067	51,634	22,433
	12 " " '08	227,006	149,291	77,715	48,214	29,501
PHILADELPHIA, PA. American Rys. Co.	1m., Mar. '09	214,155	.....	.....	.....	.....
	1 " " '08	207,618	.....	.....	.....	.....
	9 " " '09	2,108,093	.....	.....	.....	.....
	9 " " '08	2,181,044	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Feb. '09	6,730	5,241	1,489	2,088	†599
	1 " " '08	6,341	6,415	†74	2,324	†2,399
	12 " " '09	123,154	86,013	37,141	26,327	10,815
	12 " " '08	120,612	85,419	35,193	27,246	7,947
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Mar. '09	370,730	175,720	195,009	.....	.....
	1 " " '08	336,153	173,366	162,786	.....	.....
	3 " " '09	1,064,958	528,973	535,984	.....	.....
	3 " " '08	1,009,264	521,713	487,551	.....	.....
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Mar. '09	75,511	40,364	35,147	.....	.....
	1 " " '08	66,594	35,528	31,066	.....	.....
	3 " " '09	228,196	120,866	107,330	.....	.....
	3 " " '08	203,565	109,507	94,059	.....	.....
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Mar. '09	903,151	*587.104	316,047	235,504	80,543
	1 " " '08	858,908	*559,135	299,773	233,290	66,483
	3 " " '09	2,540,348	*1,663,635	876,713	705,990	170,723
	3 " " '08	2,461,761	*1,633,034	828,727	700,163	128,564
SAVANNAH, GA. Savannah Elec. Co.	1m., Feb. '09	45,855	28,234	17,621	15,747	1,875
	1 " " '08	43,718	36,508	7,211	15,395	†8,184
	12 " " '09	601,621	375,126	226,495	187,361	39,134
	12 " " '08	603,050	403,079	199,971	178,444	21,527
SEATTLE, WASH. Seattle Elec. Co.	1m., Feb. '09	379,692	230,038	149,653	96,511	53,142
	1 " " '08	347,616	220,248	127,369	84,803	42,566
	12 " " '09	4,589,625	2,690,751	1,898,874	1,117,084	781,789
	12 " " '08	4,250,149	2,532,086	1,718,063	958,484	759.579
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Feb. '09	128,441	94,088	34,353	44,313	†9,960
	1 " " '08	117,502	79,788	37,714	41,150	†3,436
	12 " " '09	1,710,189	1,130,177	580,012	519,675	60,337
	12 " " '08	1,691,470	1,042,809	648,662	469,171	179,491
TAMPA, FLA. Tampa Elec. Co.	1m., Feb. '09	53,460	29,838	23.622	4,643	18,980
	1 " " '08	48,569	30,644	17,924	2,104	15,819
	12 " " '09	563,151	367,233	195,918	44,706	151,212
	12 " " '08	532,355	379,164	153,192	17,712	135,479
TOLEDO, O. Toledo Rys. & Light Co.	1m., Mar. '09	218,032	124,077	93,955	70,942	23.013
	1 " " '08	202,187	114,880	87,307	68,899	18,408
	3 " " '09	657 532	372,025	285,506	212,866	72,641
	3 " " '08	628,624	356,270	272,354	205,953	66,402

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MAY 8, 1909 No. 19

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Dilution of Average Fares by Transfers

W. A. House, president of the United Railways & Electric Company of Baltimore, has contributed, in his annual report to stockholders for the year 1908, to the current discussion regarding the dilution of the average revenue per passenger carried, resulting from the extended use of transfers. A system of universal transfers became operative in Baltimore in 1890 and since that time there has been the same rapid increase in their use which managers of urban traction properties have witnessed with concern in other cities where no remedial restrictions are imposed. The compilations by other companies of statistics similar to those presented by Mr. House [see ELECTRIC RAILWAY JOURNAL of April 24, 1909, page 797] and the increasing appreciation throughout the country of the possibilities of abuse of the transfer system, lead naturally to an inquiry as to how long the process of continued reduction in the average fare per passenger carried can be borne. The average revenue per passenger on some lines has been brought from 5 cents to the neighborhood of 3 cents by the rapid spread of the legitimate use of transfers accompanied by an even more rapid increase in the illegitimate use of the privilege; since that fact has been demonstrated by recent developments in various cities it is important that the public should understand clearly that the tendency cannot continue indefinitely in its present direction without disaster.

A Bureau for the Prevention of Accidents

In creating a bureau for the prevention of accidents, the Philadelphia Rapid Transit Company has taken a step that should meet with public approval and yield ample returns on the investment. The first superintendent, F. W. Johnson, has done distinctive work with motormen and conductors, primarily for the benefit of the claim department, with which he was formerly identified; but the effect of the instruction given was seen in the improved interest of trainmen in the prevention of avoidable accidents.

The duty of avoiding all risks that may lead to accident belongs no less to the general public than to the conductors and motormen of street railways; each class should be equally concerned in preventing injury or the destruction of life. Corporations are beset with claims arising from real or simulated injuries, the result of actual or pretended accident, and anything that can be done to lessen the number of claims that have no just basis will tend to bring sharply into relief what should be the only problem of this nature. This is the reduction of the opportunity for accidents so far as that result can be accomplished by human foresight.

The training of motormen and conductors in this important matter will never be complete on any large city system, because of the large proportion of men who retire from the service each year; nor will the time ever come when the education of the public will reach the point of perfection, but continued effort will undoubtedly so impress thousands of people that the simple accidents that are so common on street railways will be reduced. If the prevention of accidents could be taught to each trainman and to each passenger as a subject of vital, personal welfare to himself, all would realize how much easier it is to follow

simple precautions rather than always to suffer the regret which follows a preventable casualty.

When the results of public education in other respects are considered, it is futile to say that electric railways cannot profit by continual endeavor to lead travelers to appreciate the dangers with which they are inclined to be so familiar that fear and precaution may be forgotten. The American Red Cross Society has spread, systematically and successfully, the facts regarding tuberculosis, with unquestioned benefit to mankind, and sound business motives will justify electric railway companies in the adoption of extraordinary means to curtail the startling numbers of accidents and their cost in large cities.

The Work of the Legislatures

The attempts at public utilities legislation, so called, at the sessions of the Legislatures of the different states now being concluded have failed in New Jersey, Indiana, Kansas, West Virginia, South Dakota, Idaho, Utah, Nevada, Oklahoma, Iowa, Nebraska, Colorado, Maine, New Hampshire and Minnesota. In Connecticut the public utility bill has been reported adversely by the judiciary committee of the House. As previously noted in the Electric Railway Journal, Vermont is the only State successful in its attempt to emulate New York and Wisconsin. The bill in Iowa resulted in the appointment of a special committee to report to the next Legislature, and the attempt in New York to amend the present law so as to bring telegraph and telephone companies under the commissions resulted in the matter being referred to a committee to report at the next session. Except possibly in the cases of New Jersey and Connecticut, where they received extended consideration, the bills for new commissions could hardly be taken seriously.

It would be impossible here to point out all of the ridiculous conditions incorporated in some of the measures, but that the bills were very largely unjustified is strikingly illustrated in the case of the Utah measure. An eloquent plea was made for the measure in Utah by its fanatical author, who had as his guiding star a Governor who had recommended that a measure such as the author had drawn should be passed. There are less than 200 miles of electric railway in Utah and only one railroad that really is important, that would have come within the provisions of the bill. Still it was proposed to create a commission of three members at a salary of $3,500 a year each and a total cost to the State variously estimated at from $25,000 to $50,000.

In New York State both Houses have passed the bill broadening the conditions under which the Public Service Commission may grant franchises for the construction of rapid transit lines in New York City with private capital, and the Travis-Lee constitution amendment exempting income producing bonds from the debt limit of New York City. The Travis-Lee amendment is intended to provide funds for the construction of additional rapid transit lines by the city. It passed at the 1908 session and must now be submitted to popular vote for approval. The cheap bid for popularity by Senator Wagner in New York with his bill for a 5-cent fare to Coney Island failed.

The trolley freight measure in New Jersey, after many vicissitudes, finally was approved. The original measure was vetoed by the Governor. A second measure was then introduced. The Governor announced his opposition to this second measure, citing his reasons, and a third measure drawn so as to overcome his objections was introduced at the last moment and became a law. The Jersey freight law should work to the advantage of the electric railways in that State and at the same time be of benefit to the public. Legislation in Pennsylvania was largely of a negative nature, the most important bill to be defeated being the one taking out of the hands of the Railroad Commission its jurisdiction over street railways operating in cities of the second class.

Preventing Corrosion of Iron and Steel

Of the many theories advanced as to the cause of corrosion of iron and steel, the comparatively recent hypothesis that it results from electrolytic action, and not, as generally believed, from a purely chemical change, seems to be most convincingly demonstrated as correct. All the curious phenomena of rusting can be explained by it, and numerous experiments designed to prove its truth have yielded valuable scientific data on possible methods of preventing corrosive action. R. S. Perry, in a paper read recently before the Western Society of Engineers, summarizes the fundamental principles underlying the corrosion of iron according to the electrolytic theory as follows:

When iron is in contact with water, there will be a transfer of electricity from the free hydrogen ions of the water to the iron ions of the iron, causing the solution and subsequent oxidation of the metal.

The presence of impurities having a difference in potential to that of the iron in which they are contained, and the uneven distribution of such impurities, increases the amount of electrical action.

While there are certain compounds, sometimes found as impurities in iron and steel or used as pigments in protective coatings, which act as preventives of such action, there is a group of compounds, on the other hand, which act as preventives of such action. The investigators of the electrolytic theory have found that bi-chromates of some of the alkaline metals, particularly potassium bi-chromate, stand out as almost perfect preventives of rust when applied as surface coatings, or when added as impurities to iron or steel. The relative effects of these rust-preventing and rust-accelerating compounds when mixed in protective paints has been demonstrated by many accelerated corrosion tests, chief among which are the exposure tests now being made by the Paint Manufacturers' Association and the American Society for Testing Materials, on steel fences erected at Atlantic City.

Protective coatings for structural iron and steel have a two-fold purpose, to exclude moisture and air from the surface of the metal and to prevent the spread of any local corrosion which may start. Most protective paints consist of a finely ground metallic salt or other pigment suspended in a liquid vehicle, usually linseed oil with the addition of a small quantity of resinous gum. When applied in a thin coat the vehicle dries and adheres to the metal as an elastic, impervious covering. The pigment protects the paint coat from mechanical abrasion, assists in excluding moisture and gives the desired color. If the protective coating is pierced and moisture and gases come in contact with

the metal, local electrolytic action starts and corrosion results. The vehicle of the paint is, usually, inert, so far as the electrolytic action is concerned, but the pigment which is in close contact with the metal may be either an inhibitive or an accelerator of rust or it, too, may be inert. An inhibitive pigment will prevent to a great extent the spread of corrosion on the surface of the metal under the paint coat, which results in the common phenomena of blistering and peeling. On the other hand, an accelerating pigment may cause the initial rusting to spread rapidly and soon destroy the entire coating. It is important, therefore, in selecting structural paints to know the nature of the pigments used in compounding them. The pigments may be classed as harmful, safe or beneficial. Venetian red and some other artificial oxides of iron and sulphate of calcium, which are commonly used as pigments in structural paint, are said by Mr. Perry to be active accelerators of corrosion. Chromic salts in general are rust preventives, and there are a large number of inert pigments in use.

The composition of the iron and steel to which the paint is applied also influences the spread of corrosion, marked segregation of impurities in the metal causing extreme local pitting. The protection of steel structures therefore is dependent not alone on the paint, but on the rust-resisting qualities of the metal itself. However, the right kind of paint properly applied and frequently renewed if subject to abrasion or chemical deterioration through the action of gases and fumes will do much to prevent serious corrosion of the metal on which it is spread.

Side-Rod Electric Locomotives

The new side-rod electric locomotive which is described elsewhere in this issue represents a reversion in all of its mechanical details to long-established steam-locomotive practice. The wheel arrangement, with a four-wheel bogie truck at one end, three pairs of coupled driving wheels and a two-wheel radial pony truck at the opposite end, is exactly the same as that commonly designated as the "Pacific" type by steam-locomotive designers, and is the type which has been generally adopted for heavy high-speed passenger service. With the exception of the bearings for the jack shafts to which the motor connecting rods are attached, the trucks, frame, spring equalizing system and the wheels and axles are precisely the same as are used on a steam locomotive. The entire weight of the machine, except the wheels, axles and side rods, is spring borne. The center of gravity of the locomotive is much higher than that of either the New York Central type or the New Haven type, but is somewhat lower than that of a steam locomotive of the same general dimensions.

The general distribution of weight in modern steam locomotives is the result of developments in design covering a long period of years, and has been dictated largely by necessity, rather than by theoretical considerations. It is a curious fact that the distribution of weight as it exists to-day, although arrived at by rule of thumb, is generally agreed upon by steam locomotive designers to be quite satisfactory. The tendency in electric locomotive design, therefore, toward substantially the same distribution of weight is not mere imitation, but is a logical step toward the construction of a machine which is equally as powerful as the largest steam locomotives and is mechanically as well balanced and easy riding. Thus a high center of gravity is desirable, because it greatly relieves the strain on the head of the rail when the locomotive rocks or cants outward in rounding a curve.

One of the points which has often been advanced as an advantage of existing designs of electric locomotives is that the revolving parts are in perfect balance, and that no blow or nosing effect results from the rapid reversal of motion of unbalanced reciprocating connections. It is possible to counterbalance perfectly the weight of side-connecting rods. The difficult problem in steam-locomotive design has always been to approximate a correct counterbalance on the driving wheel to which the piston connecting rod is attached. This connecting rod has a reciprocating motion at one end and a circular motion at the other end. In this new electric locomotive the side rods are balanced perfectly and the inclined connecting rods from the motor crank arms to the jack shafts are counterbalanced at each end, their motion being exactly the same as that of the side rods, but in a different direction. The center of gravity of the jack shaft counterbalance is, of course, between the prolongation of the axis of the horizontal side rod and the inclined connecting rod.

The use of two motors of large capacity mounted above the frames gives this design a number of advantages over the use of many motors mounted on the axles. The weight per horse-power of large motors is less, of course, than of small motors of the same aggregate capacity and of the same electrical characteristics. The location of the motors above the frames places them out of the way of dust and dirt, permits of better ventilation and greater accessibility for inspection and repair. It also permits the use of armature bearings of ample size, and for this reason a reduction of the air-gap to a minimum. This has a marked effect on the mechanical and electrical efficiency of the motors. As plenty of space is available above the frames it is possible to use with large diameter driving wheels slow-speed motors without interposing any gearing. It is interesting to speculate on the effect of this design upon the desirability of 15-cycle single-phase motors. One serious drawback to this type of motor has been that it was larger than the d.c. motor, or even than the 25-cycle single-phase motor, and that the available space on the axle was hardly sufficient for large-sized motors. With the motor above the frames this difficulty practically disappears. The general design of the locomotive described is, of course, adapted for use with any form of propulsion current and for either freight or passenger service. Two direct-current motors, single-phase series motors or three-phase motors can be mounted on the frames, and the motors are interchangeable at will without in any way affecting the running gear. The electrical equipment could be shifted from one locomotive to another just as it is shifted from summer cars to winter cars by street railways.

It is interesting to learn in this connection that the new electric locomotives to be used in the Pennsylvania Railroad tunnels in New York City also are to employ the side-rod method of driving, with the motors placed above the frames. These locomotives are to consist of two units, each carrying a 2000-hp direct-current motor.

LARGE NEW CAR HOUSE OF CHICAGO CITY RAILWAY

The Chicago City Railway Company has just completed at Ashland Avenue and Sixty-ninth Street a large fireproof car house with especially elaborate accommodations for division officials and trainmen. The new building occupies the block between Sixty-ninth and Seventieth Streets and Marshfield and Ashland Avenues. Its width is 265 ft. 3 in. and it is 487 ft. long. The two ends of the building are set back about 55 ft. from the property line to permit cars to enter between columns placed between the tracks in each bay. The building is subdivided into



Chicago City Railway Car House—Sixty-ninth Street Elevation

six car-storage bays and one repair and general-utility bay. A second-story portion on the Sixty-ninth Street end is subdivided into storerooms, a clubroom, trainmen's rooms and division offices.

CONSTRUCTIONAL FEATURES

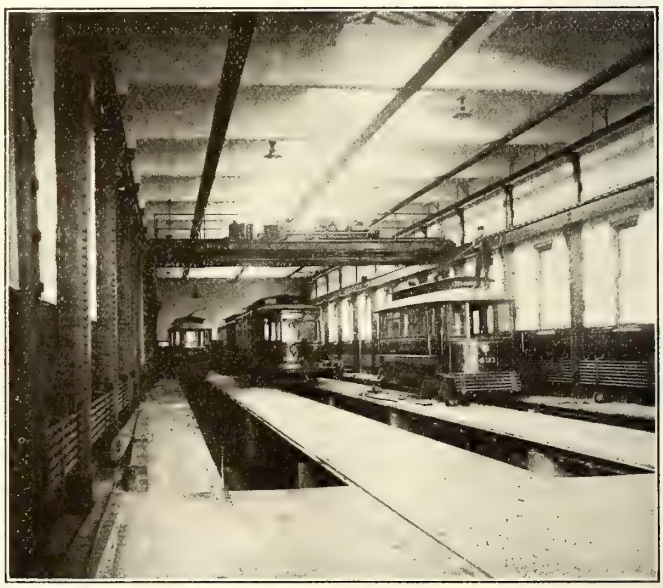
The accompanying plan shows the relative arrangement of the car-house bays and the through connecting tracks which are built so that all cars may enter from the south or Seventieth Street end and leave from the north end without any unnecessary shifting or reverse movements. When cars are turned in at night for cleaning and inspection they are passed progressively from the south end of a bay without shifting from track to track. As they enter at the south end they are washed, then moved forward to be cleaned and fumigated, then run ahead over a pit for inspection and adjustment. Finally when ready for service, they are moved to the north end of the bay, there to await the demands of the transportation department.

To facilitate this method of handling cars, through tracks with connecting switches at each end have been provided in all but the repair bay. A loop track extends completely around the building. The car-house curves are laid out for complete clearance with adjacent main tracks and have a minimum inside radius of 40 ft. The three leads to each bay are united into one track which in turn connects with a ladder track parallel with the building at each end. The ladder track on Sixty-ninth Street is gauntleted with the main track so that there will be the least possible wear on the special work. As no main line passes the building in Seventieth Street, the tracks are not gauntleted, but the leads of two of the bays are connected with an independent ladder which facilitates the rapid handling of cars and permits of using a larger radius on the approach curves.

All of the yard space between rails and tracks outside of the ends of the building is paved with granite blocks, affording a smooth surface on which to handle cars should they become derailed. The granite blocks used in this pavement were taken from the old cable tracks that have been relaid during the rehabilitation period. According to the ordinance the company was not permitted to relay these blocks in the streets and therefore good use of part of them is made in paving car-house yards and the rest are crushed for concrete.

The exterior walls of this new car house are faced with No. 1 purple Continental brick and have white cut-stone trimmings. Floors and roofs are made of reinforced concrete. The division walls and pilasters are built of Chicago brick. Each bay with its three tracks will hold approximately 30 48-ft. cars. The repair bay has three pit tracks with a capacity for five cars each. All of the car-storage tracks have pits 250 ft. long, open from wall to wall. The total capacity of the car house is 191 double-truck cars and there is sufficient space on the property outside of the building to store 25 cars. The end openings are closed by Kinnear steel rolling doors. The walls of the car-house bays have but two openings each, one near each end, all of which are protected by means of double automatic steel fire-doors, so that one bay of 30 cars represents the maximum loss or risk from fire. The two-story portion and the rooms of the service bay are similarly protected and separated by means of double automatic fire-doors.

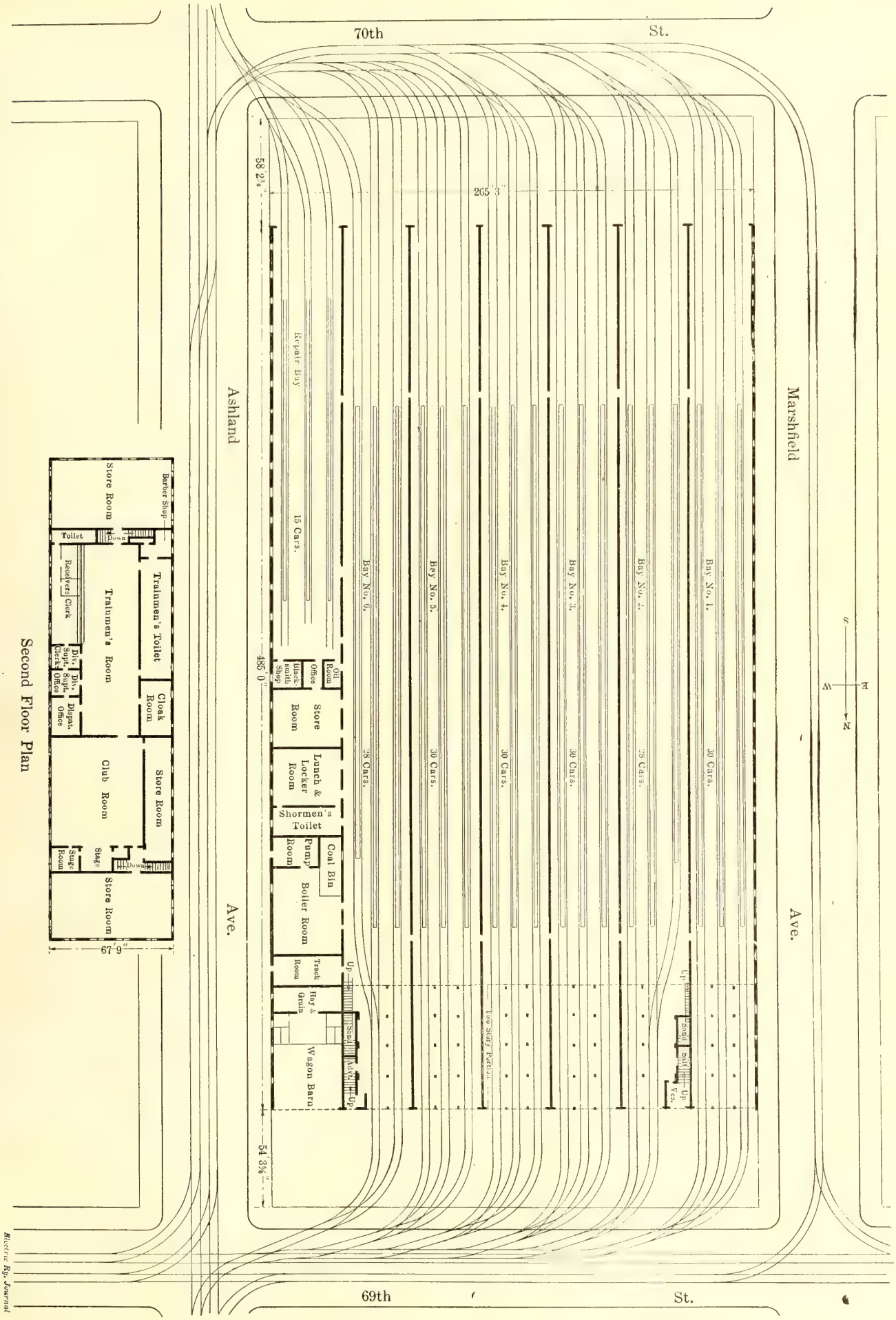
Each bay is lighted in the daytime by a continuous skylight 8 ft. wide located over the center track and extending the full length of the bay with two sidelights in sections of 16 ft. long each. The repair bay has a skylight 12 ft. wide with sidelights for its full length. Small skylights



Chicago City Railway Car House—Interior of Repair Bay

are placed over all the smaller rooms in the repair bay and in the roof of the two-story section which contains the division offices and trainmen's rooms. There is a total of about 30,000 sq. ft. of Anti-Pluvius skylight construction in this building.

The reinforced concrete roof slabs, which are 4½ in. thick, were cast in the molds as a monolith over the entire structure except that part which is two stories high. This roof slab is 417 ft. long and 265 ft. 3 in. wide, the full width of the building. Provision for expansion is made at the ends where the concrete roof joins the brick parapet


70th St.
69th St.
Ashland Ave.
Marshfield Ave.
Repair Bay
15 Cars.
Bay No. 6.
28 Cars.
Bay No. 5.
30 Cars.
Bay No. 4.
30 Cars.
Bay No. 3.
30 Cars.
Bay No. 2.
28 Cars.
Bay No. 1.
30 Cars.
Two Story Portion
Oil Room
Office
Black smith Shop
Store Room
Lunch & Locker Room
Shormen's Toilet
Pump Room
Coal Bin
Boiler Room
Track Room
Hay & Grain
Wagon Barn
Sand
Ash
Up
Up
Up

walls. Galvanized-iron flashing protects the expansion joint from the weather. The roof slab is supported by concrete girders spanning the bays on 16-ft. centers. Corrugated bars rerolled from old rails were used for reinforcement. It is stated that the high-grade steel obtained from the old rails when reworked into the smaller-sized



Chicago City Railway Car House—Overhead Lighting in Storage Bay

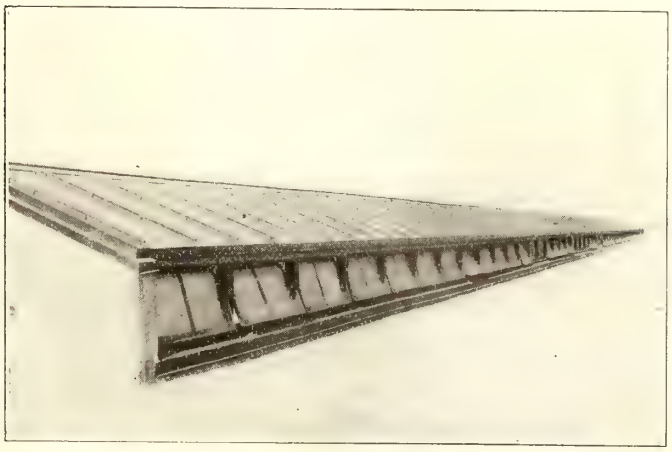
bars gives excellent results because of the refinement brought about by the additional working which the steel received. The following specifications were issued to cover the steel for ½-in. bars:

Furnish and lay rods for reinforcement of concrete of each size called for. All rods are to be of high carbon steel, manufactured by the open-hearth or Bessemer process, chemical properties to be limited as follows:

Phosphorus shall not exceed 0.06 per cent.

Sulphur shall not exceed 0.06 per cent.

Manganese shall not exceed 0.06 per cent.



Chicago City Railway Car House—Monitor Skylight over Repair Bay

Tensile strength shall not be less than 90,000 lb. per square inch.

Yield point shall not be less than 50,000 lb. per square inch.

Rods shall not fracture on the outside bent portion when bent cold through an angle of 105 deg. around a diameter equal to their thickness.

Elongation shall not be less than 10 per cent in a length of 8 in.

Variations in weight and section are not to exceed 2½ per cent.

Furnish written and certified report of chemical analysis and tensile and bending tests.

Give separate figure for using corrugated or deformed bars (stating make of bar) of equal net section to bars shown on drawings.

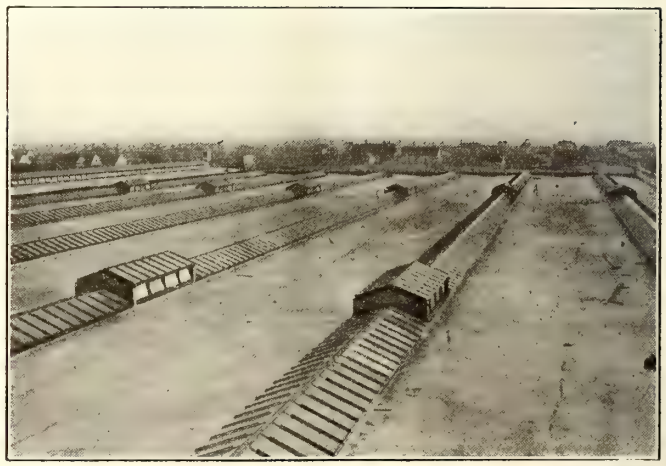
The specifications issued for the concrete to be used in reinforced floors and roofs follow:

Wherever reinforced floor and roof slabs are called for the same are to be made of concrete of a mixture of 1 part Portland cement, 2½ parts of sand and 5 parts of broken stone. All stone for this work is to pass through a ½-in. ring. Use a rather wet mixture for all this work. Space all reinforcing rods accurately, as shown on detail drawings, and block same up by means of concrete blocks and other devices as called for. Wire ends of rods where same cross each other to prevent displacement. Before placing concrete thoroughly wet the forms and spread a mortar made of 1 part cement to 3 of sand over cracks to prevent leaking away of rich cement mortar in concrete. Top finish of all roofs to be ½ in. thick of 1:3 cement and sand rodded and broom finished. Furnish all required concrete blocks.

The forms used in constructing the roof slabs and its supporting girders were built so that they could be removed part by part to permit of the most rapid drying of the concrete. This design is illustrated. When the roof slab had set the form underneath was removed. Next, the boards at the sides of the girders were taken away to permit these to dry out and, lastly, the supports underneath the girders were withdrawn. All parts of the forms were made of light material and none were so large that they could not be handled by one man. In this way the work of setting and removing forms was greatly expedited with very little damage to the lumber. Some of the forms were used more than three times on different parts of the roof of this car house and then were shipped to another car house of similar design, where they were used twice. The specifications for these forms follow:

The constructor is to furnish and erect in place all forms for foundation, pit floor and reinforced concrete floors and roofs.

Foundation forms to be made of 2-in. plank, dressed on



Chicago City Railway Car House—Continuous Skylights over Storage Bays

one side and to be securely braced and wired to prevent bulging.

Forms for pit floors to be made of 1-in. hemlock sheathing, resting on 2-in. pine centers well supported.

Forms for second floor are to be of 1-in. hemlock sheathing, laid on 2-in. x 12-in. joists spaced 24 in. apart.

All roof forms are to be of 1-in. sheathing, resting on

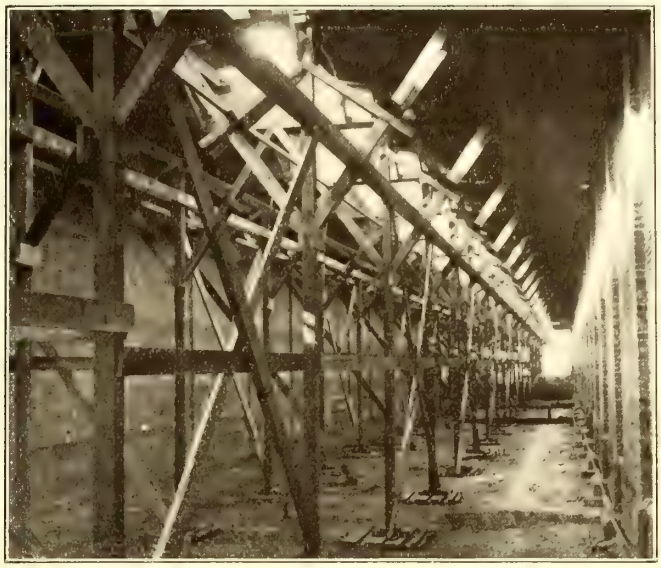
2-in. x 12-in. joists spaced about 2 ft. 6 in. apart. Joists are to be suspended from top cord of truss.

As no covering was placed on the car-house roof special care was used in finishing the upper surface of the large concrete slab. It has been the experience of the Chicago City Railway Company that concrete roof slabs, if cast rather wet, will be sufficiently watertight without the use of waterproof covering for a roof over car-storage space. In depositing the concrete great care was taken so that there might be no surface cracks. Concrete was placed along the roof, two bays at a time, and at night the line of concrete was stopped in the center of a span between trusses so that if later there should be deflection at the center of the slab, it would tend to close any opening that might appear where the mixture of two days joined.

Before depositing the concrete in the forms all bolts for supporting feed wires, trolley boards, arc lamps and steam mains were set in the forms by transit line. The electrical wiring conduits, which are 1 in. in diameter, in groups of six and seven, are run across the building through the supporting girders. Had these pipes been placed in the roof slab they would have been exposed underneath the skylights.

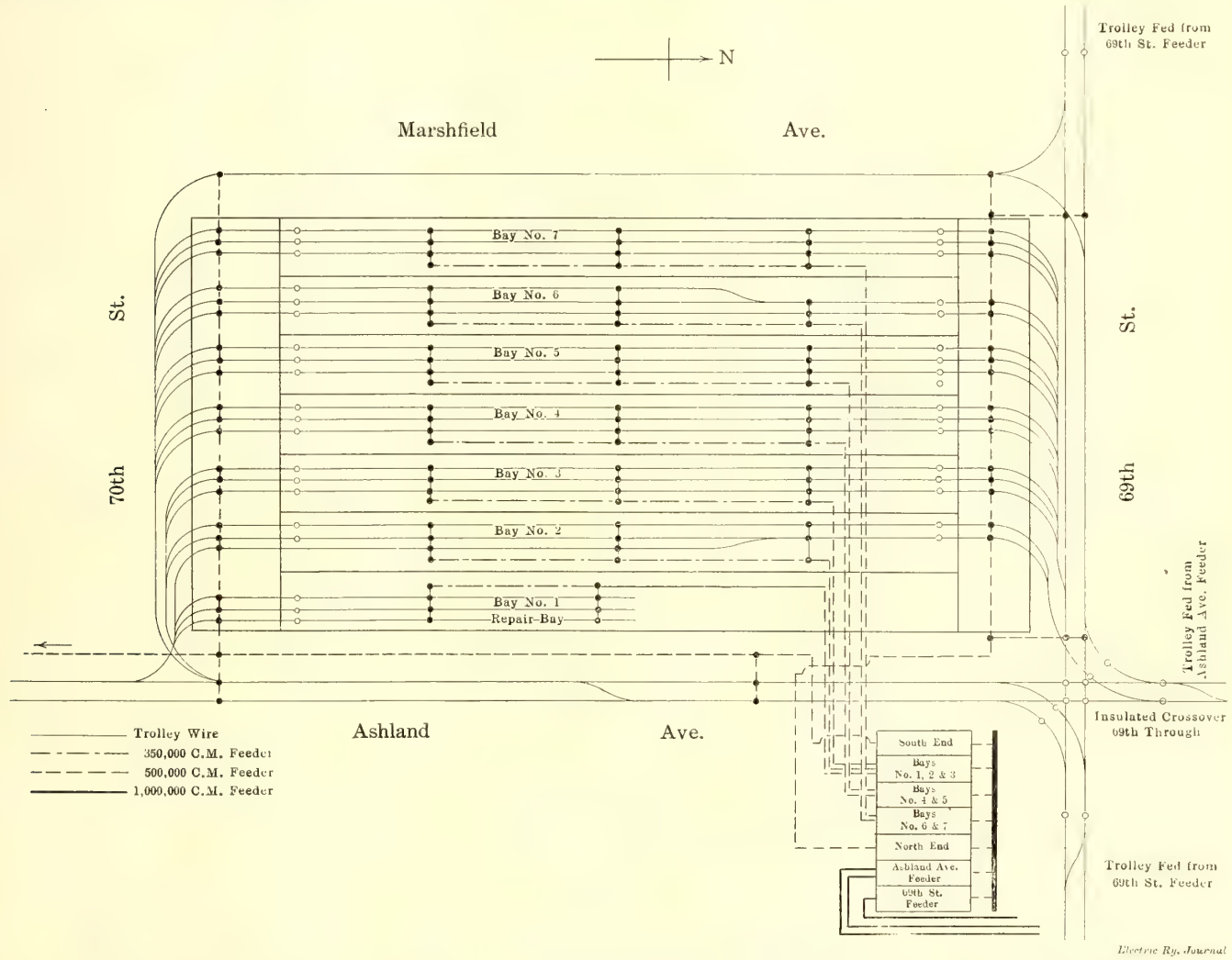
TWO-STORY SECTION

The Sixty-ninth Street end of the car house has a second story 67 ft. 9 in. wide extending across the building. This floor is subdivided by 12-in. brick firewalls into three fireproof sections comprising a storeroom at either end and trainmen's rooms adjoining offices at the center. The center section in turn is subdivided by hollow tile partitions into the following rooms, the arrangement of which is illustrated: Clubroom with stage, cloakroom, trainmen's room, trainmen's toilet, barber shop, dispatcher's, division superintendent's and receiving clerks' offices.



Chicago City Railway Car House—Scaffolding Supporting Roof Slab Forms

The interior finish of the second story is heavy quarter-



Chicago City Railway Car House—Plan of Wiring, Showing Sectionalization of Trolley Wire in Bays and Approaches

sawed white oak cabinet work. The floors in the trainmen's room and toiletroom are laid with red tile and the wainscot and partitions are slate. The fittings in the latter room are especially fine, as shown by the illustrations. A sanitary drinking fountain is provided in the center of the toilet-room and plate-glass mirrors are mounted over the enameled iron wash bowls. Each storeroom has a concrete floor, in the center of which is a balanced steel trap



Chicago City Railway Car House—Trainmen's Room on Second Floor

door through which the supplies may be passed to and from the ground floor. In the clubroom and operating offices the floors are hard maple and that in the clubroom is scraped, cross planed, sanded and waxed for dancing purposes.

The accommodations in the receiving office are especially complete. This section of the second floor is set off from the trainmen's room by a substantial partition with sash filled with clear wire glass. The heavy black walnut counter has slate dealing plates and woven wire screens enclose the section occupied by the receivers. Behind the clerks' counter is a large case for storing "lost articles." Underneath the receiving counter are electrical trips for a burglar alarm. The contacts are controlled by a part of the footrest, thus requiring an unnoticeable movement to



Chicago City Railway Car House—Stage in Club Room

operate. When once pushed the contacts automatically lock, so that it is necessary to stoop below the counter to release them.

PAINTING

The specifications for the general interior painting are presented in full herewith:

Material.—All paint to be strictly pure white lead, pure linseed oil, pure colors ground in oil and turpentine unless otherwise specified.

Where "Standard Green" is specified, same is to be a special green paint ground by Sherwin-Williams Company under name of "Chicago City Railway Company Standard Green."

Where graphite paint is called for it is to be Dixon's graphite.

Asphalt paint to be Western Roofing & Supply Company black asphaltum or equal.

All colors in oil to be Sherwin-Williams Company best colors ground in oil or equal.

Use Wheeler's wood filler for all oak.

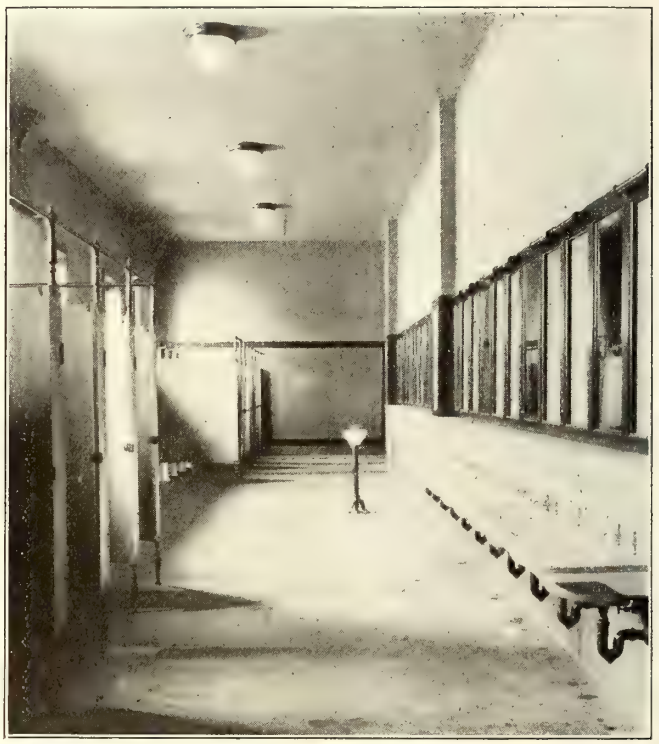
Varnish to be Murphy Varnish Company best quality or equal.

Whitewash material to be George Fletcher & Company "Monarch" or other cold wash paint as approved by Board of Underwriters.

All material to be delivered at the building in the original sealed packages and approved by the engineer in charge before using.

Exterior Work.—Thoroughly shellac all knots.

All exterior woodwork to receive two coats oil paint in addition to priming coat. Final coat to be standard green, except flag pole, to be white. All exterior sheet metalwork,



Chicago City Railway Car House—Trainmen's Lavatory

all exposed ironwork, including Kinnear doors, to be painted two good coats. First coat to be graphite and final coat standard green. Outside of main doors and frames to be painted, grained and varnished to match quarter-sawed white oak.

Interior Work.—All trusses and other iron which is to be fireproofed shall be given a good coat of graphite before fireproofing. All other exposed ironwork, including Kinnear doors, stairs, fire-doors, fire-windows, etc., to receive a coat of graphite and a coat of standard green. All woodwork (except oak and walnut, which are to be varnished,) is to be painted a coat of lead and oil and a coat of standard green. This includes all trolley boards. All interior standing finish of trainmen's room, clubroom, toilets, barber shop, stair halls and connecting rooms will be finished in quarter-sawed white oak with black walnut counters. This woodwork to be filled to match samples which will be furnished by the engineer in charge. Filler to be well wiped out and allowed to become thoroughly dry before shellacing. All this work to receive two coats of varnish after erection and final coat rubbed to egg-shell gloss with powdered pumice stone and rubbing oil. Use best spar varnish for all window sills, doors to toilet compartments and outside of entrance doors and frames.

Floors in clubroom to be given a coat of shellac and finished with floor wax, using weighted brushes. All other wood floors in offices, etc., to receive a coat of boiled oil and two coats of best floor varnish.

Walls and Ceiling in Offices.—All walls and ceilings in offices are to receive first, two coats of lead and oil, next, apply one coat of ground glue sizing. Apply a final coat of paint and stipple with stippling brushes.

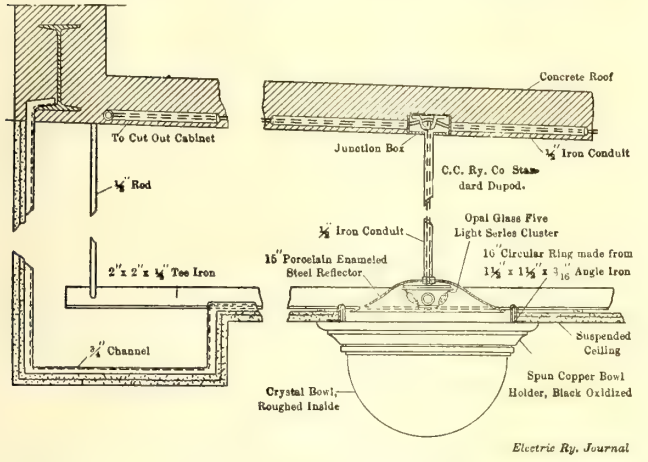
Putty.—After first coat of paint or varnish all nail holes, etc., to be filled with putty and smoothed over before applying next coat. Wherever wood is varnished putty to be colored to match the finish. Sandpaper freely between coats.

Whitewashing.—All exposed walls and ceilings to be given two or more coats of cold-water paint to a uniform white color. Whitewash may be applied with spray machine, but all defective places must be made good and material applied with brush whenever necessary. Protect all glass, floors, pipes, etc., and clean whitewash from all surfaces not intended to be whitewashed.

Dados.—Along all walls of car house and rooms on first story, paint dado 5 ft. 6 in. high with black asphaltum paint. Apply two or more coats if necessary for a uniform black surface.

REPAIR BAY SECTION

The repair bay section at the rear of the car house is so laid out and equipped that all minor repairs may be made on the cars housed at this station. Spanning the



Chicago City Railway Car House—Details of Ceiling Clusters in Trainmen's Rooms

three tracks of the repair bay are two Niles electric cranes capable of lifting a car body from the trucks and moving it laterally or longitudinally so that it may be placed directly over another set of trucks on any of the three tracks within the bay. Each of the two cranes has two drums with two hooks set 9 ft. 6 in. apart. Each drum has a lifting capacity of 4 tons. By this arrangement of drums and with hooks spaced apart the width of the car body the maximum headroom for lifting is obtained, which is greater than could be had if one hook with a yoke was used.

In the same division of the building with the repair shop, and just forward of it, are several utility rooms, the general arrangement of which is shown on the plan. The rear subdivision of the utility space is an office for the foreman with an oilroom on one side and a blacksmith shop on the other. Connecting with the repair shop through the foreman's office is a storeroom. Next are lunch, locker and toilet rooms for the shop men. The heating plant is next in the row. The boilers are served by a Weber steel-concrete stack. The building is heated by steam pipes laid out according to the Van Auken system installed by the Consolidated Engineering Company, Chicago. Outside of the repair bay no ceiling coils are used and wall coils are installed only at the ends of the bays where they will most efficiently warm the air entering through the car-house doors. The pits are heated by four 2-in. pipes laid under each walk between the tracks. The plumbing includes a large number of water connections located near the south end of the building where car washing is done.

At the front of the service bay are a room and stables for wreck wagons, with hay and grain storage at the rear. These wreck-wagon rooms were located at the front and most prominent corner of the building so that the least amount of driving and turning would be required when the wagon answered an emergency call. Also this location is an economical one because the wreck-wagon man, when not otherwise engaged, replaces or repairs the trolley poles of passing cars on notice from conductors.

ELECTRICAL WIRING

All the lighting and power wires in the car-house center at a switchboard in the pumproom adjoining the boiler plant. There are two feeder panels on this board, each of which is fed by independent sections of trolley network which are in turn fed from two substations. A transfer bus provides for receiving current from either station. There are five other sub-section panels on this board controlling and sectionalizing the feeders within the building and the trolley wires over the trackwork surrounding the building and to a distance of 100 ft. outside of the connecting special trackwork.

The general layout of the 500-volt feeders is illustrated. One panel of the switchboard controls the trolley feed for the ladder tracks at one end of the building and for one-half the length of the building along the street on the other side. Another panel similarly controls the current fed to the trolley wires over the other half of the outside special work. The remaining panels, with duplicate sets of switches and circuit breakers on each, control the current fed to the wires in each of the six bays. With this scheme of sectionalization, at the time of a fire in any of the car-house bays, the trolley wire over the yards outside of the burning end of the building could be made dead so that the work of the fire department might proceed with safety. Meanwhile current could be kept on the trolley wires in any or all of the bays and over the special work at the opposite end of the car house so that the fullest opportunity would be provided for running out the cars. In other words, the trolley wires within the bays and yards are so sectionalized that current may independently be cut off from any bay or from the yard tracks at either end.

The two feeder panels through which the current is received for distribution at the car house are fitted with wattmeters which record the total load used within the confines of the car-house special work. A separate board is installed for controlling the lighting and power current only, used in the shop and throughout the building. All light wiring is independent of the trolley so that in emergencies the current may be cut off from the trolley wire and the lights left burning. Each bay is illuminated by six GE enclosed arc lamps and two similar lamps hung one at each end outside. The arc lamps are provided with mirror reflectors so that all the light is thrown down where it may be useful. Each of the three pits in a bay has 20 incandescent lamps on a separate circuit.

Across each end of the car house, just beyond the ends of the pits, is a line of openings through the partition walls serving a walkway from bay to bay. It is planned that when the work on the cars in one bay has been completed for the night the arc lamps and the pit lights will be put

out in that bay so that the current may be saved. To provide for illuminating the passageway across the car house, a cluster of lamps has been placed over each of the fire-doors in the curtain walls. With this arrangement the workmen may pass from bay to bay at night along a well-lighted passageway, even though the general illumination in any of the bays has been cut off.

The general illumination in the division headquarters is by 16-in. crystal bowls hung from the false ceiling in spun copper rims, as shown in the illustration. The conduits of the ceiling lighting are laid in the concrete roof and the outlets extend down to the suspended ceiling. Inserted in the suspended ceiling are angle-iron rims which support the 16-in. crystal bowls enclosing the lamp clusters. A 1-in. annular space is left between the bowl and the rim to provide for the escape of hot air. The lamps within the bowls are held in Harder cast-glass five-light clusters, above which are placed white steel-enameled reflectors.

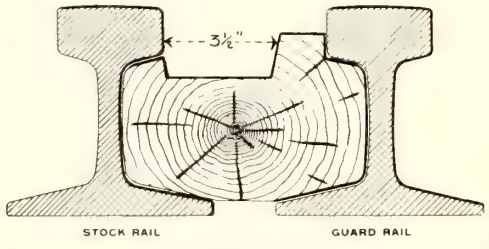
BLOCKING FROGS AND BEVELING GUARD RAIL ENDS

The Railroad Commission of Indiana has sent to the chief engineers of all the steam and electric interurban railways operating within the State a circular of inquiry regarding the value of blocking frogs and beveling guard-rail ends. The questions follow:

1. What is your opinion as to the value of blocking frogs, guard rails and switches, considered from the standpoint of prevention of injuries to trainmen and others?

2. What is the result of your experience and experiments as to the best manner of blocking frogs, guard rails and switches?

3. What is your opinion of the value of a blocking device such as is shown in the accompanying drawing, the same being made of wood or metal, and filling the entire space between the webs of the stock and guard rails, coming up to the bottom of the ball on the side next the stock



Blocking for Frogs

rail, then sloping downward and inward toward the guard rail about ½ in., then horizontally toward the guard rail to a point 2¼ in. from the gage line, then sloping upward so as to come on a level with the center of the ball of the guard rail and extending over to the guard rail, fitting it snugly, the same device to be applied to wing rails, frogs and switches.

4. What is your opinion of the value of beveling the ends of guard rails, wing rails and foot guards with the view of reducing to a minimum the liability to accident from tripping against the ends of such guard rails, wing rails and foot guards?

5. Will you submit to the commission blue print or prints of foot guards which you have used and approved, with full explanation thereof, and suggestions for improvements therein, together with cost of installation per guard?

6. What suggestions have you to make as to the best method of securing adequate blocking of guard rails, wing rails, frogs and switches throughout the State, provided a suitable guard can be devised and is directed by the commission to be used?

7. What proportion of your frogs, guard rails, switches and wing rails are now blocked?

8. Any further information upon these subjects you are able to furnish.

THE OVERTHROW OF PREJUDICE

BY H. S. NEWTON, GENERAL MANAGER, HARTFORD & SPRINGFIELD STREET RAILWAY COMPANY

The breaking up of the popular prejudice against public service corporations, and the necessity for self-preservation prescribes that it must shortly be broken up, would seem in most localities where it exists to be a work of enlightenment and persuasion. It is customary to refer to the task as the education of the public. As a matter of fact, experience would seem to show that education or the making clear of the real facts is not sufficient. The demagogue has been building up a feeling of prejudice for a decade and this feeling has been strengthened so vigorously during the past few years by the speech and actions of men who are much in the public eye that it is a question whether education will not have to be followed by some inducement to be effective.

It is an error for the managements of city lines to consider that the popular feeling is in any way confined to their roads. The interurban road, and especially the New England interurban road, is made a punching bag for the buffets of public opinion to fully as great an extent, and is, if anything, often less capable of protecting itself than the city company. Leaving out of consideration the impossibility of the local head of an interurban road getting into as close touch with as large a proportion of the road's patrons as can be reached by the city man the solution of the problem would appear sometimes to be more difficult in the territory of the interurban road than in the city because of the number of authorities and governing boards, town, municipal and State, with which the road has to deal. The writer is familiar with one interurban road in the State of Pennsylvania where nine borough councils are factors to be reckoned with and where during his connection, lasting a period of years, he found it necessary to be on friendly terms with at least three-fourths of the members of these governing bodies. In New England the boards of selectmen, who are peculiarly susceptible to the pressure of public opinion, sometimes make the logical operation of a road difficult. This is especially the case when there is a considerable number of these boards and it is possible in the ordinary course of events, when adopting a new schedule or promulgating a new rule, to please highly one board while highly offending another. Add to the requirements of the selectmen the requests of the representatives, especially the newly elected ones, who are looking to promote the fancied interests of their constituents to the utmost of their ability, and you have a condition with more complications than the situations in the cities growing out of the existence of city councils or boards of aldermen can often present.

In the crusade for public enlightenment in which the electric roads must sooner or later engage, some fallacies will be unearthed among the people which are responsible for a great deal of the spirit of prejudice. Some of these are worth mentioning.

A widespread belief will be found that the railroad business, and especially the electric railroad business, is, from the nature of things, a vastly profitable one, capable in all times of bringing immense returns to its stockholders. Every man going to his work in the morning on a well-filled car has made a mental calculation as to the enormous receipts which such cars running throughout the day must bring to the corporation. If by any means this man has been shown that the cars are not always carrying

so many people at other times during the day and his figures are not, therefore, strictly accurate, he has at once with cheerful assurance ignored the logical conclusion and decided that if the road is not making immense profits it is because the capital stock has been watered to such an extent that the stockholders cannot reasonably expect to receive dividends and must, therefore, be content to carry on the business at a loss *pro bono publico*. Unfortunately, the part of his conclusion as to the existence of watered stock has in some cases been warranted, and this makes it all the more difficult for the legitimately capitalized and economically operated road to carry conviction in its attempt to make matters clear.

The problem will present itself of convincing the public that because the interurban road has been granted a franchise over the streets and highways of various towns or boroughs through which it runs, the holding of that franchise must not necessarily be a justification for all kinds of demands for unnecessary car service and uncalled-for public improvements. A franchise may have gone begging for years because there was no individual with enough confidence to build on it, but the moment it has been built on, it seems to become in the opinion of the public an asset of tremendous value. Allied to this belief is the opinion commonly held that a division or branch of an interurban road, even though it may be operated at a loss, should be compelled to give service equal to that on any other part of the system. Counsel for a town has been heard to advance and strenuously maintain in a hearing before a railroad commission, and with the applause of his clients, the doctrine that because an electric road was operating under a franchise granted by the people it should give a service which was satisfactory to the people whether this service was maintained at a profit or a loss. As in the case at issue the demand was that the time interval between cars be reduced by half throughout the year there was no difficulty in estimating whether the service would result in building up a surplus or a deficit.

A marked prejudice will also be found against foreign corporations, so called. It seems to be the exception for an interurban road in New England to be built, operated and controlled by capital residing in the country through which it passes. Often the owners reside in a neighboring city, sometimes they reside without the State. In either case the company becomes a foreign corporation and the disposition seems to be to deny it the fair treatment, indeed, the common justice which, were it a local enterprise, it might expect to receive. How strong this feeling is can usually be easily ascertained after a few moments' talk with one of the road's patrons.

A sentiment for municipal or State ownership will also be discovered. This exists to a less extent, naturally, in connection with interurban roads than with city lines. It forms too large a subject to be taken up in detail here.

A discussion of some of the measures which may to some extent avail in an interurban road's attempt to down these fallacies and others not mentioned is the purpose of this article. Many of the recommendations advanced may appear so obvious as to be commonplace. Most of them have been tried out by the writer, however, in a long experience and may serve, if nothing more, as reminders of the methods used, and perhaps forgotten, by the reader in other fields.

THE PRESS

It is impossible to conceive how much can be done in the line of public enlightenment against the opposition or even without the co-operation of a majority of the local newspapers. Yet, strange as it may seem, there are numerous roads to-day which make no systematic attempt to get the newspapers into line. The editorial pages and the news columns of the dailies published in their territories are given up very often to critical, or worse yet, humorous, comments on local conditions and the local managements. As a general proposition, it may be said that it is a very great mistake to allow a single newspaper in the territory served, if it can be avoided, to take a position as an enemy of the road. Even the yellowest sheet, with no reputation for veracity and a big one for libellous utterance, will carry conviction to many.

Every interurban electric road should do some newspaper advertising, whether it pays from a traffic-making standpoint or not, and this advertising should be carefully distributed among the local papers. By such plan, discreetly followed, and by good treatment of the reporters, the writer has on several occasions been able to get up real enthusiasm toward his road in the local papers when exploiting a new park or introducing an improved service. This has resulted in his being able not only to secure space in the news columns for a great deal of matter at a small cost, but through frequent contact with the newspapers' representatives has brought about a more cordial and warmer feeling toward the road.

The newspaper is most often, and naturally, the mouthpiece of a faction or the organ of a political party. When party strife separates the press into two or more camps, it is usually of immense consequence that the railroad shall have, as a corporation, no political tendencies and shall take no part in the campaigns. This attitude is sometimes difficult to maintain, but the writer has proved on several occasions that a neutral ground is far the safer one, even though the benefits to the road may seem to rest entirely with one side.

It will be found that nine out of ten newspapers are reasonable and upright in their dealings, and are ready, if given half a chance, to take up the cause of a maligned railroad. They will often fight as strenuously for the road as they will fight against it if only they can be shown that the cause is worth fighting for. With the thought of conciliating the press in mind, it is a mistake to ask the newspapers to print in their news columns, without compensation, stale news or hackneyed advertising matter, but it is not a mistake to see that they are all furnished promptly, by some one whose business it is to do so, with every bit of real news which happens on the road. With the popularity of the road among all newspaper readers at stake, it is a mistake to see that one paper is taken care of, while the others are left to ferret out the news themselves. Things are constantly occurring on an electric road which have a decided news value, and no man appreciates a square deal more than your newspaper man, and no man is more ready to give you one in return. It is well to remember, too, that although the newspapers must print news, they are usually quite willing, if asked, to discriminate between news and the idle gossip which is sometimes given space and so often hurts the road.

The irresponsible local correspondent or the sometimes more irresponsible reporter, who gathers up the news from the small suburban towns and villages through which the road passes, sometimes gets a "trolley knock" in the paper, because it is a good story and no one takes sufficient interest to keep it out. If the city editor really appreciates the situation, however, and if the railroad management is in

touch with him and his chief, the irresponsibe reporter's good story won't go. A tactful story given to all the boys and published simultaneously by all their papers has been known to veer public opinion right around. A campaign of enlightenment carried on by the newspapers naturally cannot fail to impress the public and make it conscious of unjust treatment toward a public service corporation if such has been the case.

THE MAN ON THE CAR

It is seldom—in fact, so seldom as to be the exception—that the man on the car gets a training from his company which will make him a pronounced factor in the electric road's popularity with the people. He usually is the instrument solely for turning on the power or taking up the fares, but is of no positive value in smoothing out the relations between the company and the public or in fighting some of the battles which opportunity gives him a chance to wage every day. When we consider what a number of agents a company might have in its conductors and motormen to rally to its support in times of stress, were the men ready and prepared to fight its battles, it is a cause for wonder that nothing more has been done in this line. The extent to which your condutcor, especially, can get in touch with the public, if he sets out to, is wonderful, and if he can be made to exchange his habitual indifference for a strong pro-company feeling, he will accomplish great things.

The rather strained relations which so often exist between the management and the employees' labor organizations are probably quite often responsible for the lack of initiative on the part of the men in fighting the company's battles. The time has passed, however, when a good railroad management has often to suffer such a condition to exist, and, with everything smoothed over and good feeling restored, there is no reason why a little education of the employees should not result in the corporation making a large advance in public favor. A man whose intelligence is so limited that he cannot comprehend to some extent the details of railway costs should have no place on a car. With these costs in mind, the motorman or conductor of intelligence is prepared to put up an argument with the public he rubs up against which will carry conviction.

Few roads insist on the degree of courtesy and good manners from their men toward the public which the public should have a right to expect. A correction of this difficulty will be found to be one of the largest factors in persuading people that the company is not a predatory institution. The inspection of the operating force on some lines will often lead to the reflection that there is hardly as high a grade of intelligence and morals represented as might be secured for the wages paid. Aside from the many other reasons why the bum and the degenerate should be kept off the cars, the fact that they are to come in contact with the public and are to help mold public opinion toward the road should be a specially convincing one.

Frequent meetings between the management and the men, when the details of cost of maintenance, power and transportation can be discussed, should be held. At such meetings the reasons why fixed charges must be a factor, and why depreciation, a sinking fund and other things should be allowed for, could be explained. On the usual occasion when the management and the men get together to promote good feeling it is the custom for a company official to make a condescending address, full of commonplaces and platitudes, and often of doubtful value. It goes against the grain of the American employee to be patronized. A heart to heart talk is far more effective, and the influential men among the employees, if enlisted in the cause, will help out amazingly in convincing the others that they should not withhold their assistance.

THE MAN IN THE OFFICE

The public often has trouble in seeing the manager with its complaints. This is a mistake. The manager of an electric road should be as approachable as any business man who wants to sell goods. He is not caring for his own property, but for that belonging to others. This consideration should cause him to be, as far as possible, accessible to every person who may have a complaint or a suggestion to make. There is, of course, a limit to his endurance in this line, but he should know casually a large number of his patrons and should know all of whom it is wise to know. It can be demonstrated to a certainty that the "state your business to my secretary," "take your card," "wait in the anteroom" type of manager is poorly adapted to amalgamate with the public. The secretary may be the man to whom the visitor can be safely turned over after he has been received, but he should first be received. Indeed, the railroad manager should be a technical man, an executive and an economist, but, most of all, he should be a mixer, a companion among his fellow men. Too often a company has suffered in favor with the public solely because its chief representative was unable to assimilate with the people it served.

The public has always but a faint idea of the real cost of operating a road. It should be primarily the manager's duty to enlighten the population his road serves. Endless opportunities occur; public addresses, newspaper interviews, talks at the clubs, after-dinner speeches—all are occasions when the cost of power, maintenance and labor may be dwelt upon, and men made to see how expensive to the corporation the trolley accommodations are. With the foreign corporation, especially, where the president or other officers are not available for information, it should be peculiarly the manager's province to advertise these figures and persuade the community that they are getting value received. The one phase of the situation which the man in charge, if he fits his place, can generally make clear to the man of business is that good service, a smooth track and clean cars demand a prosperous road—one which has revenues sufficient to pay for the labor and material to keep things up as well as to pay dividends and fixed charges. This point, self-evident as it is, will usually prove to be a particularly effective one in a discussion with a hard-headed business man.

From the manager should come the incentive, if the employees are expected to play a part in the enlightenment of the public. He should be close to his men; occasions arise when he needn't lower his dignity by consulting with them. On all but the largest properties he ought to hire them himself. If he is not fitted by previous training to do this with better results than any of his subordinates, there is a question if he is fitted to hold his post. The attitude of the man in the office toward the operating force is a true gage of the attitude which that force may naturally hold toward the public. Cordiality, which has the true ring and is free from condescension, shown by master to man is apt to be reflected by man toward the public on the cars.

It is a question whether the time has not come when the preservation of our public utility corporations and the con-

quest of public prejudice does not call for larger concessions to local interests. In other words, it has become pertinent to ask whether the old practice of transferring a single share of stock to a prominent local man, to be reassigned on demand, with the understanding that this man shall act as a nominal director, could not profitably be changed for the plan of really turning over to local men, at a concession perhaps, substantial interests, which will warrant their active co-operation. Undoubtedly this plan is not new, yet it is one which certainly is not always followed. Nevertheless, to the writer's knowledge, it has not been pronounced a failure in a number of instances in which it has been tried.

It would seem to be a foregone conclusion that with the directory of an interurban road made up of men of real influence and substance, one from each community along the line, a great many of the difficulties which come up with the traveling public would be easily smoothed out. A man can usually convince his neighbor more easily than he can a man in the next town if he and that neighbor are on good terms, and it is the man who is on good terms with his neighbors who should be chosen for the board. It might be urged that men of this class, being entirely unfamiliar with the details of railroad operation, might in some things be a serious handicap to the local operating head. This, however, could be regulated by the choice of men and by a little tact on the part of the operator. There is always a possibility, also, that members of such a board will take only a perfunctory interest in things, notwithstanding the fact of their stock holdings. This possibility, however, can be made slight if this interest is substantial enough to warrant their spending the time. It is conceivable, also, how a board of this kind might become unmanageable, but this could always be regulated at the annual meeting, and usually by a few practical suggestions from the men among the members who had had some real railroad experience.

People can be found who say that the pendulum has swung to its limit, and that from now on the prejudice against corporations of all kinds will subside. The writer's observation goes to show that this is not true in New England. The farming communities here, influenced no doubt by the bitterness born of bad times not yet entirely over, are still embarrassing interurban roads by unjust and arbitrary demands. The knowledge that earnings on these roads have decreased, owing largely to the lack of patronage from these farmers, in no way reduces their exactions. The "no limit" quality called for in the public accommodation is taken as a matter of course; arguments as such are of small account. That an organized attack on public prejudice, however, made on the lines just laid down might succeed even with the farming population seems probable. Prejudice is usually proof against logic, but will not always stand up against persuasion when administered tactfully and not in too large doses.

The Sublime Porte of Turkey has rendered an important decision on the granting of concessions and franchises for public utility enterprises by local city governments. One of the suburbs of Constantinople applied for permission to build a municipally owned tramway system. The Minister of Public Works has decided that such privileges cannot be granted to communal authorities either in Constantinople or in the provinces, as they would be lacking in both financial strength and technical experience to carry out such an undertaking.

BULLETIN ON THE DENVER CONVENTION

The American Street & Interurban Railway Association has issued the following preliminary bulletin on the Denver convention:

PLACE OF MEETING

The annual convention of your association will be held at Denver, Colo., on Monday, Tuesday, Wednesday, Thursday and Friday, Oct. 18, 19, 20, 21 and 22, 1909. The days upon which the different associations will hold their meetings have not been definitely decided, but this matter will be arranged in the near future.

At the midwinter meeting of the executive committee of the American association, held in New York City on Jan. 29 last, the subject of the 1909 convention city was given much attention. After considering the matter from all standpoints it seemed to the committee, inasmuch as the conventions of the past several years have been held in the East, and being mindful of the fact that the Western membership of the association represents about 20 per cent of the total, and also realizing that these Western companies have been most generous in their attendance at the Eastern conventions, that the welfare of the association could best be served and the Western companies given the consideration which is their due by holding the 1909 convention in some city west of the Mississippi River. A convention location committee was then appointed, and this committee, accompanied by a similar committee from the Manufacturers' Association, visited Denver and other Western cities in an endeavor to decide upon the city which this year seemed the logical meeting place. From the standpoint of hotel accommodations and other matters of interest to visiting delegates, all the cities considered have qualifications peculiar to themselves, but, in view of the fact that Denver had in 1908 made a strong plea for the convention, and again this year had extended a warm invitation, the committee finally decided upon that city, as stated above.

The selection of Denver has already aroused a great deal of enthusiasm among many of our Eastern members, and there are many reasons why this should be so. A number of conventions have been held in Denver in the past few years, and reports from all those who have had to do with such conventions have been in most hearty commendation of Denver's facilities, willingness and ability to make the stay of all who visit their city most pleasant and profitable. Its great electric railway system, its climate and its location in the heart of Colorado, and the opportunity thus afforded of visiting many famous points of great natural beauty are well known, and our members are already looking forward to this trip as being one which will prove enjoyable and profitable in the highest degree.

HOTELS

While detailed information will be given in later bulletins as to hotel locations, rates, etc., it is thought well at this time to call attention to the splendid facilities offered by Denver in his direction. Twenty of the best hotels, practically surrounding the convention halls, provide 1600 rooms, many having baths attached, and 40 other good hotels are in a position to furnish 1000 additional rooms, while ample assurance has been given that the hotel rates during the convention period will be most satisfactory to the delegates.

EXHIBITS OF THE MANUFACTURERS' ASSOCIATION

The exhibits provided by the Manufacturers' Association must always prove of immense interest to those attending our conventions, and it is felt that this year, with the exhibit room provided in the new Denver Auditorium and adjacent space, together with the recent great development of the electric traction industry in the Western country, and the keen interest already shown by the Western companies in the coming convention, the exhibits will prove fully as extensive as those of previous years. This supposition is also borne out by the number of letters received from manufacturing interests when the consideration of Denver as a convention city was first suggested, all of these being of an enthusiastic tone as to the advantages to be derived from the selection of a Western city for convention purposes.

Later convention bulletins will contain full information with regard to hotel and railroad facilities, convention halls and manufacturers' exhibits, together with other facts of interest concerning locations of hotels with reference to exhibit halls, etc.

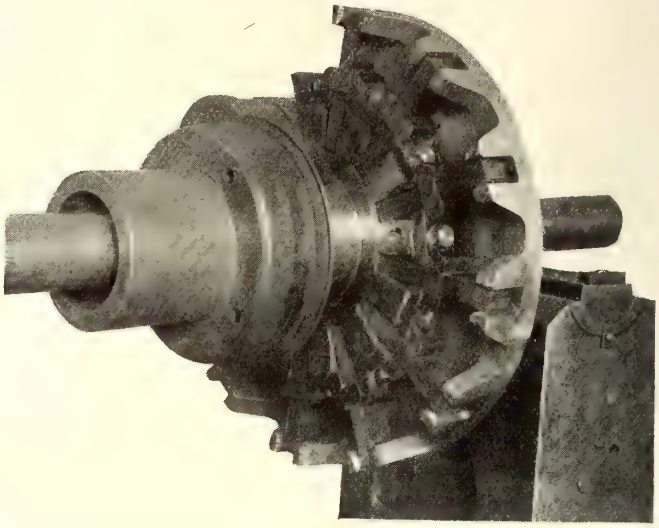
It is firmly believed, considering the already expressed sentiment of many Eastern companies and the cordial support assured by the Western companies, that the 1909 convention is bound to prove one of the most successful in the history of the association.

A NEW SIDE-ROD ELECTRIC LOCOMOTIVE

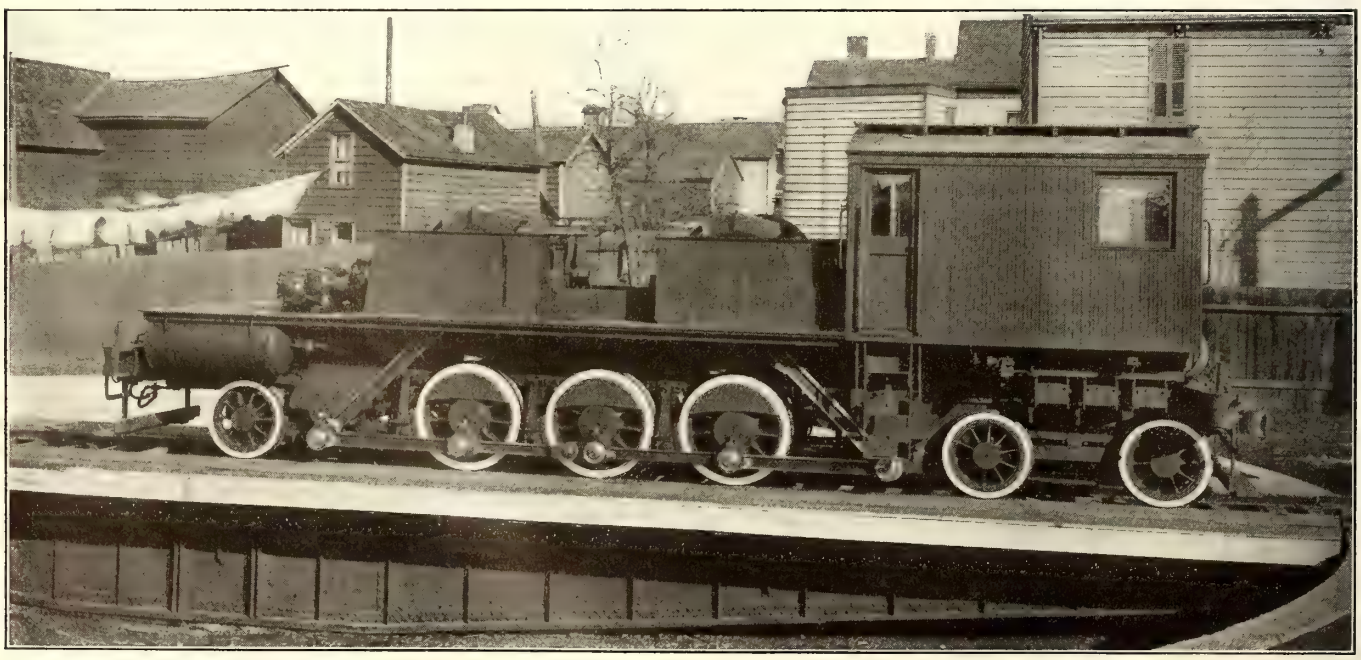
The accompanying illustrations show the principal features of a novel type of electric locomotive which has recently been designed and built jointly by the General Electric Company and the American Locomotive Company. The distinguishing feature of this locomotive is the fact that the motors are mounted on top of the frames and are connected to the driving wheels by rods and cranks instead of having the armatures geared to or mounted directly on the driving axles. The locomotive is designed to carry two 800-hp, single-phase, 15-cycle motors, and with this equipment will develop a tractive effort of 30,000 lb. at a speed of 18 m.p.h. The motors are capable of driving the locomotive at a maximum speed of 50 m.p.h. and will operate equally well when running in either direction. The locomotive has been equipped temporarily with two 400-hp motors for testing purposes, and the illustration from a photograph shows these small motors and a temporary cab in place. It is the intention to build a cab over the entire length of the machine as shown in the illustration on the opposite page.

The frame and running gear are very similar to those of steam locomotives. There are three pairs of coupled driving wheels 49 in. in diameter, a radial two-wheeled pony truck with wheels 36 in. in diameter at one end and a four-wheeled bogie truck with 36-in. diameter wheels at the other end. The total wheel base of the locomotive is 36 ft. 3 in., but the rigid wheel base is only 10 ft., which will permit rounding the sharpest curves. This wheel arrangement corresponds to what is commonly known as the "Pacific" type in steam locomotive practice, and while it is unsymmetrical by reason of having a pony truck at one end and a bogie truck at the other, the locomotive is adapted for running in either direction. Preferably it would be run with the bogie truck in front.

The system of spring supports is equalized between all six wheels on each side and is also cross equalized. The pony truck at one end has a radial center bearing and is guided by two radius bars, which are pivoted at the center of a cross piece between the frames forward of the rear driving wheel. The total weight of the locomotive when equipped with two 800-hp motors will be 250,000 lb., of which 162,000 lb. will be carried by the three driving axles. This gives a weight per driving axle of 54,000 lb., which is slightly less than the maximum weights employed on high-speed steam locomotives, but is much higher than the weights on either the New York Central or New Haven electric locomotives.



Flexible Coupling Between Motor Shaft and Crank Arm

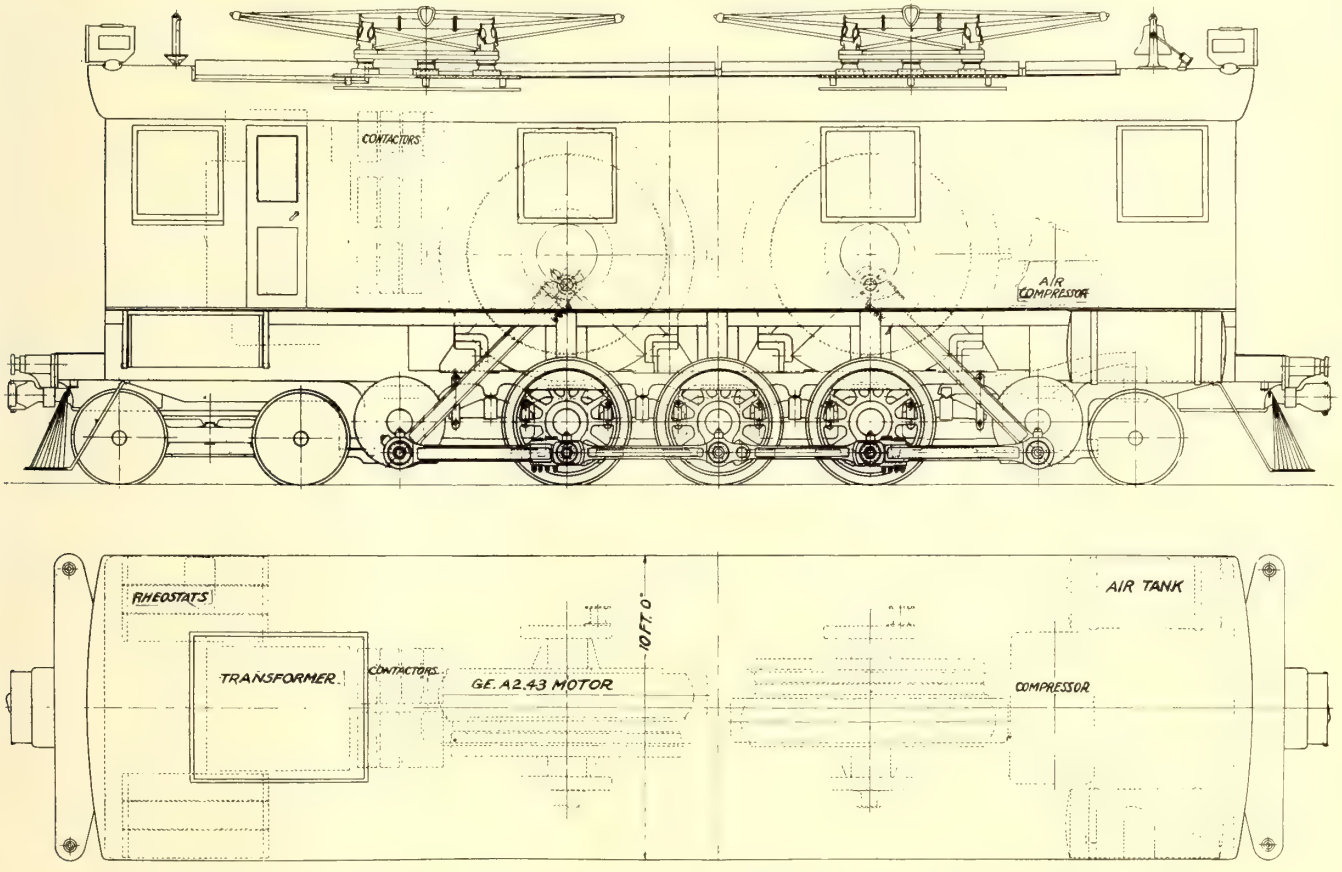


Side-Rod Electric Locomotive as Experimentally Equipped with Two 400-hp Motors and Temporary Cab

The two 800-hp motors which are mounted on the locomotive are of the GEAZ-43 type, designed for operating on 15-cycle, single-phase current. The electrical control is arranged so that the motors start as repulsion motors with

short-circuited armatures and are changed over to series repulsion motors as the speed increases. This arrangement eliminates running with a short-circuited armature on high voltage and gives the motors a high torque at starting. The tractive effort is about twice as great when running as repulsion motors as when running as series repulsion motors for the same current input. The armatures are similar to those of an ordinary direct-current motor with equalizer rings. The windings are of the multiple-drum type, with the bars soldered directly to the commutator segments. The field or stationary windings are of the distributed type and are made in two sections, the exciting and the inducing windings. The exciting winding has the same function as the field winding in an ordinary series motor, while the inducing winding produces the high working torque when the motors are connected as repulsion motors with short-circuited armatures at starting.

The arrangement of connecting rods between the motors and the driving wheels is well illustrated in the engravings. Two jackshafts, 10 in. in diameter and supported in bearings rigidly fixed in the locomotive frames, extend across the frames outside of the end driving wheels. Quartered crank arms are shrunk and keyed on both ends of these jackshafts and similar crank arms are attached with flexible couplings to both ends of each motor armature shaft. Inclined connecting rods extend from each motor crank arm to the corresponding jackshaft crank. To the same crank pins on the jackshafts are connected the driving-wheel side rods. For each revolution of the motor armatures, therefore, the driving wheels make one complete revolution and the two motors revolve in exact unison, due to the mechanical connection through the driving-wheel side rods. The object of inserting the jackshaft as an intermediate connection between the motors on top of the frames and



Side Elevation and Plan of Side-Rod Locomotive as Equipped with Two 800-hp Motors and Cab

The motors are mounted on top of the frames and this permits using armature bearings of exceptionally large size. With large bearings there is no danger of the armature dropping on the pole pieces, and hence the air-gap can be reduced to a minimum. The entire weight of the motor field and the armature, being carried on the frame of the locomotive, is spring supported, and therefore no severe shocks are produced by dead weight carried on the axles. The location of the motors close together near the center of the frame concentrates a very large proportion of the total weight of the locomotive over the driving wheels, and there is the further advantage that with the weight concentrated near the center the moment of inertia of the entire locomotive around its vertical axis is reduced to a minimum. This tends to lessen the lateral rail pressure on the truck wheels, and consequently the wear on the wheel flanges and the rail head.

the wheels is to permit a horizontal drive between the spring-supported part of the locomotive and the driving wheels. This is necessary in order to provide for vertical play between the spring-supported part and the non-spring-supported wheels with a negligible variation in the distance between crank centers. Counterweights are cast in the driving-wheel centers radially opposite to the side-rod pins and the crank arms on the jackshafts are similarly counterweighted. The jackshaft counterweights, however, are of such mass and their center of gravity is so located as to counteract the resultant forces produced by the revolution of half the mass of the inclined motor connecting rod and half the mass of the horizontal side rod between the jackshaft and the first driving wheel.

A very interesting mechanical detail of the locomotive is the flexible coupling inserted between the motor armature shaft and the motor crank arm. The motor crank

arm and its counterweight are formed in one piece, which is bored out to fit over an extension of the motor armature shaft. Just outside the armature bearing the armature shaft is enlarged in diameter, and notches are cut out to form seats for eight sets of radial leaf springs. On the inside surface of the crank-arm counterweight suitable notches are formed to seat the other end of the leaf springs. The sets of springs are fastened to the counterweight by bolted lugs which fit over the spring bands. The entire set of springs is designed to be of such strength as to carry the entire torque of the motor flexibly with an amount of deflection which will reduce the effect of the pulsating torque of a single-phase motor to a minimum.

The controller in the cab of the locomotive is mounted in the end over the bogie truck. The operator thus has a clear and unobstructed view ahead. Immediately back of the controller is mounted a static transformer, and back of it the multiple-unit control switches. On the deck at the opposite end of the locomotive, over the pony truck, is mounted an air compressor for the braking system, and under the deck two large main reservoirs. This arrangement of auxiliary apparatus gives a good distribution of weight, and at the same time permits of easy access to all parts of the machine from the cab.

The locomotive has been thoroughly tested up to its maximum speed on the General Electric Company's experimental track at Schenectady, and the tests have demonstrated conclusively that the design is entirely satisfactory, both mechanically and electrically. It is believed that owing to the motors being located in the cab, where they may be easily inspected and adjusted, and also where they are out of the way of all dust and other foreign material, the maintenance charges will be greatly reduced. The design permits the use of driving wheels of small diameter and motors of comparatively large size. It is equally well adapted for the application of direct-current motors, single-phase motors or three-phase motors.

CHIEF ENGINEERS' MEETINGS IN BOSTON

The Boston Elevated Railway Company has begun to hold regular monthly meetings of the chief engineers of its power stations, corresponding to the meetings which the company also holds with its division superintendents and car-house foremen. It is proposed to appoint subjects for discussion which will lead toward a reduction in operating costs and the improvement of the power station service in general. Tabulations of the cost of production at the different plants will be prepared regularly, including comparisons of the current performance of each station with previous operation, and the contrasting of conditions and operating results in the several plants. The company at present operates eight steam and two gas-engines plants of a normal capacity of 50,000 kw. The operations of these stations are under the jurisdiction of a superintendent of power stations, reporting to the chief engineer of motive power and rolling stock. At the initial meeting in April a general discussion of operating conditions in the different plants was held, after which the purpose of the meetings was explained by Paul Winsor, chief engineer of motive power and rolling stock. James D. Andrew, superintendent of power stations, presided, and J. Henry Neal, general auditor of the company, pointed out the importance of accurate records of cost and the value of co-operation between all departments of the company in securing the most efficient results.

RESULTS OF A STUDY OF CAR VENTILATION IN CHICAGO

INTRODUCTION BY W. A. EVANS, M.S., M.D., COMMISSIONER OF HEALTH, CHICAGO, ILL.

REPORT OF TESTS BY J. F. BIEHN, A.M., M.D., AND J. B. GOOKEN, S.B., DEPARTMENT OF HEALTH, CHICAGO, ILL.

The introduction of large, modern street cars, differing radically in construction from the older types of cars, which had no platform protection and were not built with tight doors and windows, has created a necessity for installing some positive means of ventilation. With the old cars, which permitted passengers to enter or leave by either the front or rear doors, a large volume of fresh air entered whenever the doors were opened before coming to a full stop. The leakage through the end doors and bulkheads, the monitor sash and the loosely fitted side windows also supplied an excess of fresh air. In the new cars, such as are being operated in Chicago and other cities, the front platform is entirely enclosed and the exit door is not opened until the car has come to a full stop. This adds to the safety and comfort of passengers, but at the sacrifice of natural ventilation.

The principles of ventilation of street cars differ from those obtaining on steam railroads or high-speed interurban electric cars running through open country. The writer is of the opinion that enough fresh air will enter through leakage around the doors and windows and other ordinary ventilation devices in a sleeping car when running in a train at reasonable speed to supply the needs of the passengers constituting the ordinary sleeping-car load. The average load carried in a street car during the crowded hours is larger than that carried in steam cars or interurban cars, and the speed at which the cars are operated is much less. Hence the ventilation due solely to the velocity of the car is quite inadequate. When 100 passengers are crowded into a street car there is but 10 cu. ft. of space in the interior for each passenger, after due allowance is made for the space occupied by the seats and the bodies of the passengers. For proper ventilation it is necessary that the air should be changed frequently; three times per minute if the fresh air and the foul air are mixed, and less often in proportion as they are kept separate. This necessity for frequent changing of the air underlies several of the principles which govern proper and adequate ventilation for street cars.

A street car does not run with sufficient velocity to force through the ordinary ventilator openings enough air to supply the needs of the passengers. This method of natural velocity ventilation, which works satisfactorily in cars running in steam railroad trains, is not suitable for application to street cars. When the weather is cold enough to require the windows to be shut tight, passengers will ordinarily object to the admission of enough cold fresh air through the ventilators to supply their needs, especially if the openings are located so as to produce direct drafts on the passengers. It is essential, therefore, that the incoming air be heated as it enters the cars. The ordinary method of heating by direct radiation from heaters placed under the seats is usually ineffective, because the body and clothing of the passenger and the seat and the side of the car form a closed space which confines the heat under the seat.

If the foul air and the fresh air are mixed together, the ordinary car will require about 400,000 cu. ft. of fresh air per hour. To heat such a volume of air on a cold day is

expensive; it also would require the installation of bulky apparatus, which would occupy much valuable space. The only feasible plan is to reduce the amount of fresh air required by keeping it separated as much as possible from the foul air. To this end the outlet openings should be in the deck sash and the inlets near the floor line. Methods for accomplishing proper ventilation in this way are described in the following discussion by Dr. Biehn and Mr. Gooken. The principles involved are applicable to any car, and this method of ventilation should be enforced from the time when the temperature falls low enough to cause the windows to be shut tight until warm weather arrives and the windows can again be raised.

VENTILATION EXPERIMENTS BY MESSRS. BIEHN AND GOOKEN

Within the past two years the Board of Health of the city of Chicago has made a careful and scientific test of existing conditions of ventilation on surface, elevated and steam railway cars. The system in most common use depends on opening the deck sash. On the cars in Chicago these deck-sash ventilators are rarely opened in cold weather, as the railway companies are required by city ordinances to heat the cars to a temperature of 52 deg. F. in all weather conditions. The general practice is to keep the ventilators and doors closed whenever the heat is turned on in the cars. Tests were made to determine the efficiency of deck-sash ventilators. These tests consisted of taking anemometer readings to determine the volume of air entering and leaving the car through the ventilators; filling the car with fumes to determine the direction of air currents, and the diffusion of the incoming air and the time required to change the air in the car.

The results obtained in the first tests with deck-sash ventilators turning on a longitudinal axis showed 560 cu. ft. of air per minute leaving through the ventilators when running at average speed and 805 cu. ft. entering. The time required to clear the car of all fumes was 4.5 minutes. The greatest efficiency possible in this type of ventilator was calculated as follows: Amount of air entering the car through ventilators, 48,300 cu. ft. per hour. As this is a dilution system, 300,000 cu. ft. per hour are required for proper ventilation with a load of 100 passengers. The ratio of actual ventilation to theoretical ventilation required, therefore, is only 18.37 per cent.

Deck-sash ventilators hinged at one end are even less efficient. Tests with this type showed that only 10.24 per cent of the required volume of air is admitted to the car. The effect of opening the door when the car comes to a stop is equivalent to nearly 26 times the action of deck-sash ventilators. This action, however, is not true ventilation, because it is not constant. The first pay-as-you-enter cars in service in Chicago were equipped with ventilators having an area of 190 sq. in. in the rear and front of the monitor hood on a level with the deck sash. The air was supposed to enter through the front ventilator, pass down through the car and out at the rear ventilators. Tests showed that this action was not found in practice.

As a result of the experiments made by the Board of Health, certain standards of car heating and ventilation were determined upon and submitted to the Board of Supervising Engineers. These standards are as follows:

At least 28,000 cu. ft. of air per hour must be supplied to each car. This air must enter at or near the floor line from as many points as possible, primarily to give a proper distribution, and, secondly, to prevent drafts. This air must be heated as soon as it enters the car and the foul air must be removed at or near the ceiling, and from as many points as possible. The temperature in the car shall not be over 52 deg. F. A temperature of 41 to 45 deg. F. is considered high enough, as the passengers have on heavy clothing and overcoats. Some heat is required, however, because if the air is not warmed it will be more readily noticed as a draft, and as the passengers are not exercising, they will require a somewhat higher temperature than if they were walking in the outdoor air.

The standard temperature, it is believed, can easily be maintained with a method of ventilation in which the fresh air is admitted near the floor line and foul air exhausted near the roof. It is plain that by passing the incoming air over the heaters under the seats the efficiency of the heaters is increased at least 400 per cent.

When the proposed standard requirements for heating and ventilation of street cars were submitted to the Board of Supervising Engineers of Chicago Traction, the members of the board said that they knew of no ventilating system which would meet the requirements. The health department then offered to make tests with any system which the Board of Supervising Engineers would install. Several manufacturers of ventilating apparatus were invited to submit plans, and five systems were installed on five of the latest pay-as-you-enter cars. Tests were made of all of these devices and a report submitted to the Board of Supervising Engineers. A brief description of each of the systems tested and the results obtained is given below:

TAYLOR SYSTEM

The Taylor automatic ventilator consists of two interior bronze diffusion boxes and a brass exterior panel, which is inserted in the deck-sash openings, six on each side. The deflector, which is composed of chilled steel, extends 8 in. from the deck sash and is 7 in. high. The outer end is bent to the front and rear. When the car is moving fresh air is forced into the car through the forward openings, the deflector forcing it into the rear. On the other side of the deflector a partial vacuum is caused, which is intensified by the overhanging portions, thereby exhausting the vitiated air. The openings in these boxes are 6 in. x 8 in., and are covered with a coarse screen. Each opening is fitted with five stationary louvres which extend upward at an angle of about 45 deg. In addition there are six intake openings on each side of the car 5 in. above the floor line. These openings are 4¼ in. x 6¼ in. and fitted on the inside with ordinary register faces. They are placed under the seats and the fresh air entering through them passes through the heater coils. A V-shaped deflector is hinged by a steel pin to the outer edge and outside of the car. When the car is in motion the wind opens the forward end of the deflector and closes the rear end. Ventilators are also installed in the vestibules.

When this system was first tested out the lower openings at the floor line were not in use and the railway company claimed that dust would enter through these openings. Experiments were therefore made to determine how high the dust of the street rises when disturbed by street cars. It was found that the dust showed a tendency to move away from the cars. The wind assisted this material and the dust did not deposit along the side of the car, the speed of the car and its direction always being away from the swirl of the dust, which is left behind. Air exhausted from the brakes under the car body did not raise the dust higher than the floor line. Dust raised by the wind and by wagons passing along the street, which may be blown into the car, it was found, was not more abundant at the floor line level of the car than at other levels higher up.

With the Taylor system a test made Dec. 2, 1908, showed that a total of 32,062 cu. ft. of air per hour entered the

car. The diffusion was very good and the temperature was maintained without difficulty. When the car was standing still on one occasion 13,100 cu. ft. of air per hour entered. Some other observations did not show as high a reading. This system depends largely upon the direction and velocity of the wind and the speed of the car.

PERRY SYSTEM

The next system tested was the Perry system. This ventilator fits into the monitor top. It consists of a number of copper ribs or louvres extending out from the car for a distance of about 3 in. These louvres are curved downward and the space between them on the inside is half closed by bending them back upon themselves so as to form a dead air space. The fresh air is forced into the car when under motion through the vertical openings so as to pass under the deflector plates before being taken into the interior. The air takes an S-shaped course before it enters the car. It is claimed that the impurities, such as dust, smoke, etc., as well as rain and snow, are drawn under the deflector and forced out through small openings on the side of the ventilator. When the car is in motion at the forward end of the ventilator there is a strong outward current of air and at the rear end of the ventilator there is an inward current.

The car tested had eight ventilators, four on each side, two in the front part of the car and two in the rear. The total amount of air taken in, as nearly as could be determined, was 13,043 cu. ft. per hour and the total exhaust 28,133 cu. ft. per hour. Intake and exhaust of air varied directly with the direction of the wind and the velocity of the car. The tests showed that the purification was limited to the upper part of the car. This is a dilution system and does not introduce sufficient air into the car.

GARLAND VENTILATORS

The third system tested was the Garland automatic. The Garland ventilator is fitted to the roof of the car at the deck sash. It consists of two funnel-shaped ducts so arranged that the velocity of the car causes air to pass into one duct and out of the ventilator at right angles to the car. Foul air is drawn through another duct that communicates with the exhaust portion of the ventilator as a result of this rush of outside air by the opening. This is practically a double cowl so arranged as to operate whether the car is moving in one direction or another. It is a vacuum or exhaust system. The amount of air exhausted depends upon the speed of the car and the area of openings or cracks and crevices in the car through which the air is taken in. On opening a door the exhausting power was about double, the small natural openings in the car offering too great a resistance to allow sufficient ventilation. Without special intake openings this system is not efficient, as the air supplied must come through accidental openings, which are not evenly distributed and which are almost entirely eliminated by modern car-building methods. This system exhausted 18,896 cu. ft. per hour under usual conditions. With the rear doors opened when running at the same speed as in the previous test an exhaust of 53,664 cu. ft. per hour was recorded.

M'GERRY SYSTEM

The McGerry system consists of two separate but identical fan sets installed at opposite corners of the car under the longitudinal seat. These fans are driven by ½-hp motors enclosed in a sheet-iron casing. The motor has a long shaft, one end of which is fitted with a suction fan and the other with a blower fan. The suction fan is connected to a wooden duct which runs up in the corner of the car and terminates in a 7-in. x 7-in. opening directly under the deck rail inside the car. Through this opening the foul air is drawn down and expelled below the floor of the car. The fan on the opposite end of the motor shaft is connected by a galvanized iron tube to an opening on the outside of the car 5 in. x 8 in. in size, near the corner post of the car and about 5 ft. above the platform level. Fresh air is drawn through this opening by the fan and is forced over the heater coil. It is then discharged into the car at various openings under the car seats, beng conducted along the side of the car at the floor line by a sheet-iron duct. A duplicate system is installed on each side of the car. The best results obtained with this system were shown on a regular trip in which 22,237 cu. ft. of air entered the car through the ventilators and 11,582 cu. ft. were exhausted. In this system there are only two exhaust points near the ceiling, one on each side of the car at the end of the car. These are not sufficient.

COOK VENTILATION SYSTEM

The Cook vacuum system consists of a motor-driven exhaust fan located at one end of the car roof. The air is taken into the car at the floor line, passes over the motor coils and rises in the car to be exhausted at the ceiling through a plenum chamber between the roof and a false ceiling. The fan is connected directly to a 1/3-hp motor driving a fan 10.5 in. in diameter and 3 in. in width at the periphery at 2100 r.p.m. The sectional area of the plenum chamber increased in size with the distance from the motor. There are also openings for exhausting the air in the vestibules. The foul air is exhausted from the body of the car under a partial vacuum. Tests of this system showed an exhaust of 47,524 cu. ft. from the body of the car, 2983 cu. ft. from the front vestibule and 3969 cu. ft. from the rear vestibule, making a total of 54,476 cu. ft. of air per hour. The diffusion with this system was very good, but owing to the air entering at the four corners and only passing over four heaters, it was not possible to maintain the desired temperature. This can be remedied, however, by placing all of the heaters above the air intakes or by increasing the number of intakes and placing one under each heater. The latter arrangement is preferable.

The McGerry and Cook mechanical systems deliver a uniform amount of air. The variations are due only to variations in the voltage. The direction of the wind and the speed of the car do not affect the amount of air supplied.

DISCUSSION OF CAR HEATING BY DR. EVANS

A large pay-as-you-enter car heated to 52 deg. Fahr., running when the outside temperature is 0 deg. Fahr., will radiate 18,300 B.t.u. per hour from the sides, floor and roof. One hundred passengers will generate 38,000 B.t.u. Subtracting from this the 18,300 B.t.u. radiated, it will be seen that the passengers will not only make up the heat radiated from the car, but will contribute 19,700 B.t.u. toward the heating of fresh air. If 38,000 cu. ft. of air are taken in at 0 deg. Fahr., 34,544 B.t.u. are required to raise its temperature to 52 deg. Fahr. Subtracting the 19,700 furnished by the passengers leaves 14,844 B.t.u. as the amount of heat required to be furnished by resistance coils. Thus the cost of heating the car would be 6.4 cents per hour assuming that current costs 1.5 cents per kw-hour at the car.

If the dilution system of ventilation is employed a minimum of 2000 cu. ft. of air per passenger per hour should be taken in. For 100 passengers this means 200,000 cu. ft. of air per hour per car. As each passenger has 14 cu. ft. of air space after subtraction is made for car seats and the bodies of the passengers, it follows that the air must be

changed 2.4 times per minute. This, of course, is impracticable. A volume of 200,000 cu. ft. of air per hour heated from 0 deg. Fahr. to 50 deg. Fahr. will require 181,181 B.t.u. per hour. Subtracting 19,700 B.t.u. furnished by the passengers leaves 161,481 B.t.u. per hour to be furnished by the resistance coils—an impossible amount of radiation in the room allowable in a street car. Therefore the dilution system is impractical. The cost would be 69.6 cents per hour per car if electricity costs 1.5 cents per kw-hour.

On page 272 of "The Electrification of Railway Terminals," 1908, we find the following table of electric heating costs. Some time ago the Chicago City Railway furnished the data on the cost of car heating by electricity given in the following table, which was originally published in the STREET RAILWAY JOURNAL:

Electric heating per car, 12 amp 9 hours equals 54 kw-hours at .992 cent	$0.536
Interest at 5 per cent plus depreciation at 7 per cent on $80, cost of heater, 365 days divided by 150 days' heating season	.064
Hauling dead weight 360 lb. 100 miles per day, 365 days per year, at 0.95 cent per day of heating season	.042
Repairs 5 cents per car per day	.050
Interest 5 per cent plus depreciation 3 per cent on additional copper required for electric heaters per day per heater	.038
Cost of electrical heating per day	$0.73

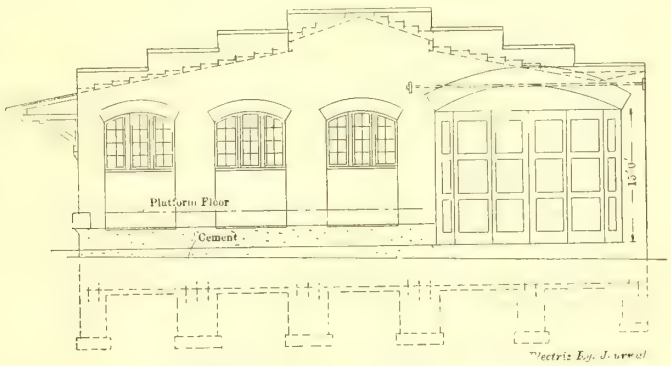
ACTION OF ONTARIO RAILWAY & MUNICIPAL BOARD ON UNIFORM ACCOUNTS

The third annual report of the Ontario Railway & Municipal Board, covering the year ended Dec. 31, 1908, states that the board concluded to "join in the movement to secure uniformity of returns both in the United States and Canada. As the forms of the returns which this board devised and sent out to be made by the railways under its jurisdiction are modern and in conformity with the best up-to-date practices of company accounting, little or no change will require to be made in our forms. The advantage of uniformity of returns both in the United States and Canada is obvious. Comparisons of results of management and of operation and other details can be made between the different operating systems in Canada and the United States, and for statistical purposes uniformity of returns will be invaluable."

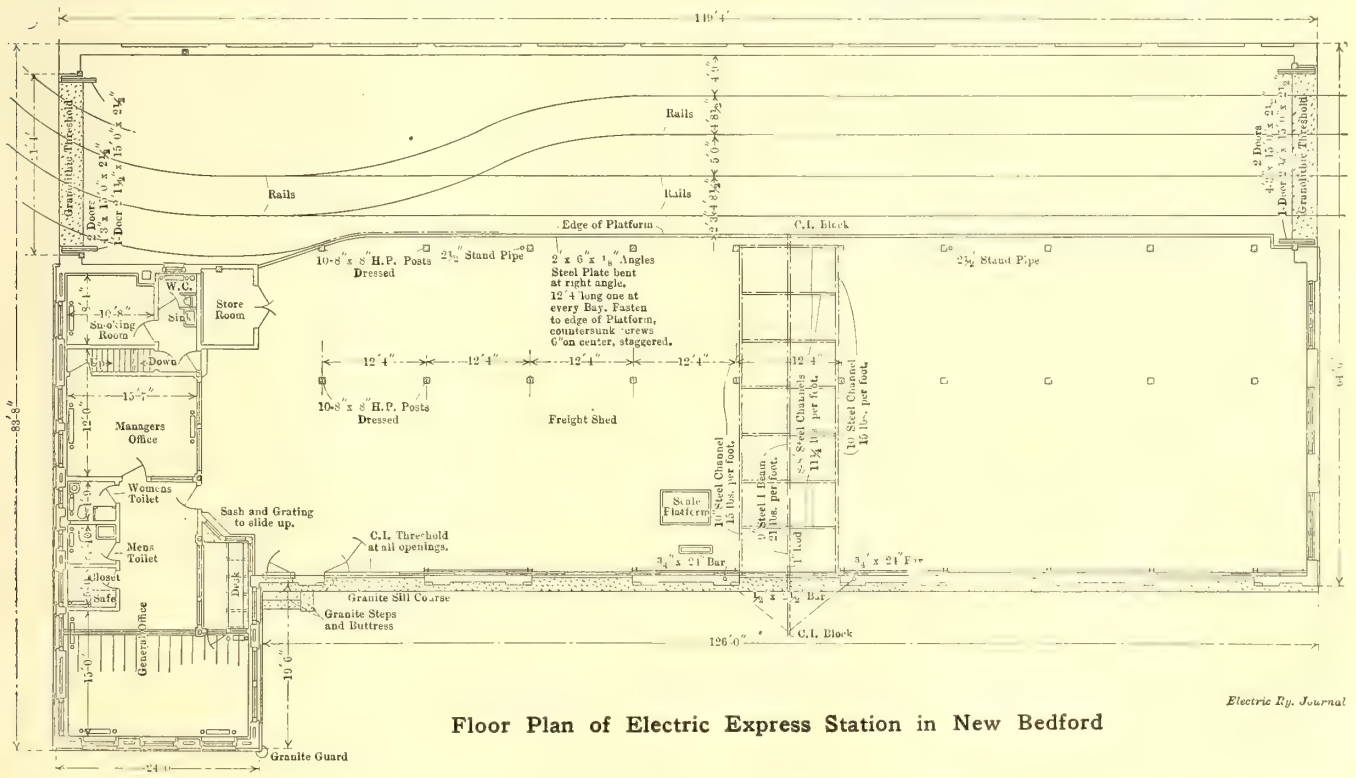
The report mentions the attendance of the board at the last convention of the American Street & Interurban Railway Engineering Association at Atlantic City, N. J. The board also attended the convention of the Canadian Street Railway Association at Ottawa, Ont., in November, 1908, "principally for the purpose of taking part in the discussion in reference to bringing about uniformity in the form of returns from railways in Canada."

ELECTRIC EXPRESS STATION AT NEW BEDFORD

The Dartmouth & Westport Street Railway Company is about to build a new freight terminal in New Bedford, Mass., to be located on the east side of North Water Street at the corner of Elm Street. The architect has succeeded in working out a building of neat appearance, and one which will prove very convenient for handling the large amount of freight that is shipped to and from New Bedford by the Dartmouth & Westport, New Bedford & Onset and Old Colony Street Railway companies.



End Elevation of Express Station



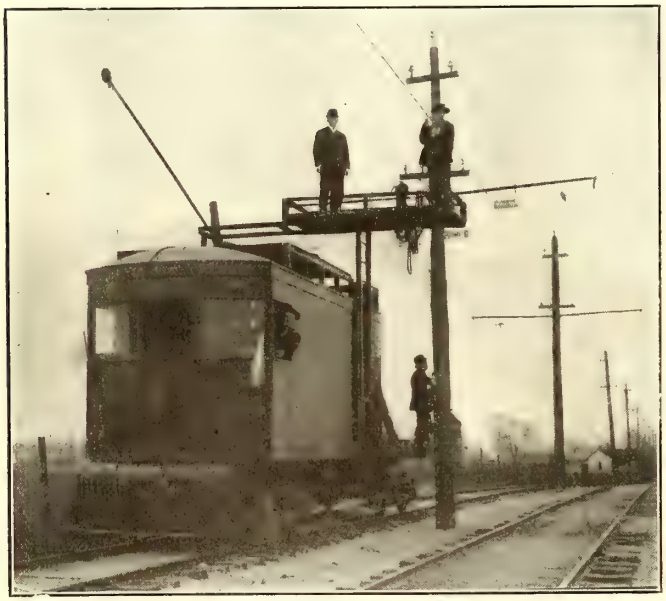
Floor Plan of Electric Express Station in New Bedford

the accommodations for freight, the building provides waiting rooms and general offices for the company. A feature of the building is a traveling crane which extends across the building from north to south, about midway between the east and west ends, for use in moving heavy machinery or freight of any kind that cannot be trucked easily across the floor of the shed. The station will cost $20,000.

NOVEL LINE CAR ON INDIANAPOLIS, COLUMBUS & SOUTHERN

The Indianapolis, Columbus & Southern Traction Company has recently put in service a new form of line car. The car is 8 ft. 4 in. in width and 36 ft. long; 20 ft. of the length is closed cab, the remainder is the ordinary flat car design. The bottom framing is composed of four sills. The two side sills are of 6-in. x 10-in. pine, and the center sills are of 6-in. x 8-in. pine, running the full length of the car. There are four needle beams 6 in. x 8 in., with 1¼-in. truss rods.

The closed cab portion of the car is fitted with shelving suitable for carrying all supplies necessary, such as trolley hangers, ears, insulators, frogs, crossings, etc., in fact, everything that is used in the construction of an overhead



Indianapolis, Columbus & Southern Line Car

trolley line. There are suitable hooks for hanging blocks and ropes, cabinets for tools, and a small work bench fitted with a vise. There is a platform extending the entire length of the roof of the cab, so as to prevent its wear by the workmen. The platform consists of 4-in. x 1½-in. oak, laid 1 in. apart. The side posts project through the roof to the height of the platform and carry the platform proper.

The car is provided with a tower, the normal position of which is level with the platform, of which it forms a part unless raised by means of a windlass and cable from the inside of the car. The tower can be raised to a height of 20 ft. and is also arranged to slide out over either side of the car a distance of 6 ft. The size of the tower is 4 ft. x 8 ft. 4 in., and the platform has a railing 1 ft. in height.

The rear or flat part of the car is arranged for holding reels of wire and for carrying poles. As the opening of the inner swinging doors of the cab is 5 ft. in width, long poles can be carried on the car by opening the doors and allowing the poles to extend into the interior of the cab. The space between the sills at the rear end is ceiled at the bottom for the purpose of carrying shovels, bars, pike poles and such other tools as are used in the setting of poles. There is also a small platform that slides directly under the side of the bottom of the car and is held in place by iron straps. This platform is used as a bench in repairing telephone jack boxes, pole signs, etc.

The motor equipment consists of two GE-57 motors, both on the front truck, geared to 55 m.p.h., Brill No. 27 trucks and Christensen air brakes. The car is fitted with a full set of electric classification lamps.

The car was built at the company's shops at Greenwood, Ind., on design of and under the supervision of its master mechanic, T. W. Shelton. The accompanying description and illustration were supplied through the courtesy of A. A. Anderson, general manager of the company.

HEARINGS ON SIDE DOOR CARS IN NEW YORK

The hearing on side-door cars for the subway before the Public Service Commission of the First District of New York, set for Thursday, April 29, was postponed until Monday, May 3, at the request of Mr. Hedley, general manager of the Interborough Rapid Transit Company, who was obliged to attend an important engagement affecting his company. Mr. Hedley said, however, that the end-door train could be made ready for operation by May 10 if the commission desired. Mr. Eustis replied that from reports on the center-door train by the commission's experts, it would seem that the center-door train had made even a better record in service than the end-door train, and stated that the commission might be able to decide the type of train best suited for service from the data already in hand, without the necessity of putting the end-door train into service again.

At the hearing on May 3 Mr. Hedley said that he desired to submit evidence in rebuttal of Mr. Arnold's figures on the operation of the end-door train, but that the company would not be prepared to present its data for a week. Mr. Hedley has no doubts about the record made in service by the new center-door train. The train equipped with the center-door cars carries more people than the regular trains and reduces the time of stops at stations, but it increases the liability of accidents to passengers. Mr. Hedley also said he has concluded that any type of side-door car in the subway will increase the danger to passengers materially and add to the capacity of the road only slightly. The company is now preparing estimates of the increased carrying capacity of the side-door trains, but they are not sufficiently complete yet to venture an estimate. The train with side-door cars had been running eight days when the hearing was held, and there had already been several minor accidents and one serious one.

Mr. Hedley said that the company is operating about 430 cars on the express tracks, and that it expects to order a sufficient number of cars to utilize to a maximum all the improvements in the subway when they have been completed. It had taken only three weeks to change the new steel cars for center-door operation, but this was no criterion for converting the entire equipment, as the end-door train was stripped of its equipment to facilitate work on the side-door train, and less urgent work in the shops was abandoned temporarily to hasten the completion of the side-door train. Mr. Hedley said that it would take three or four months to secure material for changing the 50 steel cars bought recently, which are designed for con-

version to the side-door type. It would be a very slow and costly job to change the regular cars to cars of the end-door type.

The company will convert the 50 steel cars purchased recently if so ordered, but is opposed to converting more than 50 cars at this time. The 50 cars will give six trains of eight cars each. Mr. Hedley said that from the experience in service with these trains conclusions could be drawn regarding the advantages to be gained by converting all the cars intended for the express service. Mr. Hedley said that he himself may ultimately recommend the adoption of the side-door car to his company, but would not do so with the present experience as a basis for conclusions. On account of the additional weight of the side-door cars, the present side-door train is composed of six motor cars and two trailers.

NEW INLAND EMPIRE TRAIN SCHEDULE

The Inland Empire System, Spokane, Wash., announces a new summer schedule on its Cœur d'Alene division, beginning May 2. The new schedule includes 10 trains daily in each direction between Spokane, Wash., and Cœur d'Alene, Idaho. Five of these trains will carry one of the Inland's handsome parlor observation coaches. The Cœur d'Alene division of the Inland system runs east from Spokane to the city's beautiful lake resorts, and the new schedule will include also seven trains in either direction between Spokane and Hayden Lake, Idaho, and also eight trains between Spokane and Liberty Lake, Wash., the city's chief bathing resort. Daily connections will be made at Cœuer d'Alene, as heretofore, with the Red Collar Line steamers, whic hoperate across Lake Cœur d'Alene and up the St. Joe River.

Besides the regular "Shoshone Flyer," which makes the run between Spokane and Cœur d'Alene, 32 miles, in one hour, connecting for the Cœur d'Alene mining district, the new schedule includes the "Camper's Limited," which will be a through train in either direction between Spokane and Hayden Lake, and will make the run of 40 miles in 1 hour and 16 minutes. This train leaves Spokane terminal daily, except Sunday, at 4:25 p. m. and reaches Hayden Lake at 5:40, thus enabling business men to live at the lake during the summer months. The train leaves Hayden Lake each morning at 7:40, arriving in Spokane at 8:50.

The eight trains in either direction between Spokane and Liberty Lake have been placed on the new schedule to give the very best service to Spokane's most popular bathing and picnic resort. The Inland Empire System has expended a large amount of money at this resort in building a handsome dancing pavilion over the lake and erecting new bath houses and a restaurant building; also a fine 35-acre park has been laid out at the company's terminal, bordering on the lake. This resort is a very popular one for picnic, bathing, boating and dancing parties.

The accompanying illustration from a photograph shows a number of morning trains ready to leave the Spokane terminal station. The high fill along the river bank is being made by depositing the material excavated from the subway which is being built under Front Avenue to provide an entrance to the terminal station and relieve the present congestion on the surface tracks on the streets.



Inland Empire Terminal Station at Spokane

DEPRECIATION OF UNDERGROUND CONDUITS, CABLES AND WIRES

The annual report of the American Telephone & Telegraph Company for the year ended Dec. 31, 1908, contains the following discussion and figures on the subject of depreciation:

Studies have been made during the year to determine the actual rate of depreciation which should be provided for.

Figures from actual experience could be made for pole lines, iron wires and most of the central office and substation equipment, but underground conduits, copper wires, and cables must still be ascertained from experience.

Of the total value of the telephone plants owned by the American Telephone & Telegraph Company and associated companies

	Per cent
Real estate constitutes	9
Underground conduits and cables	20
Copper wires and aerial cables on poles	18
Pole lines, not including wires	26

Eight million dollars of this represents ownership of rights of way over private property.

	Per cent
Iron wires	4
Central office and substation equipment	23

As to the depreciation of property, real estate is standard and established.

Underground conduits can be classed with real estate, or, rather, with permanent construction on long-term ground rents.

Cables and copper wires have shown very small depreciation, and experience has not yet established a definite rate; there is, however, a net scrap value of 40 per cent.

Iron wires have a life of from 8 to 15 years.

Pole lines have a life of from 10 to 16 years.

Central office and substation equipment have a depreciation dependent on their character, the condition in which they are maintained, and on the policy of renewal or replacement by new or improved apparatus.

TICKETS ABANDONED IN PHILADELPHIA

On May 4, the Philadelphia Rapid Transit Company made the important announcement that it would abandon the sale of six tickets for 25 cents. The announcement was displayed in large advertisements printed in the Philadelphia daily papers, in which the reasons for the abandonment of the sale of these tickets were given. The step taken followed within a week a decision rendered by the Supreme Court of Pennsylvania, April 26, to the effect that the company was not obliged to give transfers except when a cash fare of 5 cents was paid. For the benefit of those who are not familiar with the fare situation in Philadelphia, a brief review will be given.

Prior to the organization of the Philadelphia Rapid Transit Company the street railway lines in Philadelphia were operated by several independent companies. The cash fare was five cents. Three cents additional was charged for an "exchange" ticket, which was good until used, except that at a few points several of the companies issued transfers without additional charge. About 1907, the company voluntarily placed on sale strips of six tickets which were sold for 25 cents, and gave free transfers with either ticket or cash fares. On June 20, 1907, a new franchise, readjusting the relations between the city and the company, was passed by the Council and was ratified by the company. This franchise contained a proviso "that the present rates of fare may be changed from time to time, but only with the consent of both parties hereto." A few months ago the Philadelphia Rapid Transit Company withdrew the transfer privilege when the fare was paid by ticket and allowed it only in cases when a cash fare was paid. The city immediately complained that this action was a change from the established rules of fare in existence when the contract was entered into, as it required a cash payment to secure the transfer. An injunction was asked restraining the company from discriminating in the way indicated. The case was decided in favor of the company in the court of Common Pleas, but was appealed by the city, and thus brought before the Supreme Court.

In its decision the Supreme Court defined the difference between rates of fare and charges for transportation in the following words:

OPINION OF SUPREME COURT

The question presented is a very narrow one. The expression "rates of fare" as used in the proviso is more or less inapt, and therefore lacks definiteness. We are not aided in its interpretation by anything elsewhere appearing in the contract. The proviso is left to speak for itself. Strictly speaking, the traction company had no established rates of fare when it entered into this contract. A rate is the measure of a thing by its ratio or relation to some fixed standard. When a certain sum is determined for a particular service, unless it is proportional and comparaitve according to a recognized standard, it is not a rate, but a charge. The compensation which this company was accustomed to receive for the facilities it afforded had relation to no standard. The 5-cent fare for one continuous ride was not measured by distance traveled or anything else that would suggest proportion, and the same must be said of every other fare it required. None of them was determined by ratio.

It is quite evident, however, that the reference in the proviso was to the charges and fares the company was receiving at the date of the contract; it could be to nothing else. Accepting this as the meaning, it is necessary first to inquire what these several charges were. We have referred to one—5 cents for a single continuous ride in the same car. Another was 8 cents for a single change from one car to another on certain intersecting lines. It is not defined that these charges fall within the meaning of the proviso. No attempt has been made to change these in any particular. It is contended that there was also a third charge, distinguishable from these mentioned, which also falls within the proviso, viz., 25 cents for six tickets when purchased together, each ticket being the equivalent of a 5-cent cash fare and entitling the holder to equal service. * * * The sum of 25 cents distributed upon six tickets makes the cost of each, considered separately, 4 1/6 cents. This simple statement would seem to show such a reduction in cost to the purchaser as would warrant a conclusion that the company had two charges for the same service; that is, the continuous ride, one 5 cents and another 4 1/6 cents.

But this method of differentiating does not express the whole truth as we need to know it for a proper determination of the question. Clearly, the 4 1/6-cent charge is not all the company exacts in the way of payment when it sells by ticket. One ticket cannot be purchased for that sum. In order to get one the purchaser must buy six and pay 25 cents before he gets any service whatever in return. It results that the company gets the benefit of this advance payment without interest. Where all the six tickets are used promptly the advantage derived by the company in this respect may be too slight to be considered; but, as every one knows, all are not used promptly, and it is not mere speculation to say that the general average would show a very substantial benefit inuring to the company from this course, an advantage which could be fairly regarded as the full equivalent of the amount abated. Whatever the company gains in this way is at the cost of the party purchasing, of course.

The company was all the while adhering to the 5-cent charge for the general public. The ticket arrangement was one of its own devising, adopted not because forced upon it, but at its own pleasure. If the purpose was to reduce the charge, the question at once arises, to what end? It will hardly be contended that it was to gratify a generous impulse prompted by an over-abundant income. No more can it be supposed that it was done with a view to increase the company's revenues through an enlarged traffic. The average individual would not be likely to take more rides during a month or year because of the reduction of five-sixths of a cent upon each ride. It is quite as inconceivable that its purpose was to give individuals who, without inconvenience to themselves, could spare 25 cents at any time, the advantage of a lower fare then was charged those who could conveniently spare not more than 5 cents each time they travel. The only reasonable explanation is that in adopting the ticket system the object was to afford an additional convenience for a consideration in the way of advance payment, which would equal the amount of abatement in the fare in dollars and cents. Indeed, we think it so evident that the purpose of the company was to adhere to the 5-cent charge as a basis that we are unable to see how the complainant in contracting with the company with respect to the matter of fares could have any reason to suppose that the ticket system introduced any other.

It is only by supposing that the understanding of the parties with respect to it was wholly different from what the transaction on its face imparts as to its meaning and purpose that we can read this ticket system into the terms of the proviso, and there is nothing in the case as presented that would give us warrant for so doing. If, then, it is not "a rate of fare" within the meaning of the proviso, but a mere regulation of the convenience of the public involving no change in charge—and this is our conclusion—it follows that the traction company in restricting its application in the manner complained of was strictly within its rights, and the concurrence of the city was not required.

The decree is affirmed and the bill dismissed at the costs of appellant.

The announcement of the abandonment of the tickets follows:

ANNOUNCEMENT TO THE PUBLIC

Pursuant to a resolution this day unanimously adopted by the board of directors of the Philadelphia Rapid Transit Company, the sale of the six-for-a-quarter tickets will be discontinued on and after Tuesday, May 4, 1909.

During the past nine months the average fare received

by the company has been less than 4 cents, or about 3.90 cents. This sum is the result of the following distribution of all riders:

48 per cent pay the full fare of 5 cents.
8 per cent riding on exchange tickets, pay 4 cents.
31 per cent riding on package tickets, pay 4 1/6 cents.
13 per cent ride on free transfers.

It is absolutely necessary that the company increase its revenues for four reasons:

1. With this average per passenger it is doubtful if the company during the current fiscal year could, with the strictest economy, meet its operating expenses and fixed charges. The tendency of everything in this country is to cost more, and there seems no chance that the roads can be operated any more cheaply in the future than they are now being operated.

2. An economical operation of any public service corporation means inferior service to the public. The company must be more liberal in its expenditures if the public is to have better accommodations.

3. The directors of a corporation owe a duty to their own stockholders. They are the trustees for the $30,000,000 of capital which has been paid into this company during the past seven years and expended in order to give the people better transportation facilities. Not one dollar of return has been received by these stockholders, and at present market rates their capital has depreciated upward of 25 per cent. The lost interest on this fund to our stockholders will amount on July 1, 1909, to $6,239,725.

4. Every public service corporation must grow with the city which it serves. In fact, it must grow first or the city cannot grow. Extensions, additional cars, more power, all cost money. A company which has no credit can get no new money either on stock or bonds; and if money is to be spent in the future the credit of the Philadelphia Rapid Transit Company must be assured. This can only be done by increased earnings.

Under the contract with the city, it is provided that the stockholders of the company shall first receive in dividends before any distribution is made to the city 6 per cent on the moneys paid in by them, dating from Jan. 1, 1907. Already there is accumulated under this provision of the contract over $6 per share on the 600,000 shares of the company, and this amount is due to the stockholders of the company before the city can receive any division of the profits. This gross amount to which the stockholders are entitled under the contract is $3,827,225. As an evidence of the good faith of this company, and as a proof that its purposes are not merely to enrich its stockholders, if the people, through their representatives in Councils, will pass an ordinance authorizing the changes in the contract outlined herein, we will recommend to our stockholders that they shall agree to such changes. These changes shall include a surrender by the stockholders of all accumulated dividends on their stock to which they are at present entitled up to July 1 of the current year.

As already stated, this amounts approximately to $4,000,000, and represents any increase in fares which will be received by the company for at least the next two years. We will also recommend that hereafter the dividends shall not be cumulative, but shall be paid and divided under the contract only from year to year as earned. This will prevent any accumulation against the city's share during the periods of business depression in the future.

The Rapid Transit Company is under no compulsion in this matter. It does not need any action by Councils. It does, however, appreciate the value of the good will of the people.

The Rapid Transit Company appreciates that the contract with the city would never have received the unanimous support of the press of the city and the approval of its most prominent and public-spirited citizens if all parties had not believed that the city would reap in the immediate future substantial returns. You looked for an immediate payment into the city treasury; you looked for immediate extensions, and perhaps the last thing which you expected was any change in the schedule of charges which would result in an increase of the rate per passenger. An increase in revenue is imperative if the community is to reap the benefits of the contract. As already stated, the present average charge per passenger is 3.90. A careful estimate of the average charge under the new schedule is 4.35, a change of less than ½ cent per passenger. If the company continued strip tickets and abolished all free transfers, the average charge would be greater, viz., about 4.42. This would be unfair to the poorer people who have bought their small homes in the outlying districts, where property is cheaper and fresh air plentiful. A cutting off of transfers would stop the growth of the city and tend toward a congested population.

It has been said that the abolition of the sale of tickets will mean an addition to the cost of transportation for those least able to pay. This is a mistake. The result of observations carefully made by the company, and the knowledge of the people themselves, justify the assertion that the majority of those who use package tickets use them on account of the convenience. They are bought to save trouble more than to save money.

So, it has been asserted, that the stock of the Philadelphia Rapid Transit Company has been watered and that the action now taken by the company has for its object the solely selfish purpose of paying dividends upon fictitious stock. The fact is that the thirty millions of capital stock of this company represents no water or fiction of any kind whatever, but every dollar of it has been paid by the stockholders and has gone into the construction, operation and maintenance of the street railway properties.

SANITARY HANGERS IN NEW YORK SUBWAY CARS

The Interborough Rapid Transit Company, of New York, has been trying for the past week a car equipped with novel non-leather hangers in place of the customary hand straps, in line with its policy to make its cars as sanitary as possible. The new hanger is made of No. 26 steel tubing covered with a porcelain enamel which is glazed on at 1800 deg. F. The most valuable feature of this hanger is its absolute cleanliness, as the porcelain coating prevents the absorption of dirt or perspiration. This quality has met with favorable comment from the press and the public. The ladies in particular are pleased, because they no longer suffer the discomforture of having their silk or kid gloves soiled by smutty straps. The shape of the hanger is also much more convenient and restful for the hand than flat, thin-edged leather straps.



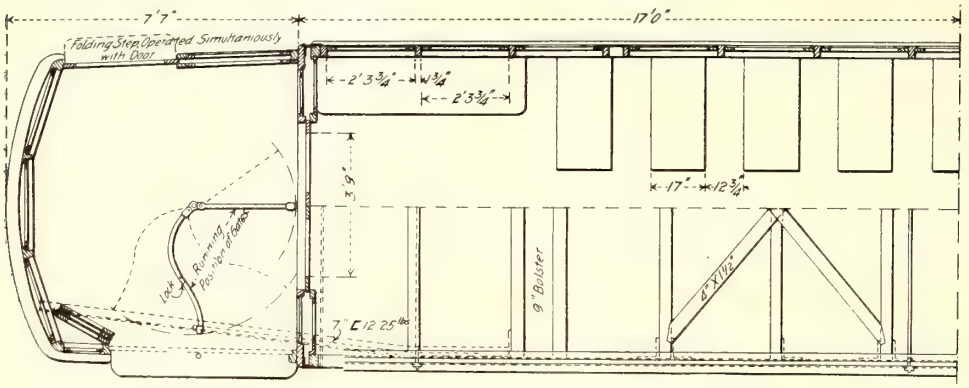
Sanitary Hanger

The company does not rely upon the smooth, non-absorbent surface of the hangers to keep them germ-proof. Every night the handles are immersed in an earthen vessel containing a solution of carbolic acid —a treatment which could not be withstood by straps of animal or vegetable fiber. The hangers do not have to be removed from the tubing, as the vessel is simply lifted up beneath them. After the hangers have been dipped, they are left to dry without any further attention.

On examining the accompanying illustration it will be noted that the upper part of the hanger has a spring to keep it in tension at an angle to the hanger tube. When the hanger is not kept perpendicular by the passenger the tension of the spring is sufficient to prevent it from swaying and interfering with people in any way. It is possible to use a glazed handle without the spring by employing leather connections which can be looped around the tube to keep the hanger perpendicular at all times.

NEW CITY CARS FOR CHICAGO & MILWAUKEE ELECTRIC RAILROAD

The Chicago & Milwaukee Electric Railroad operates a local street car service over its 3.5-mile double-track entrance to the city of Milwaukee. During the past season small interurban cars have been used in this local service, but it now is announced by L. L. Smith, master mechanic, that 10 new cars for city service in Milwaukee will be built for the company by the St. Louis Car Company. The accompanying half floor plan shows the platform arrangement as designed for the use of the Birney "pay-on-platform" method of fare collection.



Floor Plan of "Pay-On-Platform" City Car for Chicago & Milwaukee Electric Railroad

The car body length over corner posts is to be 34 ft.; length over bumpers, 49 ft. 2 in.; width over vestibules, 7 ft. 3 in., and width over all, 8 ft. 8 in. While the car is primarily designed for city service, it is suitable also for suburban or summer park service. Every effort has been made to eliminate unnecessary weight without sacrificing a rugged, durable construction. The underframing is of steel, employing the Robertson double channel construction, giving a continuous rectangular steel frame under the body proper, with 8-in., 11.25-lb. channels placed back to back and a 6-in. x ½-in. plate riveted to the bottom flanges, forming a box girder. The posts and superstructure are of wood, except that 13 steel carlines are used in the roof. The outside panels below the window rail are sheathed with No. 16 gage steel plates.

Four GE-216 interpole type motors, rated at 50 hp at 600 volts, are to be used. A K-28 F. controller will be mounted on each platform.

The trucks are of the McGuire-Cummings No. 20-A design, with a wheel base of 6 ft. The truck frames are made of 4-in. x 3½-in. x ⅝-in. angles braced with center and corner gusset sheets. The axles of open-hearth steel with journals 4¼ in. x 8 in.; the wheels are rolled steel 34 in. in diameter. Brakes and motors are inside hung.

The interior trim will be of birch with mahogany finish and birdseye maple headlining. There will be 18 double cross seats and four longitudinal seats in the corners, giving a total seating capacity of 52. The cross seats are of the Hale & Kilburn "Walkover" type with pressed-steel pedestals and end plates and rattan covering.

Other special equipment includes the following: Westinghouse straight-air brakes, American Brake Shoe & Foundry Company brake shoes, Van Dorn No. 11 couplers, Forsyth ring curtain fixtures, General Electric gears and pinions, 14-in. steel gongs, St. Louis vertical brake wheels, Consolidated electric heaters, Incandescent headlights, Sherwin-Williams paint, Ham air sanders, Stanwood steps, General Electric trolley pole fixtures, Murphy varnish.

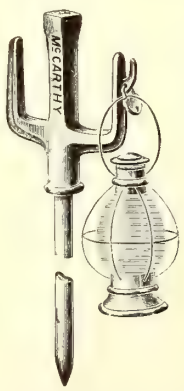
PENNSYLVANIA ELECTRIC LOCOMOTIVES

A dispatch from Pittsburg states that the East Pittsburg shops of the Westinghouse Electric & Manufacturing Company have received orders to begin the construction of the first lot of electric locomotives which the Pennsylvania Railroad Company will operate in the tunnels of the New York terminals. It is understood that these locomotives will combine the most desirable features of electric locomotive design as determined by the tests conducted by the company with locomotives of different types on the West Jersey & Seashore and the Long Island railroads, and by the manufacturers at East Pittsburg. These tests have represented the expenditure of more than $500,000.

It is understood that the locomotives will be the most powerful electric locomotives ever built, and will be of the articulated type, each locomotive to consist of two units. Each unit will be equipped with one 2000-hp direct-current motor mounted above the frames and connected to the wheels by connecting rods and side rods. The locomotives will be able to attain a speed of 90 m.p.h., and the first two to be built will be ready for test in the early fall. The present order will consist of 24 double units, but it is probable that more will be required soon after the terminal station is opened.

A GUARD RAIL AND LANTERN HOLDER

The Metal Finishing Company, Union City, Conn., has added to its extensive line of electrical hardware of pins, brackets, switches, trolley ears, wood strain insulators, etc., the McCarthy guard rail and lantern holder shown in the accompanying cut. This device consists of a bar 4 ft. 2 in. long, constructed of malleable and wrought iron. The upper part is trident-shaped and has three heavy prongs 2½ in. apart, thus giving ample room for the insertion of planks. The type shown is especially designed for ordinary dirt or macadam roads, or any pavements of the Belgian block type which permit the incision of a pointed bar without damage. In this particular type the lower end of the trident is pointed, so that the guard-rail holder may be driven into the earth any desirable distance.



Guard Rail and Lantern Holder

This continuance is also manufactured with a heavy instead of a pointed base, for use on smooth pavements, such as asphalt and vitrified brick. The manufacturer states that this saves considerable time and expense, since it obviates the necessity of piling up stones on which to put planks for protection, and also makes it unnecessary to carry barrels around from one place to another. The holder has a receptacle on one side for the lantern. Each holder is furnished with a Corbin lock, to permit the lantern to be locked and thereby eliminate all possibility of its being stolen. At the same time, the lantern will burn without interruption.

News of Electric Railways

Cleveland Traction Situation

At the meeting of the committee of the whole of the City Council of Cleveland on April 26 Judge Tayler stated that he did not feel that it would be expedient for him to express his ideas at this time, but that he did think that he should sound a note of warning, since it seemed to him that a settlement would never be reached if the intention of some of the members of the Council is carried out and the question of valuation opened. Judge Tayler feels that the discussions should be upon the vital points at issue rather than on the matters which have taken up so much time of late.

Horace E. Andrews, president of the Cleveland Railway, stated that the company would need $13,842,000 within the next four years to care for the bonded debt and improvements if a settlement should be reached under the Tayler plan. Of this amount Mr. Andrews estimates that $1,000,000 would be needed for improvements. He read telegrams from Speyer & Company and from N. W. Harris & Company, New York, in which they stated that bonds of the company could not be handled if the maximum rate was made seven tickets for 25 cents. Mr. Andrews even said that he doubted whether the bonds could be sold if a maximum rate of six tickets for 25 cents was adopted. He also read letters from Hayden, Miller & Company; J. R. Nutt, of the Citizens' Savings & Trust Company; E. G. Tillotson, E. W. Moore and others. All hold about the same opinion. When the offer of the company two years ago to accept a franchise at seven tickets for 25 cents was called to Mr. Andrews' attention he said that he expected no dividend for four or five years after starting at that rate. Mr. Andrews said that personally he would be willing to accept a franchise providing for the sale of seven tickets for 25 cents if the other provisions of the franchise were sufficiently liberal.

At a meeting of the retail merchants' board of the Chamber of Commerce on April 26 the matter of securing better terminals for the interurban railways was discussed. E. W. Moore, president of the Lake Shore Electric Railway, said that it would be difficult to perfect arrangements for the interurban railways until the situation in Cleveland is adjusted, but that the interurban roads are willing to do anything they can for the business interests of the city. Receivers Bicknell and Scott said that they could do nothing looking to the relief of the interurban situation, as the creditors must approve all expenditures.

Prof. E. W. Bemis, superintendent of the water works department, who has been revising the appraisal values of the railway property, estimates that the value is $7,130,797 less than the appraisers reported a year ago when the Municipal Traction Company took over the Cleveland Electric Railway. Apparently Mayor Johnson, City Solicitor Baker and a number of members of Council are convinced by the findings of Mr. Bemis that there should be a revision of the figures, although at the meeting on April 28 they did not contend that his results were correct or that they should be taken as final. A summary of the report by Professor Bemis follows:

Deductions on track	$990,887
Deductions on pavement	1,498,000
Total gross deduction on track and pavement	$2,488,887
Addition to overhead	474,090
Net deduction on physical value	$2,014,797
Deduction on franchise value	2,416,000
Deduction on good-will	2,700,000
Total deductions	$7,130,797
Total appraisal	22,184,132
Appraisal, less above deductions	15,053,335
Outstanding liabilities Jan. 1, 1908	9,314,132
Net value left in stock	5,739,203
Total value per share	24.53
Total reductions on value per share	31.47

"So far as the Cleveland Railway or the receivers have secured from the car riders an amount in excess of the interest at 6 per cent on the approximately $2,000,000 property of the Forest City and the Neutral Traction Company since last spring and 6 per cent on the $13,000,000 of the physical value, and on the approximately $2,000,000 of franchise value—in other words, just so far as the company or the receivers have secured more than 6 per cent on $17,000,000 to that extent will there be reductions from the franchise value due to the Cleveland Electric Railway. In other words, through a part of the dividend rentals already paid, and through the money accumulated from the excess of the 5-cent fare above, about 3.25 cents since Feb. 1, to that extent have the public been paying off some of the $2,000,000 of the principal of the franchise value already mentioned."

These figures are all on the property originally owned by the Cleveland Electric Railway. The report on the property acquired from the Forest City Railway, Mr. Bemis said, was made up from the books of the company, and not from an investigation into the merits of the case. The valuation of the Forest City Railway is left at $1,805,600, just as it was a year ago, when the Cleveland Railway purchased the property. Professor Bemis has deducted the amount allowed the old company for good-will in the leasing contract and has made a large reduction in the franchise value, although the Cleveland Railway has received no benefit from the property during the past year with the exception of one dividend of $220,000 paid during the first quarter of the Municipal Traction Company's régime. After making total deductions of $7,130,797, Professor Bemis states that the net value of the property is $5,739,203, this being the amount after taking out the outstanding liabilities on Jan. 1, 1908. The value of the stock is placed at $24.53 per share, which is a reduction of $31.47 from the $55 which Mayor Johnson and Mr. Goff decided upon a year ago.

Valuations of franchises were predicated in some cases upon the possibility of competing low-fare lines paralleling the company's lines in case a settlement is not reached. Figures for comparison were taken from the present low-fare lines, whose cars are uncomfortably crowded most of the time. Other results were reached by similar computations, and it is not believed that the bases taken would be anything like that required in a satisfactory operation of the lines.

Horace E. Andrews, president of the Cleveland Railway, stated that he had entered into the negotiations with the distinct understanding that the valuation found a year ago would be used as a basis of settlement at this time. If a new appraisement must be had he wants the work done by a board of arbitration composed of men not intimately acquainted with the situation in Cleveland. He suggested that one member of the board be chosen by the company, another by the city and a third by the city and the company or by Judge Tayler, if a third is needed. According to Mr. Andrews, his company would be willing to abide by the decision of such a board.

The Mayor insists that both sides shall decide upon the points they wish to arbitrate before the matter is given to a board. Mr. Andrews favors naming the points on which both agree and then having the board take up all others. It was decided that the valuations placed on real estate, power houses and some other items are satisfactory to both. These matters would merely be added to the results on the disputed points. It was suggested that the rules used by Mayor Johnson and Mr. Goff be accepted by the new board, but this suggestion was not adopted.

Mr. Andrews stated that if the value of the property is to be arbitrated he wants the conclusions to be as of Jan. 1, 1908, with 6 per cent interest on the valuation from that time, as the company has had no benefits from the property from that date. The Mayor suggested that the subject of revaluing the property be considered by both sides until May 3, and the matter went over until that date.

Discussion of Transit Problems in New York

At the annual transportation night dinner of the Municipal Club of New York, at the Imperial, in Brooklyn, on Tuesday, April 27, some interesting statements were made regarding the rapid transit situation in New York by Commissioner Eustis, of the Public Service Commission of the First District, and E. W. Winter, president of the Brooklyn Rapid Transit Company. T. P. Shonts, president of the Interborough Rapid Transit Company, was unable to attend on account of a business engagement. Mr. Eustis' remarks concerned chiefly the possibilities for transit development contained in the Travis-Robinson bill which has passed the Legislature and is to be submitted to the people of New York State for approval. It exempts from the debt limit of the city income-earning bonds and will make available for rapid transit construction in New York about $150,000,000. The commissioner criticized the attitude of several city officials on rapid transit measures as picayune and said that they seemingly did not exercise the same caution in acting on other measures affecting the city and involving the expenditure of considerable sums of money for public works.

It has been known for some time that the Brooklyn Rapid Transit Company had tentative plans in mind for the

reconstruction of its elevated lines and the building on certain of them of additional tracks for handling passengers during the rush hours. President Winter, of the company, however, made the statement that he had recently submitted to the directors of the Brooklyn Rapid Transit Company a plan calling for the expenditure of about $37,000,000 in connection with elevated railway and other improvements. He said that in his opinion the only adequate transit development for Brooklyn was to be found in a comprehensive extension of the elevated system. His opinion is that it would be useless to extend the terminal facilities of the company in Manhattan unless additions are made to the elevated system in Brooklyn so that proper use can be made of the terminal extensions in Manhattan. He said that the improvements which he has proposed to the directors involve the four-tracking of the Fulton Street line, the four-tracking of the Broadway line and the laying of at least a third track on the Fifth Avenue line. Mr. Winter has grave doubts about the ability of the proposed Fourth Avenue subway in Brooklyn to pay, and said he thought that sight had been lost of the fact that the movement of traffic in Brooklyn is largely one way, that is, Manhattanward in the morning rush hours and Brooklynward in the evening rush hours. According to Mr. Winter the fact is not generally appreciated that the transportation business in New York is on a new basis, both as to means of creating facilities and methods of operation; that these new conditions, while there is much to be said in their favor, are turning the current of the industry into new and untried channels, and that calculations of the future which do not take into intelligent consideration this potent and far-reaching influence will surely go astray.

Mr. Winter also discussed the question of street railway fares. He said that at the time of the agitation of a 5-cent fare to Coney Island it would have been impossible to receive fair consideration at the hands of the public, whose minds had been inflamed by agitators unacquainted with street railway conditions and not qualified to discuss the cost of passenger transportation and that it would have availed the company nothing to have set up at that time its estimate of the cost of transporting passengers. Taking the returns of the Brooklyn Rapid Transit system for 1908 and reducing the tariff to a passenger fare basis of 5 cents, Mr. Winter said that 20 per cent of every fare, or 1 cent, was returned to the public in transfers; that operation, maintenance and paving absorbed 2.35 cents; taxes, 0.22 cent, and interest and rental 1.1 cents, leaving to the company 0.33 cent per passenger. President Winter concluded by saying:

"On the difference between transportation and other industrial products are based many misconceptions. It would be much easier than it is for the average passenger to realize the commercial aspect of the transaction if he could know the actual cost to the manufacturer of the particular quantity of transportation he is purchasing with his nickel—or receives for nothing on a transfer. True, it might irritate him to find 2½ cents marked on the package he has bought at double the sum, but this would be counterbalanced by the next passenger, who would note the gratifying fact that he was getting double or triple the quantity of goods the carrier could turn out for the price paid. Whichever way it might go, the fact that to produce the particular piece of transportation he was receiving had cost a specific sum would be realized and the way opened to recognition of the succeeding proposition that a transportation merchant must receive an average of more than cost for his goods, or he can't stay in business.

"Assuming that he is rightfully in and lawfully conducting his business, he has the right to a reasonable profit; and yet, nearly every day we see or hear of movements on the part of the unconscious public possibly involving serious consequences with no apparent consideration of what their effect may be on the interests immediately concerned, and ultimately, through them, on the public itself. Now, it would be unjust to charge this familiar experience to evil intent or more than the average selfishness of aggressive business methods on the part of the public. The real explanation lies in the lack of appreciation of the fact that this exaction, while bringing advantage to the one, inflicts a tangible loss on the other, and that before compelling this loss in the interests of common equity and the common good, the offside merits of the proposition should be fairly weighed, though they rarely receive any consideration."

Plans of Southwestern Ohio Traction Company

It is understood now that the plans of John E. Bleekman, president of the Southwestern Ohio Traction Company, the incorporation of which was noted on page 802 of the issue of the Electric Railway Journal of April 24, 1909, include the construction of an elevated and underground railway in Cincinnati which will afford a ready entrance to the heart of the city for the interurban roads and the consolidation and extension of several of the roads. Mr. Bleekman has filed an ordinance with the city clerk which provides that the proposed road shall extend from downtown Cincinnati along either Third Street or Pearl Street to Norwood and from a connection with this line to the east end of the city, furnishing an entrance for the cars of the Cincinnati, Milford & Loveland Railway, the Interurban Railway & Terminal Company, the Cincinnati & Columbus Traction Company and the Cincinnati, Georgetown & Portsmouth Railroad.

The capital stock of the Southwestern Ohio Traction Company will be increased from $10,000 to $13,000,000, of which $3,000,000 will be preferred stock and $10,000,000 common stock. It is also proposed to issue $12,000,000 of bonds. George H. Worthington, Cleveland, will be elected chairman of the board of directors of the company; the other members of the board will be: Charles H. Davis, J. M. Hutton, Lewis Seasongood, Henry H. Huffman and B. H. Korger or a representative of the Korger lines, W. L. Moyer, A. S. White, Samuel Jarvis, J. L. Greatsinger and representatives of several trust companies.

Following the proposal made two years ago to construct such a road as is now contemplated Mr. Bleekman and others decided to investigate the situation and report on the engineering possibilities. Charles Hansel, of Charles Hansel & Company, New York, and J. M. Stewart, Cincinnati, did the engineering work in Cincinnati, and Jenkin W. Jones, Columbus, Ohio, inquired into the extensions toward Columbus. The estimated cost of the work in Cincinnati is $5,000,000, while the proposed acquisitions and extensions will entail an expenditure of $12,000,000 more. The tunnel under Walnut Hills in Cincinnati will be about 4400 ft. long. The proposed extensions to interurban lines will furnish direct connection with Columbus, 103 miles; Springfield, 70 miles; Blanchester, 35 miles; Hillsboro, 50 miles; Bethel, 32 miles; New Richmond, 21 miles, and a number of other towns. The principal new line will be an extension of the Cincinnati, Milford & Loveland Traction Company's present road to Columbus from either Hillsboro or Blanchester. It is said that the Cincinnati, Milford & Loveland Traction Company operating to Blanchester; the Interurban Railway & Terminal Company, operating to Lebanon, Bethel and Georgetown, and the Cincinnati & Columbus Traction Company will all be included in the merger. The consummation of the project as outlined now depends upon the action of the City Council on the franchise requested.

Joint Data Sheet on Shop Accounts

The joint committee of the American Street & Interurban Railway Accountants' Association and of the American Street & Interurban Railway Engineering Association, appointed to consider the question of shop accounting, has issued a letter asking for copies of shop schedules and other data. This committee consists of: C. L. S. Tingley, vice-president, American Railways Company, Philadelphia; F. B. Lasher, accountant, Mohawk Valley Company, New York; P. S. Young, comptroller, Public Service Railway Company, Newark; Wm. G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, Brooklyn; Charles Hewitt, superintendent motive power, Philadelphia, and John Lindall, superintendent rolling stock and shops, Boston Elevated Railway Company, Boston.

The letter, which is signed by W. G. Gove, chairman of the committee, reads as follows:

"To the general managers of member and non-member companies.

"The joint committee of the Accountants' and Engineering associations, appointed to consider the question of departmental accounts, is desirous of obtaining eight copies of the schedule of operating expenses as used by your company, this schedule to show particularly all subdivisions of main accounts covering the maintenance of equipment, both power house and rolling stock; the maintenance of way and structures, and of overhead lines and cables. The committee proposes to submit, for the consideration of the two associations, a report on a uniform system of subdividing accounts, and in this way endeavor to standardize and co-ordinate methods of making charges to the underlying accounts of the standard classification of the American Street & Interurban Railway Accountants' Association.

"The committee earnestly requests your hearty co-operation in this matter, as it will require a comprehensive exhibit of the various schedules in use throughout the country to enable it to arrive at conclusions which will meet with the approval of electric railway companies as a whole.

Prompt response is also requested in order that the committee may have ample time in which to formulate its report for presentation to the 1909 convention.

"Please mail all schedules, with the name of your company marked thereon, to Bernard V. Swenson, secretary, American Street & Interurban Railway Association, 29 West Thirty-ninth Street, New York."

WM. G. GOVE, Chairman.

H. L. Weber in New Ohio Line

J. G. Webb and associates, mainly Cincinnati and Louisville capitalists, have employed H. L. Weber as chief engineer to push surveys and construction of the new connecting link between Columbus and Toledo, Ohio, via Marion and Findlay. The Webb interests control the line from Findlay to Toledo, and it is the ultimate aim to connect with their lines in the southern part of the State and have a through line from the Ohio River to the Lakes.

Considerable interest is attached to the location of the new extension as the city of Bucyrus is making an effort to have the new line run from Marion to Findlay via Bucyrus, where the Webb syndicate already has a line entering the city from the north. This would make the city a diverging point for lines from Columbus to Toledo and Cleveland and would be an important factor in making Bucyrus a coming interurban city.

Mr. Weber is still directing the affairs of the Utah & Southwestern Railroad as chief engineer and has left C. L. Rood as the resident engineer in charge of the local office at Los Angeles, Cal. Mr. Rood will have charge of field operations in Utah when construction work is commenced. Mr. Weber was formerly chief engineer of the Fort Wayne & Wabash Valley Traction Company and had charge of the recent reconstruction and extension work on those lines. Mr. Rood was associated with Mr. Weber in this work as resident engineer on the Logansport and Lafayette extension.

Second Hudson Tunnel to Be in Operation in July.—The Hudson & Manhattan Railroad has formally announced to the public that it expects to place its tunnel under the Hudson River between the Pennsylvania Railroad station in Jersey City and its own terminal building at Church and Cortlandt Streets, New York, in operation about July 1.

Oklahoma Electric Light, Railway & Gas Association.—F. H. Tidnam, president of the Oklahoma Electric Light, Railway & Gas Association, announces that the third annual convention of the association will be held in Oklahoma City on May 18, 19 and 20. The officers of the association promise an excellent program. Galen Crow, Guthrie, Okla., is secretary of the association.

Meeting of Colorado Association.—The Colorado Light, Power & Railway Association will probably hold its annual convention in Denver during the week of Oct. 11-16. As this is the week preceding the annual convention in Denver of the American Street & Interurban Railway Association, the members of the Colorado association will arrange to stay in Denver for both meetings.

Agreement Between Mahoning & Shenango Valley Railway and Employees.—The Mahoning & Shenango Valley Railway, Youngstown, Ohio, and its employees have reached an agreement regarding wages for the ensuing year which provides that the pay shall be 22, 23 or 24 cents an hour, according to the number of years the men have been in the employ of the company.

Meeting of Committee on Power Generation.—G. H. Kelsay, chairman of the American Street & Interurban Railway Engineering Association's committee on power generation, has called a meeting of the committee to be held on May 11, in Pittsburg, Pa. The committee will organize and outline plans for the preparation of its report to be presented at the Denver convention of the association in October.

Annual Convention of the Street Railway Association of the State of New York.—The 27th annual convention of the Street Railway Association of the State of New York will be held at the Fort William Henry Hotel, Lake George, on Tuesday and Wednesday, June 29 and 30, 1909. Hotel accommodations and reservations can be secured through J. F. Wilson, manager of the Fort William Henry Hotel, 243 Fifth Avenue, New York. The program of the meeting has not yet been announced.

International Conference of Railroad Y. M. C. A.—The thirteenth international conference of the Railroad Young Men's Christian Association will be held in St. Louis on May 27, 28, 29 and 30. From 1200 to 1500 railroad men from all parts of the United States, Canada and Mexico will attend, representing 240 railroad branches of the association. Presidents and other officials of railroad companies will meet employees from all branches of railway service, and will listen to addresses and participate in discussions bearing upon the work of the association with the representatives of the railroads.

Massachusetts Railroad Commission Issues Finding on Malden Elevated Extension.—The Massachusetts Railroad Commission has issued an order stating that it will approve the extension of the Boston Elevated Railway to Malden by a general route from the Sullivan Square terminal through Alford Street to Chemical Lane, and thence over private lands and parallel to the Saugus branch of the Boston & Maine Railroad to a terminus near Main Street in the square in Malden bounded by Main, Charles, Middlesex and Centre Streets. The commission states that the route will relieve the streets of elevated structures placed longitudinally in them.

Commodities Clause Valid.—The Supreme Court of the United States on May 3 in the cases of the anthracite coal roads held that the so-called commodities clause of the Hepburn rate act is constitutional. This reverses the finding of the Federal Circuit Court for the Eastern District of Pennsylvania. The Supreme Court holds, however, that the ownership by railroads of stock in coal companies is not direct or indirect interest in the commodity within the meaning of the act, which will permit the roads to continue their coal business through other corporations, and also that the act does not prevent a railroad from owning coal mines and operating them; providing it sells the coal at the pit mouth in good faith, the road can also transport its products.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Massachusetts.—Governor Draper has signed the bill to permit the General Electric Company to use a part of the tracks of the Pittsfield Street Railway and has also affixed his signature to the bill authorizing the Railroad Commission to recommend relocations of railroad and street railway stations. The law now provides that if the board is of the opinion that repairs are necessary upon any railroad or street railway, or that an addition to its rolling stock, change or relocation of stations, change in waiting-rooms or rates of fare or freight charges, it shall recommend them. The bill to authorize the Connecticut Valley Street Railway to fund its floating debt has progressed to the point of a third reading in the Senate, after having passed the House to be engrossed. The Senate bill relative to the locations of street railway companies has been passed to be engrossed in the Senate and given a first reading in the House. This bill modifies the requirements as to the voting of boards of directors on location matters and allows a little more elasticity in the action of such boards than the old law permitted, and it extends the time limit of accepting locations from 30 days to 60 days. The report of the committee on metropolitan affairs giving leave to withdraw on the Bryant bill to locate the Boston terminus of the Cambridge subway at Scollay Square has been accepted by the Senate. The House has given a first reading to the resolve to provide for an investigation and report by the Boston Transit Commission and the Railroad Commission in regard to the consolidation of the Boston Elevated Railway and the West End Street Railway.

New York.—The Legislature adjourned on April 30. There is considerable talk of an extra session, but no one will venture to express an authoritative opinion. There is the precedent before the body of the extra session last year, but it is pointed out that measures endorsed by the Governor have received more courteous consideration at this session than ever before, despite the fact that several acts which he urged were not passed. In his annual message to the Legislature the Governor made recommendations upon 29 subjects, and in reviewing the work of the session it is found that 22 of the subjects he recommended were passed. The most important transit matters recommended by the Governor and approved provide for the construction of additional rapid transit lines in New York by the city or by private capital and for submitting to the voters a constitutional amendment, making $150,000,000 available for subway construction in New York by exempting income-producing bonds from the city's debt limit. The recommendation of the Governor that the authority of the Public Service Commissions be increased and extended to include telephone and telegraph companies was not approved, but provision has been made for the appointment of a legislative commission to investigate thoroughly the operations of the existing law and to determine if the present work of the commission would warrant an extension of the jurisdiction of the commissions. The New York Central & Hudson River Railroad has been given the right, with the approval of the Public Service Commission and the Board of Estimate and Apportionment, to construct a combined subway and elevated line on Eleventh Avenue, New York, to take the place of its surface tracks.

Financial and Corporate

New York Stock and Money Market

May 4, 1909.

After several days of moderate trading and irregular prices, the stock market wakened yesterday and to-day to activity with a strong upward tendency. This sudden change for the better was attributable directly to the United States Supreme Court decision in the commodities case. Rates for money to-day were: Call, 1¾ to 2¼ per cent; 90 days, 2½ to 2¾ per cent.

Other Markets

Philadelphia Rapid Transit was the most interesting issue on the Philadelphia Exchange. The daily transactions ran into the thousands of shares. The price has not passed 36½, the mark reached last week, but the recessions from that figure have been only fractional. Union Traction was also active. Little interest was shown in Philadelphia Traction.

In the Boston market, Boston Suburban preferred sold at about 71 and Massachusetts Electric preferred around 72, representing the principal trading.

Traction issues have been a trifle more active in the Chicago market, Series 2 and 3 of the Chicago Railways issues being particularly strong.

In the Baltimore market, United Railways bonds continued to be in active demand and were fractionally higher.

The following traction securities were sold at the weekly security auction in New York: Virginia Passenger & Power Company, $648,000 5 per cent bonds, Class A, at 60; $475,000 Virginia Passenger & Power, Class C, at 90; 2567 shares Virginia Passenger & Power preferred stock, $300 for lot; 856 shares Virginia Passenger & Power common, $100 for lot; Southside Railway & Development Company, Richmond, Va., $50,000 first mortgage bonds at 90; Richmond & Petersburg Electric Railway Company, 6000 shares at 25; Richmond & Petersburg Electric Railway, $500,000 5 per cent bonds at 100.

Quotations of various traction securities as compared with last week follow:

	Apr. 27.	May 4.
American Railways Company	45	45½
Aurora, Elgin & Chicago Railroad (common)	a38¼	*a38¼
Aurora, Elgin & Chicago Railroad (preferred)	a88	*a88
Boston Elevated Railway	131	129
Boston & Suburban Electric Companies (common)	*15	*15
Boston & Suburban Electric Companies (preferred)	*70	72
Boston & Worcester Electric Companies (common)	12	12
Boston & Worcester Electric Companies (preferred)	56	56⅞
Brooklyn Rapid Transit Company	76¾	78⅝
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	85¾	86½
Capital Traction Company, Washington	a138½	137
Chicago City Railway	a190	*a190
Chicago & Oak Park Elevated Railroad (common)	*44½	*44½
Chicago & Oak Park Elevated Railroad (preferred)	*a11	*a11
Chicago Railways, ptcptg. ctf. 1	*a110	a110
Chicago Railways, ptcptg. ctf. 2	*a40	a28
Chicago Railways, ptcptg. ctf. 3	a27	a28
Chicago Railways, ptcptg. ctf. 4	*a11	*a11½
Cleveland Electric Railway	*a78	*a78
Consolidated Traction Company of New Jersey	a77½	a77½
Consolidated Trac. Co. of N. J., 5 per cent bonds	a106½	a107¼
Detroit United Railway	*57	*57
General Electric Company	158	159¼
Georgia Railway & Electric Company (common)	82	84
Georgia Railway & Electric Company (preferred)	82	84
Interborough-Metropolitan Company (common)	15⅝	16⅞
Interborough-Metropolitan Company (preferred)	44⅝	46⅜
Interborough-Metropolitan Company (4½s)	78⅞	80
Kansas City Railway & Light Company (common)	a47¾	*a52
Kansas City Railway & Light Company (preferred)	a82	*a83
Manhattan Railway	143¾	144⅞
Massachusetts Electric Companies (common)	13½	14
Massachusetts Electric Companies (preferred)	71¾	71
Metropolitan West Side, Chicago (common)	a19	a19
Metropolitan West Side, Chicago (preferred)	a50½	a50½
Metropolitan Street Railway	26	26
Milwaukee Electric Railway & Light (preferred)	*a110	*a110
North American Company	82	83¼
Northwestern Elevated Railroad (common)	a24	a24
Northwestern Elevated Railroad (preferred)	a70	a71
Philadelphia Company, Pittsburg (common)	41½	43½
Philadelphia Company, Pittsburg (preferred)	41½	43
Philadelphia Rapid Transit Company	35¾	35⅓
Philadelphia Traction Company	93½	94
Public Service Corporation, 5 per cent. col. notes	a100¼	a100½
Public Service Corporation, ctfs	a81½	a84½
Seattle Electric Company (common)	a91	*a91
Seattle Electric Company (preferred)	a98	a98
South Side Elevated Railroad, Chicago	a56	a57
Toledo Railways & Light Company	12	12¾
Third Avenue Railroad, New York	32¾	34½
Twin City Rapid Transit, Minneapolis (common)	*103½	103
Union Traction Company, Philadelphia	57¼	58
United Railways & Electric Company, Baltimore	11	12¼
United Railways Inv. Co., San Francisco (common)	*37½	37¼
United Railways Inv. Co., San Francisco (preferred)	56	57¾
Washington Railway & Electric Company (common)	a42¾	a41¼
Washington Railway & Electric Company (preferred)	a92⅜	a92½
West End Street Railway, Boston (common)	98	a98
West End Street Railway, Boston (preferred)	111	*111
Westinghouse Electric & Manufacturing Company	81⅞	83¼
Westinghouse Electric & Manufacturing (1st preferred)	*119	120

a Asked. * Last sale.

Annual Report of New Orleans Railway & Light Company

Earnings of the New Orleans Railway & Light Company for the year ended Dec. 31, 1908, compare as follows with the preceding year:

	1908.	1907.
Operating revenue:		
Railroad department	$4,033,788.95	$4,094,216.31
Electric department	1,046,776.08	1,054,209.71
Gas department	887,933.23	851,304.90
Total	$5,968,498.26	$5,999,730.92
Operating expenses:		
Railroad department	$2,468,366.34	$2,440,710.01
Electric department	487,516.91	465,180.57
Gas department	409,101.39	381,822.11
Total	$3,364,984.64	$3,287,712.69
Net operating revenue	$2,603,513.62	$2,712,018.23
Deduct: Operating taxes	476,727.08	497,399.98
Net revenue from operation	$2,126,786.54	$2,214,618.25
Net non-operating revenue	10,497.40	9,178.83
Gross income for the year	$2,137,283.94	$2,223,797.08
Income deductions:		
Interest on funded debt	$1,451,272.21	$1,316,173.62
Other interest charges	68,188.23	150,387.52
Dividends on New Orleans City Railroad stock, in accordance with provisions of lease, proportion payable to minority stockholders	4,746.00	4,480.50
Amortization of commission on loans	26,388.88	.....
Uncollectible accounts and unadjusted claims charged to current year's income	14,694.61	3,637.43
Other deductions from income	1,500.00	3,105.26
Total deductions from income	$1,566,789.93	$1,477,784.33
Net income for the year	$570,494.01	$746,012.75

Hugh McCloskey, the president, states in his report to shareholders:

"Thirty-five single-truck 20-ft. cars were purchased and placed in operation.

"Work on the bascule bridge over Bayou St. John at Esplanade Avenue was begun during the year and is progressing satisfactorily.

"There was expended during the year on power houses $77,939, the largest part of which was for finishing up the construction of the central power station.

"The past year was one of stagnation in all business. The inauguration of the new transfer system on Jan. 16, 1908, caused the companies to carry 15,492,363 transfer passengers, against 7,590,597 the previous year, an increase of 7,901,766, or 104.1 per cent. Considering these conditions, it is with pride we call attention to the small percentage of decrease in earnings, which speaks so well for the earning power of the properties.

"It is pleasing to be able to assure you that the physical property and the equipment of the company in every branch have been maintained in a good state of repair and their efficiency considerably increased.

"On Dec. 3, 1908, the company sold 2400 of the 4½ per cent bonds held in its treasury to be delivered on June 20, 1909, so that on the date mentioned, the floating indebtedness of the company will be reduced by $1,800,000."

The accounts were examined by Marwick, Mitchell & Company, who state in their report: "The income account fairly represents all the operations of the company, apart from depreciation, which has not yet been ascertained, though the expenditures for maintenance of way and equipment during the year have been made on a liberal scale."

Traffic statistics for three years compare as follows:

	1908.	1907.	1906.
Revenue passengers carried	77,459,499	78,879,204	73,606,068
Transfers redeemed	15,492,363	7,590,597	7,220,152
Revenue mileage	18,671,256	18,432,963	17,718,107
Eighteen-hour cars	115,605	113,648	108,637

Central Crosstown Railroad, New York, N. Y.—The holders of notes of the Central Crosstown Railroad are said to have reached an agreement with the receivers of the Metropolitan Street Railway by which the Central Crosstown Railroad will continue to be operated until May 1, 1910, under the arrangement whereby the Metropolitan Street Railway guarantees the payment of the fixed charges instead of a dividend rental in addition, as called for by the lease.

Chicago (Ill.) Consolidated Traction Company.—The proposition of assessing bondholders of the Chicago Consolidated Traction Company for improvements was discussed before Judge Grosscup in Chicago on April 26. The various companies are not now earning sufficient funds to carry out the provisions of their ordinances requiring pavement and improvements. The question of authorizing receivers' certificates by the various companies to carry out improvements required was also discussed.

Dayton & Xenia Transit Company, Dayton, Ohio.—Thomas A. Ferneding, receiver of the Dayton & Xenia

Transit Company, has applied to the United States Court at Cincinnati to fix a date for the sale of property of the company. It is understood that the Dayton, Springfield & Xenia Southern Traction Company, recently incorporated, will be a bidder for the property of the Dayton & Xenia Transit Company. The officers of the Dayton, Springfield & Xenia Southern Traction Company are: Thomas A. Ferneding, president; W. S. McConnaughey, secretary and treasurer; John C. Shea, John Kepler and R. J. Wells, Dayton, directors.

Hudson & Manhattan Railroad, New York, N. Y.—The names of the 20 largest stockholders of the Hudson & Manhattan Railroad, with the number of shares held by them on June 30, 1908, are given in a supplementary report which has been submitted to the Public Service Commission of the First District of New York, as follows: Hudson Companies, 128,678 shares common and 15,750 shares preferred, total, 144,428. Simpson, Thacher & Bartlett, trustees, 136,684 common; Dumont Clarke, Pliny Fisk and W. M. Barnum, 71,250 common; Hudson Improvement Company, 32,588 common and 6037 preferred, total, 38,625; Harvey Fisk & Sons, 7091 common and 11,359 preferred, total, 18,450; F. W. Walz, 8508 common and 5595 preferred, total, 14,103; W. G. Oakman, 6704 common and 724 preferred, total, 7428; J. P. Morgan & Company, 6666 preferred; First National Bank of New York, 3333 preferred; C. T. Ellis, 3464 common and 2266 preferred, total, 5730. Following are prominent holders of common stock: W. H. Barnum, 1299; F. H. Sillick, 66; W. G. McAdoo, 32; F. B. Jennings, 33; E. H. Gary, 32; E. C. Converse, 32; A. N. Brady, 32; J. G. Cullough, 32; G. Tracy Rogers, 22, and E. F. C. Young, 22 shares.

Interstate Railways, Philadelphia, Pa.—The Real Estate Title & Trust Company, Philadelphia, trustee for the $10,776,600 of 4 per cent bonds of the Interstate Railways, announced on April 29 that it had been officially notified that the coupons defaulted on Feb. 1 would be paid, and that funds for that purpose would be deposited with it before May 1, thus preventing foreclosure proceedings. The Philadelphia *Financial News* says: "It appears probable that George H. Earle, Jr., Richard Y. Cook, Samuel F. Houston and James F. Sullivan, either individually or through the institutions with which they are identified, will hereafter be important factors in the company's affairs, possibly through the acquisition of a majority of the $2,500,000 common stock." Before this announcement more than two-thirds of the entire issue of 4 per cent bonds of the Interstate Railways had been deposited with the Philadelphia Trust Company. This was done in accordance with the plan of reorganization which was proposed by the firm of Edward B. Smith & Company.

Quebec Railway, Light & Power Company, Quebec, Que.—Control of the Quebec Railway, Light & Power Company is said to have been sold to a syndicate of shareholders which has arranged to extend the road from its present terminus at St. Joachim to Murray Bay, 56 miles. Construction will begin this summer and the cost of the line will be more than $2,000,000, for which bonds will be underwritten.

Toledo Railways & Light Company, Toledo, Ohio.—The stockholders of the Toledo Railways & Light Company have selected the following committee to represent them in the refinancing and reorganization that are contemplated: J. K. Secor, Toledo; W. E. Hutton, Cincinnati; Dr. Joseph F. Demers, Quebec; Joseph M. Spencer, Toledo, and F. H. Goff, Cleveland. Mr. Goff will act for Henry A. Everett, Cleveland, as Mr. Everett's health will not permit him to take part in the work that will devolve upon the committee.

United Railways Investment Company, San Francisco, Cal.—A special meeting of the stockholders of the United Railways Investment Company will be held on May 17 to vote on the following matters: (1) Increase the capital stock from $50,000,000, or the preferred from $15,000,000 to $20,000,000, and the common from $25,000,000 to $30,000,000. (2) To provide that no part of the authorized increase in the preferred stock shall be issued except by an affirmative majority vote of the entire capital stock. (3) To ratify the acquisition of the Stanislaus Power Company under the plan of Jan. 14, 1909. (4) To authorize the issue of $1,000,000 of each of the preferred and common stocks for the purchase of the Stanislaus company. (5) To authorize the sale of $10,000,000 of the company's holdings in the common stock of the United Railroads of San Francisco to a new corporation, all of the capital stock of which is to be held by the Investment company. (6) To determine the compensation of a committee of the directors for effecting the purchase of the property of the Stanislaus Power Company.

Traffic and Transportation

Recommendations Regarding Service in Pittsburg

The Railroad Commission of Pennsylvania has made public its recommendations regarding street railway service in Pittsburg based largely on the report made to the commission by Stone & Webster, Boston, Mass., whose conclusions were published in the ELECTRIC RAILWAY JOURNAL of March 20, 1909, page 528.

The Railroad Commission in its report refers to the peculiar peninsular form of the city and the difficulties which are offered to advantageous operation, and concludes that "on account of the peculiar conditions that obtain the periods of maximum load during rush hours are, perhaps, shorter and sharper in Pittsburg than in any other city in the country." The inadequacy of the bridges and the barriers which grade crossings impose are shown to restrict the size of cars and to work serious hardships by causing delays. The commission plotted curves from the data furnished by the company regarding the number of passengers carried per car, the size and capacity of the cars and the number of cars operated each hour which give a general idea of the relation between the seats furnished and the passengers carried on the whole system during a day of 24 hours. The commission concludes that "the data indicate that the seating capacity except during the short periods in the morning and evening known as the rush hours is adequate for the present amount of travel."

The recommendations of the commission follow:

"First—That additional service be provided by the railways company during the period commonly known as the 'rush hours' on the following routes and to the exact amount indicated opposite each:

Route	Designation	Trippers Per Hour
203	Heidelberg	3
204	Crafton-Ingram	3
205	Crafton-Thornburg	3
213	Mount Washington via Tunnel	6
307	Arlington Avenue	4
403	Wilmerding via Homestead	2
706	Wilkinsburg via Frankstown Avenue	5
714	East Liberty Express via Liberty Avenue	5
1001	Sharpsburg via Penn Avenue	5
104	California Avenue to Avalon and Emsworth	4
207	Elliott and Sheraden	4
303	Knoxville via Tunnel	6
901	Wylie, Bedford and Herron avenues	5

"The maximum number of cars on the most congested loop with this increased schedule would be 120 per hour. Car movements will necessarily have to be facilitated in every possible way to get satisfactory service from this headway, and the actual schedule of the different routes may have to be modified to properly take care of the increased number of cars; this, however, is an operating matter to be worked out by the traffic department of the company.

"The above recommendation is made on the assumption that the company will use the same type of cars on the various routes as are now in use thereon, but wherever possible, the long, double-truck cars should be substituted for the smaller ones, and a still greater improvement in the service would thus be effected.

"Second—That the company station inspectors at every important point and that, as far as practicable, the municipal authorities secure to these inspectors the authority to regulate the headways of cars on the various lines, to the end that a closer adherence to schedule may be maintained.

"Third—That at all important junctions in the terminal district electrically operated switches be introduced, or that the switches now in place be operated by employees of the company other than those engaged in the operation of the cars.

"Fourth—That the company endeavor to at once improve the lighting arrangements in the short cars, and give more careful attention to the heating and ventilation of all cars.

"Fifth—That every legitimate effort should be made to secure the speedy abolition of all grade crossings of steam railroad lines."

Fender Order Issued in New York

The Public Service Commission of the First District of New York, on April 28, issued orders to the street railways in Greater New York to equip all their cars, except those operated by animal power, with wheel guards or fenders of a type to be approved by the commission. The companies in Brooklyn are given further time to experiment with different types of wheel guards, but meantime

must comply with the order for fenders of a type approved by the commission. The companies in the boroughs of Manhattan and the Bronx must install wheel guards on all their cars by Aug. 1, 1909, and submit to the commission by May 15 for approval drawings and specifications of the device to be used. The companies in Brooklyn and Queens are required to equip all their cars in service with fenders by July 1, 1909, and to submit drawings and specifications for the approval of the commission by May 15. The Staten Island Midland Railway and the Richmond Light & Railroad Company, which operate in Richmond Borough, are ordered to install both fenders and wheel guards on their cars by July 15, and to submit drawings and specifications for approval by May 5. This action was taken in accordance with the recommendations of a report made by Commissioner Milo R. Maltbie, who held hearings upon the subject after the sub-committee on safety devices had reported the results of the fender and wheel-guard tests held by the commission in Schenectady and Pittsburgh. These tests were reported in detail in the Electric Railway Journal, the findings of the commission being abstracted in the issue of Feb. 6, 1909.

An abstract of Commissioner Maltbie's report follows:

"The relative efficiency of fenders and wheel guards depends, to some degree, upon traffic and operating conditions. In congested districts where the cars are operated at low speeds, automatic wheel guards are efficient. In suburban or rural districts where cars are operated at high speeds certain types of fenders perform a function which wheel guards cannot perform, but the experiments of the commission and the experience of street railway companies show that in many cases no fender yet devised will always pick up a prostrate body. In other words, fenders perform certain functions which wheel guards cannot perform, and wheel guards perform certain functions which fenders cannot perform.

"In view of the variations in local conditions the orders adopted by the commission differ somewhat in the several boroughs. All of the street cars operated in Manhattan and the Bronx, except those propelled by animal power, must be equipped with wheel guards, one at each end of the car. It is possible that it will be found necessary at some future time to require that cars upon certain lines in the Bronx, and possibly in the northern portion of Manhattan, be equipped also with fenders; but until more experience has been had with continuous operation of wheel guards, it is impossible to determine whether fenders will be necessary and what device or devices could be used to best advantage.

"The cars operated in the Borough of Richmond must be equipped with both wheel guards and fenders, and the companies have expressed a willingness to do so.

"In Brooklyn and Queens most of the lines operate through narrow congested streets and sparsely settled districts. In Queens many of the streets are not paved, the level of the ground between the rails being considerably below the level of the rails. It is evident that where such a condition exists, a wheel guard will not be effective. The cars operated by the companies in Queens and in Brooklyn are equipped with fenders, and the companies have urged that they be given an opportunity to test a number of devices upon their various types of cars in order to determine which ones are suited to their conditions. In view of the local peculiarities, the various types of cars operated and the condition of the tracks, it is thought that such experiments should be allowed and that until these have been made the companies should merely be required to equip their cars with a type of fender approved by the commission."

The companies operating in Brooklyn are given permission to experiment with various types of wheel guards until Nov. 1, 1909, when the commission will either confirm its order for the use of fenders throughout that territory, or wheel guards, or a combination of both fenders and wheel guards.

Traffic Charts and Exhibits of New York

The Public Service Commission of the First District of New York has on exhibition at the City Planning and Municipal Art Exhibition, in the Twenty-second Regiment Armory, New York, a graphic chart showing the hourly ticket sales on the various transportation lines in Greater New York. The chart consists of a map showing the subway and elevated lines in Manhattan and the Bronx, and the bridges and ferries to Brooklyn, mounted upon a board which sets on a table. Imposed upon the map, at various points, are blocks of wood, cut in profile to show the number of ticket sales at each point for every hour in the day. The count upon which these profile blocks were based was made on an average day, Feb. 17, 1909. The number of tickets sold each hour of the 24 was ascertained and the blocks to represent this number were cut in steps, from the lowest level, which is 200 an hour, up to the highest, which was 29,000 tickets in one hour. The resulting elevation to indicate this large total makes the block representing it appear like a skyscraper towering over the other blocks. The station at which this highest record was made was at the Manhattan terminal of the Brooklyn Bridge and represents the largest hourly sale of tickets during the height of the evening rush hour. The next highest point reached was 11,000 for one hour, which was the maximum of sales at the Atlantic Avenue (Brooklyn) station of the subway and represents the peak of the ticket sales during the morning rush hours from Brooklyn to Manhattan.

An unlooked-for development was the discovery that the hourly ticket sales, or fares, on the surface railways crossing the Williamsburg Bridge were nearly as large as those on the surface railways of the Brooklyn Bridge during the evening rush hours. The chart also shows that the ticket sales in the morning on the Lenox branch of the subway are much heavier than those on the Broadway division of the same line.

The figures for hourly ticket sales in the subway on Feb. 17, 1909, the day on which the count was made, follow:

	Morning.	Evening.
Atlantic Avenue Subway Station (Brooklyn)	10,900	1,304
Nevins Street	2,816	511
Hoyt Street	2,320	667
Borough Hall	4,100	1,100
South Ferry	503	305
Wall Street	703	6,025
Fulton Street	1,480	7,676
Brooklyn Bridge	6,303	5,208
Fourteenth Street	1,701	6,510
Twenty-third Street	902	5,225
Grand Central	4,800	3,905
Times Square	1,300	6,025
Seventy-second Street	1,801	906
Ninety-sixth Street	2,605	605
137th Street	1,800	410
181st Street	1,500	590
Dyckman Street	130	100
207th Street	60	42
215th Street	4	5
225th Street	140	71
231st Street	112	20
242d Street	500	240
110th Street (Lenox)	4,000	400
116th Street (Lenox)	3,000	651
125th Street (Lenox)	1,800	1,043
135th Street (Lenox)	2,110	461
145th Street (Lenox)	700	200
Mott Avenue (Lenox)	200	160
Prospect Avenue (Lenox)	1,505	621
180th Street (Lenox)	280	90

The commission also has on exhibition two maps showing the number of railroad and street railway accidents in Manhattan, the Bronx and Brooklyn for a period of 20 months, from Aug. 5, 1907, to May 1, 1909. The map of Manhattan and the Bronx shows that during the period 511 persons were struck by cars and killed or injured, that there were 330 collisions between cars, and 295 collisions between cars and vehicles. These maps show that accidents are relatively fewer where the congestion is greatest on account of the necessity of slow operation in such districts. The map of Manhattan shows that the section south of Canal Street and Grand Street is the safest in the city, and that accidents on the Second Avenue and Third Avenue lines are more numerous than on Madison Avenue. This is probably due to the elevated pillars in the street along the Second Avenue and Third Avenue lines. The map of Brooklyn shows that 246 persons were struck by cars and killed or injured; that there were 87 collisions between cars and 137 collisions between cars and vehicles.

Other exhibits show in graphic charts and maps the population, fare, time and distance by various transportation lines in Greater New York, the surface lines, routes, density and origin of traffic, and the distribution of traffic inbound and outbound.

More Pay-as-You-Enter Cars in New York.—The Metropolitan Street Railway, New York, has recently placed 60 pay-as-you-enter cars in service on its Eighth Avenue line. This is the second line of the company on which pay-as-you-enter cars have been adopted, and the entire service on the line will be given with this type of car as soon as the additional cars needed to meet the schedule can be prepared for service.

Additional Limited Service Between Fort Wayne and Indianapolis.—The Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., and the Indiana Union Traction Company, Anderson, Ind., have arranged to put 20 limited cars and several additional freight trains in opera-

tion between Fort Wayne and Indianapolis on May 16. Traffic will be divided between the Peru and the Bluffton divisions. It is proposed, however, materially to reduce the running time over the Bluffton route.

Columbus Terminal.—Business men in Columbus, Ohio, are endeavoring to persuade the Ohio Electric Railway to erect a central station building in the business part of the city with funds that they say can be secured locally instead of building a freight and passenger station at Third Street and Rich Street, as has been proposed by the company. A 15-story building is proposed, the first floor to be used for passenger purposes, the second for the railroad offices and the others to be rented for general office purposes. The locations suggested are Third Street and Gay Street, Gay Street west of High Street, where the present station of the railway is located, and Long Street and Front Street.

Merchants' Report on the San Francisco Railways.—Under the auspices of the Merchants' Association of San Francisco, an inspection of the service and facilities of the United Railroads of San Francisco has been conducted. The report has just been presented and is a pamphlet of 36 pages. Suggestions or remarks, for the most part of local interest, are submitted on each of the lines of the company. The most important suggestion is the substitution of longitudinal seats for cross seats on the lines of heavy traffic, the purpose being to provide more standing space with the same number of seats. The report has been referred to the street railway committee of the Merchants' Association for its consideration.

Ohio Commission Asks for Schedules.—Passenger agents of the various electric railways in Ohio have received letters from the State Railroad Commission requesting them to file schedules showing the fares and distances between stops with the commission by July 10. The Ohio Electric Railway has 1000 stops outside of municipalities, and W. C. Whitney, general passenger agent, has estimated that 12 clerks, working eight hours a day for two months, would be required to compile the information desired at a cost of from $1,750 to $2,000. Several of the companies have already taken the matter up with the commission in the hope that the original order may be so modified as to lighten the task for the companies.

Petition for Reduction of Fare in Massachusetts Dismissed.—The Mayor and the City Solicitor of Salem, Mass., recently petitioned the Railroad Commission of Massachusetts for a reduction of fares on the Boston & Northern Street Railway between Salem and Lynn and between Salem and Boston via Highland Avenue. The established fares by these routes are 10 cents and 20 cents, respectively. The Highland Avenue line, so-called, was built to enable the company to operate through cars at high speed from Town House Square, Salem, to Boston. A careful study of the capital outlay for the construction of this line was made by the commission, which has decided that in view of the total receipts for the character of service rendered the fares complained of are not unreasonable. The commission therefore finds no reason for making any recommendation to the company.

Albany Company Required Completely to Vestibule Cars.—The Public Service Commission of the Second District of New York has issued an order requiring the United Traction Company, Albany, N. Y., completely to vestibule its cars. The commission says that Section 111 of the Railroad Law, which prescribes that "the front and rear platforms of every car * * * shall be inclosed from the front and at least one side of the platform to the hood" is intended to require a minimum standard of protection, and does not prevent the commission from prescribing such further protection as may be proved necessary. The order of the commission follows: "That the United Traction Company be and it is hereby directed completely to inclose or vestibule the front and rear platforms of all closed motor passenger cars to be operated by it in Albany and Rensselaer counties during December, January, February and March, and to complete before Nov. 1, 1909, the changes in such cars necessary to enable said company to comply with this order; and that said inclosures or vestibules shall be properly constructed of iron, wood and glass, with doors therein to allow of entering or leaving the platforms so inclosed or vestibuled. That during said months in the future the platforms of all closed motor passenger cars operated by said company in said counties shall be found to be so inclosed or vestibuled. That this order shall take effect upon the service of a certified copy thereof on said United Traction Company, and shall continue in force until modified or abrogated by this commission. That said United Traction Company shall notify this commission on or before May 10, 1909, whether the terms of this order are accepted and will be obeyed by it."

Personal Mention

Mr. L. H. Palmer, formerly assistant to the general manager, Metropolitan Street Railway, New York, has been appointed superintendent of transportation. Mr. Palmer has been performing the duties of the latter office for some time.

Mr. Walter A. Pearson sailed on the *Lusitania* last week via Southampton for Rio de Janeiro, South America, where he will take up his duties as assistant general manager of the Rio de Janeiro Tramway, Light & Power Company. Mr. Pearson was tendered a farewell dinner by a number of his friends at the Machinery Club in New York before his departure.

Mr. Jesse F. Orton has been appointed secretary to Mr. Milo Roy Maltbie of the Public Service Commission of the First District of New York to succeed Mr. Fay N. Seaton, resigned. Mr. Orton had been secretary of the tariff reform committee of the Reform Club. He is a graduate of the University of Michigan and of Cornell University and has practised law for about 10 years.

Mr. Richard T. Laffin has become associated with the Stone & Webster Management Association, Boston, Mass., in connection with the Seattle Electric Company and other Puget Sound railway and lighting properties. Mr. Laffin was for many years connected with the Boston (Mass.) Elevated Railway, and was later general manager of the Worcester (Mass.) Consolidated Street Railway. He resigned from the latter company to become vice-president and general manager of the Manila Electric Railroad & Light Company, Manila, P. I., and spent about four years in the Philippines, doing much of the work of establishing and organizing the property. He has returned to this country only recently.

Mr. John Powers, who at the time of the organization of the Eastern Wisconsin Railway & Light Company was appointed chief engineer of the company, accepted that position after resigning as chief engineer of the Winnebago Traction Company, of Oshkosh, Wis. Mr. Powers has been engaged in the electric railway business for the past 20 years and has engaged in both operation and construction. For five years he served as superintendent of the Sterling, Dixon & Eastern Electric Railway Company; later he took active part in the construction of the Watertown a.c. section of the Milwaukee Electric Railway & Light Company and was afterward superintendent of overhead construction for the McKinley syndicate at Galesburg, Ill.

Mr. S. D. Wager, who recently resigned as master mechanic of the Toledo, Port Clinton & Lake Side Railway, Genoa, Ohio, has been appointed general shop foreman of the Northern Ohio Traction & Light Company at Canton, Ohio. Mr. Wager began his railroad career in 1891 and since that time has been connected with the Lake Shore & Michigan Southern Railroad, Chicago, Rock Island & Pacific Railroad, Missouri, Kansas & Texas Railroad, Toledo & Indiana Railway and the Toledo, Post Clinton & Lake Side Railway. On June 15, 1906, Mr. Wager was appointed chief train dispatcher of the Toledo, Port Clinton & Lake Side Railway and on Nov. 15, 1907, he was promoted to general shop foreman. In July, 1908, he was made master mechanic of the Toledo, Port Clinton & Lake Side Railway.

Mr. Charles B. Scott, whose appointment as assistant general manager of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Light Company, New Albany, Ind., was noted in the ELECTRIC RAILWAY JOURNAL of May 1, 1909, became connected with these companies as claim agent on Jan. 1, 1907. On assuming the duties of claim agent of the company, special efforts were made by Mr. Scott to reduce the number of accidents. He introduced a thorough system of inspection of equipment and impressed upon the men in the operating department their individual responsibility. The position to which Mr. Scott has recently been appointed was especially created, and Mr. Scott will continue to have charge of the claim department and of all litigation growing out of claims against the company. Aside from the duties which he formerly performed, Mr. Scott will assist Martin J. Insull, general manager of the company, in the general duties of that office.

Mr. M. F. Flatley has been appointed master mechanic of the Rochester, Syracuse & Eastern Railway, Syracuse, N. Y., effective May 1. Mr. Flatley has had wide experience in the mechanical departments of electric railways, especially with heavy motor equipment and multiple-unit control apparatus. He entered the employ of the Twin City Rapid Transit Company 18 years ago and remained there for seven years. He then was employed for a number of

years by the Westinghouse Electric & Manufacturing Company on construction work. He left this company to accept a position with the Interborough Rapid Transit Company, which was then carrying on the electrification of the elevated lines in New York City. Five years ago Mr. Flatley went to the Brooklyn Rapid Transit Company, where he has held various positions in the mechanical department. At the time of his appointment as master mechanic of the Rochester, Syracuse & Eastern Railway he was foreman of the Fresh Pond elevated shop of the Brooklyn Rapid Transit Company.

OBITUARY

Henry D. Smith, secretary and treasurer of the Wisconsin Traction, Heat, Light & Power Company, Appleton, Wis., is dead. Mr. Smith was prominent in financial and business circles of the Middle West and was president of the First National Bank of Appleton and president of the Riverside Fiber & Paper Company.

NEW PUBLICATIONS

Manual of Electrical Undertakings and Directory of Officials for 1909, compiled by Emile Garcke. London: Electrical Press, Ltd. Price, 21 shillings, net.

This is the thirteenth annual volume of Garcke's Manual and contains statistical and general information, including names of officials, relating to nearly 3000 electrical enterprises in the United Kingdom and the British Colonies. In many cases comparative summaries are given covering financial results and other statistics of the electric lighting and tramway undertakings. In the general statistical tables it is interesting to note that the increase in capitalization of private traction undertakings has been £9,300,000, as compared with £15,770,000 last year. A large part of the increase this year is accounted for by the steam electrification of the Midland Railway and South London Railway. The increased investment in municipal traction undertakings has been £328,000, as compared with £5,770,000 last year. The average dividends paid on traction undertakings was 2.97 per cent, as compared with 3.62 per cent last year, but here also an outside factor must be considered, the inclusion for the first time of a large amount of tube railway capital. The revenue from passenger traffic of all the municipal tramways has increased 9.1 per cent, and in the case of the private companies has decreased 1½ per cent.

Heavy Electrical Engineering. By H. M. Hobart. New York: D. Van Nostrand & Co., 338 pages. $4.50, net.

The book under review is a natural extension of the joint work of the author and Mr. Parshall, on "Electric Railway Engineering," to which there are occasional references in the text. If one reads the preface before the body of the book, he will expect to find considerable space devoted to a discussion of the single-phase "mania." Nor will he be disappointed upon reaching the later pages. The single-phase motor is a monstrosity (spelled in large type), it is a delusion and a discredit to electrical engineering. The author prefers for heavy traction work 3000 volts and a third-rail. All of the book, however, is not taken up by the author's discussion of motors. There are six chapters on generating stations, two on transmission lines, one on electric traction calculations and one on motors. The chapter on calculations is devoted largely to a development of the author's formulas for train resistance in tube railways and in the open, in both of which the usual second term depending on the first power of V is omitted. These formulas, more particularly the second, are later plotted in a series of curves to show the watt-hours per ton-mile for various degrees of acceleration, rates of speed, duration and frequency of stop, etc., as well as the average input in kilowatts per ton.

The Public Service Commission of the First District of New York on May 4 approved the application of the Hudson & Manhattan Railroad for an extension of its subway from the original terminus at Thirty-third Street and Sixth Avenue, New York, to the Grend Central Station, at Fourth Avenue and Forty-second Street. The franchise now goes to the Board of Estimate for action, and in that body 12 out of the 16 votes are necessary to pass it on the first call. Failing to receive the required number on the first call, the franchise may be taken up on a second call and passed by a majority vote. The franchise by the Public Service Commission is similar to the intermediate grant to the Hudson & Manhattan Railroad by the Rapid Transit Commission. The principal terms of the franchise were given on page 745 of the issue of the Electric Railway Journal of April 17, 1909. Three stations are to be included on the new line, instead of the two originally planned. One is at Sixth Avenue and Thirty-eighth Street, one at Fifth Avenue and Forty-second Street, and the other is the terminal station at the Grand Central.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (* indicates a project not previously reported.

RECENT INCORPORATIONS

***Sacramento & Sierra Railroad, Sacramento, Cal.**—Incorporated to construct an electric railway from Sacramento to Lake Tahoe via Orangeville, Georgetown and Jackson Springs, 126½ miles. Rights of way have been secured and the surveys are completed. Capital stock, $1,000,000. B. F. Hulings, Sacramento, local representative.

***St. Louis & Chester Railway, East St. Louis, Ill.**—Incorporated to build an electric railway from East St. Louis to Chester, passing through the counties of St. Clair, Monroe and Randolph. Principal office, East St. Louis. Capital stock, $100,000. Incorporators: Rudolph Stecher, Murphysboro; Eugene W. Ziegenhein, Richard A. Stack, East St. Louis; Edward Schiwitz, William F. Bentzen, St. Louis, Mo.

***Shore Line Traction Company, Indianapolis, Ind.**—Incorporated to construct and operate an electric railway in Indiana. The articles of incorporation do not disclose where the promoters will build the line, but it is understood that it will be constructed from Indianapolis southeast to Beach Grove, a distance of 8 miles. Headquarters, Indianapolis. Capital stock, $10,000. Directors: Joseph F. Weber, Frank T. Edenharter and George F. Mull.

***Triborough Railroad, New York, N. Y.**—Incorporated to operate a double-track electric street railway, 2½ miles long, from the intersection of Canal, Walker and Baxter Streets, in Manhattan Borough, to the intersection of Fulton Street with Flatbush Avenue extension, Brooklyn. Capital stock, $50,000. Directors: William Bradley, James E. Gaffney, Henry Steers, New York, and William E. Bolte, Maywood, N. J. Back of this project are the same interests which are represented in the Bradley-Gaffney-Steers Contracting Company, which applied recently to the Public Service Commission for permission to build a Lexington Avenue subway from the Bronx to the Brooklyn Bridge.

FRANCHISES

Phoenix, Ariz.—The Suburban Railway has been granted a franchise to construct an electric street railway in Phoenix by a vote of 764 to 51. F. J. Bennett and Homer B. King are said to be interested in this company. [E. R. J., March 20, '09.]

Fresno, Cal.—F. S. Granger, representing the Fresno, Hanford & Summit Lake Interurban Railway, has applied to the Board of Supervisors for a 50-year franchise for an electric railway over certain streets in Fresno County. [E. R. J., March 20, '09.]

Wilmington, Cal.—The City Council has granted the Pacific Electric Railway an extension of its franchise for completing its track around the west bay until Sept. 5.

Wilmington, Del.—The People's Railway has been granted a franchise to extend its tracks on East Fourth Street, from Church to Bridge Street.

Kansas City, Mo.—The City Council has granted the Kansas City, St. Joseph & Excelsior Springs Railway an extension of two years' time, until May 22, 1912, in which to begin the construction of its proposed 110-mile electric railway from Kansas City to Excelsior Springs. [E. R. J., Jan. 9, '09.]

Atlantic City, N. J.—The Venice Park Railroad, the incorporation papers for which will be filed within a few days, has made application to the City Council for a franchise to build a street railway from Ohio Avenue to Gramercy Avenue, a distance of about 1 mile.

Allentown, Pa.—The Inter-County Electric Company, Topton, which proposes to construct an electric railway from Reading to Allentown via Lyons and Tipton, has applied to the Allentown Council for a franchise to build its proposed line over certain streets in Allentown.

***Pittsburg, Pa.**—An ordinance has been introduced in the Select Council by C. C. Kohne which provides for the construction of a tunnel, to start at Seventh Avenue and the Grant Boulevard, to extend under the hill to Center Avenue and Craig Street.

Nashville, Tenn.—The Nashville Railway & Light Company has applied to the City Council for a franchise to extend its tracks out Broadway and the Hillsboro Pike.

Sherman, Tex.—The City Council has granted a franchise to the Texas Traction Company permitting it to connect its tracks with those of the Denison & Sherman Railway and to operate its cars over the lines of the latter road. As a consideration for this the Texas Traction Company

agrees by April 1, 1910, to build and operate lateral or local service lines in West Lamar Street and Cemetery Avenue.

Bellingham, Wash.—A franchise has been granted to the Whatcom County Railway & Lighting Company permitting it to build lines on Dock Street and on North Street.

Colfax, Wash.—The County Commissioners have revoked the franchise held by the Whitman Railroad & Power Company to build and operate an electric railway between Colfax and Palouse.

Spokane, Wash.—Application has been made to the City Council by the Spokane & Inland Empire Railroad for franchises covering 3 miles of new track in Spokane.

Spokane, Wash.—Application has been made to the City Council by the Washington Water Power Company for a franchise to build a line about 1 mile in length from Princeton Avenue and Nevada Street, the present terminal of the Astor and Lidgerwood lines, northerly on Nevada Street to Rowan Avenue.

TRACK AND ROADWAY

***Corning, Ark.**—It is reported that D. W. Reynolds and J. Pickrell, Louisville, Ky., are interested in a proposition to build an electric railway from Corning to Maynard, a distance of 18 miles.

Pacific Electric Railway, Los Angeles, Cal.—Announcement is made that construction work will soon be started by this company on the extension of its line from Santa Ana to Huntingdon Beach.

Ontario & San Antonio Heights Railroad, Ontario, Cal.—Rights of way are being procured by this company for an extension to be constructed between Uplands and Claremont, a distance of about 6 miles.

Shore Line Electric Railway, New Haven, Conn.—This company has awarded to T. A. Scott & Son, New London, the contract to drive piles for the trestle across Middle Cove Bay.

Washington, Spa Springs & Gretta Railroad, Washington, D. C.—This company has recently begun construction work on its proposed electric railway from Fifteenth Street and H Street in Washington to Bladensburg, Riverdale and Berwyn Heights, 10½ miles. About 2½ miles of track will be laid in Washington. Headquarters, 419 National Metropolitan Bank Building, Washington. Officers: S. S. Yoder, Washington, president; W. W. Poultney, secretary; W. C. Brown, treasurer; C. D. Eldridge, electrical engineer. [E. R. J., April 10, '09.]

***Savannah, Ga.**—It is stated that T. D. Heywood and Neils Christensen, Beaufort, S. C., are at the head of a movement to construct an electric railway from Savannah to Bluffton and then to Charleston.

Lewiston (Idaho) Terminal Company.—Announcement is made that this company is completing arrangements for starting construction work on its proposed terminal in Lewiston within 30 days. About 6300 ft. of track will be constructed and will be sublet to interurban railways desiring to enter the city. David Guland, chief engineer. [E. R. J., April 17, '09.]

East St. Louis, Columbia & Waterloo Railway, Columbia, Ill.—This company advises that it plans to begin construction work during this month on its proposed 23-mile electric railway which is to connect East St. Louis, Dupo, Bixley, Columbia and Waterloo. Falling Springs, an amusement resort, will be reached by the line. It is proposed to furnish power for lighting. Capital stock authorized and issued, $10,000. H. Reichenbach, Columbia, secretary-treasurer; Baxter Brown, 610 Laclede Building, St. Louis, Mo., chief engineer. [E. R. J., March 13, '09.]

Murphysboro (Ill.) Street Railway.—This company has awarded to the Westinghouse Electric & Manufacturing Company the contract for poles, wires, etc.

Auburn & Turner Railroad, Lewiston, Maine.—It is reported that this company plans to extend its line from Turner Village to Livermore Falls. Two routes have been proposed—one following up the river and the other going from Turner Village to North Turner, to Livermore, to North Livermore, to Livermore Falls.

Bangor Railway & Electric Company, Bangor, Maine.—This company is said to have ordered a preliminary survey for an extension to the Charleston division of the lines running from Bangor, which will eventually reach Waterville, 52 miles west of Bangor. The extension will begin at East Corinth and will extend to Dexter, thence through the towns of St. Albans, Hartland and Canaan, skirting Moose Pond, to Skowhegan; thence over the rails of the Somerset Traction Company, if it can be purchased, or if not, by independent line to Waterville. This proposed road will link Bangor, by trunk line, to the westward. In connection with the new road a branch line from Dexter north to Dover and Foxcroft is contemplated.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.—It is rumored that this company is planning to extend its line through Eastport to Bay Ridge and connect with Arundel-on-the-Bay, a small summer resort about 5 miles from Annapolis.

Springfield (Mass.) Street Railway.—This company, it is reported, will expend about $80,000 in new tracks, wires and electrical equipment and other improvements during the coming season.

Escanaba (Mich.) Electric Street Railway.—It is said that this company contemplates extending its line from Escanaba and Wells to Rapid River via Gladstone.

Gallatin Valley Electric Railway, Bozeman, Mont.—It is announced that this company has definitely decided upon the route for its proposed electric railway between Bozeman and Salesville, 18 miles. The terminal and yards will be located on the outskirts of Bozeman. It is stated that the company has completed arrangements to take over the Bozeman Street Railway and operate it in connection with its proposed interurban railway. The contract for building and equipping the line has been let to Westinghouse, Church, Kerr & Company, New York, N. Y. Contracts for the grading have been sublet to D. J. Burke and to Locke & Dier, Bozeman, for the engineering work. A. J. Busch has been appointed superintendent of track work by the company.

Interstate Railway, Kansas City, Mo.—This company, which proposes to build an electric interurban railway between Kansas City and St. Joseph, and which has secured from the property owners about 80 per cent of the right of way between the two points, has filed injunction proceedings against the Missouri River & Cameron Railroad, enjoining and restraining it from attempting to build over the right of way of the Interstate Railway and from molesting the contracts for deeds heretofore secured from the land owners by the plaintiff company. The company has also begun condemnation proceedings in Circuit Courts of the counties of Platte and Buchanan in order to perfect its right of way not already contracted for, and is preparing to begin construction of its line. The company reports that it is to build a standard gage electric railway on a 7-10 of 1 per cent grade and with no curve sharper than 3 per cent. Headquarters, 735 New York Life Building, Kansas City. S. P. Martin, secretary. [E. R. J., April 3, '09.]

Ithaca (N. Y.) Street Railway.—This company expects to commence the reconstruction of its line on June 1, 1909. The entire railway will be double tracked and the overhead work will be entirely rebuilt. The Pennsylvania Steel Company, Steelton, Pa., has been awarded the contract for the rails, and the Electric Service Supplies Company, Philadelphia, will furnish all the insulators, etc., necessary for the rebuilding of the overhead work.

Grand Forks (N. D.) Street Railway.—This company expects to place contracts during the next four weeks for the construction of 3½ miles of new track. T. D. Campbell, general manager.

Turkey Foot Traction Company, Akron, Ohio.—Thomas L. Childs, chief promoter of the plan to build an electric railway between Akron and the chain of lakes south of the city, is said to have announced that the proposition has been abandoned and that the bonds for financing the property will be cancelled. Money paid for bonds and stock will be refunded and deeds given for lots as premiums with stock will be taken up. [E. R. J., Feb. 13, '09.]

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—Arrangements are said to have been completed by this company to extend its line from Bowling Green to Tontogany, 6 miles. The line already connects with the Lake Shore Electric Railway at Woodville, and at Tontogany it would connect with the Ohio Electric Railway lines. [E. R. J., Jan. 6, '09.]

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.—James McCampbell, president of the Board of Trade at Marysville, Ohio, has appointed L. B. Harvey, George E. Whitney and John H. Shearer to confer with the officers of this company regarding a route through that place for the proposed extension from Findlay to Columbus. Three routes are receiving consideration. One of them is from Findlay to Marion and thence to Columbus, and another from Findlay to Kenton and to Columbus, through Marysville, Mt. Victory, Byhalia, Plain City and other towns. The third is through Kenton, Richwood and several smaller places.

Toronto Suburban Railway, Toronto Junction, Ont.—This company was recently given a new lease by the railway committee. It is stated that the company proposes to

continue its line at present built to Weston, up to Brampton and along through Peel, Wentworth, and Welland Counties to Port Colborne. It also proposes to continue its line at present built as far as Lambton Mills along to Hamilton and on through Wentworth and Lincoln Counties to Niagara Falls. It was decided to give the company two years in which to start and five to finish the work.

Dunnville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—This company, which proposes to build a 22-mile electric railway to connect the three cities in the title, has advertised for tenders for the grading of the line. It is proposed to begin work at once. Three or four small bridges will be built, the largest to span the Chippewa Creek, and one over the Twenty River. The grade down the mountain is a comparatively easy one, being on an average about 3 per cent. Along the whole route the fills will be insignificant, the heaviest being between St. Ann's and Dunnville. It has been decided to purchase power to operate the line. James A. Ross, Wellandport, president. [E. R. J., Jan. 6, '09.]

Eugene-Pacific Electric Railway, Eugene, Ore.—George M. Miller writes that this company has been formed for the purpose of constructing an electric railway from Eugene to Florence. Surveys are now under way and the engineer's report has been placed in the hands of capitalists for examination. Plans are being made for developing water-power to generate current. A site has not yet been secured for the proposed power plant. All the stock in the Eugene-Pacific Electric Railway is owned by the Lane County Asset Company. Capital stock authorized, $3,000,000. Officers: Frank E. Dunn, president; F. J. Berger, vice-president; J. W. Zimmerman, secretary; Alton Hampton, treasurer; Lohman & Company, San Francisco, Cal., engineers. [E. R. J., March 6, '09.]

***York, Pa.**—Dr. J. M. Wilson, George J. Fringer, William Benson, W. H. Bright and Stephen Gill are reported to be at the head of a movement to build an electric railway from Reisterstown to Hanover, 18 miles. The line will be a connecting link uniting Baltimore and York.

Memphis, Covington & Northern Railway, Covington, Tenn.—R. W. Sanford advises that this company contemplates building an electric railway to connect Memphis, Millington, Mumford and Covington. No definite arrangements have yet been made in regard to the furnishing of power. Officers: G. B. Gillespie, Covington, president; J. B. Witherington, Mumford, vice-president; J. T. Garner, Covington, secretary-treasurer. [S. R. J., Feb. 29, '08.]

Portland, Baker City & Butte Electric Railroad, Portland, Ore.—This company announces that its proposed electric railway will start from Portland and cross the Warm Spring Indian reservation and Central Oregon to Baker City, thence to Butte, Mont., a distance of 600 miles. Permission to survey across the reservation has been obtained from the Department of the Interior, and the survey will be immediately started. The company has also secured valuable terminal facilities and rights of way. It is the intention to start construction work about July 1. An 8000-hp steam power plant will be built at Portland and additional power will be purchased from the Wasco County Electric & Water Power Company, whose plant is located on the Deschutes River. The first meeting of the incorporators of the company was held on April 15, when the organization was completed. The following officers were elected: H. C. McAllister, president; J. W. Gilkyson, vice-president; John Tait, treasurer; J. C. Robinson, secretary; M. W. Gill, assistant secretary; C. D. Charles, general manager. The entire capital stock ($2,000,000) was fully subscribed for and fully paid up. A bond issue of $40,000,000 25-year 5 per cent gold bonds was authorized by the directors and ratified by the stockholders. [E. R. J., Feb. 13, '09.]

Laurens, S. C.—Joseph E. Sirrine, of Greenville, has been awarded contract to make surveys of the proposed electric railway between Laurens and Clinton. A. C. Todd, Laurens, is interested in the project. [E. R. J., April 17, '09.]

***Toppenish, Wash.**—Press reports state that F. A. Williams, Toppenish, and Otto Lube are considering a plan to build an electric railway from Toppenish to Zillah and back to Toppenish via Wapato.

Fairmount & Clarksburg Traction Company, Fairmount, W. Va.—This company has awarded to Hamilton & Huffman the contract for the grading of its line from East Park to the fair grounds.

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company has recently awarded a contract to W. D. Chapman, Akron, Ohio, for the financing and building of its proposed 65-mile electric railway. Most of the right of way and franchises have already been secured. The line will connect the following cities: Milwaukee, Sussex, Templeton, North Lake, Neosha, Hustisford, Juneau and Beaver Dam. A branch line will extend from Sussex to Wawhesha via Pewaukee. Headquarters, 914 Majestic Building, Milwaukee. J. W. Barber, 2829 Highland Building, Milwaukee, secretary. [E. R. J., March 27, '09.]

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company has purchased through H. A. Strauss, consulting engineer, Chicago, the following additional equipment and construction materials to be used in the electrification of its 35-mile standard steam road between Salt Lake City and Ogden, Utah: 10 car bodies, to be built by the Jewett Car Company; Baldwin all-steel M.C.B. trucks with cast steel full-swing bolsters; 36-in. Standard rolled steel wheels; overhead material to equip 37 miles of line from the Westinghouse Electric & Manufacturing Company. The trolley wire will be span-supported, designed for 700 volts d. c. operation; Westinghouse line lightning arresters; pole hardware from the Western Electric Company, Chicago, and the St. Louis Malleable Castings Company; 2000 guy anchors from the St. Louis Malleable Castings Company. All poles on the line will be back guyed, and this will require the purchase of approximately 3000 additional guy anchors. Negotiations are now under way for the purchase of interpole motors, automatic air brakes, etc., for the car equipments, and generator and substation machinery. A preliminary announcement of the electrification of the Salt Lake & Ogden Railway was presented in the Electric Railway Journal for Feb. 13, 1909, page 285.

SHOPS AND BUILDINGS

Rockland, South Thomaston & Owl's Head Railway, Rockland, Maine.—It is reported that this company is planning to build a new car house either at Crescent Beach or Martin's Corner. The building will be 35 ft. x 60 ft. in size.

Duluth Street Railway, Duluth, Minn.—It is stated that this company is planning to erect a water tower and sprinkling system at its car house on Fourth Street and Ogden Avenue, Superior, Wis.

Gallatin Valley Electric Railway, Bozeman, Mont.—This company, which proposes to construct an electric railway from Bozeman to Salesville, advises that it expects to award contracts within the next three weeks for the construction of a car house. Charles B. Anderson, secretary.

Grand Forks (N. D.) Street Railway.—Thos. D. Campbell, general manager, announces that this company will build a new car house.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Peoria, Ill.—This company is said to have awarded a contract to J. J. Jobst for the construction of a new substation at Mackinaw. Plans are now being made to rebuild the substation at Minier.

Gallatin Valley Electric Railway, Bozeman, Mont.—This company advises that it is considering the purchase of machinery for two substations.

Camden & Trenton Railway, Camden, N. J.—This company advises that it is having plans prepared by Ford, Bacon & Davis, New York, for the erection of a new central power plant. At present power is being purchased from the Bordentown Light & Motor Company and the Cinnaminson Electric Light, Power & Heating Company. Pending the construction of the new plant, power will be obtained from the original source of supply or from the Public Service Corporation. If this latter company supplies it, two substations will be equipped on flat cars and located along the line.

Grand Forks (N. D.) Street Railway.—This company is considering the purchase of a 250-kw generator. Thos. D. Campbell, general manager.

Johnstown & Gallitzin Street Railway, Johnstown, Pa.—It is stated that this company, which proposes to construct an electric railway from Johnstown to Gallitzin, has determined to locate its power plant at St. Michael. [E. R. J., Feb. 6, '09.]

Galveston-Houston Railway, Houston, Tex.—This company, which proposes to build an electric railway between Galveston and Houston, is said to be contemplating the erection of a power plant at some point between the two points. The proposed plant will probably have a capacity of 2000 kw. Plans have not yet been prepared. [E. R. J., March 13, '09.]

Houston (Tex.) Electric Company.—It is reported that this company will expend $150,000 for improvements to its power station, which will include the installation of an 800-kw unit, with two 500-hp boilers and two new stacks.

Manufactures & Supplies

ROLLING STOCK

Topeka (Kan.) Railway will purchase 10 city cars through L. E. Meyers, Chicago, Ill.

Fort Wayne & Wabash Traction Company, Fort Wayne, Ind., is in the market for 10 city cars.

Gallatin Valley Electric Railway, Bozeman, Mont., will purchase one 360-hp freight locomotive and one 160-hp passenger motor car.

Pittsburg & Kansas City Railway, Pittsburg, Kan., is reported to be making inquiry as to the cost of interurban cars. This is a proposed railway.

Slate Belt Electric Street Railway, Pen Argyl, Pa., contemplates purchasing some additional rolling stock, though the number of cars has not been decided upon.

Nebraska Traction & Power Company, Omaha, Neb., has purchased two passenger and 10 freight cars through the General Construction Company, Omaha.

Northern Texas Traction Company, Fort Worth, Tex., it is reported, is in the market for 10 double-truck cars. Stone & Webster, Boston, Mass., are general managers.

Grand Forks (N. D.) Street Railway is having three cars built by the American Car Company. In addition, the company contemplates purchasing four double-truck second-hand trail cars and some good second-hand motor cars.

Little Rock Railway & Electric Company, Little Rock, Ark., which was reported in the ELECTRIC RAILWAY JOURNAL of April 3, 1909, as being in the market for 11 double-truck trailer cars, has decided not to purchase the cars now.

Portland Railway, Light & Power Company, Portland, Ore., recently received 30 pay-as-you-enter cars from the American Car Company, which are now in service on its lines. The company has ordered an additional 50 cars of the same type.

Kanauga Traction Company, Gallipolis, Ohio, mentioned in the ELECTRIC RAILWAY JOURNAL of May 1, 1909, as having ordered one car from the Jewett Car Company, Newark, Ohio, has only purchased material for the rebuilding of one car body recently destroyed by fire.

Cairo Electric & Traction Company, Cairo, Ill., mentioned in the ELECTRIC RAILWAY JOURNAL of April 17, 1909, as having purchased six 10-bench single-truck open cars from the American Car Company, it is learned, will have these cars built by the Danville Car Company.

Salt Lake & Ogden Railroad, Salt Lake City, Utah, has placed an order with the Baldwin Locomotive Works for the 20 Class 78-30 trucks to be used on the 10 interurban cars which have been ordered from the Jewett Car Company, Newark, Ohio, as reported in the ELECTRIC RAILWAY JOURNAL of May 1, 1909.

People's Railway, New Hamburg, Ont., a proposed road, contemplates purchasing ten 50-ft. combination cars with baggage, smoking and passenger compartments, with four 75-hp single-phase motors and multiple-unit control; also one or more express cars built to be used as electric locomotives in case of an emergency, and one 65-ton electric locomotive to be equipped with four 100-hp motors.

Ocean Electric Railway, Far Rockaway, N. Y., mentioned in the ELECTRIC RAILWAY JOURNAL of May 1, 1909, as being in the market for four cars, it is learned has purchased six double-truck cars from the St. Louis Car Company. The cars will have 34-ft. bodies with steel channel underframes and the platforms will be 6 ft. long. St. Louis No. 47 trucks and the Birney prepayment platforms were specified.

Interborough Rapid Transit Company, New York, N. Y., is asking bids on 94 motor and 56 trailer cars for subway service with the option of increasing the order to 250 cars, and is also in the market for 60 motor and 40 trailer cars for the elevated lines, with the option of increasing the order to 200 cars. The subway cars will be duplicates of the last 50 purchased. They will have single cross seats so that center doors can be put in if necessary. The elevated rolling stock will be the same as the cars now in service.

Milwaukee Northern Railway, Cedarsburg, Wis., mentioned in the ELECTRIC RAILWAY JOURNAL of March 13, 1909, as contemplating the purchase of interurban cars, has ordered two combination interurbans from the Niles Car & Manufacturing Company, Niles, Ohio. The cars will be 50 ft. 4 in. long over all, 8 ft. 10 in. wide over all, will have body length of 40 ft. 2 in., over vestibule 49 ft. 2 in., a height of 9 ft. 4 in. from sill to trolley base, a 6-ft. 8-in. wheelbase, will weigh 28 tons and seat about 52. The interior finish will be of quartered oak, with bronze car trimmings. The company has specified Van Dorn type H couplers, Pantasote curtain material, Peacock brakes, Crouse-Hinds arc headlights, Symington journal boxes, Lintern signals, Nichols-Lintern sanders, Hale & Kilburn No. 3 plush and Pantasote seats, Niles steps and National sash fixtures.

Atlantic & Suburban Traction Company, Pleasantville, N. J., which was mentioned in the ELECTRIC RAILWAY JOURNAL of April 10, 1909, as having purchased three double-truck cars from The J. G. Brill Company, has specified the cars to be of the closed vestibule type, with 30-ft. 8-in. bodies and a seating capacity of 44. Other details of interest are:

Air brakes.....National A-4	Headlights .... Imperial arc
Circuit breakers.....GE 12-B	Motors.....2 West. 101-B
Control system K-28	Sanders ..... Dumpit
Curtain fixtures .....Curtain Supply Company	Seats ..... Winner
	Trolley base.....U. S. No. 1
Gongs ..... Dedenda	Trucks.....Brill 27 GE-1
Hand brakes .....Brill	Wheels...Lehigh Car Wheel & Axle Company
Heaters ..... Consolidated	

Burlington (Vt.) Traction Company, mentioned in the ELECTRIC RAILWAY JOURNAL of March 20, 1909, as having ordered four cars from J. M. Jones' Sons' Company, will have these cars delivered some time in May. The specifications include the following:

Type of car...13-bench open	Bolsters, body....Composite
Seating capacity.....78	Curtain fixtures, Curtain S. Co.
Weight (car body only), 30,000 lb.	Fenders ..... Parmenter
Bolster centers, length..19 ft.	Headlights.....Star 12-in.
Length of body....35 ft. 4 in.	Motors.....2-101-B West.
Over posts at belt.....9 ft.	Paint ..... Masury
Sill to trolley base..9 ft. 1 in.	Registers.....New Haven
Height from top of rail to sills .....31¾ in.	Sanders.....De Witt
	Trolley retrievers.....Wilson
Body .....Comb.	Trolley base.....Nuttall
Underframe .....Comb.	Trucks ..... Taylor
Air brakes.....West.	Varnish .....Babcock

Northern Ohio Traction & Light Company, Akron, Ohio, which was reported in the ELECTRIC RAILWAY JOURNAL of April 24 as not having purchased a private car for Henry A. Everett from the G. C. Kuhlman Car Company, it is learned has ordered a car from the Niles Car & Manufacturing Company, Niles, Ohio, to replace the car "Josephine" recently destroyed by fire. The new car will be 53 ft. long over all, 8 ft. 9 in. wide over all, 9 ft. 5 in. high from sill to trolley base and will seat about 25. The body weight is 56,000 lb. The car will be fitted with kitchen, lavatory and toilet and a standard Pullman drawing room with upper and lower berths. The floor will be laid with rubber tiling and the interior finish will be mahogany. Other specifications are as follows:

Body ..... Wood	Headlights ....Crouse-Hinds
Underframe..Niles semi-steel	Journal boxes....Symington
Center bearings..Symington	Lavatory fittings....Pullman
Control system, GE Multiple-Unit	Motors GE-73
	Sanders .....Nichols-Lintern
Couplers.....Janney radial	Sash fixtures..O. M. Edwards
Curtain material...Pantasote	Trolley retrievers...Knutson
Gongs ..... Niles	Trucks.....Baldwin Special
Handbrakes ..... Niles	

TRADE NOTES

Putnam A. Bates, New York, N. Y., has removed from 42 Broadway to 2 Rector Street, where he has more commodious offices.

Allis-Chalmers Company, Milwaukee, Wis., has removed its Los Angeles office from 623 Citizens' National Bank Building, to 129 East Fifth Street.

Detroit Graphite Company, Detroit, Mich., has moved its New York office from 141 Broadway to 135 Broadway, where it will have more spacious quarters.

W. A. Campbell has been appointed sales manager of the General Railway Equipment Company of Chicago, recently organized. Mr. Campbell was formerly connected with the Hicks Locomotive & Car Works.

Edward M. Raymond, Real Estate Trust Building, Philadelphia, Pa., has been engaged for the last six months in examining and reporting on various electric railways and steam railroads on the Pacific Coast for investors.

Electric Service Supplies Company, Philadelphia, Pa., recently received an order from the Philadelphia Rapid Transit Company for sufficient automotoneers to equip all this company's cars.

Crocker-Wheeler Company, Ampere, N. J., has placed Edmund Lang in charge of its repair shop. For the last five years Mr. Lang has been connected with the Wheeler Condenser & Engineering Company.

T. H. Symington Company, Baltimore, Md., advises that Symington journal boxes and bearings were specified for use on the cars recently purchased by Stone & Webster, Boston, Mass., for the Galveston Electric Company.

Independent Pneumatic Tool Company, Chicago, Ill., manufacturer of "Thor" specialties, has removed its headquarters in the First National Bank Building, Chicago, to the company's new building at 1307 Michigan Avenue, Chicago.

Muralt & Company, New York, N. Y., have opened a branch office in the Temple Court Building, corner of Bay and Richmond Streets, Toronto, Ont. J. Engh, who has been connected with this company for many years, will be in charge as manager.

Western Electric Company, Chicago, Ill., will have ready for distribution at an early date a catalog of nearly 400 pages on its electric railway and mine supplies. It will be published in sections so that it can be distributed either in parts or as a complete publication.

Aldon Company, Chicago, Ill., has moved its main office from 631 Monadnock Block to room 964 in the same building. This company manufactures rail benders, car replacers and car movers, track drills and other railway supplies. E. W. Rosenberg is president.

Rooke Automatic Register Company, Providence, R. I., now has its registers in use by street railway companies in the following cities in Iowa: Des Moines, Sioux City, Oskaloosa and Keokuk. The Waterloo, Cedar Falls & Northern Railway Company is also using the Rooke register.

Raymond Concrete Pile Company, New York and Chicago, has been awarded the contract for the foundations, including concrete piling, for the new six-story warehouse to be erected on Pier 2, Baltimore, Md., for the Standard Oil Company. Haskell & Barnes, Baltimore, are the architects for the work, and William Ferguson & Brother, the general contractors.

Walter B. Snow, Boston, Mass., announces the association with his publicity staff of Carl S. Dow, S. B., engineering department, Harvard University, late publicity manager, B. F. Sturtevant Company. Mr. Dow was also formerly in charge of the instruction and textbook departments, American School of Correspondence, and brings to the organization a diversified experience which will add materially to the value of the service rendered in all lines of technical publicity.

Keystone Lubricating Company, Philadelphia, Pa., manufacturer of Keystone grease, gives a record of this product as used in the Queens County pumping station at Valley Stream, Long Island, N. Y. This station contains two 8,000,000-gal. vertical triple-expansion pumping engines, built by William Todd & Company, Youngstown, Ohio. It is asserted that a saving of between 80 and 85 per cent is made over lubricating oil formerly used, with no increase in the friction load. This saving is based on an allowance for the oil that was filtered and reclaimed.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., announces that it has received a contract from the Falkenau Electrical Construction Company of Chicago, engineers for the Salt Lake & Ogden Railway Company, covering direct suspension line material for the 37 miles of electrification of the present steam road between Salt Lake City and Ogden. In the same connection, a contract has been closed covering the line material for the Gallatin Valley Electric Railway Company, of Bozeman, Mont., for 18 miles of new line; and an order has also been entered from the Long Island Railroad, covering 12 miles of low-voltage catenary construction.

Dossert & Company, New York, N. Y., report that H. B. Logan, their president, who is making an extended trip throughout the West, has concluded arrangements with Otis & Squires, 155 New Montgomery Street, San Francisco, Cal., to act as Pacific Coast managers for Dossert & Company. This firm will carry in stock a complete line of Dossert solderless connectors, cable taps and terminals. The company received during the current week large orders for its solderless cable taps and connectors from the Chicago City Railway, Worcester Consolidated Street Railway, St. Louis & San Francisco Railroad, South Side Elevated Railroad of Chicago and from the Copper Range Railroad and Southern Pacific Company.

Westinghouse Machine Company, East Pittsburg, Pa., has lately received an order from the City Electric Company, of San Francisco, for a 15,000-hp steam turbine. This will be the most powerful steam turbine installed west of the Mississippi River. This company has already installed three Westinghouse steam turbines of a smaller size. The East Pittsburg shops are also turning out for the city of Detroit a 5000-hp steam turbine, and another of the same size is building for the Nichols Copper Company, of Laurel Hill, N. Y., while the Saginaw & Flint Railway has contracted for a 1150-hp turbine and the Alaska Treadwell Gold Mining Company, San Francisco, has ordered two 1000-hp units.

Railway Business Association, New York, N. Y., following out its publicity campaign and better to acquaint the public with the needs of railroad companies, has reprinted an article which appeared in a recent issue of *Machinery News*. This article discusses the new spirit which animates railroad management and contains recent interviews with E. H. Harriman, T. P. Shontz, W. C. Brown, Charles S. Mellen and other prominent railroad presidents. The interviews indicate that the railroad companies are anxious to deserve public approval, and the wide publicity given by the Railway Business Association in matters of this kind and the able speeches by the president of the association, George A. Post, and other officers, are doing a great deal to conserve the interests of the railway companies.

Henry Docker Jackson, consulting engineer, 88 Broad Street, Boston, Mass., visited the works of the Westinghouse Electric & Manufacturing Company at Pittsburg, recently, to make an acceptance test on a special 250-hp motor, which is to be used to operate a ventilating fan in a coal mine in West Virginia. This is one of the largest electrically operated ventilating fans in the country. The motor is a specially designed one, the general scheme being suggested by Mr. Jackson, the design and details being worked out by the Westinghouse Company—the idea being to get the starting characteristics of the best type induction motor, combined with the operating and line regulating characteristics of the synchronous motor. The tests were eminently successful, both the starting characteristics and the regulating characteristics being remarkably good. The motor and fan are being installed in connection with other work at the mine, the consulting engineers on which are Messrs. Jackson and Timothy W. Sprague, who make a specialty of equipping mines with electrical apparatus.

ADVERTISING LITERATURE

Midvale Steel Company, Philadelphia, Pa., has published a catalog of mining wearing parts and smelter castings.

F. Bissell Company, Toledo, Ohio, has issued a small placard illustrating and describing its Security pole seat No. 2.

Carnegie Steel Company, Pittsburg, Pa., has reprinted the catalog on sheet steel piling made by it which was originally published in October, 1907.

Hobart Allfree Company, Chicago, Ill., has issued a pamphlet describing the Freeland clamp derailer and the Smyth handthrow derailer. These derailers are made in various sizes from 24 in. to 60 in. long.

John C. Dolph Company, Long Island City, N. Y., is distributing a series of catalogs with price lists of its insulation varnishes and compounds. These publications are being issued in English, French, German, Italian and Spanish.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has recently issued bulletin No. 82, listing second-hand railway material for sale, among which are rails, frogs, switches and other track material, locomotives and rolling stock of all types, and other railway supplies.

Samson Cordage Works, Boston, Mass., have issued a novel souvenir commemorative of the completion of 25 years in the manufacture of braided cord. It is in the form of a medal, the obverse of which shows Samson tearing apart the jaws of a lion and the reverse, a piece of braided cord.

Browning Engineering Company, Cleveland, Ohio, has printed the following descriptive bulletins: Lifting magnets, including locomotive cranes equipped with magnets; revolving steam shovels, orange-peel and clam-shell buckets for handling various materials, locomotive cranes, railroad ditchers and scraper bucket excavators.

Northwestern Expanded Metal Company, Chicago, Ill., is distributing a booklet on beam and column data prepared by its chief engineer, Ernest McCullough. Mr. McCullough is well known as a contractor, engineer and author on reinforced concrete. The booklet is intended to be eminently practical and free from complicated formulas.

Galena Signal Oil Company, Franklin, Pa., has printed in pamphlet form for distribution at the coming Master Car Builders' convention an extract from the argument of John G. Milburn in the suit of the Government against the Standard Oil Company, in which Mr. Milburn pays a high tribute to the genius of General Charles Miller, president of the Galena Signal Oil Company in building up the very large business which the company now enjoys.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MAY 15, 1909 No. 20

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

The New Canaan Electrification

The New Canaan electrification of the New York, New Haven & Hartford Railroad described in this week's issue is a good example of the flexibility of the high-tension alternating-current trolley in making extensions at minimum cost. The installation is probably unique in being the first 500-volt d.c. railway to be converted to single-phase operation at 11,000 volts. The main reason for this change was the economy attainable by using power transmitted directly from the large generating station at Cos Cob, 11.27 miles distant. The service over the New Canaan branch is comparatively light, and consequently the catenary construction is of the simplest type. As on the main line, the running wire is of steel, and precautions have been taken to protect the insulators from locomotive blast. The service thus far has proved most satisfactory, and there is every reason to believe that its general reliability will be as good as it was with the costlier direct-current distribution.

Gasoline Motor Cars

Interest in gasoline motor cars for railways has revived, owing, possibly, to the demonstrated practicability of the gasoline motor in automobile service. Abroad, independent motor cars operated by gasoline, storage steam, live steam and storage batteries have always been used more extensively than in this country, and there is considerable literature on the subject in the transactions of the International Street & Interurban Railway Association. The work in this country has been carried on principally along two distinct lines, one to develop a rather heavy car suitable for high speeds and weighing anywhere from 45,000 lb. to 100,000 lb.; the other class of motor cars developed has been in the direction of a very light car. There seems to be a field for each of these cars, as well, probably, as for a car of medium weight. Moreover, this field should not interfere particularly with that of the electric motor car or that of the steam locomotive, although the boundaries of each would naturally overlap to some extent. We should say that one criterion for determining the desirability of gasoline or electric—perhaps the principal criterion—would be the headway to be used in the proposed service, and that the upper boundary between the electric car and the gasoline car would be somewhere between two hours and three hours. As compared with steam operation, the respective fields would seem to be more properly defined by the loads to be transported. Both heavy and light gasoline cars, but particularly the latter, also provide a means for gaging the traffic possibilities of a line before installing the more expensive and more permanent electric installation. They also seem well adapted to roads in use for a part of the 12 months only. The gasoline motor car has the tremendous advantage over the automobile of absence of tire trouble, but the problem of a flexible and variable speed drive is greater than in the automobile because of the greater weights involved. Nevertheless, the difficulty has not been found to be insurmountable, even by mechanical means. It is yet too early to determine how permanent an aid to transportation methods the gasoline motor car will be, but several companies have adopted them to a greater or less extent. The question of repairs and depreciation is yet to be determined, but this will be answered by time.

Losses from Casualties

Casualties to electric railway property resulting from the serious ice jam at Niagara and from spring floods in various parts of the country recall the action of the Railroad Commission of Wisconsin in taking steps, during the last winter, to obtain information as to the cost of storm losses experienced by public utility corporations. The letter of inquiry on this subject which was sent out by the commission asked for data covering both the expenditures required for repairs of damaged property and the losses resulting from suspension of business during the necessary interval of incomplete operation. This subject is one of academic as well as practical importance. The law under which the Wisconsin commission exercises its jurisdiction over public utilities of the State directs that the commission shall "ascertain and determine what are the proper and adequate rates of depreciation of the several classes of property of each public utility." The destruction of property, resulting from casualties of this character, is one of the elements which should properly receive consideration in a study of the nature indicated, not only in Wisconsin, but also in all other localities where a determined effort is made to calculate the true cost of operation. The danger always exists that losses of this character may be appalling in amount; but even if they appear to involve small sums only it is not wise to ignore them as factors that increase the expense of operation of a public utility.

Discharged Employees

The letter from J. T. Funk, general superintendent of the Louisville Railway Company, printed in our issue of April 24, and the two commendatory letters published this week, call attention to a serious evil. No railway company should put a man in the responsible position of conductor or motorman without careful investigation as regards his previous history. Otherwise, it will be very likely to enroll some men who have been discharged by previous employers for incompetency or dishonesty. This will not only afford the chance of serious loss to the company through accidents or fraud, but if the character of the men is known, service with the company will be distasteful to the better class of its older employees. Of course, any railway company which places a man in a position of responsibility has to accept a certain amount of risk; no one is infallible, but it is wise to take all the precautions which are reasonably possible. We do not mean that a man should be considered as forever incapacitated for holding a position on one road because he has been discharged from another. He may have been misjudged, or his offense may have been slight, and the experience thus obtained might render him capable of better service on the new road. But it is an axiom in business that an employer has the privilege of knowing all the previous history of a prospective employee, so far, at all events, as it relates to the kind of work which he is likely to perform in the future. This is particularly the case in the railway business, where not only property, but lives, are dependent upon the faithful execution of the trusts imposed.

We are of the opinion that the positions of both motorman and conductor demand physical and temperamental qualifications which are by no means universal. The proper man for either position must be in full possession of his senses of sight and hearing. In addition, he should be neat in appearance, alert to perform his manifold duties, able to think clearly and be fully conversant with the rules. If he is a motorman, he should also have that "sixth sense" which intuitively directs one what to do in emergencies. If he is a conductor, he should possess the mathematical knowledge which enables one to make change quickly and the memory for faces which permits him to know those who have paid their fares and those who have not; he should be courteous on every occasion, and in all ways he should be able to comport himself creditably as a representative of the company. When once acquired, these duties become almost second nature. One superintendent of employment, with whom this subject was discussed, said that it was not difficult to detect ex-employees who had testified falsely that they never had had railroad experience, because in breaking them in their tendency is instinctively to do any one of several things directly in their line of duty.

If the qualifications just mentioned are accepted as essential, a careful investigation into a man's previous record follows as a matter of course. Such an investigation can be conducted by mail or by person. The former method is the easier, and sometimes the only way available, especially with persons who are far distant from the company's office. It is open, however, to the perpetration of fraud, and is never so satisfactory as a personal interview. A previous employer will often hesitate to put in writing his opinion of a man or the causes for his dismissal, but will often have no objection to explaining the facts verbally. In a personal interview, also, a good investigator can usually tell whether the man being questioned is sincere in his recommendation or is sympathetic for a friend or acquaintance out of a position. It is strange how many persons will falsify the facts to help a man get a job, when they know that his incompetence will in no way affect them. A rigorous investigation of this kind is expensive, but is economy if it prevents subsequent loss.

In the case of cities that are close together, personal ties can be cultivated between the superintendents of employment of the different roads, so as to bring to the attention of one another all flagrant cases of misconduct. This will reduce to a minimum the possibility of a man discharged from one company falsifying his record so as to enter the employ of another. Carrying this idea further, it might even be possible for the companies in one locality, or the national organization, as suggested by one writer, to perfect a clearing house of information regarding men who are discharged from time to time.

It might be claimed that a clearing house, such as suggested, would constitute a "boycott" or "black list," and as such be illegal in some States. We hardly believe this would be held, however, if the object was not to keep men from employment, but to detect those who might endeavor to secure employment under false pretenses. In any case, also, we do not believe that a statute could prevent any prospective employee from agreeing to permit his employer to verify the statements made in his application. This agreement could be made part of his application in any States where such a law was in force.

Accidents to Pedestrians

Fully 20 per cent or 25 per cent of street railway accident cases arise out of collisions with pedestrians. In many of the claim and legal departments they are classified as "Knock Down" cases. Because of the very strong elements of contributory negligence ever present in such accidents, the number of these suits which are tried is large and a great deal of law on this subject is to be found in the books. Of the decisions rendered some half-dozen have recently been handed down in leading and widely separated jurisdictions and present some important general principles which will here be briefly considered.

The New York courts contribute half of these authorities. It is perhaps needless to say that the decisions of the Empire State tribunals are highly respected and usually followed throughout the United States. In New York State a pedestrian has the same right to use a street that a street railroad has, and while he is bound to use care, he may properly cross a track, though he knows a car is approaching, providing he has reason to suppose that the car will slow down and thus give him time for the crossing. This is the doctrine of one decision where a non-suit in a death case on the ground of contributory negligence was reversed and a new trial ordered. It is, of course, a well-known rule of law that the sufficiency of the evidence necessary to show freedom from contributory negligence is not so strict in death cases as in cases where the injured person is alive and a witness at the trial. In the case under discussion there was ample proof of the company's negligence in operating the car at an excessive speed while the motorman was applying the power on the rear instead of the front platform, the conductor being on the front platform operating the brake and giving the signals. This unusual condition was because the car was crippled, but there was no excuse, the court said, for not turning it around so that "the motorman and the operation of the power could have been on the front platform." The car did not slow down for the crossing as it should have done and as the deceased rightly assumed it would. Hence the court decided against the company.

In another case the following instruction by the trial judge was affirmed on appeal:

When one attempts to cross the tracks of a street car and has approached the track at such a distance from an approaching car that he has reasonable ground to suppose that he will be able to cross the track, it is the duty of the street-car driver to give him a reasonable opportunity to cross, and if for that purpose it is necessary for him to check the speed of the car or even stop the car entirely for a short space, it is his duty to do it, and the person crossing the track has the right, without being charged with contributory negligence, to assume that that duty will be performed.

Pedestrians are not required to look for an approaching car further than a reasonable distance, as people at crossings ordinarily do, before passing to the opposite side of the street. Such at least is the law of a Brooklyn case where an elderly lady was knocked down at night at a place not well lighted. When struck she had nearly crossed the track and was picked up on the far side after the accident. This physical fact, which ordinarily cannot be disputed, is always of great and often controlling importance. On the other hand, if the injured is struck just after he stepped over the first rail and thrown back, it is quite apparent that he was not justified in his attempt to proceed. These last observations are prompted not by any particular decision, but by experience of attorneys in the defense of railway negligence actions.

There was a strong dissenting opinion in the Brooklyn case by Judge Hooker, who did not agree with his colleagues when they distinguished this case from another case decided by an even higher court in which it had been said that if the pedestrian looked she must have seen the car and that as she did not see it, it is proof that she did not look. The controlling view, however, was that the dulness of the faculties of the aged has to be considered, especially at times in unfrequented localities.

In Kansas we find a decision favorable to the railway company where the sole question was whether the plaintiff used ordinary care. In a drizzling rain he alighted from a car which had crossed the intersecting street (usually an important fact), saw a car approaching 175 ft. away on the parallel track and started to cross. The car he left had moved on and when he reached the first rail of the other track it was passing the approaching car 45 ft. away. He was struck just after he had passed over the first rail and was picked up between the two tracks. The witnesses substantially agreed that the car which collided with him was running 20 m.p.h. and went 150 ft. to 300 ft. before stopping. The pedestrian said he thought the car was approaching at a reasonable speed of 8 m.p.h., but could not tell then or at the trial how fast it was traveling. He was adjudged guilty of contributory negligence and we find this unusually clear and interesting exposition of the law:

The plaintiff had the right to begin his journey with the assumption that cars on the next track would be run at a reasonable rate of speed, and would be under ready control when approaching street crossings. But such an assumption cannot be relied upon as a guide to conduct or as an excuse for taking a risk after knowledge or fair warning to the contrary. Due care requires that a man shall look for approaching cars before crossing a railway track. * * * If he sees a car coming, the duty arises to make some estimate of its speed and of the distance it has to come before he attempts to cross. Distances and speed are matters of the commonest daily observation. Men no less than the lower animals have been trained at the peril of survival to regard them ever since the species arose. A man may not be a good judge of either, but he must suffer the consequences if he makes a mistake which a reasonably prudent man would not have made.

We have referred above to what the pedestrian may rightfully assume. It will be interesting, on the other hand, to note what the motorman may assume. While the motorman may expect that a pedestrian will turn out of the way, he cannot rest on such assumption until he reaches a point where it will be impossible for him to control the car or to give warning in time to prevent injury. Nor may such assumption be indulged beyond the time when the pedestrian's danger is seen to be imminent. Such is the law gathered from two decisions against the company operating surface cars in Birmingham, Ala. The court said:

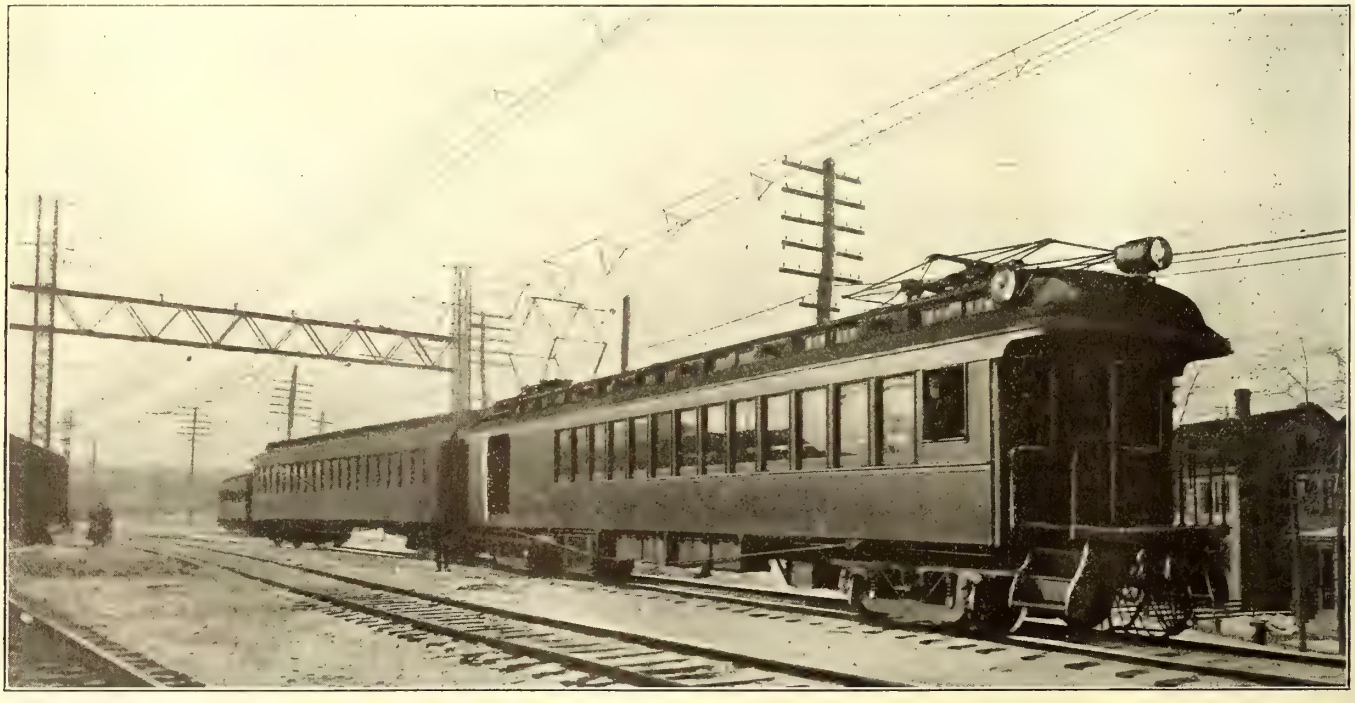
The rationale of this doctrine is that "the original negligence of the injured person, whereby he is placed in a perilous position, does not in a legal sense contribute to the result. * * * The law ascribes the disaster solely to a want of due care on the part of the person controlling the agency of the injury, but for whose negligence no hurt would have been done, notwithstanding the injured party's original fault.

CONVERSION OF NEW CANAAN BRANCH FROM 500-VOLT D.C. TO 11,000-VOLT A.C. OPERATION

The New Canaan branch of the New York, New Haven & Hartford Railroad extends from Stamford on the main line in a general northeasterly direction to New Canaan, and has a total route length of 7.66 miles. The intermediate stations after leaving Stamford are: Glenbrook, 2 miles; Springdale, 3.22 miles; Talmadge Hill, 5.47 miles. Between Stamford and Glenbrook the branch tracks adjoin those of the main line, but the branch line cars run to and leave from the former station, because no through trains stop at Glenbrook. The branch was originally operated by steam, but was equipped with the 500-volt d.c. overhead trolley about 10 years ago for the passenger service only. About a year ago it was again converted, this time to the 11,000 single-phase system. The New Canaan line was particularly suitable for such a change, the expense for overhead construction being comparatively small, as on nearly 25 per cent of the route the wires were carried from the main line overhead bridges, which had been extended over the branch tracks with this end in view. There is, of course, an appreciable saving in cost of power from supplying the line from the main Cos Cob station, only 11.27 miles from New Canaan, instead of by independent power.



New Canaan Electrification—View at Junction with the Main Line, Illustrating the Difference in Overhead Construction Between Heavy and Light A.C. Operation



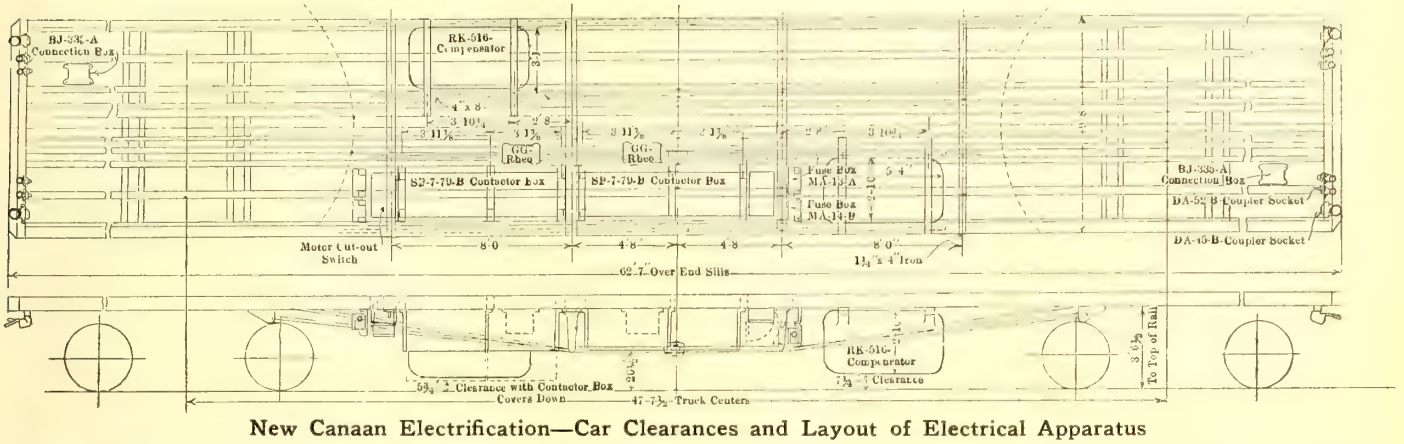
New Canaan Electrification—Branch Line Motor and Trail Car at Stamford, on the Main Line

Direct-current operation of the New Canaan branch was

discontinued about Nov. 1, 1907, and the results obtained since the installation of the 11,000-volt, 25-cycle, single-phase catenary clearly demonstrate the adaptability of this system for branch-line electrification. The following is a description of the principal features of the overhead line and of the rolling stock:

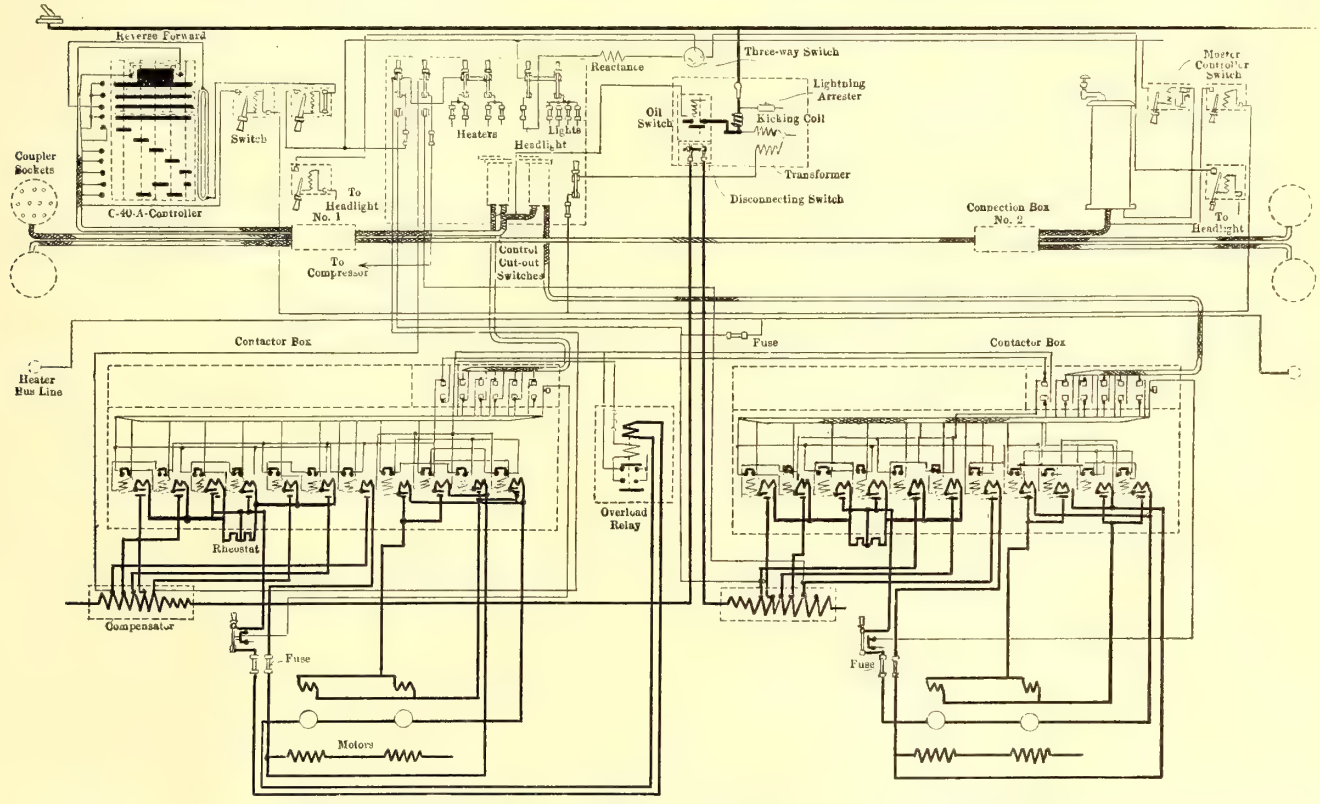
OVERHEAD CONSTRUCTION

The overhead line between Glenbrook junction and New Canaan is carried on wooden poles which are 35 ft. in height, set 10 ft. from the center line of the track, and are spaced 150 ft. on tangents. At curves the poles are guyed with plate anchors and ⅜-in. steel strand wire. The bracket is a simple 3-in. steel I-beam turned up at the end and braced by a ½-in. wrought-iron tension rod bolted through the pole. The messenger wire is of 7/16-in. bare steel strand, and is carried on glazed porcelain double petticoat insulators. These insulators are 7½ in. in diameter, 5½ in. high, and are protected from the blasts of the steam freight locomotives operating on this division by an under piece of sheet iron clamped to the bracket. An auxiliary, No. 0000, steel working conductor is clamped to the No. 0000 copper feeder wire, as on the main line. Hickory steady strains are used on every other pole at tangents in addition to their customary application on curves. The clearance between the trolley and track is 22 ft., and is maintained throughout the line, as there are no tunnels or bridges of any kind. The total weight of the catenary construction carried between the I-beam brackets on the tangent bents or spans of 150 ft. is 280 lb., or slightly under 2 lb. per foot. The line is anchored at 11 places between Glenbrook and New Canaan. As the pantograph collectors on the cars take current at 11,000 volts it was not necessary to install any transformer stations or special transmission wires at any point on this division.



New Canaan Electrification—Car Clearances and Layout of Electrical Apparatus

Section insulators are located at Talmadge Hill, Springdale and the main line junction at Glenbrook. The section insulator at the main line junction at Glenbrook is shown in the illustrations on pages 900 and 902; in addition there are other breakers at Talmadge Hill and Springdale. The sidings normally are dead, being cut in only when necessary. It should be stated that as the trip between New Canaan and Stamford is made in 17 to 20 minutes, only one train is required ordinarily to carry out the schedule.



New Canaan Electrification—Wiring Diagram of Electrical Apparatus

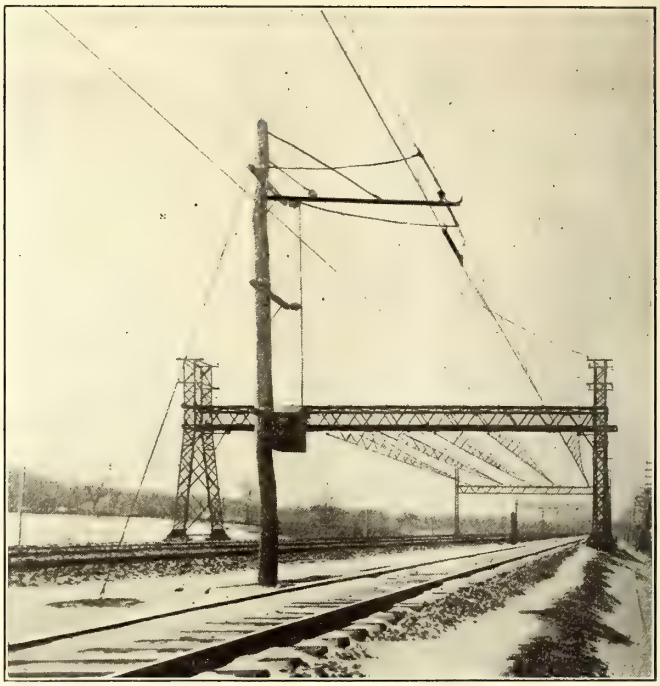
The overhead line is grounded by No. 0000 iron wire

which is swung from pole to pole and grounded to the rails every five poles. This ground wire constitutes the sole lightning protection. The rails have No. 0000 bonds.

This line was designed and installed by the Electrical Engineering Department of the New York, New Haven & Hartford Railroad.



New Canaan Electrification—Construction on Curves Showing Steady Strains



New Canaan Electrification—Section Break at Branch-Off From the Main Line

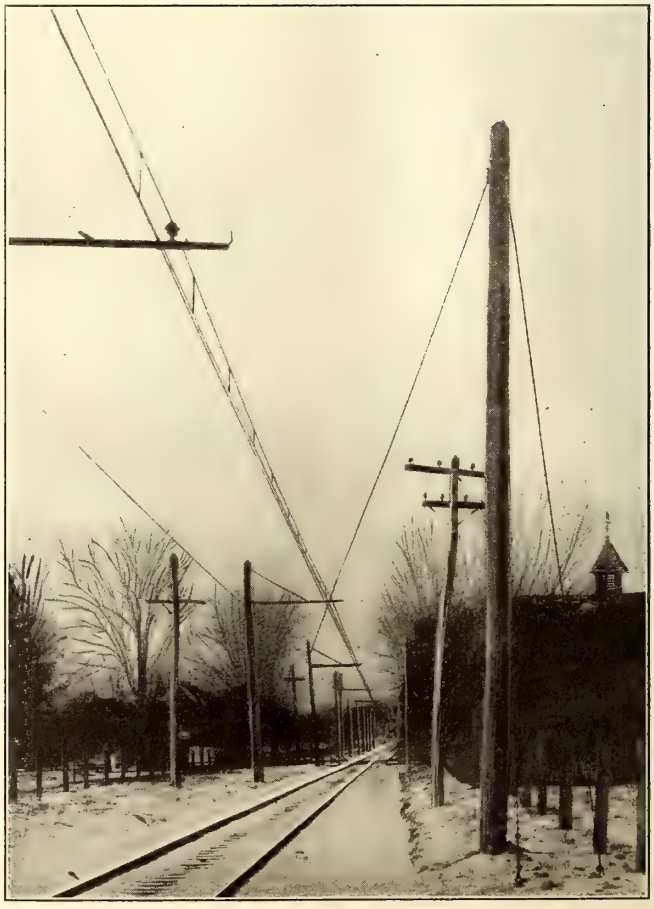
THE ROLLING STOCK AND ELECTRICAL CIRCUITS

The rolling stock of the New Canaan division consists of two trains, each composed of one motor car and one trailer. The trailers are of the standard New Haven steam coach design for straight passenger service, seat 72 passengers and weigh 35 tons.

The motor cars are of the combination passenger and baggage type, 63 ft. over all and seat 52 passengers. Each

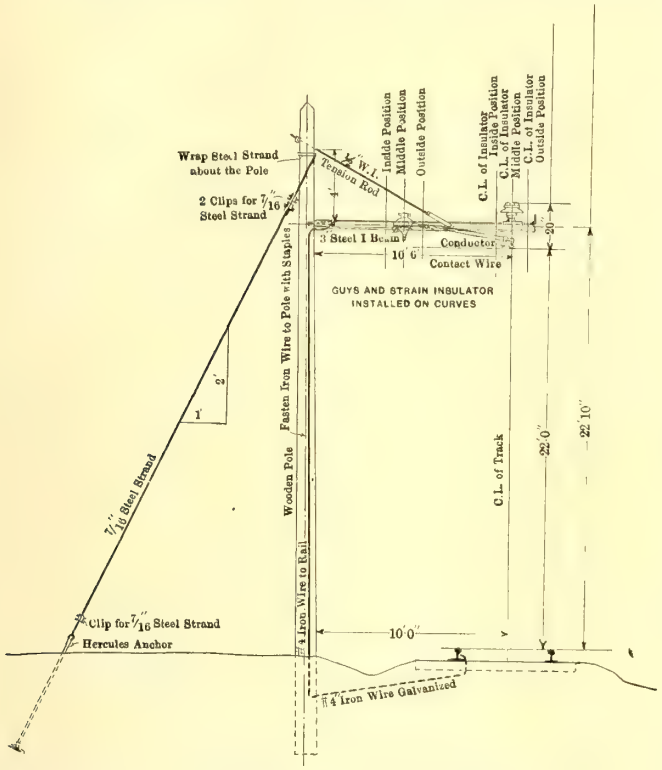


New Canaan Electrification—Overhead Construction with Deflectors at a Siding



New Canaan Electrification—Suspension Copper Conductor and Steel Contact Wire

car is carried on two American Locomotive Company's B-592 trucks, as described in the ELECTRIC RAILWAY JOURNAL of June 13, 1908. These trucks have 36-in. diameter wheels, 6½-in. axles and 5½-in. x 10-in. journals. Each carries two GE-603-A, 125-hp, single-phase motors operated at a maximum speed of 50 m.p.h. These motors are ar-



New Canaan Electrification—Standard Bracket Construction on Tangent Sections

ranged for multiple-unit control, as shown in the wiring diagram on page 901. A set of contactors is used with each pair of motors, seven contactors being used for accelerating and four for reversing. The motors are grouped two pairs in parallel, the motors on each truck being in series. Reversal is accomplished by changing the exciting field connections. Either pair of motors can be cut out in case of trouble. All auxiliary circuits are controlled from a switchboard located in one of the motorman's cabs. Power for the control circuit can be taken from either one of the two transformers. The air brakes were furnished by the Westinghouse Air Brake Company and the electric heaters were supplied by the Consolidated Car Heating Company.

WEIGHTS OF CARS AND EQUIPMENTS

The following weights may be of interest: Motor car fully equipped, but without passengers or freight, 140,000 lb.; electrical equipment, including collectors, 44,000 lb.; two trucks, including wheels and axles, but not motors, 30,000 lb.; maximum passenger load, 10,000 lb.; maximum baggage load, 15,000 lb.

The cities of Ekaterinburg and Perm, Russia, it is stated, have decided to grant franchises for the construction of electric tramway systems. The municipality of Ekaterinburg has offered the grant to an English syndicate for a term of 25 years, with the provision that ground for the necessary power house, car house and other buildings will be given free, and in return the holders of the franchise must construct certain specified lines, pave the streets through which they pass and light them with electricity.

PIECE-WORK RATES USED BY THE THIRD AVENUE RAILROAD COMPANY, NEW YORK

After a careful study of the comparative advantages of the day-rate and piece-rate systems, the Third Avenue Railroad Company has decided to adopt the latter in car maintenance work wherever possible. This is feasible in many cases because all of the repair work is concentrated at the Sixty-fifth Street shops, and it is possible to specialize it to a great extent. The decision to adopt piece work was largely influenced by the successful results secured in applying that system to the equipment of the first 150 pay-as-you-enter cars purchased by the Third Avenue Railroad Company. The rates for the different contracts were based on observation of the amount of work done by the more skilful workmen in a day, and then fixing a payment based on the assumption that the output would be in-

DISTRIBUTION OF PAY-AS-YOU-ENTER PAY ROLL

First Pay Roll November 5, 1908
Last Pay Roll January 14, 1909

	Total	Average Cost Per Car
Total amount of piece work	$8,982.86	$59.88½
Total amount of fixed charges	5,431.32	36.21
Total amount of pay roll	14,412.18	96.09½
Total amount chargeable to other than "PAYE" work	1,045.55	.....
Total cost of new cars	13,366.63	89.11
Analysis of Piece Work		
Installing electrical equipment	$3,292.39	$21.95
Installing all conduit	1,733.25	11.56
Carpenter work, mounting motors and car cleaning	2,533.96	16.87
Blacksmith work	542.75	3.62
Mill work	322.26	2.15
Machinist work	588.25	3.73
Total	$8,982.86	$59.88
Analysis of Fixed Charges		
General inspector	$185.00	
Time checker	161.50	
Foreman	627.15	
Jackers	566.20	
Oilers	60.00	
Brakemen	178.50	
Storeroom boy	69.00	
Laborers	216.31	
Painter	102.00	
Wire inspector	172.00	
Carpenters	850.95	
Wiremen	1,345.60	
Pipe fitters	897.11	
Total	$5,431.32	$36.21
Analysis of Charges Other than to Pay-As-You-Enter Work		
To the J. G. Brill Company	$238.01	
To Westinghouse Traction Brake Company	10.34	
Work on new sweepers	407.30	
Work on Union cars	389.90	
Total	$1,045.55	$6.97
Grand Total of "PAYE" Work Pay Rolls		
	$14,412.18	
Charges other than to "PAYE" work	1,045.55	
Actual cost of labor on "PAYE" cars	$13,366.63	$89.11

creased from 25 to 30 per cent. This worked out very well in practice, for while a few men claimed that they could not earn as much under the piece-work method as before, most of the employees showed a surprising increase in output. On the whole, the men in the different departments earned from 25 to 50 cents more a day than before. In some kinds of work, as pipe bending, it was even necessary to hold the men back, to prevent them from overspeeding the machines. Despite the fact that the men worked faster than before, the quality of their output was much better than under the day-rate system, because they were obliged to do a given job over again on their own time if it was not up to the standard.

The schedule for the work on the pay-as-you-enter cars was worked out in such thorough detail as to be of real value to others who contemplate the preparation of similar lists. It will be seen from the accompanying tables, which are slightly condensed, that not only were figures prepared to cover the rates for the different kinds of work, but that pains were taken to specify the exact size and

quantities of all the items to be handled in equipping the cars at the shops of the railway company. The original data, prepared by J. S. McWhirter, superintendent of equipment, show also the cost of the trucks, motors, air brakes, controllers, fare boxes and other items, but as these are confidential figures, they are omitted in the tables. The fixed charges and the expenses for other than pay-as-you-enter work were also presented to show the influence of extraneous items.

THE PIECE-WORK AND BONUS SYSTEMS FOR CAR MAINTENANCE

The piece-work system is gradually being extended to cover electrical and mechanical maintenance of rolling stock. Every kind of piece work is given a contract number and a definite price. In general, there is but one man per contract, but in a few cases an assistant or helper is included. Aside from piece-work contracts, a bonus scheme has been adopted to cover such jobs as installing the complete electrical equipment of a single car. If a job of this character requires an eight-hour day from two men at $2 each, the company will divide equally with the men any saving in time. Thus, if the work is completed in six hours, each man receives 25 cents extra. If the men are working at different rates, the bonus is divided in proportion.

The following contracts are in force for electrical work done for this company and others under the same receiver:

ELECTRICAL PIECE-WORK AND BONUS CONTRACTS

First stripping circuit-breaker and car-body connectors, pulling dead wires out of cables, connecting up kicking coils, lightning arresters, grounding dashes where necessary, installing ground wires on No. 1 end; two men, eight hours each, at 25 cents an hour. (Bonus arrangement for open cars.)

Circuit-breakers, stripping canopy switches, replacing trolleys, installing and connecting circuit-breakers; also relocating light trolley tap, making cabinet for trolley stand, sweating on sleeve and doing all necessary cleating; eight hours at 25 cents an hour. (Bonus arrangement for open cars.)

Disconnecting K-27 controller and replacing with K-8 controllers—dismantled by the wireman, but put in place by the carpenter; one wireman allowed four hours at 25 cents an hour. (Bonus arrangement for any car.)

Testing, connecting and disconnecting two motors and making ground tap on No. 2 motor; contract price per car for the wireman, $0.80, and for the helper, $0.625	$1.425
Stripping a K-8 controller; one helper	.20
Making up jumper boards of a K-8 or K-27 controller	.15
Making up connection boards of a K-8 or K-27 controller	.60
Stripping and reassembling K-8 and K-27 controllers	1.50
Stripping and reinsulating Westinghouse No. 68 field coils	1.05
Retaping No. 68 field coils; one helper	.200

SHEET No. _____

PIECE WORK PAY ROLL for Week ending _____ 190

CHECK NUMBER	NAME	JOB NUMBER	FRIDAY		SATURDAY		SUNDAY		MONDAY		TUESDAY		WEDNESDAY		THURSDAY		TOTAL NUMBER OF PIECES	PRICE PER PIECE	AMOUNT	
			Car No.	Number of Pieces	Car No.	Number of Pieces	Car No.	Number of Pieces	Car No.	Number of Pieces	Car No.	Number of Pieces	Car No.	Number of Pieces	Car No.	Number of Pieces			Dollars	Cents
																TOTAL				

TOTAL OF SHEET _____

I hereby certify that the persons above named are employed by this Company, and that the time and amounts thereof are correct.

Approved _____ TIMEKEEPER. *Signed* _____ FOREMAN.

SUP'T OF EQUIPMENT.

Third Avenue Railroad—Part of Piece Work Pay Roll

SHEET No. _____

PAY ROLL *For Week Ending* *190*

	Badge or Check No.	NAME	Total Amount	Check		Amount	Rate	Hours	Fri.	Sat.	Sun.	Mon.	Tues.	Wed.	Thu.	Amount	Hours	Rate	Amount	Hours	Rate	Amount	Hours	Rate	Amount	Hours	Rate
1																										
2																										
3																										
4																										
5																										
50																										

PROOF

I hereby certify that the persons above named were employed by this Company, and that the time and amounts therefor are correct.

Timekeeper.

Correct.

I hereby certify to having examined extensions and footings of this sheet, and that they are correct as shown.

Accountant.

I hereby certify above persons were paid by me.

Paymaster.

Third Avenue Railroad—Pay Roll for Day or Hour Rate Employees

Forming a Westinghouse No. 56 field coil; two men, including one helper	1.20
Making up resistance splash pans on a car, to include changing over old splash pans and making up two new ones; one helper	.22
Making up ground wires, to include cutting of wires and sweating on terminals, two wires to a set; one helper	.05
Making up resistance jumpers; one helper	.15
Tin wire shields; one helper	.045
Stripping canopy switch, installing circuit-breakers, splicing leads for same and tapping off main trolley to trolley stand (closed car)	.95
Making all resistance splices and changing over heat, light and trolleys; also sweating on brass sleeves on main trolley where it connects to trolley stands; one wireman	.78

NON-ELECTRICAL WORK ON OPEN 10-BENCH CARS

The following prices are those prevailing for non-electrical work on open cars for the Union Railway Company:

Getting out material for overhead trolley guards, sign cards, grab handles, step brackets; $0.92 for blacksmith and $0.67 for helper—per set	$1.93
Drilling holes in brake hangers, per set	.02
Renumbering, eight sets of numerals (sides, dash and bonnet)	.80
Painting kicking boards on under sides	.50
Partial painting of seats and touching up inside and outside cars	.70
Making two brake handles per car; one blacksmith, $0.17, and helper, $0.12	.29
Drilling all holes in irons for overhead trolley apparatus for hood shields, per set	.25

IRON BRACKETS AND HANGERS MADE IN SHOP

Under this head, the original table gives the size, number, type and cost of the resistance hangers, splash pan hangers and brackets as made in the shop. The total cost of these items was $586.50 for 150 cars and $3.98 per single car.

LOCKNUTS

The original table shows that there were used the following numbers and sizes of lock nuts: 900 ½-in.; 600 ¾-in.; 900 1 in.; 600 1¼ in.; 300 1½-in.; and 2,400 2-in.. The cost for each car was $0.748 and for 150 cars, $112.20.

CONDUIT

Size	Amount Used Per Car	Amount per 150 Cars	Cost Per Foot	Cost Material Per Car	Cost Per 150 Cars
½-in.	20 in.	3,000 ft.	$0.04	$0.80	$120.00
¾-in.	95 ft.	14,250 ft.	0.050	4.72	708.00
1 in.	24 ft.	3,600 ft.	0.65	1.57	235.50
1¼ in.	2 ft.	300 ft.	0.093	0.18	27.00
1½ in.	3 ft. 6 in.	525 ft.	0.106	0.37	55.50
2 in.	40 ft.	6,000 ft.	0.146	5.84	876.00
				$13.48	$2,022.00

REDUCING BUSHINGS

Size	No. Used Per Car	Total No. Used	Price	Cost Per Car	Cost Per 150 Cars
1–½ in.	1	150	$0.04 each	$0.04	$6.00
1¼–1 in.	4	600	.05 each	.20	30.00
1½–1 in.	1	150	.05 each	.05	7.50
2–1½ in.	1	150	.07 each	.07	10.50
				$0.36	$54.00

WIRE

Size	Amount Used Per Car	Used On	Cost Per 1,000 ft.	Used for 150 Cars	Total Cost Per Car	Cost Per 150 Cars
0-strand	56 ft. 6 in.	.....	$125.20	8,025 ft.	$6.69	$1,003.50
0–flex	40 in.	.....	135.00	500 ft.	0.451	67.50
2–strand	59 ft.	.....	80.00	8,850 ft.	4.72	708.00
4–strand	35 ft.	also grd. wires from scrap	59.40	5,250 ft.	2.06	309.00
6–strand	6 ft.		40.00	900 ft.	0.24	36.00
10–strand	7 ft. 6 in.	.....	23.00	1,125 ft.	0.17	25.50
12–strand	211 ft. 4 in.	.....	17.44	31,700 ft.	3.67	550.50
14–strand	105 ft.	.....	15.08	15,750 ft.	1.58	237.00
4 or 6 strand	38 ft.	grd. wires	scrap	5,700 ft.	.....	.....
					$19.58	$2,937.00
			per ft.			
7 connecting cable	52 ft.	.....	$0.611	7,800 ft.	31.77	4'765.80
8 connecting cable	52 ft.	.....	0.582	7,800 ft.	30.26	4,539.00
					$62.03	$9,304.80

PIPE STRAPS, COUPLINGS AND PIPE TS

Thirty-four pipe straps ranging from ½ to 1½ in. size were used per car. This strap cost $0.07 per lb. The cost per car was $0.167, and for 150 cars, $23.59.

Thirteen couplings required per car cost $0.86, and for 150 cars, $128.25. The four ½-in. pipe Ts per car cost $0.32 and totaled $48.00 for 150 cars.

MATERIAL MADE IN MILL

	Material and Size	Cost Material Each	Cost Material Per Car	Cost Material Per 150 Cars	Used Per Car
	Wood	*sq. ft.*			
Resistance bars	2x3x46 in.	$0.08	$0.28	$42.00	2
Controller fillers	2½ sq. ft.	.08	.20	30.00	2
M. L. switch block	8 to sq. ft.	.08	.01	1.50	1
Pump switch	2 to sq ft.	.08	.04	6.00	1
M. L. cluster, rosettes	.....	.14	.42	.....	.....
Slotted	Wood Slotting	.03	.09	63.00	3
Circuit-breaker box	6½ in. pine, $0.05				
	5 sq. ft. oak, $0.08	.73	.73	109.50	1
Wood cleats	80 to sq. ft.	....	.015	2.25	17
			$1.785	$254.25	
Circular loom cut to 8¾ in. lengths; labor					8
Asbestos for top resistance—Asbestos ¼x42x19.14c. sq. ft.					1
Asbestos for fuse boxes—Asbestos, ¼x5¾x11½x28, 24c. sq. ft., $3.36 per car				$504.00	24 sq. ft.
Conduit covers, fibre—10c. per lb., 15c. car				22.50	10

LIGHT FITTINGS—BUZZERS

The light fittings and buzzer circuits cost $26.32 per car or $2,448.75 for 150 cars.

OUTSIDE MATERIAL

	Used Per Car	Used per 150 Cars	Cost Each	Cost Per Car	Total Cost Per 150 Cars
Fibre cleats o wire	7	1,050	$0.0024	$0.168	$25.50
Fuses					
3 amperes	1	150	.02	02	3.00
10 amperes	7	1,050	.14	.98	14.70
Ribbon	2	300	.02	.04	6.00
Circular loom ⅜-in.	6 in.	900 ft.	4.20 per 100 ft.	.252	37.80
Circular loom 1 in.	6 in.	900 ft.	9.60 per 100 ft.	.576	86.40

JUNCTION BOXES

Type	No. Per Car	Total Per 150 Cars	Cost Each	Cost Per Car	Total Cost Per 150 Cars
88	5	750	$0.90	$4.50	$675.00
89	2	300	1.75	3.50	525.00
90	2	300	1.135	2.27	340.50
106	2	300	1.55	3.10	465.00
$0.11 each boring 38 boxes				$13.75	$2,005.50

SHEET IRON

Size	Used	Used Per Car	Used to 150 Cars	Cost Per Car	Cost Per 150 Cars	Total Cost for Material Labor for 150 Cars
20x37x.035	Res.	1	1,200 lb.	8 lb.	$0.28	$43.20	Res. $43.20 Iron
						2.50 Rivet
10x96x.035	C. B.	1	1,350 lb.	9 lb.	.31	48.60	42.00 labor
Rivets							C. B 48.60 Iron
3-16x⅜ in.	Res. S. P.		243,600.50 lb.	5c. lb.	.01½	2.50	30.00 labor
							$78.60

NOTE.—Labor and material for brackets for res. splash pan, is included in "Paye" brackets, etc.

BRASS TUBING

½x⅜ in. Rheo. jun.	1 ft. 6 in.	225 ft.	$0.06	$9.00

BOLTS

The number of bolts used per car, as summarized from the detail table, was 139 and their cost $1.04 or $157.10 for 150 cars.

SCREWS

The cost of the screws, which are given in size and number in the original table was $4.97 per car or $74.56 for 150 cars.

T–B BUSHINGS

The cost of the T–B bushings was $2.15 per car or $323.10 for 150 cars.

MISCELLANEOUS

Charcoal	Amount Used	Price Per Car	Per 150 Cars
Charcoal	1 bag to car	$0.60	$90.00@$0.60
P. B. Comp	1 gal., 4 cars	0.20	30.00@ 0.80
Solder paste	1 daily	0.10	15.00@ 0.10
		$0.90	$135.00
Solder	4 bars to car	$1.60	$240.00@ 0.32
Tape ¾ rubber	3¾ to car	1.50	225.00
Tape ¾ friction	6 to car	1.60	240.00
Tape 2 friction	3¼ to car	1.36	204.00
		$6.96	$1,044.00

LEAD GASKETS—SCRAP LEAD—MADE IN SHOP

Size	No. Per Car	Total No. Per Car	No. of Lb.	Cost of Labor	Total Cost Per 150 Cars
1¼ in.	2	300	28	$0.002 each	Material, $17.20
1½ in.	2	300	30	.....	Labor, 6.00
2 in.	16	2,400	266	.....	Total, $23.20
		3,000	324	$6.00	Total cost per car, $0.15

WASHERS

The cost of washers was $1.26 per car, or $190.79 for 150 cars.

CONDULETS

The cost of condulets was $10.68 per car or $1,602.00 for 150 cars.

Lettering six signs with two coats in white letters.. 3.30
Varnishing six signs, two coats..... .20
Lettering "Union Railway" in 6-in. letters on sills... .60

THIRD AVENUE RAILROAD COMPANY, Frederick W. Whitridge, Receiver.

NAME..... RATE..... DATE.....

Acc't No.	DISTRIBUTION	Hours	Amount

CHECK No._____ FOREMAN_____

Third Avenue Railroad—Timekeeper's Card, with Column for Account Number

Varnishing inside and outside of cars..... 2.90
Painting posts, gates, bumpers and floor steps..... 1.35
Painting roofs and reflectors..... .75
All carpentry work for overhead trolley apparatus.. 3.50
Scrubbing open cars, cleaning inside and outside and polishing brass 3.90
Cleaning and painting two trucks..... .70

YONKERS 28-FT. CLOSED CARS

The following items relate to work done at the Sixty-fifth Street shops for the Yonkers Railroad Company on 28-ft. closed cars:

Sandpapering and painting last coat of paint over outside, including vestibules and dashes..... $1.40
Striping and lettering cars and dashes with numbers inside 5.50
First coat of varnish outside car, vestibule and dashes 1.25
Second coat of varnish outside of car, sash, doors, dashes, bonnet, inside and outside of vestibules.. 1.25
Painting roofing and touching up dome..... .75

THIRD AVENUE RAILROAD COMPANY.
FREDERICK W. WHITRIDGE, Receiver.
DAILY TIME CARD

Shop. Date, 190...

NAMES	CHECK NUMBER	CLASSIFICATION	HOURS PIECE WORK	HOURS DAY WORK	REMARKS

PIECE WORK

CAR Nos.	CONTRACT NUMBERS	No. OF PIECES	DESCRIPTION	PRICE	TOTAL VALUES

TO FOREMAN, ETC.—If work is listed on other side, do not sign here.

CHECKED AND FOUND CORRECT: CORRECT:

Clerk. CORRECT: Inspector

Foreman.

Third Avenue Railroad—Daily Time Slip for Day or Piece Work.

Painting floor-posts, gates and bumpers..... 1.00
Cleaning all glass on car..... .85
Scrubbing cars, cleaning inside and outside and polishing brass 2.90

LABOR OF CARPENTER WORK AND MOUNTING MOTORS AND CIRCUIT BREAKERS ON PIECE WORK

No. of Cars		Total	Average Cost Per Car
143	Motors mounted	$479.70	$3.355
135	Car cleaned	148.50	1.10
150	Assembling circuit breaker boxes	139.50	.93
148	Boring and cutting underneath	888.00	6.00
144	Outside carpentry	588.00	4.00
148	Inside carpentry	148.26	1.00
142	Installing splash pans, etc	142.00	1.00
	Total cost	$2,533.96	$16.87

Labor of Conduit Piece Work

128	Installing large conduit	$540.90	$4.225
150	Bending small conduit	225.00	1.50
140	Installing small conduit	464.80	3.32
150	Bending large conduit	90.00	.60
140	Threading large conduit	56.00	.40
140	Threading small conduit	217.00	1.55
127	Motor lead conduit	63.50	.50
117	Assembling resistance conduit	76.05	.65
	Total cost	$1,733.25	$11.555

Labor of Electrical Piece Work

149	Pulling wire	$689.68	$4.62
149	Connecting heaters	375.48	2.52
143	Connecting and installing lights	103.55	.735
138	Connecting controllers	138.00	1.00
142	Connecting circuit breakers	54.95	3.34
148	Connecting canopy switches	57.74	.39
131	Connecting main fuse box and body controller	58.30	.445
144	Cable taps	216.00	1.50
150	Cable taps	107.17	.72
145	Resistance	205.63	1.41
68	Connecting motors	63.99	.94
101	Fuse box, heat, light and pump circuit	37.65	.37
141	Connecting pump circuit	56.90	.40
125	Testing	199.11	1.59
117	Grounding all conduit	87.75	.75
103	Resistance splash pans (mfg.)	28.84	.28
135	Circuit-breaker splash pans (mfg.)	14.85	.11
137	Resistance jumpers	30.83	.225
143	Bus line fuse boxes	21.45	.15
122	Filling and chipping junction boxes	39.65	.325
142	Pulling all heat, light and pump wire	264.24	1.90
150	Making all conduit grounds	79.50	.525
150	Connecting buzzers	41.75	.275
150	Cut wire for heat, light and pump circuit	42.00	.28
149	Pulling motor leads	239.11	1.60
126	Placing lock washers on heater bolts	28.35	.225
46	Re-wiring heater switches	7.92	.18
	Total cost	$3,292.39	$21.95

Labor of Machine Shop Piece Work

Pieces and Sets	Class of Work	Price Each	Total	Average Cost Per Car
300	Boring plow bars	$0.14	$42.00	
300	Slatting plow bars	.16	48.00	
150	Drilling plow plates	.204	6.00	
150	Boring plow yokes	.20	30.00	
300	Boring plow sleeves	.18	54.00	
300	Threading plow sleeves	.31	93.00	
150	Countersinking and cleaning plow yokes	.185	28.25	
150	Sets drilling all irons for circuit breakers	.20	30.00	
150	Sets drilling resistance hanger brackets	1.00	150.00	
300	Boring junction boxes, No. 88.	.11	33.00	
150	Sets drilling motor lead irons..	.13	19.50	
150	Drilling angle irons for brake slides	.03	4.50	
100	Drilling heater switch boxes..	.05	5.00	
150	Sets draw bar hangers	.04	6.00	
150	Drilling draw bars	.06	9.00	
	Total cost		$558.25	$3.725

Labor on Mill Piece Work

600	Block for conduit	$0.60 per 100	$3.60	
300	Resistance bars	.055	16.50	
300	Nailing asbestos wood on resistance bars	.015	4.50	
300	Transit for junction box braces	1.10 per 100	3.30	
1800	Fibre condulet blocks	.025	45.00	
150	Circuit breaker boxes	.28	42.00	
150	Junction box blocks	.55 per 100	.83	
300	Controller blocks	.23	69.00	
150	Main light switch blocks	.04	6.00	
450	Main light switch blocks, slatted	.65 per 100	2.93	
300	Pilot boards	.24	72.00	
900	Motor lead cleats	.015	13.50	
600	Conduit brace blocks	.30 per 100	1.80	
600	Conduit brace blocks	.20 per 100	1.20	
3300	Small wire cleats	.40 per 100	13.20	
100	Three-way switch blocks	.03	3.00	
130	Heater switch blocks	.03	10.40	
300	Buzzer blocks	.04	12.00	
300	Wooden cleats	.500 per 100	1.50	
	Total cost		$322.26	$2.15

Labor of Blacksmith Piece Work

150	Sets resistance hangers and conduit clamps..	$357.00	$2.38
150	Sets angle irons for circuit-breaker boxes....	21.00	.14
150	Headlight conduit clamps	16.25	.105
150	Sets motor lead brackets	12.00	.08
150	Pieces angle iron for brake rigging	36.00	.24
150	Sets draw bar hangers	72.00	.48
150	Draw bars	28.50	.19
	Total cost	$542.75	$3.615

The forms accompanying this article are the following: The daily time slip shown on page 906 is for either the hour or day rate, and is signed by the inspector and foreman. The piece-work payroll is made up from these time slips, to show the unit cost and amount of piece work done on specified cars. Separate piece-work records are also kept to show the total cost of equipping each car, thereby preventing the possibility of paying more than once for the employees. The timekeeper's card on page 906, which is used in making up the payroll, shows also the distribution of labor charges according to account numbers, and is turned over to the auditor at the end of each week.

Item	Material: Cost Per Car	Material: Cost Per 150 Cars		Labor: Cost Per Car	Labor: Cost Per 150 Cars
			Piece work.	$15.50	$2,325.00
			Day work..	6.19	928.50
Conduit and fittings			Total..	$21.69	$3,253.50
			Piece work.	$32.04	$4,806.00
			Day work..	7.97	1,195.00
Electric equipment			Total..	$40.01	$6,001.50
			Piece work.	$18.48	$2,772.00
			Day work..	7.73	1,159.50
Car body, trucks, etc.			Total..	$26.21	$3,931.50
				$87.91	$13,186.50
Air brake..				50.00	7,500.00
Two (2) fare boxes.....				$137.91	$20,686.50
	$4,640.74	$696,111.00			

Summary of Material

	Cost Per Car	Cost Per 150 Cars
Conduit.—Also including condulets, couplings, pipe, straps, pipe Ts, lock-nuts, reducing bushings, brackets holding conduit, condulet covers (fibre), conduit junction boxes, lead washers, iron washers, T-B bushings...	$45.406	$6,809.90
Electric Equipment; Wires and cables.....	$81.61	$12,241.50
Cleats, bolts, screws, fuses, iron brackets, sheet iron for solash pans, washers, circular loom, brass tubing, rivets, asbestos lumber, fuse boxes for light, heat and pump, wood for resistance, bars, circuit breaker boxes, controller blocks, switch blocks.....	19.90	2,986.28
Light fittings.....	12.425	1,863.75
Total Electrical Equipment.....	$113.935	$17,091.53
Total all material.....	$159.34	$23,901.43
Motor equipment in contract from G. E., including two 210 motors, two K-27 controllers, one set resistance, two canopy switches, two circuit breakers.....		
Set heaters and switches; One plow, two MA-13 fuse boxes; Miscellaneous, solder, tape, etc.		
Electric equipment: Car body with truck; Air brake.....		
Fare boxes.....		
	$4,640.74	$696,111.43

Material Summary

	Cost Per Car	Cost Per 150 Cars
Iron brackets, hangers, etc.....	$13.91	$586.50
Conduit.....	13.48	2,022.00
Pipe straps.....	0.157	23.59
Couplings.....	0.855	128.25
Pipe Ts.....	0.32	48.00
Condulets.....	10.68	1,602.00
Rock nuts.....	0.748	112.20
Reducing bushings.....	0.36	54.00
T-B bushings.....	2.154	323.10
Lead washers (including labor cutting).....	0.155	23.20
Wire.....	19.58	2,937.00
Cables.....	62.03	9,304.50
Wood.....	1.695	254.25
Asbestos lumber.....	3.36	504.00
Fibre ¼ in. condulet covers.....	0.15	22.50
Fibre cleats.....	0.168	25.20
Fuses.....	1.04	156.00
Circular loom, ⅜-in.....	0.252	37.80
Circular loom, 1-in.....	6.576	86.40
Conduit junction boxes.....	13.37	2,005.50
Sheet iron.....	0.612	91.80
Rivets.....	0.017	2.50
⅜-in. brass tubing.....	0.06	9.00
Bolts.....	1.04	159.10
Screws.....	4.97	745.50
Light fittings.....	12.425	1,863.75
Fuse boxes, light, heat and pump.....	3.90	585.00
Washers (lock and flat).....	1.2724	190.79
Total.....	$159.346	$23,901.43

CAFE PARLOR CAR EQUIPMENT OF CHICAGO & MILWAUKEE ELECTRIC RAILROAD

BY L. L. SMITH, MASTER MECHANIC

The limited service of the Chicago & Milwaukee Electric Railroad between Evanston and Milwaukee was inaugurated Feb. 8, 1909, and was described in the ELECTRIC RAILWAY JOURNAL of Feb. 13.

While the high standard of equipment and fast schedule of this service have contributed to its popularity, one of its most attractive features is the excellence of its three café parlor car service, to a description of which this article is devoted.

In planning the scope of what the café service should include the preliminary questions were:

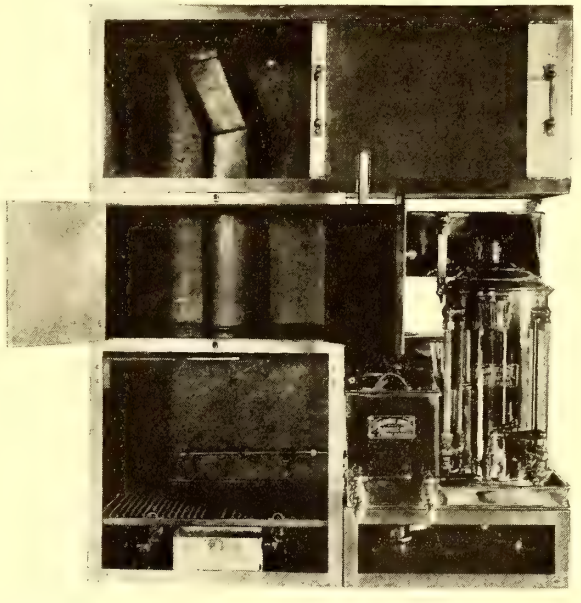
(a) What is the least amount of passenger seating space which must be sacrificed for the storage of supplies, the cooking and serving of meals?

(b) What design of range equipment will make most advantageous use of this space?

(c) How elaborate a bill of fare can be served with the facilities which will meet the requirements (a) and (b)?

In answer to question (a) the kitchen is 33¼ in. x 77¼ in. and was provided with a pantry 33¼ in. x 46⅜ in. in floor area.

A plan of one of the café parlor cars is given on page 908. The chairs are of green wicker design with leather cushions and leather padded backs and arms. The width of a chair over all is 25 in.; height to top of back from floor, 35½ in.;



Café Car—Range with Doors Open to Show Interior Space

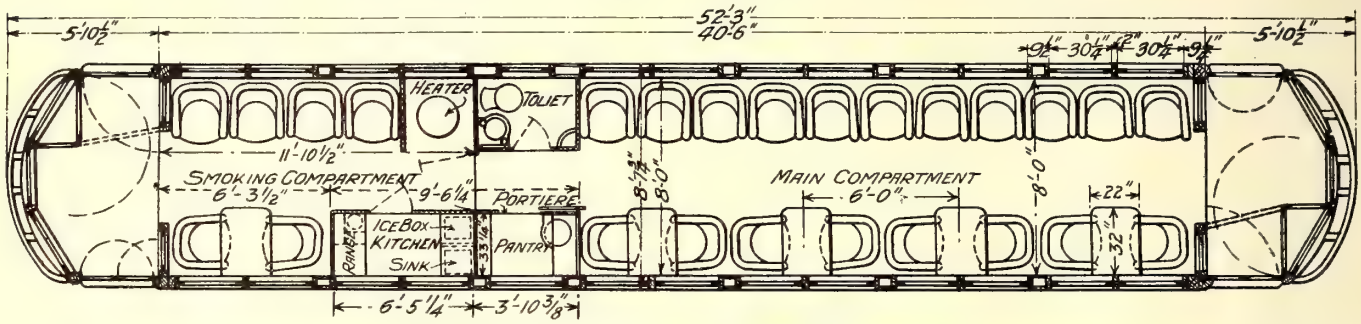
height to top of arms from floor, 25½ in. The maximum seating capacity of these upholstered chairs is 29 with no tables set up. When tables are set up it is desirable to move two or three chairs to the vestibule or off the car entirely. When an extra large load is carried the wicker seats are supplemented with six or eight folding camp chairs. The tables are of the ordinary dining-car type with the single folding leg, table hooks and wall plates. These table tops measure 22 in. x 32 in. and a raised bead around the edge, ¼ in. wide and ⅛ in. high, prevents the slipping of the tablecloth. Two persons can very comfortably be served at a table of this size.

The car arrangement shown in plan with a row of tables down one side and a row of chairs down the other is

merely to illustrate table and chair capacity of car. Ordinarily five tables are set up, one in the smoking compartment and four in the main compartment, the two pair farthest away from the observation end.

The motorman's cab is of such design that it may be folded into a very compact shape and the vestibule used as an observation end for seated passengers.

The answer to question (b) called for the investigation of all forms of ranges and broilers. From the cooking standpoint Pintsch gas would have been ideal, but the lack of charging stations and sufficient room under the car for storage tanks prevented the use of gas. Although no alcohol ranges for railroad use were on the market, and so far as could be learned the use of alcohol fuel for such purposes had never been attempted, the possibilities of denatured alcohol fuel seemed to warrant making the experiment and so specifications for ranges were furnished by the railroad company to the Stearnes Steel Range Company, of Chicago. Ranges were built as illustrated by accompanying line and half-tone engravings.

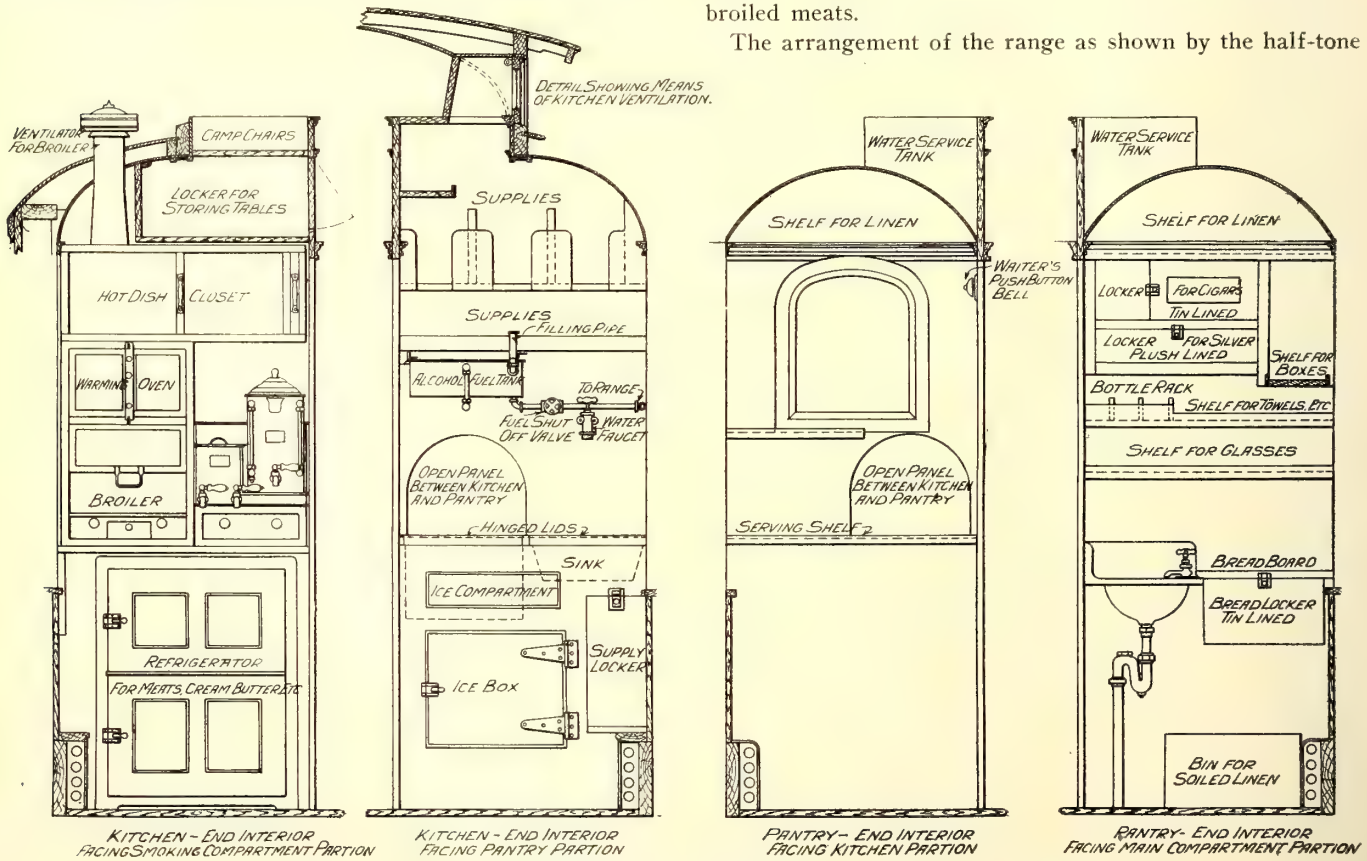


Café Car—Plan of Car and Main Dimensions

The range consists of a broiler, coffee urn, cooker and hot-water tanks. Surmounting these is a sheet-steel hot-dish closet. The alcohol is burned in four burners which vaporize the fuel and cause it to burn with a blue, odorless flame giving intense heat. The burners are imported from Germany and are of the Barthel design. The broiler portion is equipped with two of these burners, which are located under corrugated iron broiler plates 8¾ in. x 12½ in. in size each. The broiler is partly hooded by a folding flap and the smoke from the broiler passes upward through a vent pipe and out a ventilator in the roof. The daily consumption of alcohol fuel is 1 gal. to 1½ gal. per day. It is possible for this broiler to broil a chop satisfactorily in about six minutes. On the side of the range opposite the broiler is a cooker tank for cooking and warming soups, etc., and in the back is a tank which holds clean hot water used for such purposes as making tea, etc. In the front on the extreme right is a 1½-gal. coffee urn. Under the broiler plates is a tin box or can to collect the grease from broiled meats.

The arrangement of the range as shown by the half-tone engraving has been followed except that it was found desirable to remove the fuel tank to the opposite side of the kitchen and pipe the fuel to the range. The fuel tank was thus put in a cooler place, where unnecessary evaporation was avoided and additional safety afforded.

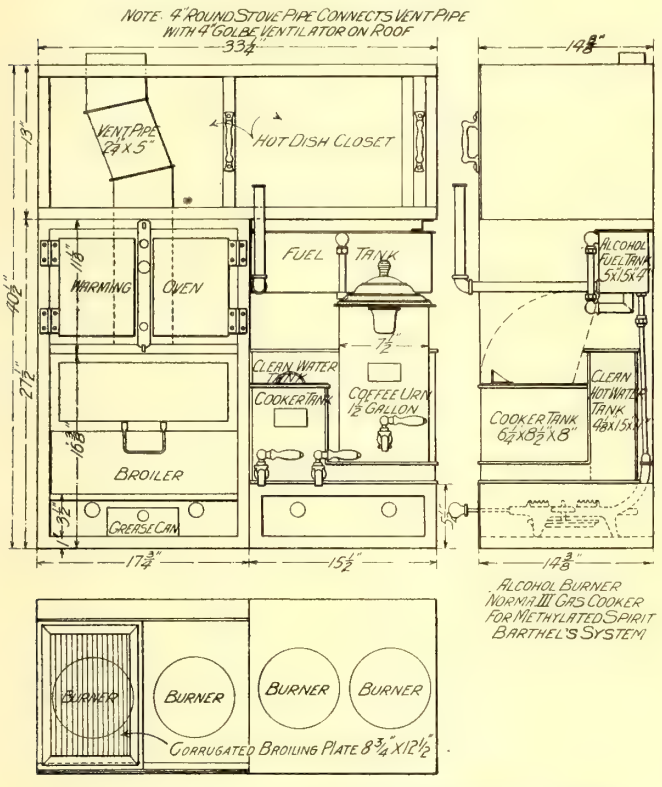
The range is located in the kitchen on a shelf above the refrigerator, and over the kitchen is a locker for the



Café Car—Elevations Showing Arrangement of Kitchen and Pantry

storage of tables. Through the open panel between the kitchen and pantry the cook passes the orders as they are prepared. The waiter prepares his tray for service in the pantry.

In answer to question (c) regarding the extent of the bill of fare, the menus for breakfast and luncheon are similar to those of a first-class Pullman service. For supper the menu is the same as that for luncheon.



Café Car—Plan, Front and Side Elevation of Range

The commissary headquarters are at Evanston and the café car service is under the direction of H. S. Moniger, who has had a large experience in this line of work and has developed a careful system of keeping check on the equipment and supplies as well as on the conduct of the service. The waiter's checks are numbered and by the means of carbon backs they are made out in duplicate. One copy is retained at the commissary and the other is forwarded to the auditor. When a car starts out in the morning a record is made on a printed blank of the supplies for which the cook and waiter are responsible and at night when the waiter checks in, he must have the supplies or their equivalent in cash.

A detailed list of china, glassware, silver, linen and other equipment for one car follows:

CAFE PARLOR CAR EQUIPMENT FOR ONE CAR, BASED ON MAXIMUM OF SEVEN TABLE SET-UPS. TABLES, 22 x 32 IN.

LINEN.

36 table cloths, 36 in. x 45 in.
72 table tops, 23 in. x 35 in.
168 napkins, 20 in. x 20 in.
36 dish towels.
36 glass towels.
12 waiter's aprons.
6 cook's aprons.
12 waiter's jackets.
6 cook's jackets.
2 blue jackets.
2 blue aprons.
12 table felts.
2 small meat cloths, 18 in. x 36 in.
2 wrappers, 56 in. x 72 in.

KITCHEN UTENSILS.

3 egg fry pans.
1 fry pan.
2 small egg whips.
2 vegetable ladles.
3 aluminum saucepans.
1 aluminum saucepan.
2 meat platters.
1 improved rice boiler.
1 4-qt. improved coffee pot.
2 dredge boxes.
2 12-in. basting spoons.
4 14-in. basting spoons.
2 potato knives.
1 cook's fork.
1 bread board.
2 scrub brushes.
1 8-qt. galvanized pail.
1 broiler scraper.
1 weight, 2 in. x 4 in.
1 weight, 2 in. x 5 in.
3 1-qt. crock.
1 2-qt. crock.
1 pudding pan.

CHINA.

30 8-in. plates.
18 butter chips.
6 soup plates.
6 small platters.
15 large platters.
24 coffee cups.
24 coffee saucers.
8 small vegetable bakers.
8 sauce dishes.
2 mustard pots.
3 celery trays.
6 after-dinner cups.
6 after-dinner saucers.
4 holder egg cups.
3 cocoa pots.
4 fancy finger bowl plates.
6 bean pots.

GLASSWARE.

18 water glasses.
12 beer glasses.
6 whiskey glasses.
6 claret glasses.
6 straight champagne.
2 vinegar bottles.
2 water bottles.
5 salt shakers.
6 pepper shakers.
6 ale glasses.
2 toothpick holders, 594A.

SILVERWARE.

18 knives.
18 medium forks.
36 tea spoons.
12 dessert spoons.
6 after-dinner coffee spoons.
6 oyster forks.
4 white-handled knives.
2 silver tongs.
1 ginger ale holder.
2 loaf sugar bowls.
2 powdered sugar bowls.
1 cash tray.
2 silver hinged-cover creamers.

MISCELLANEOUS.

4 brass finger bowls.
2 2-cup tea pots.
4 independent tea pots.
2 nickel coffee pots.
2 aluminum trays.
1 knife board.
1 cork puller.
1 bar strainer.
2 bar towel hangers.
1 bar spoon.
2 rubber stoppers.
4 tea strainers.
1 ice pick.
1 ice shaver.
1 can opener.
2 mustard spoons.
1 ham knife.
1 bread knife.
1 steel.
1 ice scoop.
1 silver brush.
1 paste brush.
1 keeler.
1 2-qt. cream can.
1 1-qt. cream can.
1 small cleaver.

In the selection of attractive designs of Theodore Haviland china, Oneida silver, cut glass and other equipment it has been the aim of the management to inaugurate and maintain in all details a service of the highest class.

The above equipment was supplied with these cars when they were put into service and has been very satisfactory.

TEN-DAY COMPARATIVE STATEMENT

A new blank form for reporting comparative railway revenue collections is used by the smaller properties operated by the Illinois Traction System. One of these blanks as filled out is reproduced. This statement covers a period of 10 days and is made up three times a month—on the 10th, the 20th and the last day of the month. It was realized that with daily reports of revenue from the large number of small properties the general manager was unable to get accurate comparisons of the small amounts of receipts for each day, partly because of the great number of reports and partly because of the way in which they might vary on account of local conditions or Sunday traffic. The present report, which is received from each property three times in a month, not only lessens the work in the local offices, but it gives the manager a convenient number of figures with which to make comparisons and draw conclusions.

JACKSONVILLE RAILWAY & LIGHT COMPANY, FEB. 20, 1909.
STATEMENT OF TEN-DAY COMPARATIVE RAILWAY REVENUE AND OTHER COLLECTIONS.

Date.	1909.	1908.	Gain or loss.	Weather.	Remarks.
Feb. 11	116.15	105.00	11.15	Clear	
" 12	110.40	114.90	4.50	Misty	
" 13	165.95	129.45	36.50	Rainy	
" 14	99.90	124.45	24.55	Rainy and cold	
" 15	123.70	164.80	41.10	Snow	
" 16	128.85	107.60	21.25	"	
" 17	127.45	130.65	3.20	Sloppy	
" 18	135.35	109.50	24.85	Rainy in evening	
" 19	166.85	111.85	55.00	Cloudy	Woods' sale
" 20	179.05	131.40	47.65	Partly cloudy	
Totals	1353.65	1229.60	124.05		
Previous 10 days	1312.75	1323.85	11.10		
Total 20 days.	2666.40	2553.45	112.95	Gain, 4%	

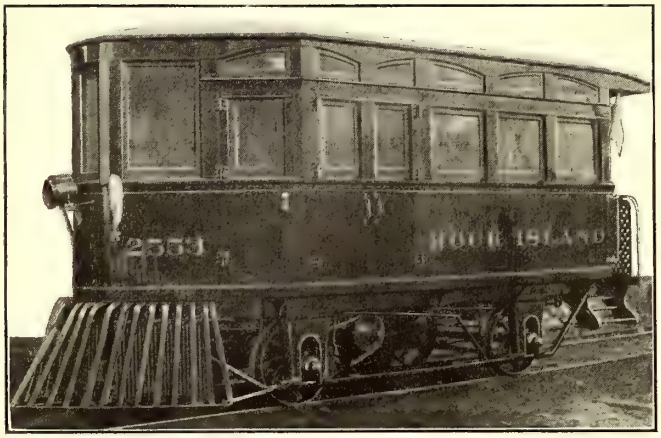
TOTAL CASH COLLECTIONS.

	1909.	1908.
Cash fares	$1,177.90	$1,043.50
Ticket sales	176.00	188.00
Personal accounts (service)	518.20	552.34
Personal accounts (miscellaneous)	106.84	213.50
Coke	29.44	24.70
Miscellaneous	85.29	109.76
Total	$2.093.67	$2,131.80
Previous 10 days	11,242.61	10,338.53
Total 20 days	13,336.28	12,470.33

Certified: H. SAWYER, Auditor.

A NEW GASOLINE MOTOR CAR FOR INTERURBAN SERVICE

The continually increasing demand for better transportation facilities in sparsely populated districts recently has resulted in the construction of a number of gasoline motor-driven passenger cars. The field for such equipment is found partly on steam railroad branch lines, which cannot be expected to afford enough passenger traffic to pay for the operation of the heavy trains, but where a passenger service must be given as a matter of policy. Gasoline motor-driven passenger cars also have been used by steam roads to give a frequent service in direct competition with parallel electric lines. Another field for small gasoline motor-driven passenger cars is on lines which operate only part of the year. A large opportunity is also thought to exist in many localities not now served with any railroad facilities. Those promoting the sale of such cars suggest that where there may be a doubt as to the profitableness of an electric interurban line or extension, it will be found good policy, first, to build up the service by the use of independent gasoline engine driven motor cars, and, later, when the traffic warrants, install the electric equipment.



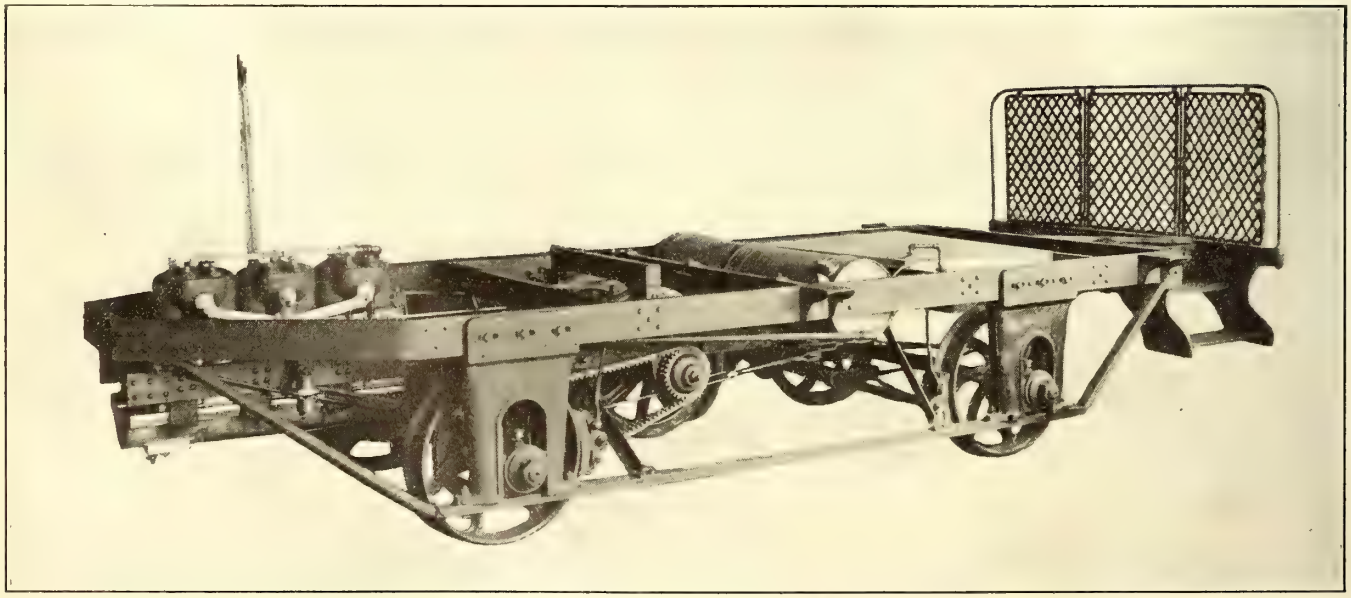
Gasoline Motor Car—Front End View



Gasoline Motor Car—Rear End View

This latter field for gasoline cars should interest electric railway builders and a description of a type of car now being sold for local and branch line service may be of value. Accompanying illustrations present the general features of the 25-passenger gasoline engine-driven combination baggage and passenger car built by the Stover Motor Car Company, Freeport, Ill., and supplied to a number of steam and interurban roads. This car has a three-compartment body supported on an all-steel underframe carried by two axles set 8 ft. 6 in. on centers. The body is built of wood and designed to have the maximum strength with due regard for minimum possible weight. The weight of the body is spring-supported on the journal bearings by eight coiled springs distributed one pair at each journal. An extension of the steel underframe supports the rear platform, to which access is had by steps on either side. This platform is not vestibuled.

The interior of the body is subdivided by two bulkheads.

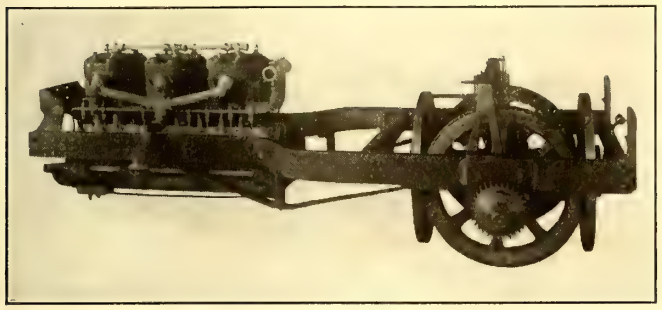


Gasoline Motor Car—Underframe, Showing Engine, Transmission and Tanks in Place

The forward compartment includes the space within the wedge-shaped front end only, and is the operating cab. The bulkhead which divides the cab from the baggage compartment connects with the latter only by means of a window. Between the cab at the front and the main compartment is a section available for the use of smokers and for carrying baggage. Double doors which swing outward

provide a means for handling baggage on each side of the car. Wood-slat seats arranged to fold flatly against the wall are furnished in this compartment. The baggage and the main compartments are connected by a swinging door in a half-glass partition. The main compartment is fitted with leather-upholstered cross seats for 16 passengers. The center aisle is 22 in. wide. Gas for illumination is furnished from Prestolite tanks carried in the cab.

The main feature of a gasoline car is its power plant. The engine of the car here described is built by the car builder and is rated at 60 hp. There are six cylinders 5½



Gasoline Motor Car—Engine and Transmission

in. in diameter by 6 in. stroke. The normal speed of the engines is 600 r.p.m. It is stated that with the car running at a speed higher than normal this engine is capable of developing 90 hp. A double system of ignition, employing a high-tension magneto for one set of spark plugs and a storage battery and spark coil for a second and independent set of plugs, assures reliability. Positive feed lubrication is provided for each cylinder and all crankshaft bearings. The motor is water-cooled from a supply tank carrying 50 gal. The radiators are placed below the front of the cab immediately behind the locomotive type pilot.

One illustration shows the running gear of the car, with the motor, transmission, fuel and water tanks mounted thereon. The motor and the double-drive friction type of transmission are built within a strong channel-iron frame, which, in turn, is supported from the underframe of the car at three points. By means of the friction drive, the wheels of which are connected through a system of levers to the main operating lever in the cab, the car may be driven forward or backward at will, or the engine thrown out of gear by the progressive movement of the one operating lever. All the transmission shafts run in Standard roller bearings, and the car journals rest in Hyatt roller bearings. Connection between the front car axle and the transmission shaft is made through two 2-in. Morse silent chains, either one of which is of sufficient strength to drive the car. The entire power plant and transmission can be taken from the trucks as a unit by removing the bolts at the three suspension points.

Strong claims are made for the operating economy of these units. The following statement of the performance of a 60-hp Stover car has been furnished by R. C. Jones, general manager, St. Joseph Valley Railroad, LaGrange, Ind., for the month of March, 1909:

Revenue		$519.50
Expense of operation:		
Wages of crew	$135.00	
Material	2.10	
Labor	11.30	
Gasoline, 381 gal.	40.00	
Lubricating oil and waste	10.75	
		199.15
Net revenue		$329.45
Passengers handled		3,483
Miles run		3,262
Miles run per gallon of gasoline		8.6
Cost per mile run		6.1 cents
Revenue per mile run		16 cents

The car illustrated was recently built for the Chicago, Rock Island & Pacific Railroad for operation on a branch line out of Atchison, Kan. This car easily carries a full load over steam railroad tracks at a schedule speed of 30 m.p.h.

DENVER AS A CONVENTION CITY

The selection of Denver as the site for the convention of the American Street & Interurban Railway Association in 1909 has brought the city and its environs, within the last week, prominently before the officials of all the electric railway companies in this country. No national street or electric railway convention has ever been held as far west as Denver. Three conventions, those of 1885, 1896 and 1904, were held in St. Louis; that of 1900 was held at Kansas City and that of 1889 at Minneapolis. With these exceptions, every convention of the American Street Railway Association and of the American Street & Interurban Railway Association has been held east of the Mississippi River.

There is much, however, to attract the visitor to Denver. It possesses excellent accommodations in the way of hotels and halls for large gatherings, and many national associations have held conventions there. Instructive lessons are to be learned from an inspection of its well-built and well-operated railway system. There is an abundance of scenic features. Finally, a convention in Denver will afford an opportunity of a mingling of railway operators from the Pacific Coast cities with those from east of the Rocky Mountains. The presence at the 1909 convention of men who are responsible for the wonderful development in the electric railway and power transmission systems on the Pacific Coast should greatly increase the scope of the features to be discussed and the resulting value from the exchange of ideas.

Readers of this paper are familiar with many of the interesting features of the local system at Denver, but a brief summary will be given here, as well as an account of some of the other points of interest which will undoubtedly attract the attention of the visitor.

THE DENVER CITY SYSTEM AND ITS INTERURBAN BRANCHES

The Denver City Tramway has 186.5 miles of track, which include the city system and the Denver & Northwestern Railway, connecting Golden with Denver. The tracks in the city system are 3-ft. 6-in. gage, while those of the interurban lines are standard gage. The track structure in Denver is notable for its excellence and because the first high T-rails were rolled for this work. The rolling stock equipment includes 306 cars for city and suburban service. Among these are comfortable "Seeing Denver" cars, always well patronized.

The types of cars used in the Denver city service were designed by the operating organization of the Denver City Tramway, and many were built in Denver. These cars are especially notable for their low weight. There are two general types of equipment—motor cars having either two or four motors and trail cars. Both types have the center side entrance, without doors, through which passengers are very satisfactorily and safely handled.

In the ELECTRIC RAILWAY JOURNAL for April 3, 1909, page 588, John A. Beeler, vice-president and general man-

ager of the Denver City Tramway, presented an article describing the operation of these cars and comparing the costs of operation of motor cars with trains of motor and trail cars. The 43-ft. closed four-motor car used in Denver weighs 43,400 lb. complete, and seats 52 passengers. During the rush hours these motor cars pull 38-ft. closed trailers weighing 13,000 lb. complete and seating 46 passengers. The problem of handling the rush-hour traffic with trail cars and the normal traffic of the day with single units has been carefully and satisfactorily worked out by the Denver City Tramway Company. A constant number of train units is operated throughout the day, and the rush-hour traffic is accommodated by the addition of a suitable number of trail cars to the motor cars, operating on the regular schedule with the regular headway.

The highly successful results with the operation of trail cars in Denver would not be possible, it is thought, if this company did not have so excellent a method of maintaining the regularity of its schedules. A telephone dispatching system serves this purpose. Nearly 20 years ago the plan of operating street cars by telephone was put into practice on the lines of the Denver City Tramway. With the growth of the railway system the dispatching methods and equipment have been improved, until now all cars in service on the city lines are operated directly under the orders of train dispatchers centrally located. The running time on all the lines and the time allowed for running between spacing points are published for the use of the trainmen, and by means of the telephone network, with call boxes along the lines, from which the crews report, the dispatcher is able to space the cars accurately and to handle them with great facility in times of emergency.

The power plants of the Denver City Tramway contain some very large reciprocating engine-driven generators, as well as later designed turbine units. The outlying lines of the tramway company are supplied with current through an a.c. transmission network feeding attractively designed substations.

Plans are now under way for the erection of new shop facilities for the Denver City Tramway. There will be found, however, in the present shops many ideas put into practice that have resulted in good car maintenance at low costs. The storekeeping and purchasing departments of the Denver City Tramway have complete systems for the handling and distribution of new and scrap materials that may be required at the five car houses.

The Denver & Northwestern Interurban Railway, which is operated by the City Tramway Company, reaches its terminus at Golden, the very foot of the Rocky Mountains. Golden is famous for being the scene of the earliest gold discoveries. This interurban road does a large freight business, particularly in the transportation of coal.

OTHER INTERURBAN LINES

A very interesting interurban line extending out of Denver is that of the Denver & Interurban Railway, which is the 30-mile electrified division of the Colorado & Southern Railroad. This line was described in the Electric Railway Journal for Sept. 5, 1908, page 595, and has two tracks between Globeville, a suburb of Denver, and Boulder, Colo. During the electrification work the roadbed was put into excellent shape and the tracks were relaid with 85-lb. rails and slag ballast. High-speed trains are operated over this line, taking single-phase current at 11,000 volts from catenary supported trolley wires. There are many detail features in connection with this road that will doubtless be of interest, and a trip over the line is doubly attractive because the snow-capped Rocky Mountain range is within sight from the car window.

Another interesting line is that of the Inter-Mountain Railway Company, which operates by steam from Denver to Ralston, a distance of 19 miles, and by electricity from Denver to Lakewood, Golf, Bee Hive, Rifle Range and Golden. This line has 16 cars, and takes power from Denver City Tramway Company.

OTHER ATTRACTIONS

Outside of its railway systems, the city has much to attract the visitor. Within half a day's ride of Denver and, in fact, in one county of Colorado the mountain peaks rival in number and height those in all of Switzerland. The various steam and electric lines radiating from Denver to the south, west and north lead directly to features of great interest to those interested in the wonders of nature.

South from Denver 74 miles is Colorado Springs, which has a well-built and well-operated city and suburban system reaching attractive natural features. From Colorado Springs the famous trip up the Pike's Peak cog railroad can be taken in a day. Other well-known haunts of the sightseer are the Garden of the Gods and the Seven Sisters' Falls. From Colorado Springs the Royal Gorge can be reached in four hours' ride. The Cripple Creek District Railway, operating both steam and electric lines, also affords a trip of intense interest. The electric cars of this road pass among the famous Cripple Creek gold-mining camps, located 10,000 ft. above sea level.

Another interesting railroad trip is offered over the New Denver, Northwestern & Pacific Railroad, which is extending its standard-gage line from Denver over the mountains toward Salt Lake City. In the summer, excursion parties are taken by steam train to the Rocky Mountain divide, where snow is found the year round, and this trip requires less than a day's time.

ACCESSIBILITY OF DENVER

If one is not familiar with the train schedules of the roads leading to Denver he will be surprised at the excellent service offered and the accessibility of that city from all parts of the country. Denver is about 1050 miles west of Chicago, and may be reached in about 30 hours' running time from any of four main trunk lines. The leaving time of the Denver trains from Chicago is such that close connection can be made with the fast trains from the Atlantic Coast cities. It is possible to leave New York at 3:30 o'clock one day on one of the 18-hour trains, have more than an hour in Chicago the next day, and arrive in Denver at 3 p. m. the third day, the total trip requiring but 50 hours. In point of time Denver is midway between New York and San Francisco. A direct line from Galveston to Denver affords good transportation service for the rapidly growing interurban territory of eastern Texas. There are also several through trains to Denver from St. Louis and Kansas City, which will afford comfortable traveling for those from the Southern States.

Three principal gages of line are used on the various railways in the Commonwealth of Australia. The most common gage, 3½ ft., is used on about 7000 miles of line, scattered over five of the States. The 5-ft. 3-in. gage is second in importance, and the 4-ft. 8½-in. gage, used only in New South Wales, third, with 3472 miles of line. There are also 82 miles of 2½-ft. gage, and 23 miles of 2-ft. gage. Standardization has been proposed, but no action has been taken.

MEETING OF EXECUTIVE COMMITTEE OF MANUFACTURERS' ASSOCIATION

A meeting of the executive committee of the American Street & Interurban Railway Manufacturers' Association was held, May 7, at the headquarters of the American Street & Interurban Railway Association, 29 West Thirty-ninth Street, New York. Those present were the president, J. R. Ellicott, H. F. Martin, K. D. Hequembourg, C. G. Castle, H. C. Evans, C. S. Hawley and James H. McGraw. W. S. McGowan was also present, representing O. H. Cutler, and S. M. Curwen, representing W. H. Heulings, Jr.

According to the amendments to the constitution and by-laws of the association, it was necessary to elect four vice-presidents, to take charge, respectively, of the subjects of entertainment, finance, exhibits and relations with the main association. Charles C. Peirce was elected vice-president in charge of entertainment; C. S. Hawley, vice-president in charge of finance; K. D. Hequembourg, vice-president in charge of exhibits, and James H. McGraw, vice-president in charge of relations with the main association. George Keegan was reappointed secretary-treasurer of the association.

The report of the committee on location, announcing the selection of Denver, was received and approved by the executive committee, and the officers of the association were authorized to execute the regular form of contract. The Brown Palace Hotel was selected as the headquarters in Denver for the Manufacturers' Association. The president was also authorized to appoint a committee of three on transportation. The members of this committee have not yet been announced. Charles C. Peirce was appointed chairman of the badge committee and James H. McGraw was appointed chairman of the printing committee.

Considerable discussion ensued on the question of convention souvenirs. It was found to be the experience of this association, as well as of other associations, that when souvenirs were given away at the different booths a great many people from the city in which the convention was located were attracted to the exhibits. These people were in no way interested in railway matters, but made every effort to obtain souvenirs, and often passed themselves off as railway men in their efforts to secure these gifts from exhibitors. The evil is one which has grown greatly in recent years at the electric railway conventions as well as at other conventions. It has been found so great a nuisance at the Master Car Builders' and American Railway Master Mechanics' conventions that the manufacturers' association connected with those associations passed a resolution following last year's convention that the members should not give souvenirs. As it was found that the same conditions had prevailed at recent electric railway conventions, the secretary of the American Street & Interurban Railway Manufacturers' Association was instructed to advise all members, in the next convention circular, that the practice of giving convention souvenirs was objectionable to the majority of the members, and it was the opinion of the executive committee that this practice should be discouraged and discontinued.

Great enthusiasm was expressed over the prospects for the next convention. Those members who were on the committee which visited Denver described the advantages of the city for convention purposes and the interest manifested in the proposal to meet there by Western managers. It was expected that the meeting would be very successful.

FINAL HEARING ON CENTER SIDE-DOOR SUBWAY CARS FOR NEW YORK

On Tuesday, May 11, Commissioner Eustis, of the Public Service Commission, gave a hearing on the question of side-door cars for the New York subway. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, was the only witness. The commissioner said that the Public Service Commission was still of the opinion that the Arnold end side-door car was the most practicable design if properly operated, but owing to Mr. Hedley's expressed preference for the center side-door car, the commission was willing to give the Interborough Rapid Transit Company as free a hand as possible. In view of the company's position he would not call for any further testimony on the question of side doors and would arrange to rescind the order for the operation of the Arnold trains when issuing an order covering the operation of center-door trains.

Mr. Hedley denied that the end-side-door train had not been properly operated. He said that, in fact, it had been operated according to the instructions of the Public Service Commission and its consulting engineer. In his opinion it was a failure and not as good even as the present equipment. He stated that the center-door train as constructed and operated by the Interborough Transit Company is the best kind of train that his company has ever had in the subway express service. It reduces the station waits and the discomfort of passengers waiting to get on and off.

Mr. Hedley said further that the 50 cars built about two years ago had been designed for ultimate center-door operation and could be easily converted for the express service. In that event the run of these cars could be so arranged that they would follow each other around the route. He was not entirely satisfied with the experimental train now in service, but the outlook was very encouraging. He was desirous, however, of embodying some improvements to add to the safety of the passengers. Not all of the cars should be changed forthwith for center-door operation on express routes, although he believed it would be done ultimately. It was advisable to get more experience on the subject by trying the 50 cars before changing over any others.

In response to a question from Commissioner Eustis, Mr. Hedley said that adjustable or sliding platforms to cover the gaps at the curved platforms would only add another source of danger. Such devices necessarily are complicated and have a tendency to get out of order. Mr. Hedley added that car manufacturers were now preparing detailed estimates on 100 subway cars which the company contemplates ordering for the fall service. No definite order could be placed, however, until the commission had specified what type it wanted. If the commission would render a decision within a week he would place the requisition for these cars before his board of directors and if approved the work on the new cars could then be started in time to have them available in the autumn. Commissioner Eustis intimated that a definite order concerning the type of side-door car satisfactory to the commission would be issued within 10 days.

The Lower Austrian & Styrian Alpine Railway, 157 miles in length, is to be changed from steam to the single-phase system. Fourteen 500-hp locomotives will be required. As the gage is only 30 in., side-rod locomotives will be used. The trolley voltage will be 6000.

CONTROVERSY OVER ABANDONMENT OF TICKETS IN PHILADELPHIA

The announcement of the Philadelphia Rapid Transit Company, published in the last issue of this paper, that it would withdraw from sale the tickets formerly sold at the rate of six for 25 cents and would charge a straight 5-cent fare, has aroused considerable opposition. On May 11 a public meeting to protest against the ruling was held at the Academy of Music. At this meeting Edwin O. Lewis, formerly a member of Councils, said he had letters from Bion J. Arnold and from Henry J. Pierce, vice-president of the Amsterdam Corporation, of New York, discussing the respective bases on which they would be willing to undertake an inquiry into the affairs of the transit company. These letters, made public later by Mr. Lewis, are as follows:

LETTER FROM B. J. ARNOLD

I would prefer that the commission for undertaking the work come from the city, for the reason that I have never as yet acted in similar cases except for the city, or, by agreement, for both the city and the companies interested, and although I know that in this case your connection, and of those you represent, is entirely in the city's interest, I hesitate about offering to accept the commission from individuals, for the reason that it would be establishing a precedent on my part that might be embarrassing to me in the future.

If, therefore, it is practicable to bring it about so that I represent the city in the analysis of the case it would be preferable to me, and I believe much more effective in the results to you, for the reason that I could, as the city's representative, probably secure information necessary for the proper conduct of my work that the companies might consistently refrain from giving were I acting for individuals.

I will furnish the necessary skilled assistants, such as engineers, draftsmen and accountants, to compile the information upon which my reports are based and make such reports as are desired.

This is the same basis upon which I have acted for the city of Chicago, the Public Service Commission of the city of New York and other municipalities and public bodies, and it has been found very satisfactory, as it enables my clients to have as much or as little work done as they desire, and at the same time puts it on a safe basis for me to undertake the work.

OFFER OF THE AMSTERDAM CORPORATION

The letter of the Amsterdam Corporation says:

Replying to your recent letter, would say that we are willing to undertake the preparation of a report upon the street railway system of Philadelphia, which shall contain a complete statement of its physical and financial condition, together with recommendations looking toward the establishment of first-class service at such rates of fare and issuance of transfers as is consistent with thorough maintenance of the property and fair return upon the capital it represents. The report would set forth the following:

A statement of the financial condition of the company; analysis of its agreements with subsidiary companies; character and extent of securities issued, owned or controlled by it; annual receipts and expenditures for, say, three years past; statistics and figures furnishing a complete financial statement.

A statement as to present value of entire property, together with estimate of cost and loss incurred in changing from horse-car system to cable and from cable to electricity, and setting forth as near as may be a fair and just value upon which the company should receive returns.

Routes: A careful study to be made of present routing of cars and volume of traffic and recommendations made for establishment of such routes as shall best conduce to economy of operation and convenience of the public.

Speed: Recommendations to be made as to requirements necessary to enable the rapid movement of cars, such as furnishing necessary power and passage of ordinance requiring vehicles to keep as much as possible off tracks.

Equipment: Recommendation of a standard, up-to-date type of car, to be gradually installed, which shall be commodious and comfortable, be equipped with the most practical electrical apparatus, have pay-as-you-enter feature, and not so heavy as to produce undue wear upon the tracks.

A thorough examination will be made of the physical condition of the property, such as power houses, car houses, track, equipment, and recommendations made, where necessary, as to their improvement.

Recommendations will be made for the establishment of such fares and issuance of transfers as consistent with first-class service under economical and capable management, together with a fair return to the company.

A statement to be made of results of operation of street railway systems in other large cities as compared with the service afforded at present by the Philadelphia system.

An analysis will be given of the existing situation between the company, the municipality and the public, together with recommendations for its improvement.

The report will be a comprehensive statement of the present condition of the street railway system of Philadelphia from a technical, financial and operating standpoint, and will present a plan for the establishment of relations between the public, the municipality and the company which shall be fair to all.

In order to furnish the information which you require and should have, and do ourselves justice, we should have, in the preparation of this report, the cordial co-operation of both the city authorities and the officials of the Philadelphia Rapid Transit Company. If the investigation is intrusted to us it shall be conducted with absolute impartiality, with the object of furnishing information and recommendations which will result in the settlement of all questions of difference now existing between the company and the municipality upon a basis that will be fair and just to all concerned.

The time required in the preparation of this report would be from two to three months, and we are prepared to undertake it with the understanding that the cost will range from a minimum of $25,000 to an amount not exceeding $35,000, depending on the required amount of detailed information.

OTHER DEVELOPMENTS

The City Club, of Philadelphia, has written letters to John B. Parsons, president of the Philadelphia Rapid Transit Company, and to Mayor Reyburn, announcing its intention to make an impartial inquiry into the relations between the city and the company. George Burnham, Jr., president of the club, in his letter to Mr. Parsons on the subject, indicates that it is proposed to make a study of the questions involved "with the consent and co-operation of the company:

"First. Under the direction of Bion J. Arnold, who reported on the street railway situation in Chicago and New York.

"Second. If this is not acceptable, under a chief expert to be named by the Railroad Commission of the State of Pennsylvania.

"In either event, it is proposed that your company pay one-half of the expense of the inquiry and the other half be paid by public subscription, to be raised by this club. If these terms be accepted the reservation shall be made that the chief expert named by the State commission shall be subject to the approval of yourself and of myself as president of this club."

William H. Carpenter, a representative of the city on the board of directors, is quoted as having said in regard to the new rule on fares:

"If there is any way under the sun for the company ever to pay dividends I think this had to be done. I left before a vote was taken regarding the fares. But I think the vote was a proper one. I have no interest in it and I have not been influenced by any one. I have nothing to do with conditions as they were. I must accept the conditions as

they are; I must accept the contract as it exists to-day. That contract was not of my making. The raise in fare was necessary. Operating expenses are increasing; the price of materials is increasing; something had to be done, and the only thing seemed to be to abolish the six-for-a-quarter tickets."

George H. Earle, Jr., who retired recently from the board of directors of the company, made a statement in which he said:

"The company was being ruined by barefaced frauds on the transfer system. They had to be stopped, or transfers, strip tickets, exchange tickets would all have been ended by a receivership.

"Now, the business question is simply this: The city cannot grow unless its means of transportation grow. This year the company will come out nearly even, but only by holding up repairs and stopping all extensions.

"That policy is not only detrimental to the city, but must sooner or later break down of its own weight.

"Is it not better to get the matter in shape at once? That was the question the board had to face. It knows more than any one about it; and I do not see how any one can therefore safely say it must be wrong. Personally, I do not think anything would justify this or any change in charges but business necessity; but I do think that if that exists, and the directors know best, it is justifiable."

Councils of Philadelphia have defeated resolutions demanding restoration of the six-for-a-quarter tickets.

WOOD PRESERVATIVES USED IN 1908

According to the United States Forest Service, more than 56,000,000 gal. of creosote and nearly 19,000,000 lb. of zinc chloride were used in preserving timber in the United States last year. Small quantities of crude oil, corrosive sublimate and other chemicals were also used. Assuming that on an average one gallon of creosote, or one-third of a pound of zinc chloride, will protect a cubic foot of timber from decay, more than 100,000,000 cu. ft. of cross-ties, piling, poles, mine and other timbers were given a treatment that will greatly increase their life and usefulness.

Never since timber treating began on a commercial scale in the United States has the domestic supply of creosote been equal to the needs of the industry. With the rapid development of wood preservation in recent years the insufficiency of the home production of creosote has become more marked. In 1908 almost seven-tenths—to be exact, 69 per cent—of the creosote used by the treating plants was imported, and but 31 per cent was obtained from domestic sources. Nearly three-fourths of the imported creosote comes from England and Germany; some is obtained in Nova Scotia, and some in Scotland and Holland. The domestic creosote used by the treating plants was obtained chiefly in New York, Philadelphia and other large cities.

Creosote is distilled from coal-tar, a by-product in the manufacture of illuminating gas and coke from bituminous coal. Not more than 20 per cent of the coke used in the United States is made in by-products ovens. No coal-tar is recovered from the beehive ovens in which most of the coke is made; consequently, the total production of coal-tar is far less than it would be with more conservative operations. Unfortunately, American operators do not even get the fullest use of the limited quantity of coal-tar made in this country, for it does not pay the operators to distill coal-tar for creosote alone; so, unless they can find a market for the associated products, it is not separated. The zinc chloride used in wood preservation is all obtained from domestice sources, according to the reports. Most of it is produced by a few large chemical companies.

The railroads have always taken a leading part in timber preservation in the United States. Twelve of the forty-four firms or companies which are operating timber-treating plants are railroad companies. The railroads also have many ties treated by commercial plants. Statistics upon the number of ties treated in 1908 have not yet been compiled. In 1907, however, according to Forest Products Bulletin No. 8, of the Bureau of the Census, the steam railroads of the United States used 19,192,000 treated ties, of which 11,217,000 ties were treated at their own plants and 7,975,000 ties were treated at other plants.

The electric roads used 664,000 treated ties in the same year, nearly two-thirds of which were purchased already treated. The majority of the treated ties used by the steam railroads was preserved with the zinc chloride, while with the electric roads more ties were treated with creosote than with any other one preservative.

PITTSBURGH A. I. E. E. MEETING

The regular monthly meeting of the Pittsburgh Section, A. I. E. E., was held in Carnegie Institute April 13, and was preceded by the usual dinner at the University Club. W. Edgar Reed, chairman, presided. The subject of the evening was "Repairing Live Lines While in Service," which was considered in a paper prepared by J. S. Jenks, assisted by W. H. Acker, both of the West Penn Railways, Connellsville, Pa. Mr. Jenks showed by means of a large number of lantern slides the system together with the tools which he and his assistants have developed on their 25,000-volt lines in order to avoid the necessity for linemen to come in contact with the line conductors, and showed how completely equipped poles could be stripped of all wires and crossarms, and the insulators, crossarms and conductors replaced without interrupting any circuit. The paper excited a lively interest among the body of engineers present, which included representatives from all the large electrical companies and public-service corporations in the territory. The discussion was participated in by H. N. Muller, D. E. Burke, W. H. Acker, N. W. Storer, A. J. Glenn, F. F. Espenschied, O. M. Jorstad, H. A. Calderwood, Graham Bright, R. A. L. Snyder and Bertrand P. Rowe.

F. Steinhart, general manager of the Havana (Cuba) Electric Railway, calls attention in the last annual report of that company to the efficiency of a system of discipline adopted in 1907, as follows: "The jury system established in October, 1907, whereby men chosen from the ranks of the carmen pass judgment upon infractions of rules committed by the men and determine the discipline to be imposed, was continued throughout the year 1908 with remarkable success. The feeling among the men in general, that they are judged by their own companions, is excellent. Aside from this, the men who serve on this jury acquire a knowledge of the importance of discipline and strict observance of the rules and regulations of the company, and can always be counted upon as important factors in harmonizing the interests of the company with the interest of the employees, and the exercise of this duty I find gives a sense of dignity and self-respect not only becoming the character of the men, but which adds to their private happiness."

COMMUNICATIONS

DISCHARGED EMPLOYEES

Shreveport Traction Company
Shreveport, La., April 28, 1909.

To the Editors:

Apropos of the communication of Mr. Funk, of Louisville, Ky., concerning discharged employees, the writer was a witness in a suit tried in a neighboring city during the progress of a large fair, and was surprised to notice several conductors in service who had been but recently discharged from this company on account of stealing. From personal observation they were appropriating several times as much money *each trip* as they had stolen during a *day's service* with us. One of them frankly told me he was expecting his discharge, but intended to move on to another city in the same territory; in fact, I gathered from him that the "bunch" was traveling in a drove. One of them had written back to our crew explaining what good "picking" was to be had in the city where they then were, and requesting some of our men to join them.

It occurs to me that concerted action on the part of all the companies interested, looking to the rejection of applicants who do not produce a service letter or clearance certificate of a very recent date, and showing continuous employment over a considerable period would eventually eliminate the movement of such employees. If the applicant pleads that he was inexperienced, one trustworthy motorman or conductor could "try him out"; if he claimed to have been engaged in other lines of work he should give full reference or produce his certificate.

I am not unmindful of the existing laws in some States relating to discharged employees, but the plan above outlined would not render the companies liable in any way, as the seeker of employment would be obliged to produce his letters, else sign a release in behalf of the company to whom inquiry was made. In my humble opinion all of the "undesirables" could in a short while be permanently retired from the service.

L. M. Levinson,
General Manager.

Sheboygan Light, Power & Railway Company
Sheboygan, Wis., April 27, 1909.

To the Editors:

In the April 24 issue of the Journal you print a communication from J. T. Funk, of the Louisville Railway Company, who puts his finger on one of the most abused features of electric railway operation. We heartily agree with Mr. Funk, and hope that some action will be taken by the American Street & Interurban Railway Association to prevent the re-employment of discharged men who have proved themselves unworthy of holding the position of motormen and conductors.

Four years ago it became my duty to reorganize the operating force of this company. Before that time accidents had been numerous and serious, and about that time actually threatened the existence of the company. Under Mr. Gonzenbach's instructions I rearranged for a systematic replacement of all the dead timber in our force, and it took some trouble, as well as diplomacy, to accomplish our purpose. I may here remark that since that time and during the past three and a half years the number of accidents has been negligible. No accident has occurred which has called for a settlement of damages in excess of $100, and the total sum paid altogether for damages within the last three and a half years has been less than $1,000, whereas the accidents during the two years previous to that had cost over $20,000. The difference, in my opinion, is entirely due to careful selection of employees.

To my utter astonishment I found that all of the undesirable employees who were weeded out from our force invariably found employment with other companies, and I was not surprised to hear from time to time of serious accidents on the lines of other companies in which, somehow or other, our old discharged employees figured; in fact, I know of three or four serious accidents which happened to cars in charge of some of our discharged former employees. We do not know if these employees were at fault, but the fact seems significant. It seems to me that a uniform reduction in damages would undoubtedly result from a more strict supervision of applicants' records, and by general co-operation among railway officers charged with the responsibility of employing platform labor.

H. J. Pagel,
Superintendent Railway.

COST OF CAR HEATING

Detroit, May 10, 1909.

To the Editors:

The article in your issue of May 8, page 876, prepared by W. A. Evans, Commissioner of Health, Chicago, is a valuable addition to the limited supply of information with regard to heating and ventilating electric railway cars. It is noted that the author of the article quotes costs for car heating as issued some time ago by the Chicago City Railway, these figures totaling 73 cents per day as the cost for heating a city car in Chicago by electric heaters. The basis on which this figure evidently has been obtained is for operation during a nine-hour period, while we believe an 18-hour basis approaches more nearly actual operating conditions.

It may not be uninteresting to present figures which differ widely from those quoted by Dr. Evans and which, contrary to his basis of figuring, show that a car can be heated more economically with hot water heaters than with electric heaters. With the idea in view of presenting

COMPARISON OF COST OF HEATING A 25-FT. CAR, 45 FT. OVER ALL, BY HOT WATER AND ELECTRICITY, BASED ON OPERATING CONDITIONS ON A 32-MILE INTERURBAN RAILWAY.

Conditions.	Hot water.	Electricity.
Weight of car with load....Tons	28	28
Schedule speed....M.p.h.	20	20
Car-miles per day per car....Miles	240	240
Cost of heating equipment installed....Dollars	175	75
Weights of heating equipment installed....Pounds	1400	225
Cost of electric power (at power station) per kw....Dollars	.0135	.0135
Watt-hours at power station, per ton mile....Watt-hrs.	125	125
Heating season....Days	180	180
Hours per day heating....Hours	18	18
Moving car equipment per ton-mile (at power station), Dollars	.0017	.0017
Moving heating equipment during heating season, per day....Dollars	.306	.0459
Weight of heating equipment during summer....Pounds	840	225
Moving heating equipment during summer day, per day....Dollars	.18	.0459
Heater coal consumed per day....Pounds	55	....
Cost heater coal per day at $7.50 per ton....Dollars	.206	....
Attendance for the season....Dollars	9	2.70
Interest and depreciation at 10 per cent heating equipment....Dollars	17.50	7.50
Repairs figured at....Per cent	3	2
Cost of repairs....Dollars	5.25	1.50
Increased feeders required....	2.70	20
Yearly cost feeders, interest and depreciation, at 7½ per cent....Dollars	6.06	37.50
Maximum current capacity of electric heater....Amp	....	18
Average kw at station, electric heater....Kw	....	5
Cost electricity per day, electric heater....Dollars	....	1.21
Summary:		
Interest and depreciation on heater equipment....$	17.50	$7.50
Repairs of heater equipment....	5.25	1.50
Attendance....	9.00	2.70
Interest and depreciation on extra feeders....	6.06	37.50
Elec. hauling heating equipment for one year....	88.70	16.75
Cost of coal consumed in one year....	37.08	....
Cost of electricity used in heater for one year....	....	217.80
Yearly cost....$	163.59	$283.75
Difference in favor of hot-water heaters....$		120.16

these figures to show that electric car heating costs far more than the amount cited by Dr. Evans, we submit the accompanying complete report of a test comparing under actual operating conditions the costs for heating the same type of car by hot water and by electricity. These tests were made by the Green Bay Traction Company, Green Bay, Wis., and are based on a small interurban car running at a schedule speed of 20 m.p.h. In the light of present costs, the charges in the hot-water column are high in some instances, but nevertheless the comparison of total charges shows a difference in the yearly cost of $120.16 in favor of hot water heaters.

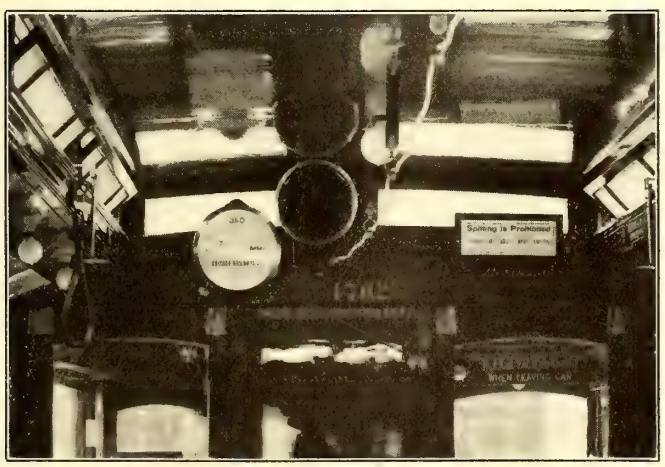
The Peter Smith Heater Company,
Daniel W. Smith,
President and Manager.

STREET ANNUNCIATOR IN CHICAGO

The Curtain Supply Company, Chicago, Ill., has placed on the market a street annunciator which is intended to facilitate the announcement of streets and stations and to give the conductor better control of his car. It was devised especially for installation on cars of the prepayment type, but has proved so successful that it is now also recommended for use on elevated and subway trains and all other trains where fast schedules and frequent stops are necessary.

The annunciator consists of a metallic mouthpiece, a metallic conducting tube and a distributing horn. The mouthpiece, which is adjustable to any required height, is attached to the end of the tube in the vestibule. The tube extends up to the top of the vestibule and through the bulkhead into the car, where it joins with the horn, which may be made secure at any desired point within the car. The horn resembles the horn ordinarily used on a phonograph. By the aid of this device the voice of a conductor is intensified sufficiently to assure it being heard distinctly in all parts of the car.

The illustrations herewith presented show the annunciator as installed on one of the pay-as-you-enter cars of the Chicago Railways Company. It will be noted that the speaking tube is located on the rear platform at a height convenient for the conductor, and that the horn is fastened



Interior of Car, Showing Horn of Annunciator

to the bulkhead in one end of the car. This type of installation will undoubtedly be the most common in practice, but the manufacturers have provided other forms to meet different conditions. If desired, a mouthpiece and speaking tube can be placed on the front as well as the rear platform, and the horn can be located near the center of the car. In either case all of the parts of the annunciator are painted the same color as the interior decorations of the car, and are not, therefore, unsightly. The device can be installed on any type of car.

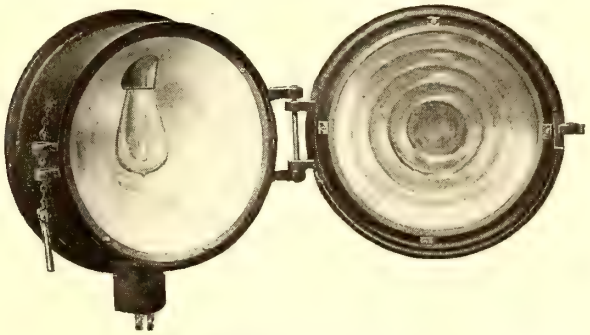


Conductor Using Mouthpiece of Street Annunciator

It is claimed the device, when properly used, facilitates the unloading of passengers, tends to prevent patrons being carried past their destinations, eliminates the draft ordinarily caused by the opening of the doors to announce street intersections or stations, allows the conductor more time to collect fares and look after the comfort of passengers, and helps to make it possible to maintain an even temperature within the car.

SEMAPHORE LIGHT FOR CITY CARS

The Trolley Supply Company, Canton, Ohio, maker of headlights and other lanterns for railway cars, is now offering for service on city cars the novel semaphore light shown in the accompanying illustration. This lamp is of sturdy construction and is recommended for use either as



Semaphore Light

a dash or signal light. The dimensions are as follows: Diameter, 11½ in.; depth, 6 in., and lens, 9 in. The lens usually furnished is white, but blue, green or red glass can be supplied if desired. The reflector is made of No. 18 gage, nickel-plated brass.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Indiana.—Eminent Domain—Proceedings—Hearing as to Right to Take—Pleading—Conclusions—Facts to be Established by Plaintiff.

Act Feb. 27, 1905 (Acts 1905, p. 59, c. 48; Burns' Ann. St. 1908, § 933), relating to eminent domain, provides that a defendant may object to proceedings for condemnation on certain grounds, which objections shall be in writing, filed not later than defendant's first appearance, and, if the objections are overruled, the court or judge shall appoint appraisers, as provided in the act. Held that, by the objections provided for, a preliminary hearing may be had, at which the landowner may controvert plaintiff's right to condemn his land, and have all such questions determined and disposed of by the judge in vacation or the court in term time, before making the interlocutory order appointing appraisers to assess damages.

An allegation, in a complaint in eminent domain proceedings, "that the change of line of said road is desirable with a view to a more easy ascent and descent to and from the same," etc., is a conclusion, and not a statement of fact.

An allegation, in a complaint in proceedings under Act Feb. 27, 1905 (Acts 1905, p. 59, c. 48; Burns' Ann. St. 1908, § 929 et seq.), relating to eminent domain, that "plaintiff has been unable to agree with the owner for the purchase of said land for the purpose of such change in the highway," is not insufficient as a mere inference, since it employs the language prescribed by section 930, providing that if such person, etc., shall not agree with the owner of the land touching the damages sustained, he may file a complaint.

Act Feb. 27, 1905 (Acts 1905, p. 59, c. 48; Burns' Ann. St. 1908, § 929), relating to eminent domain, provides that any person, etc., having the right of eminent domain, before proceeding to condemn, shall make an effort to purchase the lands, etc. Section 933 provides that defendant may file objections to the proceedings, and if they are overruled the court or judge may appoint appraisers. Held, that a corporation proceeding under the act must establish, as preliminary to its right to demand that the court appoint appraisers, that it is a corporation which is invested with the right to exercise the power of eminent domain, and that it has made an effort to purchase the property sought to be taken, and it is error to appoint appraisers without that proof being made.—(Slider et al. v. Indianapolis & L. Traction Co., 85 N. E. Rep., 372.)

Louisiana.—Constitutional Law—Obligation of Contracts—Impairment — Ordinance—Police Power—Surrender—Right to Charges and Tolls—Right "to Regulate."

Corporations and individuals are entitled to the same protection under the contract clause of the Federal Constitution.

An ordinance granting a right accepted and acted upon by the grantee becomes an irrevocable contract. The right cannot be amended or diminished without the consent of the grantee.

It is generally true of governmental power, especially the police power, that it cannot be surrendered or alienated.

The power retained after the grant does not include the authority to repeal, change, or modify the right granted.

An ordinance, granting the right to a street railway company to run its cars on terms and conditions stated, by its acceptance confers a right, and thereafter the City Council cannot lower the fare to be charged over the objection of the company.

If it were to do so it would impair the obligation of the contract. Cleveland v. Cleveland City R. R., 194 U. S. 517, 24 Sup. Ct. 756, 48 L. Ed. 1102; Detroit v. Detroit, 184 U. S. 368, 22 Sup. Ct. 410, 46 L. Ed. 592; Knoxville v. Knoxville, 189 U. S. 434, 23 Sup. Ct. 531, 47 L. Ed. 887.

The first authority cited directly reaffirms the other two; all three are pertinent. They announce the rule laid down by the Supreme Court of the United States.

In each of these decisions the agreement between the municipality and the street railway was treated as binding.

The right "to regulate" cannot be held to affect the contract right transferred by the ordinance and accepted by the company.

The contract in effect exempts the street railway from the municipal regulation of rates.—(Shreveport Traction Co. v. City of Shreveport et al. 47 S. Rep., 40.)

Massachusetts. — Evidence — Judicial Notice — Domestic Corporations—Organization — Corporations—Creation by Charter—Estopped to Question Constitutionality of Restrictions—Street Railroads—Organization Under General Law—Lawful Restrictions—Statutory Provisions—Estoppel — Unlawful Restrictions — Effect — Right of Municipal Authorities—Fixing Rates as a Condition of Granting Location—Failure to Have Railroad Commissioner Revise Fares—Subsequent Legislation — Reasonableness of Regulation — Time Governing — Carriers—Regulation — Fares — Pupils in "Schools"—Who Are Included—Words and Phrases—"Pupils."

The courts will take judicial notice that a domestic street railway corporation was organized under the general law, and not under a special charter.

A corporation cannot question the constitutionality of a proceeding in accordance with the charter, which it was content to accept.

Pub. St. 1882, c. 113, § 2 et seq., relating to the organization of street railway companies, provided that 15 or more persons might associate to form a street railway corporation, that the directors named in the articles might petition to the local authorities of the cities or towns through which the road was to run, and these officers might refuse or agree to such locations under such restrictions as they deemed for the interest of the public, and upon acceptance of such locations under the restrictions, if any, by the directors named in the articles, the corporation could be established. Held, that the granting and acceptance of a location under such lawful restrictions as were imposed by the officers granting the location was a condition precedent to the granting of the franchise to be a corporation, and if the restrictions were originally lawful, and were not withdrawn or subsequently modified, the corporation cannot, while it continues to exercise its franchise, complain of the enforcement of the restrictions to which it consented.

If a restriction imposed by a municipality in granting a street railway location were unlawful, either because it requires the performance of a forbidden act or because without its scope of authority, such restrictions could not be enforced; for, while the location would be valid, the attempt to impose unlawful restrictions would be a mere nullity.

Pub. St. 1882, c. 113, § 43, provides for the fixing of fares by the directors of a street railway, section 44 provides that on certain applications the board of railroad commissioners shall revise and regulate fares, etc., and section 45 provides that nothing in the two preceding sections shall authorize a company or the board to raise the fare above the rate established "for a locality" by agreement made as a condition of location or otherwise, except by mutual agreement with the local authorities. St. 1898, p. 743, c. 578, § 13, in force Oct. 1, 1898, in effect withdrew the right of municipal officers to impose conditions regulating and restricting fares, but confirmed prior locations and continued them, subject to regulations or conditions in force. Held that, in view of the statutes, the municipal officers, granting a location under which a street railway was organized, prior to October, 1898, could impose restrictions as to fares not unlawful in themselves, and the reasonableness thereof could not be thereafter questioned by a street railway company organized on the basis of such location and restriction.

Where the reasonableness of restrictions imposed in granting a location to a street railway are questioned in an action, only their validity at the time they were originally imposed is to be considered.

The word "schools" is one of broad signification, and sometimes it may appear, by the connection in which it is used, to include higher institutions of learning; but ordinarily, and without something to indicate that a wider meaning was intended to be given to the word, it will not be taken to include higher institutions of learning, such as collegs, universities, or institutions for the teaching of trades, professions, or business; and where a street railway was, as a condition to a grant of a location, required to provide to pupils in attendance upon the public schools, the State Normal School of W., or any school in W., transportation at half price while going to and from school, neither a college nor a business institute in W. could fairly come within the language of the restriction.

The word "pupils," by derivation and the definition of lexicographers, is properly applicable to children and youth, and students in colleges and professional schools are not called pupils; hence students attending a college or business institute are not properly within the correct construction of the term, nor the meaning of the restriction in question.—(Murphy v. Worcester Consol. St. Ry. Co., 85 N. E. Rep., 507.)

Massachusetts.—Street Railroads—Compelling Operation—Statutes—Retroactive Effect—Status—Duty to Operate—Licenses—Nature—Right to Abandon—Operation—Right to Discontinue—Railroads—Operation to Particular Point—Continuous Operation.

St. 1906, p. 302, c. 339, now St. 1906, p. 614, c. 463, pt. 3, § 76, provides, if a street railway voluntarily discontinues the use of any part of its tracks for six months, the streets

so occupied shall be cleared at the company's expense upon the order of the city, and if a street railway, without the right or lawful excuse, discontinues the use of any track and refuses to operate it when requested by the city, the Mayor may petition the Supreme Judicial Court to compel the company to resume the use thereof, but nothing contained herein shall be deemed a legislative construction of existing law or the impairment of existing rights to discontinue such use. Defendant street railway abandoned operation of a part of its road in 1905, before the enactment of the statute. Held, that a petition could be maintained under the statute to compel the company to resume operation, even though the statute was enacted after it had abandoned the road, as the statute did not affect any rights of the railway, but simply provided a new remedy for an unlawful discontinuance, and applied to past as well as future discontinuances.

Street railway companies are quasi public corporations organized for the exercise of an important public franchise, and bound to exercise the franchise for the benefit of the public, and not merely for their own profit.

As a bare license may, at any time, be revoked by the licensor, so the licensee may at any time wholly cease to avail himself of the permission given, and to discontinue his action thereunder, in the absence of an agreement to the contrary.

St. 1899, p. 264, c. 304, authorized respondent street railway to purchase the line it subsequently discontinued, and to complete the road and operate it, but did not compel it to do so. By. St. 1864, p. 30, c. 53, incorporating respondent's predecessor, its right to lay its track upon the streets was subject to the determination of the Mayor, etc., of the cities, and those officers could, after one year from beginning operation, revoke the location and require the tracks to be removed, and neither respondent's charter nor that of its predecessor required it to continue the operation of its road. St. 1864, p. 160, c. 229, § 19, provided that, if a street railway voluntarily discontinued the use of its tracks for six months, the tracks should upon the order of certain city officials be removed from the streets. After the enactment of the latter act, commissioners appointed under Resolves 1864, p. 333, c. 86, in their report advised that further provisions to allow city railways to discontinue the use of their tracks were unnecessary, nevertheless the provisions of section 19 were substantially re-enacted by St. 1871, p. 735, c. 381, § 25, Pub. St. 1882, c. 113, § 25, Rev. Laws, c. 112, § 36, and St. 1906, p. 614, c. 463, pt. 3, § 76. St. 1891, p. 794, c. 216, substantially re-enacted by St. 1906, p. 619, c. 463, pt. 3, § 97, provides that whenever, in the opinion of the railroad commissioners, additional accommodations are required upon any street railway, they may make an order requiring such accommodations after notice and hearing, and Pub. St. 1882, c. 112, §§ 14, 17 giving the board of railway commissioners general supervision over all railways, provides that upon complaint and application of the Mayor, etc., of any city in which a railroad is situated, the board shall examine its condition, and 20 or more legal voters may request the Mayor to make complaint, and on his refusal they may present their complaint to the board, which shall make such order as is necessary. Respondent street railway discontinued the use of the whole of a branch line, over which it had operated for some years and which was built by its predecessor, and suit was brought under St. 1906, p. 614, c. 463, pt. 3, § 76, to compel it to resume operations; but the board of railway commissioners had made no order to that effect. The discontinued line did not produce receipts sufficient to meet its running expenses. Held, that the course of legislation contemplated that a street railroad might discontinue operations, subject to certain control by the public officials, and the discontinuance was not "without right or lawful excuse," within the statute.

If a charter of a railroad expressly requires it to operate its road as a continuous line, it may be compelled to do so, and if its charter requires it to construct its road and operate its cars to a certain point, which it has done, it may be compelled to continue to do so; but if the charter simply authorizes the corporation to construct its road to a certain point, without requiring it to do so, it cannot be compelled to complete or maintain its road to that point when it would not be remunerative to do so.—(Selectmen of Amesbury v. Citizens' Electric St. R. Co., 85 N. E. Rep., 419.)

New York.—Carriers—Carriage of Passengers—Refusal to Give Transfer—Penalties—"Aggrieved Party"—Fares—Amount of Fare—"Connecting Branch Thereof"—"Main Line of Road and Any Branch or Extension Thereof"—Statutes — Construction—Surrounding Conditions—Other Statutes.

Railroad Law, Laws 1892, p. 1406, c. 676, § 104, provides that a street railroad corporation operating different lines of road under contracts shall carry between any two points on the lines embraced in the contracts any passenger desiring to make one continuous trip between such points for one single fare, and that the corporation shall give to such a passenger paying one single fare a transfer entitling him to a continuous trip, and that for every refusal to comply with the requirements of the section the corporation shall forfeit $50 to "the aggrieved party." Held, that the section contemplates a person who enters on or continues a trip with the actual desire of getting to some place, and whose controlling purpose is interfered with by an unjust refusal to give him a transfer, and who therefore is defeated of his aim, and does not apply to a person who boarded a car merely to seek information as to the custom of the corporation to issue or not to issue transfers at a certain point over a certain route, which information he desired for use in litigation, and who had no definite purpose of going to any particular place, since he was not prevented by the refusal of a transfer from accomplishing all he had intended, and was therefore not an "aggrieved party."

Railroad Law, Laws 1892, p. 1405, c. 676, § 101, provides that no corporation constructing and operating a railroad under the provisions of the article shall charge any passenger more than 5 cents for one continuous ride from any point on its road, or on any road, line, or branch operated by it or under its control, to any other point thereof, or any connecting branch thereof within the limits of any incorporated city, and that not more than one fare shall be charged within the limits of any such city for passage over the main line of road and any branch or extension thereof, etc. Held, that the terms "connecting branch thereof" and "main line of road and any branch or extension thereof" contemplate an original or main line which by an off-shoot and tributary line has been extended, the two constituting a single continuous and connected line of road, and not two originally separate lines not constructed with reference to one another, which have become related simply because they have been taken into a general railroad system; and hence, where a street car line did not of itself directly connect with another line upon which a passenger took passage and paid his original fare, but had to be reached by passage over a third line, the latter was not a "connecting branch" of the first line, and he was not entitled to ride on it without payment of additional fare.

In construing a statute, it is proper to consider conditions existing when it was enacted, and which it may be assumed the Legislature intended to meet, and also other statutes relating to the same subject.—(Bull v. New York City Ry. Co., 85 N. E. Rep., 385.)

MISCELLANEOUS

Colorado.—Negligence—Protection of Passengers from Other Passengers.

A common carrier is under the same strict obligation to protect a passenger from the negligence or wilful conduct of a fellow passenger that is to carry him safely.

Where a street railway passenger so carried a hoe that its handle caught under the hood of the forward car as it rocked up and down, and broke, hurling a piece back into the car and striking another passenger, the test of negligence by the carrier is whether, in view of the condition of the roadbed, the position of the trucks, and consequent rocking motion of the cars, and all the surrounding conditions, the conductor ought, as a reasonable man, to have anticipated or foreseen, as a natural and probable result of the way in which a passenger held his hoe, that this or a similar accident would likely happen.—(Farrier v. Colorado Springs Rapid Transit Ry. Co., 95 Pac. Rep., 294.)

Florida.—Railroads—Injuries to Licensees—Who Are.

A licensee is a person who is neither a passenger, servant nor trespasser, and not standing in any contractual relation to the railroad, and is permitted by the company to come upon its premises for his own interests, convenience or gratification.—(Gainesville & Gulf R. Co. v. Peck, 46 S. Rep., 1019.)

Michigan. — Damages—Pleading—Personal Injuries—Evidence—Sufficiency.

A declaration, in an action for injury to a street railway passenger, alleging that she was hurt, cut, bruised and injured in and about the face, head, body and shoulders, and was greatly injured and bruised internally, and in consequence thereof was sick, sore, lame, disordered and was seriously and permanently injured, and suffered a permanent injury to the spine, involving the spinal nerves, and that by reason thereof she suffered bodily pain, and will so continue to suffer, was sufficient to warrant the reception of evidence to show permanent injury to the uterus.

Evidence, in an action for personal injuries, held sufficient to warrant a finding that plaintiff's nerves were injured, and

that the trouble was organic, and not merely functional.—(Groat v. Detroit United Ry., 116 N. W. Rep., 1081.)

Missouri.—Carriers—Street Railroads—Ejection of Passenger—Malice—Questions for Jury—Pleading—Scope of Complaint—Evidence—Opinion Evidence—Damages—Excessive Damages.

Evidence held sufficient to warrant the submission to the jury of the question whether defendant street railroad's conductor, in ejecting plaintiff, a passenger, from a car, was insulting and abusive in his language and demeanor and acted with malice.

Where the complaint alleged that defendant street railroad company's conductor wrongfully refused to accept a transfer tendered by plaintiff, a passenger, accused the latter of attempting to defraud the company, and maliciously ejected plaintiff from the car, and that after plaintiff paid his fare and reboarded the car the conductor thereafter continued the charge in the presence of passengers that plaintiff had attempted to defraud defendant, the scope of the cause of action was broad enough to include insults offered during the entire period of transportation, and hence evidence as to what the conductor said after plaintiff returned to the car was admissible.

In an action against a street railroad for the wrongful ejection of a passenger from a car, accompanied by insulting and abusive language on the part of the conductor, it was proper for a witness to state that the conductor spoke sneeringly or angrily, and that his countenance bore a threatening or contemptuous aspect.

Plaintiff, accompanied by a woman, boarded defendant street railroad company's car and tendered the conductor transfers in payment of fare. The conductor refused to accept the transfers, saying that they were worthless, accusing plaintiff of trying to defraud defendant and threatening to put him off unless the fares were paid. Plaintiff thereupon paid the woman's fare, but refused to pay his own, and the conductor seized him and pushed him off the car, saying that he could not return without paying the fare. Plaintiff paid the fare and returned to the car, but the conductor continued to treat him in an insolent manner, saying: "Well, I put you off, didn't I? You feel a little better now, don't you?" etc. Held, that a verdict of $250 punitive damages was not excessive.—(White v. Metropolitan St. Ry. Co., 112 S. W. Rep., 278.)

Missouri.—Carriers—Injuries to Passengers—Street Railroad—Burden of Proof—Contracts—Construction—Lease—Affect—Evidence—Written Instruments—Sufficiency—Presumptions—Damages—Personal Injury—Excessive Damages—New Trial—Grounds—Res Ipsa Loquitur — Witnesses — Physicians — Competency — Appeal and Error—Review—Prejudicial Error—Evidence—Invited Error.

Where plaintiff, who was injured in a collision between street cars, sued two street railroad companies, and charged that she suffered damages through the negligence of the servants of both, the burden was on her to prove such charge.

A street railway company contracted with another to lease its railway to the latter for forty years in consideration of a specified rent to be paid and the performance of certain duties in the nature of the restoration of the property at the end of the term and for re-entry in case of default. The contract did not provide that the lessee company should transact business in the name or for the benefit of the lessor, except in so far as the former was benefited by the consideration to be paid by the latter. Held, that the contract was a lease and relieved the lessor company from liability for torts committed in the operation of the road by the lessees' servants.

Where plaintiff introduced in evidence a lease from one of the defendant street railway companies to the other, plaintiff could not thereafter object that the lease was void because of defendant's failure to show municipal assent thereto required by Const., Art. 12, § 20 (Ann. St. 1906, p. 309).

Where a street railway company leased its line and property to another company, it must be presumed in the absence of evidence to the contrary that municipal assent to such lease required by Const., Art. 12, § 20 (Ann. St. 1906, p. 309) was obtained.

Plaintiff was injured in a street car collision. None of her bones were broken, and there was only a slight temporary discoloration outwardly visible. There were no discoverable lesions or known existing abnormal organs traced to the injury, but she lost considerable weight, and claimed to be suffering from locomotor ataxia or paralysis, affecting her ability to walk. A commission of doctors appointed by the court, however, testified that her trouble was traumatic neurasthenia and traumatic hysteria, and that she would probably recover. There was also evidence that she had incurred indebtedness in the sum of $1,000 for medical treatment and $500 for drugs and medicines. Held, that a verdict awarding her $18,000 was excessive.

Damages so great as to indicate passion or prejudice on the part of the jury are ground for new trial.

Where, in an action for injuries to plaintiff, a street car passenger, in a collision between the car on which she was riding and a following car, the petition counted on general negligence, plaintiff was entitled to the benefit of the doctrine res ipsa loquitur.

The statute declaring a physician incompetent to testify concerning any information acquired from his patient while attending him in a professional capacity, and which was necessary to enable him to prescribe or do any act as a surgeon, did not disqualify plaintiff's physician from testifying in her action for injuries that on one occasion when he went to her house to collect a bill he saw her walking about and go up a flight of stairs without crutches.

Where, in an action for injuries, defendant's chief contention was over the extent and permanency thereof and the amount of damages, and the whole trend of plaintiff's case was that she could not walk without artificial aid, the erroneous exclusion of evidence of plaintiff's physician that on one occasion he saw her walk about the house and go upstairs without crutches was prejudicial.

In an action for injuries defendant offered to prove by plaintiff's physician that on one occasion he saw her walking about the house and upstairs without artificial aid, an objection that the witness was incompetent having been overruled, defendant's counsel then stated: "This doctor has not been discharged as plaintiff's physician, but has continued to treat her and was, at the time of going to see her with reference to his bill." On such statement the objection was erroneously sustained. Held, that the statement made by defendant was not an invitation to the court to change its ruling on the objection so as to render the changed ruling invited error.—Chlanda v. St. Louis Transit Co. et al., 112 S. W. Rep., 250.)

New York.—Carriers—Injuries to Passengers—Assault by Conductor—Damages.

A street car conductor called a passenger asking for a transfer a "Sheeny" and struck him in the face, causing his nose to bleed, necessitating his leaving the car. There were other passengers on the car, and he was a peaceable, law-abiding citizen, holding an important position with a manufacturing company. Held, that a verdict for $500 was not excessive.—(Coorman v. Brooklyn Heights R. Co., 111 N. Y. Sup., 531.)

Washington. — Carriers—Railroads—Operation of Cars—Transportation of Passengers—Performance of Contract by Carrier—Rights of Passengers—Trespassers—Ejection—Force—Questions for Jury—Assault by Servant—Scope of Employment.

An electric railroad is not required to run all its cars the entire length of its line in the same direction, nor provide for the transfer of passengers from one car to another in the same direction, but may run its cars to such points or stations as will best serve its own convenience and the convenience of the traveling public, and require passengers to take such cars only as will transport them to their destination without change.

Where a passenger boarded an electric car going in the direction he desired to travel, but not to his destination, owing to his own mistake in taking the wrong car, he was required to leave the car on the conductor's request that he do so at the end of its journey, notwithstanding the conductor's refusal to give him a transfer to another car on which he might complete his journey for the same fare, and, on his refusal to do so, he became a trespasser subject to ejection.

Where a passenger became a trespasser on an electric car, the carrier's employees were entitled to use only such force as was reasonably necessary to eject him from the car in case he refused to leave of his own accord, and were not entitled to eject him while the car was in motion, so as to endanger life or limb, nor to wilfully or unnecessarily assault him.

Where, in an action for the ejection of a passenger from an electric car after he had become a trespasser, there was evidence that more force was used than was necessary, and a wilful and unprovoked assault had been committed, the weight of such testimony was for the jury.

Where a car greaser employed by an electric railroad company committed an assault on a passenger who had become a trespasser in endeavoring to eject him from the car, the greaser's act was not within the scope of his employment, so that the carrier was not responsible therefor, unless what was done was to assist the conductor, at his express or implied request.—(Mills v. Seattle R. & S. Ry. Co., 96 Pac. Rep., 520.)

News of Electric Railways

Cleveland Traction Situation

A report of the operation of the Municipal Traction Company, Cleveland, Ohio, for April, made on May 5, shows a surplus of $68,444. The total deficit of the company from May, 1908, to January, 1909, amounting to $229,678, has been reduced to $71,047, and it is believed that the surplus for May will offset the deficit which now remains. As it is, the deficit from 3-cent-fare operation has been cleared up. The remainder came under the receivers while they were operating at the old rate. In three months of operation under the fare allowed by the franchises the receivers have cleared up the books and after the present month the surplus receipts will go to other funds. The report for April follows:

Gross earnings		$509,487
Maintenance	$96,010	
Transportation	169,903	
General	37,808	
		303,721
Net earnings		$205,766
Neutral Street Railway rental	$936	
Taxes	24,114	
Interest rental	38,893	
Dividend rental	73,378	
		137,321
Surplus		$68,444

At the meeting of the City Council on May 4 the treatment of the stockholders of the Forest City Railway in the event of settlement was discussed. Mayor Johnson insisted that they should lose nothing in case of a reduction in the valuation of the property of the Cleveland Railway from the figures reached a year ago. Horace E. Andrews, president of the company, stated that the companies had been consolidated and that it would be impossible to proceed with negotiations on any other basis than that all stockholders should be treated alike. The Mayor insisted that there had been no consolidation and that the Cleveland Railway is still bound by a gentlemen's agreement.

On May 5 Mayor Johnson issued a statement to the effect that he is willing to accept the finding of a board of arbitration on the value of the property of the Forest City Railway and the Cleveland Railway and to make an agreement in advance on that point. Mr. Andrews refused to make even a tentative statement until he had considered the matter. Mr. Johnson refused to give his reasons for changing his mind other than that representatives of both sides have the right to alter their opinions if they think they have been in the wrong. The opinion prevails that the Mayor desires to force a disagreement on the maximum rate of fare if a disagreement must result; and the expectation is that in this case the difference would be made a campaign issue this fall.

At the meeting on May 5 Mr. Andrews stated that it will be of little use to proceed further with the negotiations until an adequate maximum rate of fare is agreed upon. He read additional letters from representatives of Speyer & Company and N. W. Harris & Company, New York, stating that the bonds could not be handled to advantage with a maximum of seven tickets for 25 cents and that there is serious doubt whether they could be sold at all. The letters from these men also stated that the clause giving the city an option to take over the property would defeat the sale of bonds unless a sinking fund is provided and the city agrees to assume the payment of the bonds.

The City Council has voted that the members of the board of arbitration need not necessarily be residents of Cleveland. This will give a wider latitude for the selection of men who have the ability to consider a subject of this kind and render a valuation that will be fair to both the company and the city.

The receivers have put a large number of men to work on the various lines replacing wornout track and will continue the work until the money allowed by the court is exhausted. The receivers have a fund of $552,000 and another distribution to the preferred claimants could be made if thought best by the court. Holders of bonds which become due in July may object to further distributions, however, until these obligations have been satisfied. Nothing has been made public regarding the manner in which this matter will be handled.

Mr. Andrews returned from New York on May 9 to resume negotiations on May 10, but Mayor Johnson telegraphed from New York that if he was not urgently needed by the City Council he would like to remain in New York a few days. Later Mayor Johnson notified City Solicitor Baker that he would not return until May 18. The meeting originally set for May 10 was adjourned subject to the Mayor's call and Mr. Andrews returned to New York. The City Council was to have voted upon a maximum fare on May 10, but consideration of this matter was also postponed.

Program for Meeting of Central Electric Railway Association

The regular meeting of the Central Electric Railway Association will be held at The Anthony, Fort Wayne, Ind., June 3. It is suggested to members living at a distance that the trip be made in special interurban cars, which will tend to increase the interest and make the trip one of immense value by personal observation. Members may invite any friends they wish to have present at this meeting. It is especially urged that electrical engineers and master mechanics attend. The program for the meeting follows:

MORNING SESSION

10:00 a. m.—Business session and reports of special committees.

10:45 a. m.—Would Piece-Work System be Practicable and Profitable? Paper by J. A. Gohen, representing the Cleano Company, Indianapolis, Ind.

11:30 a. m.—Report of executive committee on Charges for Handling Equipment.

12:00 m.—Adjournment for luncheon.

AFTERNOON SESSION

1:30 p. m.—Auditing Department. Paper by W. B. Wright, auditor, Indianapolis & Cincinnati Traction Company, Rushville, Ind.

2:30 p. m.—Description of Spy Run Power House. Paper by M. J. Kehoe, superintendent of power, Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.

3:15 p. m.—New Things for the Benefit of Our Members.

4:00 p. m.—Visit to Spy Run power house on Fort Wayne & Wabash Valley Traction Company's line.

A. A. Anderson, president of the Central Electric Railway Association, has made the following request:

"It has been suggested that it will add greatly to the interest of our meeting in Fort Wayne on June 3, if members attending will come prepared to tell of any new devices or appliances they have adopted, or of any new methods they have applied in operation, construction or equipment.

"Please let me know if you have 'anything new' to tell us about, and we will give you an opportunity to present the matter for the benefit of the 'Craft.'

"We are sure an exchange of ideas will be interesting and beneficial.

"Supply men who are members of the association are invited to display new apparatus or appliances, models or samples, and should make early application to the hotel management for space in rooms or corridors."

Transit Affairs in New York

The Board of Estimate and Apportionment, to which the Public Service Commission referred the franchise grant of the Hudson & Manhattan Railroad which it has already approved, has referred the matter to a committee consisting of Comptroller Metz, President McGowan, of the Board of Aldermen, Borough President Ahearn and Chief Engineer Lewis, of the city, and ordered a public hearing on the application for May 14. The conditions of the grant have already been accepted by the Hudson & Manhattan Railroad.

To save work and expense in dealing with railroad franchises the Public Service Commission has proposed to the Board of Estimate that a uniform standard of franchise for street railways be adopted by the two bodies. The commission recommends that grants be for as short periods as possible to assure good service; that a scale of rates for compensation be established and that questions of repairs and allowances, which are similar in nearly all surface-car franchises, should be worked out on a uniform basis.

The Public Service Commission has reconsidered its action of a month ago, refusing approval of the franchise granted by the Board of Estimate and Apportionment for the building of an extension of the Union Railway in Pelham Avenue from Third Avenue at Fordham College east about 3000 ft. to the Southern Boulevard at the northern

entrance to the Zoölogical Park. The commission's refusal was based partly upon the fact that while the company applied for a franchise from the Southern Boulevard clear across the Bronx to Pelham Avenue and Sedgewick Avenue and across University Heights Bridge to Broadway in Manhattan, it proposed to build at once only the section east of Third Avenue. Commissioner Eustis, who wrote the opinion on which the commission acted, states in a supplemental opinion that he had become satisfied that the bondholders will not consent to the building of the complete line at present and that consequently only the section east of Third Avenue can be built. Frederick W. Whitridge, receiver of the company, has paid the $52,000 consideration fixed by the commission for the franchise.

The Metropolitan Street Railway has sent a letter to the Public Service Commission regarding its 145th Street line, in which it says: "We are quite willing to continue to operate the 145th Street line, but we do not intend to subject ourselves any further to charges that we are operating in violation of law. We think that the present is the best time to determine the question whether the operation of the line shall be continued, and we shall be obliged if you will let us know whether in view of the facts stated in our letter to the Board of Estimate and Apportionment you consider that our operation on 145th Street is unlawful and should be discontinued. If that be your view and you are ready to assume the responsibility of directing us to cease operation we shall comply with your order, but we desire to have it distinctly understood that the responsibility for the cessation of operation rests on you and not on us." The letter has been referred to Commissioner Maltbie, who will hold a public hearing and then report back to the commission.

The Public Service Commission has received a petition of realty interests asking for the construction of a west side subway on what is known as the Seventh Avenue route from Times Square to the Battery. The petition has been referred to the special committee having subways under consideration.

New York Electrical Show.—The electrical show in New York will be held this year at the Madison Square Garden from Oct. 11 to 21. This is the third annual show of the kind. The directors of the show are: Arthur Williams, president; George F. Parker, vice-president and general manager; Dudley Farrand, secretary, and Walter Neumuller, treasurer.

Massachusetts Railroad Commission Approves Cambridge Subway Plans.—The Massachusetts Railroad Commisison has formally approved the location and construction of the tracks, stations and approaches of the subway to be built in Cambridge by the Boston Elevated Railway between the Charles River and the Harvard Square district. Stations will be located at Kendall, Central and Harvard Squares.

Lake Shore Electric Railway Offices Moved from Norwalk to Sandusky.—The operating offices of the Lake Shore Electric Railway will hereafter be located in the Moore Building, Sandusky, Ohio, where quarters have been leased for a period of years. F. W. Coen, vice-president and general manager; L. K. Burge, general superintendent; A. C. Henry, auditor; Harry Rimelspach, claim agent; C. E. Mason, assistant claim agent; E. P. Denman, roadmaster; J. O. Mann, chief lineman, and A. V. Brown, engineer, will all have their headquarters in Sandusky.

Technology Club House in New York.—The new club house of the Technology Club of New York City, at 17 Gramercy Park, was opened with appropriate ceremonies May 7. The president-elect of the Institute of Technology, Dr. Richard C. Maclaurin, made an address and I. W. Litchfield, secretary of the second technology reunion committee, described the plans for the proposed Technology Reunion in Boston, June 7 to 9. The new club house is much more spacious and conveniently located for most Technology men than that formerly occupied on Twenty-eighth Street and adjoins the Princeton Club and the National Arts Club.

Cleveland Subway Discussed.—At a special meeting of the City Council of Cleveland on May 4, a difference of opinion arose as to whether the Cleveland Underground Rapid Transit Company, recently incorporated, should be granted a franchise covering both the proposed upper and lower level subways or whether separate franchises should be provided. The lower level subway would be largely for the use of the steam roads, while the upper subways would probably be used for city traffic. It is probable that the interurban cars may also be handled in the lower subway. A committee of the Chamber of Commerce will give its views to the City Council.

Lecture on the New York Subway.—On April 23 Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, addressed the Men's Forum of St. Andrew's Memorial Church, Yonkers, N. Y., his subject being the New York subway. Mr. Hedley stated that while the daily papers and citizens in New York often speak about the subway as being built with the money of the city, the interest on the bonds and all charges to the sinking fund by which these bonds will be retired are paid by the company. Mr. Hedley also described the generating and transmission system of the company, the development of the steel cars, the block signal system and other technical features of the line, and dwelt briefly upon matters like the proposed operation of special cars for women, which have attracted considerable attention recently.

Meeting of the New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on April 30. The usual technical program was dispensed with and the evening was devoted to a series of addresses on the work of the United States Navy. The guests of the club were Rear-Admiral William Swift, U. S. N., Commandant of the Boston Navy Yard and Naval Station; Colonel T. N. Wood, U. S. M. C., in command of the marines, Boston Navy Yard; Captain M. H. H. Sutherland, U. S. N., in command of the battleship *New Jersey* at the present time and also on the recent trip of the battleship fleet around the world, and Medical Inspector H. E. Ames, U. S. N., in command of the Naval Hospital at Chelsea, Mass. All spoke on naval topics at the conclusion of the banquet. About 150 members of the club and their friends were present.

Electrification Plans of the New York, New Haven & Hartford Railroad.—On page 702 of the issue of the Electric Railway Journal of April 1, 1909, it was mentioned that plans were under consideration by the New York, New Haven & Hartford Railroad for the electrification of the company's line between Stamford and New Haven. On May 10 the company issued the following statement regarding this matter: "In connection with the rumor relative to the extension of the electrification of the New York, New Haven & Hartford Railroad, preliminary estimates have been prepared and submitted for the information of the board of directors, and the entire matter is being considered by the board, but it is unlikely that any definite action will be taken or authority granted for some time. The extension is a work of very considerable magnitude, and the preparation of detail plans and specifications will consume considerable time before the actual work of construction is commenced."

Exhaust Steam Turbine Discussed Before the Chicago Electric Club.—At the weekly luncheon of the Electric Club of Chicago, on May 5, W. L. Stockton, manager of turbine sales of the Western Electric Company, discussed the exhaust steam turbine. He called attention to the very high heat economy obtainable by the use of a steam regenerator and exhaust steam turbine in connection with a reciprocating engine. The steam regenerator is a large shell in which a mixture of hot water and steam is held and into which the low-pressure cylinders of the reciprocating engine exhaust. The exhaust steam turbine takes its steam supply from the regenerator. With this large steam and water-holding capacity between the engine and the exhaust steam turbine the combination of units will readily absorb railway peak loads with economy, because the pressure in the regenerator decreases as the load increases and the hot water in the regenerator quickly supplies steam to maintain the overload on the turbine. Such regenerators have been built to carry the full load of moderate sized turbines for from four to eight minutes. Mr. Stockton did not claim that the exhaust steam turbine would increase the economy of all reciprocating engine plants, but said that the condenser problem is the determining factor, and that on this account and on account of the increased efficiency available in suitable installations, a thorough study of the possibilities of the exhaust steam turbine is warranted before increasing the engine capacity of any plant.

Advertising Campaign of the Interborough Rapid Transit Company.—Mention was made in the Electric Railway Journal of April 17, page 747, of the publication by the Interborough Rapid Transit Company in the daily newspapers of New York on April 13 of the first of a series of advertisements dealing with affairs of the company in which the public is interested. The first advertisement was entitled "What Chokes the Subway?" Since April 13 a number of other cards by the company have appeared in the press, perhaps the most important of which were entitled "The Safest Rapid Transit in the World," "It Costs

Seven Cents—You Pay Five," and "Four More Express Tracks for the Bronx." The very important fact was brought forcibly to public notice in the advertisement "The Safest Rapid Transit in the World," that more than 900,000,000 passengers were transported in the last two years by the company without a single fatality. In the advertisement "It Costs Seven Cents—You Pay Five" the company laid emphasis on the fact that it costs on the average 7 cents to carry every passenger that rides from the Bronx to the Brooklyn Bridge. As the company said, the long-haul loss is part of its business that must be met by short-haul profits, but that, short-haul and long-haul, its subway profits last year amounted to less than 6 per cent on cost. The advertisement "Four More Express Tracks for the Bronx" contained general reasons why the company should be granted the rights for which it has applied to build new lines.

Meeting of the Detroit Committee.—A meeting of the committee of 50 selected by Mayor Breitmeyer, of Detroit, to consider the terms of the extension of the franchise of the Detroit United Railway was held on May 3. The committee on extension and rearrangements made a final report. It recommends an increase in the mileage in Detroit from 195 miles to 270 miles, suggesting the construction of 57 miles of new double track and 26 miles of single track to make the present single track double. Only 9 miles of track now laid are recommended to be abandoned. Details are given of the routes which the committee thinks ought to be established so as to improve the service when the new lines which it has recommended are placed in operation. In considering the future transit needs of the city, the committee calls attention to the growth of the city as a manufacturing center and to the poor arrangement of the streets in different parts of the city and to the multiplicity of grade crossings. It recommends that the construction of a subway along Jefferson Avenue and Woodward Avenue to care for the Bell Isle and State Fair traffic be considered at once. The committee on paving and taxes presented data on some of the subjects which it has already considered, and announced that at a meeting in the near future it proposes to present additional figures on the cost of repaving and renovating the tracks of the 3-cent fare line. The committees on appraisal, municipal ownership and legal matters announced that their final reports will not be ready for presentation to the committee of the whole for 60 days. The members of the committee that visited Cleveland recently to study operating conditions in that city expressed their views individually. The opinion is that actual conditions in Cleveland disprove the statements made by municipal ownership advocates in Detroit regarding the results obtained in Cleveland during the short experiment there.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The supporters of the public utilities bill in the House succeeded on May 5 in fighting off a vote to reconsider the vote to refer the bill to a special committee. On May 6 the point was decided, based on a ruling of 1897, that the adjournment in the midst of debate did not end the legislative day. The motion to reconsider being before the House, Representative Burns forced a roll-call vote, which was carried affirmatively, 124 to 95. A resolution was then carried naming a joint committee to frame a new bill without delay. The Senate had adjourned for the week, however, before the matter could be presented before that body.

Massachusetts.—The reports of committees on matters of interest to street railways are now largely finished. One of the important measures pending in the House provides for a report by Jan. 10 by the Railroad Commission and the Boston Transit Commission acting as a joint board on the desirability of constructing additional subways, tunnels and elevated structures in Boston. Twelve petitions and proposed bills were given hearings by the committee on metropolitan affairs prior to the recommendation for a joint report. All relate to proposed new subways or tunnels, or to the use of existing subways or tunnels in Boston, and one relates to the necessity and the cost of construction of a tunnel or subway between Boston and Chelsea. If the resolve passes both branches the question of future transportation developments in Boston will be left open for action next year. After a public hearing and various conferences the joint board of the Railroad Commission and the Boston Transit Commission has reported to the Legislature that in view of the pending resolve for a general investigation of the transit bills, and a resolve for a similar investigation into various financial and corporate questions affecting the Boston Elevated Railway in particular, with an important bearing on the whole question of transportation within the metropolitan district, it would be more desirable to consider the application of the Boston & Eastern Electric Railroad to construct a tunnel under Boston Harbor in connection with the anticipated forthcoming study of the whole situation by the joint board than as a single transportation problem. The joint board states that if the resolves before mentioned do not pass, or if the Legislature should desire that a bill be drawn up in favor of the Boston & Eastern Electric Railroad containing the necessary safeguards and restrictions, the board will endeavor to comply promptly with such a request. The past or future action of the Railroad Commission with respect to the public convenience and necessity of this project is not prejudiced by the report sent this week by the joint board to the Legislature, but the project is now before the Senate and House for decision whether present action or postponement shall take effect at the current session. The Senate has given a first reading to the adverse report of the committee on taxation regarding the so-called Dean bill purporting to provide for a more equitable distribution and system of taxation for corporations. The Senate bill to change the date when stockholders in railroads and street railways may subscribe for new stock has passed the Senate to be enacted. The bill to allow the Connecticut Valley Street Railway to fund its floating debt has been passed to be engrossed by both the Senate and House, and will probably be laid before the Governor within a few days. The committee on taxation has reported favorably the Fairbanks petition and bill providing for the taxation of poles and wires erected on private property by private corporations. This bill provides for the assessment of underground conduits, wires and pipes laid in streets or private property or on a railroad by any corporation except a railway company. It also provides for the deduction from the corporate franchise valuation of a railroad, telegraph or street railway of so much of its capital stock as is proportional to that part of the line outside the State, as stated in the acts of 1902, and for deduction of the value of real estate, machinery, underground conduits, poles, wires and pipes subject to local taxation within the State. In the existing law the item of poles was not deducted from the franchise valuation in making assessments, and this measure if passed will tend to reduce the dangers of over-taxation through the omission or the withdrawal of important portions of the physical plant of street railways and other public utility corporations. The committee report has been received by the House and given a first reading. The bill to provide for a consolidation of the properties and franchises of the Boston Elevated Railway and the West End Street Railway has been passed to be engrossed by the House.

Missouri.—The House passed the Wade public utilities bill on May 5 by a vote of 72 to 59. The fate of the bill in the Senate is uncertain. It is a drastic measure in many respects, supplanting the public utilities commissions of St. Louis and Kansas City, created by the last Legislature, and appointed by the mayors of the respective municipalities. It also abolishes the Railroad & Warehouse Commissioner and places in the hands of five men, to be named by the Governor, power equal, as far as State utilities are concerned, to that possessed by the Interstate Commerce Commission to regulate national utilities. Governor Hadley has promised to appoint as members of the commission the three present members of the Railroad & Warehouse Commission, two of whom are Democrats. The bill carries an appropriation of $75,000. Each commissioner is to receive $3,500 annually and the secretary $2,500.

Pennsylvania.—Governor Stuart has signed the Murphy bill providing for connections between the tracks of steam railroads and electric railways and the interchange of both passenger and freight cars over such connected tracks, provided consent is secured from local authorities, which is made revocable after 10 years. The Shields bill, which the Governor has also signed, gives street railways the right to transport all kinds of freight, subject to consent of local authorities, and is revocable after 10 years. Among the bills of interest to electric railways which the Governor has vetoed are the Bentley boiler inspection bill, the measure providing that "any foreign corporation registered in this commonwealth may purchase, hold or acquire not more than 1000 acres of land within this commonwealth in its corporate name and in the transaction of its business"; the Wertz bill, extending the authority of the Courts of Common Pleas over the disputes as to the reasonableness of the amount of license fees "names in any ordinance of a municipal corporation for the inspection and regulation of the poles, wires, cables, conduits, pipes and other instrumentalities under its police powers," to water, gas, natural gas and other companies and corporations occupying said public highways, thereby including electric railway companies, and the bill for the incorporation of motor omnibus companies for the purpose of carrying passengers for hire.

Financial and Corporate

New York Stock and Money Market

May 11, 1909.

For another week the stock market has been strong in tone and fairly active. The better condition of industrial business, the increase in railroad earnings and the general feeling of optimism as to the future are responsible for a strength with which no existing reactionary element can compete successfully. While the trend of prices is upward the traders take in profits at every advance. The traction stocks have been fairly active with trifling price changes.

Money continues easy and cheap. To-day's quotations were: Call, 1½ to 2 per cent; 90 days, 2¾ to 3 per cent.

It is certain that continued improvement in business will lead to greater absorption of funds for manufacturing and mercantile purposes, which will be reflected in increasing demands for funds and, eventually, higher rates.

Other Markets

In the Boston market, tractions were inactive with prices practically unchanged.

In the Philadelphia market, traction shares were the absorbing feature, due to the abandonment of the sale of six tickets for 25 cents. During the last week Rapid Transit has shown a tendency to decline on heavy transactions. From the high point of 36½ the stock sold off to 31¼. To-day large interests came forward with supporting orders and the market closed at 33. Union Traction also sold 3 points lower during the week.

With the exception of Subway, there has been little trading in tractions in Chicago. This stock advanced to a new high record, 28½. Kansas City Railway & Light has been in evidence to some extent.

Heavy transactions in the bonds of United Railways marked the Baltimore market. Prices were a trifle stronger. A few blocks of stock were sold at 11½ to 12.

Among the New York sales of securities at auction last week were $90 Lexington & Eastern scrip, 30½.

Quotations of various traction securities as compared with last week follow:

	May. 4.	May 11.
American Railways Company	45½	45½
Aurora, Elgin & Chicago Railroad (common)	*38¼	a37½
Aurora, Elgin & Chicago Railroad (preferred)	*88	a87½
Boston Elevated Railway	129	128½
Boston & Suburban Electric Companies (common)	*15	*16
Boston & Suburban Electric Companies (preferred)	72	72
Boston & Worcester Electric Companies (common)	12	12
Boston & Worcester Electric Companies (preferred)	56⅞	a58
Brooklyn Rapid Transit Company	78⅝	79⅞
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	86½	87½
Capital Traction Company, Washington	137	135½
Chicago City Railway	*190	*190
Chicago & Oak Park Elevated Railroad (common)	*4½	*4½
Chicago & Oak Park Elevated Railroad (preferred)	*11	*11
Chicago Railways, ptcptg. ctf. 1	a110	*110
Chicago Railways, ptcptg. ctf. 2	238	*39
Chicago Railways, ptcptg. ctf. 3	a28	*28
Chicago Railways, ptcptg. ctf. 4s	*11½	*9½
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a77½	a78
Consolidated Trac. Co. of N. J., 5 per cent bonds	a107¼	a107
Detroit United Railway	*57	*57
General Electric Company	159¼	159½
Georgia Railway & Electric Company (common)	84	85
Georgia Railway & Electric Company (preferred)	84	*84
Interborough-Metropolitan Company (common)	*16⅞	16½
Interborough-Metropolitan Company (preferred)	46⅜	46
Interborough-Metropolitan Company (4½s)	80	79½
Kansas City Railway & Light Company (common)	*52	49¼
Kansas City Railway & Light Company (preferred)	*83	85¼
Manhattan Railway	144⅞	146
Massachusetts Electric Companies (common)	14	a14½
Massachusetts Electric Companies (preferred)	71	a71½
Metropolitan West Side, Chicago (common)	a19	*19
Metropolitan West Side, Chicago (preferred)	a50½	*50½
Metropolitan Street Railway	26	*26
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83¼	83
Northwestern Elevated Railroad (common)	a24	*24
Northwestern Elevated Railroad (preferred)	a71	*71
Philadelphia Company, Pittsburg (common)	43½	a43½
Philadelphia Company, Pittsburg (preferred)	43	a44
Philadelphia Rapid Transit Company	35⅓	a33
Philadelphia Traction Co.	94	93
Public Service Corporation, 5 per cent col. notes	a100½	a100¾
Public Service Corporation, ctfs.	a84½	a86½
Seattle Electric Company (common)	*91	*91
Seattle Electric Company (preferred)	a98	99
South Side Elevated Railroad, Chicago	a57	*60
Toledo Railways & Light Company	12¾	9
Third Avenue Railroad, New York	34½	33⅞
Twin City Rapid Transit, Minneapolis (common)	103	103½
Union Traction Company, Philadelphia	58	56⅜
United Railways & Electric Company, Baltimore	12¼	a12
United Railways Inv. Co., San Francisco (com.)	37¼	35
United Railways Inv. Co., San Francisco ((pfd.)	57¾	56¼
Washington Railway & Electric Company (com.)	a41¼	a42
Washington Railway & Electric Company (preferred)	a92½	a92½
West End Street Railway, Boston (common)	a98	a95
West End Street Railway, Boston (preferred)	*111	109
Westinghouse Electric & Manufacturing Company	83¼	83⅛
Westinghouse Elec. & Mfg. Company (1st pref.)	120	a120

a Asked. *Last sale.

Report of Chicago Railways Company for February and March

The Chicago (Ill.) Railways Company has made public its earnings for February and March, 1909, and its balance sheet as of March 31, 1909. The earnings of the company for February follow:

	1909.	1908.
Receipts from passengers	$850,200	$742,826
Other income	20,520	16,116
Gross receipts	$870,720	$758,942
Expense	624,247	564,837
Balance (actual)	$246,472	$194.104
Balance (based on 30 per cent for operation)	$261,216	$227,682
Deduct interest 5 per cent on valuation	162,530	135,787
Net income	$98,685	$91,894
Division of net income { City of Chicago, 55 per cent	$54,277	$50,542
Division of net income { Chicago Railways, 45 per cent	44,408	41,352

The earnings of the company for March follow:

	1909.	1908.
Receipts from passengers	$963,655	$840,743
Other income	22,272	16,989
Gross receipts	$985,927	$857,732
Expense	690,909	608,310
Balance (actual)	$295,017	$249,422
Balance (based on 70 per cent for operation)	$295,778	$257,319
Deduct interest 5 per cent on valuation	166,310	136,064
Net income	$129,467	$121,254
Division of net income { City of Chicago, 55 per cent	$71,207	$66,690
Division of net income { Chicago Railways, 45 per cent	58,260	54,564

The balance sheet of the company as of March 31, 1909, follows:

ASSETS

"A" purchase price: Represents price that the city of Chicago would have to pay for property of company if same was taken over for municipal operation by city, under terms of ordinance		$41,165,209
"B" purchase price: Value of merged assets of predecessor companies in addition to city purchase price		5,851,554
Treasury securities		252,642
Cash in banks and on hand		5,998,576
Accounts receivable		734,483
Advance rents and insurance premiums		23,610
Income accrued treasury securities		15,716
		$54,041,790

LIABILITIES.

Capital stock		$100,000
First mortgage bonds, 5 per cent, due 1927		14,000,000
Consolidated mortgage bonds, "A" 4, 5 per cent, due 1927	$18,600,000	
Less collateral to notes	9,265,200	9,334,800
Consolidated mortgage bonds, "B" 4, 5 per cent, due 1927	$17,194,000	
Less on hand in treasury	$255,900	
Less reserved by trustee	29,525	283,425
		16,910,575
Consolidated mortgage bonds, "C" 4, 5 per cent, due 1927	$3,593,845	
Less on hand in treasury	$203,806	
Less reserved by trustee	333,398	537,204
		3,056,640
Collateral notes: Union Trust Company, 6 per cent, due 1913	$5,000,000	
Less on hand	224,000	
	$4,776,000	
First Trust & Savings Bank, 5 per cent, due 1913	498,000	
Union Trust Company, 6 per cent, due 1913	1,200,000	
		6,474,000
Reserve for damages		834,124
City of Chicago, 55 per cent net earnings		739,290
Vouchers unpaid	$1,221,526	
Pay rolls unpaid	311,119	
Miscellaneous	115,395	
		1,648,040
Accrued interest, bonds, notes, taxes		944,321
		$54,041,790

Consolidation of Chicago Elevated Railroads

The committee composed of Ira M. Cobe, E. K. Boisot and Samuel Insull presented the plans for the consolidation of the Northwestern Elevated Railroad, South Side Elevated Railroad and the Metropolitan West Side Elevated Railway upon which it has been at work to the executive committee of the three companies at a meeting on May 17. Briefly, the plan is to form a corporation to be known as the Central Terminal Company, which will purchase outright the Union Elevated Loop and will have a paid-in capital of $4,000,000 to guarantee the payment of rentals ranging from 3 per cent to 5 per cent to the separate companies entering into the consolidation. In the case of the Chicago & Oak Park Elevated Railroad, it will be required to elevate its track through Austin before the property is taken over by the Central Terminal Company. The rental to be paid the South Side Elevated Railroad begins at $300,000 for the first year, 1910, and gradually increases until 1921, when the rental reaches the sum of

$500,000, at which rate it continues during the term of the lease, which it is proposed shall run as long as the existing franchise rights of the company. The Central Terminal Company is to pay interest on existing bonds and on such bonds as may be necessary to retire the floating indebtedness and the car equipment notes. Interest on all extension and improvement bonds which may be issued shall be paid by the terminal company as additional rental. For the purpose of consolidation, the Northwestern Elevated Railroad and the Chicago & Oak Park Elevated Railroad have been considered as one property by the committee, as the interests which control the companies are the same or closely allied. The Central Terminal Company will pay $200,000 the first year, or 4 per cent on the preferred stock of the Northwestern Railroad, and $250,000 thereafter, or 5 per cent on the stock. An additional amount is guaranteed the two companies after the first two years, beginning in 1912 with $50,000, and increasing to $350,000 in 1921 and thereafter. The terms on which the Central Terminal Company will take over the Metropolitan West Side Elevated Railway were not submitted at the meeting. Following are the essential provisions of the proposal submitted:

"A corporation will be formed, to be called the Central Terminal Company or some other name to be hereafter selected, which will lease and operate the lines of the elevated companies, paying the rental as hereinafter mentioned.

"The terminal company will have at least $4,000,000 of cash paid-in capital, and in addition thereto will acquire what is known as the downtown loop.

"The terminal company will agree that $4,000,000 of its cash paid-in capital shall be expended only for the acquisition by it through construction, purchase or otherwise, of plant, equipment or other property for use in its business, and that until so expended such fund shall not be used except that it may be invested in marketable interest-bearing securities.

"Each lease shall continue for such time as the lessor's lines in the city of Chicago may be maintained and operated under existing ordinance rights and such additional ordinance rights as may be hereafter obtained. Each lease shall include all the physical property of the lessor company, including rolling stock, elevated structure, power plants, transmission lines, lands, buildings and all miscellaneous equipment, tools and supplies.

"The rental under each lease will be paid quarterly or at such other times as may be agreed upon in order to enable the lessor to promptly meet its interest payments on bonds.

"All costs of operation, repairs and replacements and all damages, taxes and legal expenses accruing during the term of the lease shall be paid by the terminal company.

"Each lessor company shall agree to make from time to time such extensions of and improvements to its lines as may be requested by the terminal company, subject, however, to such conditions as may be agreed upon and stated in the lease. To cover the cost of such extensions and improvements the lessor company shall issue its bonds to be purchased by the terminal company, or otherwise, as may be agreed upon in the lease."

Report of Liverpool Corporation Tramways

The annual report of the general manager of the Liverpool Corporation Tramways for 1908 shows decreases in the gross receipts and the number of passengers carried in the year, as compared with 1907, of 1.7 per cent. The total passenger traffic receipts amounted to £563,144, a decrease of £9,678. The total revenue was £591,193. Operating expenses, including rental of leased lines, amounted to £407,072, or 68.9 per cent of the total revenue, as compared with 67.6 per cent in the previous year. Interest and sinking fund requirements were £109,547. The charge for reserve, renewal and depreciation was £49,716. The balance after provision for these deductions was £24,858.

The number of passengers carried was 121,927,883, a decline of 2,115,356. The number of car-miles run was 12,244,353. The average earnings per car-mile were 11.04d., as compared with 11.24d. in the preceding year.

C. W. Mallins, the general manager, attributes the decline in the receipts principally to the great depression in trade experienced during the year. An additional factor in the discrepancy was the extra traffic in 1907, due to celebrations. Under these circumstances the car-mileage was reduced considerably. Observations were also taken of the Sunday traffic, which showed that a considerable amount of unremunerative mileage was run, and it was decided that all mileage which did not amount to 6d. per mile should be eliminated and the time-tables recast accordingly. Following this rearrangement, the car-mile earnings of the week-day traffic have increased 0.08d. and of the Sunday traffic 0.10d. per car-mile.

The Tramways Benefit Society had a total income in the year of £3,939 and expenditures of £3,504. A scheme has been adopted for providing retirement allowances to members of the benefit society; a fund for this purpose was started by the transfer of £3,000 from the surplus of the society.

Berkshire Street Railway, Pittsfield, Mass.—The Massachusetts Railroad Commission gave a hearing on May 10 on the application of the Berkshire Street Railway to issue $248,000 in debenture bonds, the proceeds to be expended for a cut-off at Cheshire Harbor, Mass., a trestle fill near Farnham station and for reducing the floating debt. The application was not opposed and the board took the case under advisement.

Camden & Suburban Railway, Camden, N. J.—Cramp, Mitchell & Shober, Philadelphia, Pa., are prepared to exchange first mortgage 5 per cent bonds of the Camden & Suburban Railway, dated 1896, and due July 1, 1946, for the $250,000 of first mortgage 5 per cent bonds of the Camden Horse Railroad, maturing May 1, 1909, on a basis of 105 and interest for the 5 per cent bonds of the Camden & Suburban Railway and par for the 5 per cent bonds of the Camden Horse Railroad, subject to previous sale or change in price.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—A hearing was held before the Public Service Commission of the First District of New York on May 6 on the application of the Coney Island & Brooklyn Railroad for permission to issue $350,000 of bonds for the purpose of providing funds for improvements. Commissioner Bassett, before whom the hearing was held, asked the company how a delay by the commission in granting consent might affect the reconstruction work which the company has under way. J. J. Kuhn, for the company, said that the company would continue to make improvements to the property out of earnings as far as it could do so, but is anxious to have the sanction of the commission as soon as possible so that the issue of new securities may be underwritten to the best advantage. Mr. Bassett said that he would probably recommend that the track on Franklin Avenue be relaid by the company and that the company be given a long period in which to do the work, but that meanwhile the company be instructed to repair the track so as to alleviate the conditions about which residents along the line have complained.

Dayton & Xenia Traction Company, Dayton, Ohio.—Judge Thompson, of the United States Circuit Court, has ordered the sale of the property of the Dayton & Xenia Traction Company on June 3. The upset price is $400,000. Each bidder will be required to deposit $20,000 in cash or $35,000 in first mortgage bonds of the company. The successful bidder will be required to deposit $40,000 in cash or $75,000 in first mortgage bonds of the company.

Gainesville (Ga.) Electric Railway.—At the recent sale of the property of the Gainesville Electric Railway under foreclosure the bondholders bid $80,000. Gen. A. J. Warner, however, bid $90,000 and was given until April 17 to deposit the required $10,000 with the receiver. This he has since done, and the court has directed the receiver to readvertise the property for sale on June 1.

Georgia Railway & Electric Company, Atlanta, Ga.—Curtis & Sanger, Boston; Blodget, Merritt & Company, Boston, and Spencer Trask & Company, New York, have recently sold $1,000,000 of Georgia Railway & Electric Company refunding and improvement sinking fund 5 per cent gold bonds dated January, 1909, and due January, 1949, at 96 and interest. These bonds are part of an authorized issue of $20,000,000. A sufficient amount of the $20,000,000 issue will be reserved to retire all underlying bonds amounting to $11,000,000. The balance can be issued from time to time to pay for improvements and extensions up to 75 per cent of the actual cost. The issue of $1,000,000 was made to take up floating debt and improvements.

Havana (Cuba) Electric Railway.—Gross earnings of the railway and stage properties of the Havana Electric Railway in 1908 were $2,276,807, an increase of $133,685 over 1907. The railway operations alone resulted as follows: Gross earnings, $1,937,797; operating expenses, $971,725; net earnings, $966,072. Adding the net earnings of $64,311 derived from the stages, the result is $1,030,383. Fixed charges and taxes were $451,000, leaving a balance of $579,383. Havana transfer office and miscellaneous expenses were $3,781, leaving a net divisible income of $575,602. From this amount there were deducted $299,998, or 6 per cent dividends on the preferred stock and $74,637, or 1 per cent dividend on the common stock, leaving a

surplus of $200,967. The number of miles of railway operated was 50 and the operating ratio was 50.15 per cent.

Hudson & Manhattan Railroad, New York, N. Y.—The Hudson & Manhattan Railroad has increased the number of directors from 9 to 11 and has elected Richard W. Meirs, Philadelphia, and Frank O. Briggs, Trenton, N. J., as new members of the board. There is still a vacancy on the board. The officers of the company have all been re-elected. Harvey Fisk & Sons, New York, having placed $9,000,000 of the total of $10,000,000 of 6 per cent secured convertible gold coupon notes due Oct. 15, 1911, are offering the remainder at par and interest. Interest is payable on April 15 and Oct. 15. The Standard Trust Company, New York, is trustee, and the denomination of the notes is $500 and $1,000. They are redeemable at the option of the company at 100 and interest on any interest date upon 30 days' notice.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—Charles Fahr and G. A. Gaston have been appointed receivers of the Meadville & Conneaut Lake Traction Company.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has adjourned the sale of the property of the Metropolitan Street Railway under foreclosure from June 1 to June 29, on the petition of the Guaranty Trust Company, New York, which is trustee for the mortgage under which foreclosure proceedings were begun. It is the intention of the Guaranty Trust Company to appeal to the United States Circuit Court of Appeals from the decree ordering the foreclosure sale. The United States Circuit Court of Appeals does not convene until May 17. The appeal and the request for adjournment are understood to be in connection with the proposed reorganization of the Metropolitan Street Railway.

Middlesex & Boston Street Railway, Framingham, Mass.—This company has asked the Railroad Commission to approve an issue of $822,000 additional capital stock, for use in consolidating the Middlesex & Boston Street Railway and the Newton Street Railway. A petition has also been presented to the commission for the approval of the consolidation of the companies.

North Carolina Public Service Company, Greensboro, N. C.—W. N. Coler & Company, New York, in whose interests the North Carolina Public Service Company was recently organized with a capital stock of $3,500,000, all common, under a special act of the Legislature of North Carolina, have issued a circular about that company, which has recently taken over the property of the Greensboro (N. C.) Electric Company. Coler & Company say that they have purchased all of the property of the Greensboro Electric Company, which includes the gas plant and distributing system, electric light and power station and transmission lines and an electric railway in Greensboro embracing 11½ miles of track. It is proposed under the new management to discontinue the operation of the present electric plant at Greensboro and to take power from the Southern Power Company, owned and controlled by James B. Duke, of the American Tobacco Company, the plan being to reserve the present steam plant in Greensboro for emergency service. Coler & Company say that the street railway at Greensboro can be extended advantageously, and that additional cars are needed to give prompt service. A feature of the plan proposed for the new company is the construction of an interurban connection between Greensboro and High Point, about 12 miles distant, and between Greensboro and Winston-Salem, 24 miles distant. The circular says regarding new securities: "The new bonds ($3,500,000) will be first mortgage on the interurban railway connecting Greensboro, High Point and Winston-Salem, on the gas plant and distributing system of High Point, on the electric light and power plant at High Point, a first mortgage on all extensions, tracks, cars, transmission lines and apparatus installed by the new company in Greensboro, and a refunding mortgage on all the property of the present company. The holders of over one-half the present bonds of the Greensboro Electric Company have signified their willingness and desire to exchange their present bonds for bonds of the new company, and it is our belief that within a year or less all of the prior liens will be retired and that these bonds will be an absolute first mortgage on the entire property. The trust deed securing this issue of bonds has been carefully prepared in order to safeguard these bonds and provide sufficient funds to care for the future development of the property." The probable directors and officers of the company are: L. H. Hale, president; Bird S. Coler, vice-president; L. H. Hale, Jr., secretary and treasurer; E. P. Wharton and Z. V. Taylor.

Philadelphia Company, Pittsburgh, Pa.—The pamphlet report of the Philadelphia Company for the year ended March 31, 1909, shows gross earnings of $16,554,593; operating expenses and taxes, $8,664,860; net earnings, $7,889,733; other income, $265,546; total income, $8,155,279; deductions from income, $1,425,301; net income, $6,729,978; fixed charges, $3,366,572; net income, after deducting fixed charges, $3,363,405; improvements and betterments and notes issued April 1, 1905, and car trust notes issued Dec. 1, 1905, all retired, $895,353; surplus, $2,468,052; dividends on preferred stocks, $382,921; balance, $2,085,131.

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil.—The stockholders of the Rio de Janeiro Tramway, Light & Power Company have approved an increase in the capital stock of the company from $25,000,000 to $40,000,000. Stockholders of the company on May 5 are offered the right until May 24 to subscribe for $6,250,000 of the new stock in the proportion of one share of the new stock for every four shares now held. Twenty-five per cent of the purchase price under this option is payable on application and the remaining 75 per cent is due in three installments, on June 13, July 13 and Aug. 13. The new stock has been underwritten at par at a commission of 2½ per cent.

Scranton (Pa.) Railway.—Bioren & Company and Newburger, Henderson & Loeb, Philadelphia, Pa., offer for subscription an issue of $200,000 of Scranton Railway first consolidated 5 per cent gold bonds due 1932, which was purchased from the American Railways Company. The bonds are issued to retire an equal amount of Scranton Suburban Railway first mortgage 6 per cent bonds maturing on May 1, 1909. An option is given to exchange the old bonds for the new bonds at par, with adjustment of interest as of May 1.

Springfield & Xenia Traction Company, Springfield, Ohio.—John B. Linn, Springfield, Ohio, is negotiating for the purchase of the property of the Springfield & Xenia Traction Company. If Mr. Linn should conclude the purchase he will buy Neff Park at Yellow Springs and operate both the railway and the park.

Third Avenue Railroad, New York, N. Y.—Frederick W. Whitridge, receiver of the Third Avenue Railroad, filed the report of that company for the three months ended March 31, 1909, with the Public Service Commission of the First District of New York on April 11. The gross receipts of the four divisions of the system were $1,344,177; the net earnings $250,438 and the surplus $182,395. In transmitting the report to the commission Mr. Whitridge said that hereafter he proposed to make the earnings of the company public from his office when the reports are filed with the commission.

United Railways Company, St. Louis, Mo.—The Mississippi Valley Trust Company, Francis Brothers & Company, St. Louis, and McCoy & Company, Chicago, offer for subscription at 86 and interest $1,500,000 general first mortgage 4 per cent gold bonds of the United Railways Company dated July 1, 1909, and due July 1, 1934. These $1,500,000 bonds are part of an authorized issue of $42,000,000, of which there are outstanding $30,769,000. The remaining $11,231,000 are reserved to redeem prior liens of $11,211,000. The United Railways has secured an extension of the charter of the Missouri Railroad for 50 years from April 28, 1909, in accordance with a resolution passed by the stockholders recently accepting the general provision of the corporation laws of the State.

Virginia Passenger & Power Company, Richmond, Va.—The property of the Virginia Passenger & Power Company was sold under foreclosure at Richmond on May 6 to Douglas Robinson, New York, representing the bondholders' protective committee, for $8,100,000. The protective committee is composed of Douglas Robinson and Frank J. Gould, New York; Percy M. Chandler, Philadelphia; R. Lancaster Williams, Baltimore, and Fritz Sitterding, Richmond. The sale will have to be confirmed by the United States District Court before the reorganization can be perfected.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—Announcement is made that the Washington, Baltimore & Annapolis Electric Railway, which did not pay the interest on its terminal 5 per cent bonds due on March 1, 1909, will pay the coupons on May 20. The coupons on the first mortgage and second mortgage 5 per cent bonds due on May 1 are still unpaid, though it is understood that the management will pay them before they actually come into default, which under the terms of the mortgage is six months.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland, receiver for the Yonkers Railroad, to issue $100,000 of 6 per cent receiver's certificates, payable in not less than two years. The proceeds are to be used for renewal and reconstruction of the company's lines in Yonkers and the purchase of new rails.

Traffic and Transportation

Re-Hearing on Fenders, Wheel Guards and Safety Devices for Brooklyn Cars

A re-hearing on the order of the New York Public Service Commission, First District, as to fenders, wheel guards and safety devices used on the surface cars operated in the boroughs of Brooklyn and Queens was held by Commissioner Maltbie on May 7. Commissioner Maltbie stated that the re-hearing was held at the request of the constituent companies of the Brooklyn Rapid Transit and the Coney Island & Brooklyn systems.

W. S. Menden, assistant general manager and chief engineer of the Brooklyn Rapid Transit Company, stated that the order of the commission providing for the re-hearing contained the objections of the companies. One objection was that the Brooklyn Union Elevated Railroad was included, whereas that company did not operate trolley cars. Commissioner Maltbie said that that company could be excepted, but that at some future time it might operate other cars. If it was excepted entirely, it would be necessary for the commission to see to the actual operation, whereas if the order issued excepted all but trolley cars it would work automatically.

Mr. Menden said that if the Brooklyn Union Elevated Railroad was to be included the company would like to have the order except all equipment operated by third rail; at least it wanted to have the order show that it was not the intention to compel the installation of fenders on what was known generally as elevated equipment. The company would also like to have the order modified so as to exclude the cable cars operated on Montague Street.

Commissioner Maltbie asked whether the company, if the cable cars were excepted, would equip them with wheel guards so long as they were operated. Mr. Menden said that the company operated only six cars on the Montague Street line, and the speed of these cars was so low it did not seem to be an urgent matter. The company had in mind a change in the motive power of this line to electricity. Wheel guards, if applied temporarily to the present cable cars, would not fit the new electric cars. On an incline which formed 25 per cent of the track mileage of this line, there was no traffic across the track. Commissioner Maltbie said it would cost approximately $200 to equip six cars with wheel guards, and the expense of one accident which might have been less serious or even prevented entirely would be far out of proportion to this cost. Mr. Menden said that the traffic on the Montague Street line had decreased to probably one-third of what it was before the subway was opened.

The Brooklyn Rapid Transit Company would also like to have the order modified as to all lines, requiring a fender on the forward end only on each car. The order contemplated the installation of two fenders on each car. Some of the roads operated elevated equipment over a portion of the lines and the order should be so worded as to make it clear that the fenders were intended to be used on trolley cars only. A further objection was that the order asked the company to agree to accept an order the import of which was not clear at this time unless it should be assumed that the fenders which the company now had on cars, which it proposed to offer for the acceptance of the commission, should be accepted. If a different type should be required than the fender now on the cars it would be impossible to comply with the order.

S. W. Huff, president and manager, Coney Island & Brooklyn Railroad, in stating his position, asked modification of the order to provide for fenders on the front end only of the cars. The order of the commission provided that the fenders should be approved by the commission. As the time was so short it would be practically impossible to equip the cars with other fenders than those the company now had, if they should not be approved by the commission.

Mr. Menden said that the company, if the commission desired, could present plans of the fenders which it proposed to use. They might be presented in advance of the issue of the order by the commission, if that should be thought desirable.

The following information has been obtained in reply to an inquiry addressed to the electric railways in Greater New York regarding the steps taken by them to comply with the recent order of the Public Service Commission of the First District of New York regarding fenders and wheel guards. The Third Avenue Railroad is equipping all its cars with the H-B wheel guard, manufactured by Wonham, Magor & Sanger, New York. The Brooklyn Rapid Transit Company still has the matter of fenders and wheel guards under discussion with the Public Service Commission and no decision has yet been made by it in regard to these matters. The Coney Island & Brooklyn Railroad has agreed to make tests with automatic wheel guards. When the order of the commission has been made final, the company will submit types of fenders now in use to the commission for approval. The order of the commission to the New York & Queens County Railway calls for the equipment of its cars with fenders only. The company will not be in the market for additional equipment as it expects to use the fenders with which its cars are at present equipped. The Metropolitan Street Railway has ordered 50 wheel guards of the latest truck-suspended type from the Parmenter Fender & Wheel Guard Company, Boston, Mass.

Joint Traffic Agreement Between Illinois Traction System and the Rock Island-Frisco Lines

Tariffs are being issued for joint freight and passenger rates between all points on the Chicago & Eastern Illinois Railroad, Chicago, Rock Island & Pacific Railway and the Illinois Traction System. The advantageous location of the Illinois Traction System with regard to its connections with the 15,000-mile Rock Island-Frisco system should bring about a considerable increase in the already large freight traffic of the electric railway.

The main lines of the Illinois Traction System connect Peoria and Danville, Ill., with St. Louis, Mo. The lines of the Chicago, Rock Island & Pacific Railway extend south in Illinois to Peoria; the lines of the Frisco system extend east to St. Louis and the lines of the Chicago & Eastern Illinois Railroad extend west of the junction point with the lines of the Illinois Traction System at Glover, near Danville. Thus the three main divisions of the steam railroads are tied together in competitive territory by the Illinois Traction System, whose lines are within territory not now served by the participating steam railroads.

The first freight tariff issued was dated April 27, and showed joint rates on all classes between Chicago, Ill., the suburban territory as far south on the Chicago & Eastern Illinois Railroad as Chicago Heights and as far southwest on the Chicago, Rock Island & Pacific Railway as Joliet and all stations on the Illinois Traction System. The arrangement between the steam roads and the electric railway includes an exchange agreement for the Illinois Valley lines operated under the same management. The new tariff applies to all industries in the vicinity of Chicago reached by the following participating carriers: Chicago Lighterage Company, Chicago Warehouse & Terminal Company, Indiana Harbor Belt Railroad, Merchants' Lighterage Company, Northern Michigan Transportation Company and the parties to the tariff.

This arrangement for interchange with the large steam railroads makes it possible for the Illinois Traction System to serve all its territory in the handling of through and local freight, and will be particularly beneficial to the shippers of farm produce. All foreign cars will be handled on the per diem basis under Master Car Builders' rules, and the Illinois Traction System, thus placed under the rules of the Interstate Commerce Commission, will be allowed the same division of through rates as a steam road similarly situated. Large shipments of coal and farming produce originate in the territory served by the Illinois Traction System, and under the rules of the Illinois Railroad and Warehouse Commission the originating or the delivering road, in this case the Illinois Traction System, receives at least 25 per cent of the total freight charge.

Massachusetts Electric Companies Purchase Automobiles

The Boston & Northern and the Old Colony Street Railway companies have purchased four automobiles from the Chalmers Company, of Detroit, Mich., for the use of the general superintendents of the system. Each is a 30-hp gasoline car of the "tourabout" type, seating five persons. One machine will be assigned to Lynn, one to Lowell, one to Brockton, and one to Fall River, Mass. Each general superintendent will operate his own automobile, and for the present the machines will be maintained and cared for in local garages. The company expects that the use of these machines will save the operating officers of the organization a great deal of time in traversing the system, and will greatly facilitate the general supervision of the operating divisions. A source of saving will be in the time required to travel from points separated only a few miles in air line, but which are not reached by trolley lines except in a roundabout way, and the possibilities of covering a wide territory in times of heavy traffic where the operating conditions require executive handling have

also been appreciated by the companies. Inspection by visiting officials will also be facilitated by the use of these machines, and the time formerly lost in trying to pass through streets of more or less congested character or irregular topography will be minimized through the superior accelerating and braking qualities of the motor vehicle.

The company also has a 30-hp Studebaker gasoline car used by the superintendent of equipment, and a Stanley steam runabout used by the superintendent of lines and bonding. These machines are kept in Boston, and are also used by the officers of the company at the State Street headquarters. For emergency service and as a means of saving the time of the higher officers of the organization, the automobile has come to be an important factor in street railway work, and the magnitude of the Boston & Northern and Old Colony systems, covering over 850 miles of track, assures a practical field of usefulness for these machines.

Toledo Cars Stop on Near Side of Street.—The Toledo Railways & Light Company, Toledo, Ohio, recently issued an order to stop cars at street railway intersections in the business section of Toledo before crossing the streets.

Semi-Convertible Pay-As-You-Enter Cars in New York.—The Third Avenue Railroad, New York, N. Y., placed 14 of the semi-convertible cars which were described on page 828 of the Electric Railway Journal of May 1, 1909, in operation on May 5.

Hearing Asked on West Roxbury Service.—The Massachusetts Railroad Commission has been asked to give a hearing regarding service on the lines of the Boston Elevated Railway and the Old Colony Street Railway in the West Roxbury district.

Reduction in Fare Ordered in Ontario.—The Ontario Railway & Municipal Board has ruled that the International Railway shall reduce the fare on its line from the town of Niagara Falls, Ont., to Niagara Falls proper from 10 cents to 5 cents.

Cash Fares Increased by Massachusetts Lines.—On March 15, 1909, the rate of cash fares was raised from 8 to 10 cents by the Dedham & Franklin and the Medfield & Medway Street Railway companies which operate a continuous line 22 miles in length. The rate for the total trip is now 50 cents instead of 40 cents, five collections being made. Tickets are sold in strips of 12 for $1, which gives a fare of 8 1/3 cents.

Rochester Railway Renews Agreement with Employees.—The Rochester (N. Y.) Railway has renewed for a period of five years the agreement which it has had for some time with its employees regarding wages and hours of service. The agreement specifies a wage of 20 cents an hour the first six months of employment, then 22 cents an hour, with a final increase to 24 cents an hour. On the Rochester & Sodus Bay Railway the rate per hour for the same periods is 22 cents, 24 cents and 26 cents per hour.

Complaint Against Women's Cars Dismissed.—The complaint of Thomas Dundon, New York, to the Interstate Commerce Commission at Washington that the reservation of cars for women by the Hudson & Manhattan Railroad is a violation of the law has been dismissed by the commission. The commission holds that as men are not excluded from the women's cars, the law is not infringed. A copy of the decision by the commission has been sent to Wm. G. McAdoo, president of the Hudson & Manhattan Railroad, against whom the complaint was directed.

Interurban Railways Take Over Express Business.—The Ohio Electric Railway, the Indiana Union Traction Company, the Fort Wayne & Wabash Traction Company and other companies have entered into a contract with the United States Express Company and the Southern Ohio Express Company, by which they will operate the express business on electric railways in Ohio and Indiana aggregating about 2600 miles. The freight traffic developed by the various companies, however, will be retained by them. The arrangements for transferring the business go into effect on June 1. Extensions tentatively planned for the system will provide connections with Chicago, St. Louis and other large cities.

Chamber of Commerce on Surface Transportation in New York.—At a meeting of the Chamber of Commerce of New York recently, Gustav H. Schwab, on behalf of the executive committee, submitted the following preamble and resolution, which were adopted: "Whereas, A proper solution of the questions relating to the surface street railways of the borough of Manhattan is of great importance to the commercial interests of this city as well as to all its inhabitants; now, therefore, be it resolved, that the president appoint a special committee of five for the purpose of examining into the conditions affecting the surface street railways of the borough of Manhattan, and for the purpose of presenting such conclusions as they may arrive at in the premises." The committee has been appointed, with Joel B. Erhardt as chairman.

Ban Placed on Carrying Fish in Brooklyn Cars.—The Brooklyn Rapid Transit Company has issued an order prohibiting the carrying of fish on any lines of the company. The order reads in part as follows: "Hereafter agents must decline to accept fare from passengers who are carrying fish or baskets which have been used for the purpose of carrying fish. In the case of trains running on the surface trainmen must decline to permit passengers carrying fish, or fish baskets, to board their trains." Many passengers of the company have been in the habit of purchasing fish in the New York markets for use at home and others have been frequenters of the waters of Long Island, which are plentifully stocked with fish at certain seasons, and the practice of carrying fish on cars has increased steadily for some time until it has finally degenerated into an abuse.

"Suburban Outlook."—On May 15 forms will close for the first issue of the *Suburban Outlook*, a new magazine published under the direction of Ernest Gonzenbach, general manager Sheboygan Light, Power & Railway Company, Sheboygan, Wis. It is the aim of the magazine to encourage suburban life and thus be of indirect benefit to street and interurban railways. Arrangements are being made to distribute large quantities of the first issue to various electric railroads. It is thought that in this way any medium-sized city road or any interurban road may, by judicious distribution in its own territory, indirectly encourage its patrons to build homes outside of the confines of their city. The first issue of the magazine will contain 42 pages of reading matter devoted to such topics as the comparative cost of living in city and suburban homes; physical culture as a by-product of suburban living; a discussion on the way the doctor and the tradesman pay the suburban carfare, and detailed information on truck gardening, poultry raising and agriculture. The magazine will be illustrated.

Agreement Between Company and Employees in Pittsburg.—The employees of the Pittsburg (Pa.) Railways Company have accepted the terms offered by the company for a renewal of the agreement covering the conditions of service to govern employees. The men withdrew their requests for an increase in wages and the employment of none but union men. The sections of the original agreement between the company and the men which have been modified are Nos. 1, 8, 12 and 16. Under Section 1 the hours of service are to be made as near as possible equal on a basis of a maximum of 11 hours and a minimum of 8 hours, with 10 per cent leeway. Under Section 8 all men are to be placed on a list as to seniority of hire at the car house where they report, and have the choice of runs according to the length of service. Under Section 12 all trippers and trailers working less than 5 hours are to be paid $1.20 when working as extra men who have not worked any during the day. Under Section 16 the president of the company at 10 a. m. on the first and third Tuesday of each month is to hear such individual cases by employees as have been appealed from the decision of the superintendent. The communication is concluded with a list of the lines on which motormen will be permitted to use stools. The use of stools outside of the limits set by the company will subject the employee to dismissal.

Members of the Board of Supervising Engineers, Chicago Traction, are now making a trip to several cities in the East where supplies for the rehabilitation of the surface lines of Chicago are being manufactured. At Pittsburg the board inspected the works of the Pressed Steel Car Company where 50 all-steel cars are now being built for the Chicago Railways. At Johnstown the works of the Lorain Steel Company, which is rolling 20,000 tons of rails and building special work for Chicago track, were visited. At Harrisburg the Pennsylvania Steel Company's plant, which is furnishing a large amount of special track work, was visited. The plan of the trip includes trips to several other Eastern cities where there are large manufacturing plants. The works of the General Electric Company, at Schenectady, where the railway electrical equipment for the Chicago rehabilitation is being manufactured, may also be inspected.

Employees of the Portland Railway, Light & Power Company, Portland, Ore., have organized an electric club composed entirely of employees of the company. Meetings of the club are to be held once a month at which plans will be discussed for improving the service of the company, and lectures will be delivered on technical subjects by the heads of the various departments.

Personal Mention

Mr. Alfred F. Potts has resigned as secretary and treasurer of the Winona Interurban Railway, Winona Lake, Ind.

Mr. Horace E. Andrews, president of the Cleveland (Ohio) Railway, and president of the New York State Railways, Rochester, N. Y., has been elected a director of the Lackawanna Steel Company, West Seneca, N. Y.

Mr. U. S. Sliter, formerly superintendent of transportation of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been appointed assistant superintendent of the Flint division of the Detroit (Mich.) United Railways to succeed Mr. E. E. Maitroit.

Mr. D. T. Pierce, New York, has just been appointed assistant to the second vice-president of the Philadelphia (Pa.) Rapid Transit Company, with offices in the Land Title Building, Philadelphia. He will have charge of the relations of the company with the public press. Mr. Pierce has had a long daily newspaper experience and for seven years was editor of *Public Opinion.* He gained a wide acquaintance in Philadelphia through his connection with the Pennsylvania Railroad.

Mr. Alfred A. Gardner has resigned as general solicitor of the Interborough Rapid Transit Company, New York, effective on June 1. Mr. A. E. Mudge, who has been connected with the legal department of the company, has also resigned. Mr. Gardner and Mr. Mudge will establish offices for themselves in New York for private practice. The work of Mr. Gardner's office with the Interborough Rapid Transit Company in the future will be divided between Mr. James L. Quackenbush, general attorney of the company, and Mr. Richard Reid Rogers, counsel for the company, who recently resigned as general counsel to the Panama Canal Commission in Washington to accept an appointment with the Interborough Rapid Transit Company.

Mr. E. P. Seymour has been appointed division roadmaster of the Lowell division of the Massachusetts Electric Companies, Boston, Mass. Mr. Seymour has long been engaged in street railway work, having entered the employ of the Naumkeag Horse Railroad, Salem, Mass., on May 16, 1883. After being connected with this company five years, he accepted a position as track foreman with Shaw & Ferguson, street railway contractors, with whom he remained four years. Mr. Seymour then accepted a position as superintendent of construction of the Pierce Construction Company and remained with this company two years, resigning to become superintendent of construction for James F. Shaw & Company, Boston, with whom he remained until January, 1909. While with James F. Shaw & Company, Mr. Seymour had full charge of construction, including track and overhead work, low and high-tension line and highway work.

Mr. John Derby has resigned as fire protection engineer of the Metropolitan Street Railway, New York, effective June 1. Mr. Derby entered the employ of the Metropolitan Street Railway in November, 1907, to prepare the general layout and supervise the installation of the sprinkler systems, chemical extinguishers, standpipes, fire alarms, etc., for the protection of the property of the company from fire. In addition, he organized fire brigades and a department for maintaining the efficiency of the system which he had created. Previous to coming to New York, Mr. Derby spent six years installing sprinkler systems and eight years as inspector of sprinkler risks for the New England Fire Underwriters' Bureau. He was then engaged by the Phœnix Fire Insurance Company, Hartford, Conn., to take charge of its sprinkler risks in the Western States. Illness, however, prevented him from leaving the company's home offices where he was engaged at the time he was appointed to the Metropolitan Street Railway. Mr. Derby proposes to open an office in New York as a fire protection engineer and insurance broker, and will make a specialty of fire protection systems for electric railways.

Mr. W. F. Goble, whose appointment as superintendent of the mechanical department of the Los Angeles & Redondo Railway, Los Angeles, Cal., was announced recently in the ELECTRIC RAILWAY JOURNAL, entered the employ of the Los Angeles & Consolidated Electric Railway, which later became the Los Angeles Railway, as a car repairer in August, 1892. In 1894 Mr. Goble was appointed night foreman of the company, a position from which he resigned in 1897 on account of ill health. In 1898 Mr. Goble entered the employ of the Main, Fifth & San Pedro Street Railway, Los Angeles, as mechanical foreman. Subsequently the property of this company was purchased by the Los Angeles Railway and Mr. Goble again entered the employ of the Los Angeles Railway, this time as an inspector in charge of the overhauling work. When the Pacific Electric Railway opened its Long Beach line Mr. Goble equipped the cars for service and remained with the company as general car inspector until 1903, when he again entered the employ of the Los Angeles Railway as general foreman under Mr. E. L. Stephens, master car builder of the company. On Jan. 1, 1907, Mr. Goble was appointed general foreman of the Los Angeles & Redondo Railway, and on April 1, 1909, was appointed superintendent of the mechanical department of the company.

OBITUARY

Charles T. Hughes, one of the notable Edison pioneers of 30 years ago, died last week at his residence in East Orange, N. J. Mr. Hughes was actively associated with Mr. Edison in the experiment which he conducted with electricity as motive power for railways at Menlo Park in the early 80's.

Jacob E. Ridgway, one of the organizers of the Union Passenger Railway, Philadelphia, Pa., is dead. Mr. Ridgway retired from active street railway work several years ago. At the time of his death he was a director of the Keystone Telephone Company and president of the Atlantic City & Chelsea Improvement Company. He retired as president of the Quaker City National Bank in January, 1909.

Charles A. Gardiner, counsel for the Manhattan Elevated Railway, New York, N. Y., is dead. Mr. Gardiner was born in Canada on Sept. 2, 1855, attended an academy at Fort Covington, N. Y., Hungerford Collegiate Institute, at Adams, N. Y., and Hamilton College, where he was graduated in 1880. In 1884, having studied at the Columbia Law School, he began his practice in New York and in 1888 became a member of the firm of Davies & Rapallo, which had among its clients the elevated railway companies. Afterward he became the head of the law department of these companies.

Samuel M. Manifold died at York, Pa., on May 8. Mr. Manifold became ill shortly after he had accepted the position of manager of the Morris County Traction Company, Morristown, N. J., and before he had entered upon the duties of that position. Mr. Manifold was born in the United States on May 8, 1842, and served in the Twenty-first Pennsylvania Cavalry during the Civil War, and was mustered out of service with the rank of second lieutenant. In 1872 he began his railroad career, and shortly thereafter was appointed superintendent of the New York & Peachbottom Railroad. Subsequently he became connected with the Baltimore & Harrisburg Division of the Western Maryland Railroad and was eventually made general superintendent of the company. He was appointed general manager of the York (Pa.) Street Railway and Edison Electric Light Company, York, in 1904. Mr. Manifold was elected sheriff of York County later in 1904 on the Republican ticket, and served several terms as a member of the City Council. He is survived by a widow and six children.

NEW PUBLICATIONS

Electric Railway Power Stations. By C. C. Swingle. Chicago: Frederick J. Drake & Company, 1909; 718 pages; illustrated. Price, $2.

This book is largely a compendium describing most of the apparatus used in electric railway power stations, with a strong tinge of the schoolmaster in its definitions of power devices. Apparently, the book is designed for students, as every chapter is accompanied by a set of questions and answers. Some of the latter might well be omitted, as for example: Question—"How should a boiler be arranged with regard to cleaning?" Answer—"All parts should be easily accessible for cleaning." Engineers are not made by memorizing catechisms, even of the best kind.

Water Power Engineering. By Daniel W. Mead. New York: McGraw Publishing Company, 1908; 787 pages; illustrated, curves and tables. Price, $6 net.

The writer, who is a consulting engineer and professor of hydraulic and sanitary engineering in the University of Wisconsin, has produced a work which will be worth many times its cost to those interested in water power development. Perhaps the most commendable features are the very thorough discussions on stream flow, head, run-off and rainfall, as the author takes great pains to show the considerable variations possible in each of these factors. Professor Mead is not satisfied with the few measurements on which stream flow is usually based, but recommends the use of hydrographic curves to show daily variations for a full year at least. The book also contains data on many types of hydraulic machinery and a discussion of commercial considerations in the sale of power. The lists of books given at the ends of the chapters are in themselves a most valuable guide to those who desire more detail on certain branches of the subject.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (* indicates a project not previously reported.

RECENT INCORPORATIONS

***Columbus, Plain City & Urbana Traction Company, Columbus, Ohio.**—Incorporated for the purpose of building an electric railway to connect Columbus and Urbana, by way of Plain City. Capital stock $10,000. Incorporators: Charles E. Heath, W. L. McVey, Randolph Walton, Frank E. Ruth and Herbert Myers.

Cobourg, Port Hope & Havelock Electric Railway, Cobourg, Ont.—Chartered to construct an electric railway which is to extend across Northumberland County to Warkworth and Campbellford and on to Havelock, with branches to Blairton and to the Marmora mining district, and other branches from a point near Warkworth to Roseneath and Hastings. Incorporators: H. T. Bush, E. S. Huycke, Port Hope; W. J. Crossen, Cobourg; Reeve J. Knox, Havelock. Col. H. A. Ward, Port Hope, secretary. [E. R. J., April 24, '09.]

***Inland Oregon Electric Railway, Portland, Ore.**—Incorporated in Oregon to build an electric railway from Condon, through Fossil, southeast to Canyon City. Another branch is to be built from Fossil through Wheeler, Wasco and Crook counties to the confluence of Trout Creek and the Deschutes, where it will join the main line of the Portland-Baker City & Butte Electric Railway. Capital stock, $1,000,000. Incorporators: M. W. Gill, H. J. Martin and C. D. Charles.

***South Dakota Interurban Railway, Centerville, S. D.**—Incorporated to construct an electric railway from Sioux City to Bijou Hills, 160 miles. Headquarters, Centerville. Capital stock $1,000,000. Directors, William E. Miller, Fred E. Graves, Ralph W. Thwing and Charles E. Todd, Bijou, and George A. Miller, Academy.

***Fayette County Traction Company, Richmond, W. Va.**—Incorporated to construct an electric railway from Fayette Station to Fayetteville, W. Va. Capital stock $75,000. Incorporators: R. D. West, John Reese, E. G. Blume, G. E. Nestor and W. G. Wheatley.

***Dousman & Marlboro Railroad, Milwaukee, Wis.**—Incorporated for the purpose of constructing an electric railway 6¾ miles long, from Dousman to Marlboro. Capital stock $25,000. Incorporators, James M. Pereles, Thomas J. Pereles, Mason Pereles, Jr., William H. Lindwurm and Henry Campbell.

FRANCHISES

Burnaby, B. C.—The Municipal Council has passed a by-law giving the British Columbia Electric Railway permission to construct an extension from the east boundary of Hastings townsite east for several miles almost in the direction of New Westminster.

Los Angeles, Cal.—The Los Angeles Railway has purchased two franchises calling for extensions to its lines in Los Angeles. About 2½ miles of new track are covered by these franchises.

***Twin Falls, Idaho.**—The City Council has granted a franchise to George D. Aiken to build an electric railway in Twin Falls.

Norris, Ill.—The City Council has granted a franchise to the Peoria & Galesburg Railway to build its proposed electric railway over certain streets of Norris. [E. R. J., March 20, '09.]

Boston, Mass.—The Worcester & Providence Street Railway, which proposes to construct an electric railway between Worcester and Providence, has petitioned the Railroad Commission for an extension of time to Dec. 8, 1910, in which to begin construction. [E. R. J., Feb. 20, '09.]

Mexico, Mo.—The Mexico, Santa Fe & Perry Traction Company, which contemplates building an electric railway from Hannibal through Mexico to Fulton and Columbia, has been granted a franchise to build its proposed railway through Mexico.

New York, N. Y.—The Board of Estimate and Apportionment has granted the South Shore Traction Company a franchise for a street railway from the Manhattan end of the Queensboro Bridge over the bridge, and through Thompson Avenue and Hoffman Boulevard to the line dividing the counties of Queens and Nassau.

New York, N. Y.—The Public Service Commission of the Second District has granted its approval to the construction, extension and improvement of the New York & North Shore Traction Company's line from Roslyn, westerly on and along the North Hempstead turnpike, to the easterly limit of the Borough of Queens at Little Neck.

New York, N. Y.—The Public Service Commission of the First District has approved the franchise granted to the Union Railway by the Board of Estimate to build an extension on Pelham Avenue in the Bronx.

Carthage, Ohio.—An agreement has been reached between the Cincinnati Traction Company and Carthage by which a 5-cent fare will be given the people in return for a 25-year franchise. A line will be built out Paddock Road from the Avondale line and a loop will be used to turn the cars near Carthage.

Oklahoma City, Okla.—At a special election recently held at Oklahoma City the Oklahoma Interurban Traction Company was granted a blanket franchise over the streets of Oklahoma City. Construction work will be started at once, the franchise conferring all necessary entrance facilities. The company proposes to build an electric railway from Oklahoma City through Capitol Hill to El Reno. E. I. Wade, secretary. [E. R. J., March 20, '09.]

Portland, Ore.—An ordinance has been introduced in the City Council to grant the United Railways an extension of time until July, 1910, in which to complete its line to Mount Calvary and giving the company permission to operate its main line to Burlington in the meantime.

Greenville, S. C.—The Paris Mountain Electric Railway, which proposes to build an electric railway from Greenville to the summit of Paris Mountain, has applied to the City Council for an electric railway franchise. A. E. Sussex, Greenville, is interested in this proposition. [E. R. J., Feb. 13, '09.]

***Fayetteville, W. Va.**—The Fayette County Traction Company, which has just been incorporated to build an electric railway between Fayette Station and Fayetteville, has applied for a street railway franchise in Fayetteville.

Milwaukee, Wis.—The City Council has granted the Milwaukee Electric Railway & Light Company a franchise for a number of extensions to its lines in Milwaukee.

TRACK AND ROADWAY

Rogers, Pea Ridge & Northern Interurban Railway, Rogers, Ark.—Bryan Snyder advises that this company has completed the preliminary survey for its proposed 20-mile electric railway and it is probable that construction work will be under way within 90 days. It will connect Rogers and Pea Ridge, 10 miles north, also Diamond and Electric Springs. Articles of incorporation are now being prepared. It is the intention to erect a power plant and a repair shop at Rogers. Officers: A. R. Potter, Rogers, president; J. F. Walker, Rogers, first vice-president; W. T. Patterson, Pea Ridge, second vice-president; Bryan Snyder, Rogers, secretary; J. J. Putman, Pea Ridge, treasurer. [E. R. J., April 10, '09.]

Colorado Springs & Interurban Railway, Colorado Springs, Colo.—This company has placed orders recently for material for the construction of about 4 miles of new track.

***Mascontah, Ill.**—Capt. Charles Hewitt and H. M. Needles, Belleville, are said to be promoting a plan to connect Mascontah and Belleville with an electric railway.

***Toledo, Defiance & Ft. Wayne Electric Railway, Ft. Wayne, Ind.**—Official announcement is made that this company has financed its proposed electric railway, and that construction work will be started within two weeks. The distance is 43 miles. It will follow the old canal bed for the greater part of the way and will parallel the Wabash Railroad from Defiance to Cecil, and for 18 miles east of Ft. Wayne will parallel the Nickel Plate Railroad. E. D. Ruggles & Company, Chicago, Ill., are said to have underwritten bonds amounting to $1,250,000. The deal includes the purchase and the rebuilding of the electric railway now operating in Defiance.

Cincinnati, Louisville, Lexington & Maysville Traction Company, Dry Ridge, Ky.—This company, which was incorporated recently to build an electric railway to connect Cincinnati with Louisville, Lexington and Maysville, advises that it will start construction at once. W. T. S. Blackburn, Dry Ridge, president. [E. R. J., April 24, '09.]

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—It is reported that this company is planning to expend $100,000 during the present year in the improvement of its line. A large part of this will be spent on the division between Augusta and Gardiner, where new rails will be laid and the track re-ballasted.

Winnipeg (Man.) Electric Railway.—At the annual meeting of this company it was decided to issue $1,500,000 in new stock, the proceeds to be used in extensions and improvements.

*Bay City, Mich.—It is stated that P. S. Doyle and A. Hauer, Chicago, Ill., and E. Boggs, St. Paul, Minn., are interested in the promotion of an electric railway from Port Huron to Bay City.

Western Transportation Company, St. Paul, Minn.—J. N. Braun, president, advises that this company will soon be in the market for material for the construction of a number of proposed electric railways in which it is interested. One of these lines is projected from Portage to Grand Rapids, via Briggsville, Oxford and Friendship, a distance of 70 miles. Surveys have been made and rights of way secured for a distance of 30 miles from Portage via Briggsville to Oxford. Contracts have been let for ties and grading. The repair shops for this line will be located at Briggsville, as well as an amusement park on the shore of Lake Mason. The company also contemplates constructing a railway from Galesville to Ettrick, Wis., a distance of about 10 miles. Mr. Braun states that the company is planning to construct a 60-mile interurban railway in Montana. Surveys have not as yet been made for this project. [E. R. J., Dec. 5, '08.]

Licking, Mo.—Announcement is made that financial arrangements for the construction of the Rolla-Cabool Interurban Railway, passing through Licking, Raymondville and Houston, have terminated successfully. Towns along the right of way are said to have subscribed $100,000 to the project. The line will be 75 miles long. E. E. Young, Licking, promoter. [E. R. J., April 10, '09.]

Interstate Railway, Kansas City, Mo.—Announcement is made that this company is closing up the right-of-way preparatory to beginning construction work on its proposed electric railway from Kansas City to Dearborn and St. Joseph, a distance of 48½ miles. A total of about 110 miles of single track and sidings will be built. It is planned to have preliminary arrangements completed in order to start construction about June 15. Headquarters, 735 New York Life Building. Officers: George R. Collins, president; Ernest D. Martin, vice-president; Samuel P. Martin, secretary; Thos. F. Marshall, treasurer.

Hickory (N. C.) Railway.—M. E. Thornton, president, Water Power Electric Company and the Hickory Railway, which proposes to build an electric railway to run from Hickory, N. C., to Catawba Springs, Newton, Brookford, Hildebran and Cliffs, advises that the railway will not be ready for consideration until the electric company has been financed for construction and is quite ready for operation. The latter is now looking to floating its securities. The stock is $500,000, of which $240,000 is in the treasury, and the bonds will be $650,000 of 6 per cent, interest payable semi-annually. [E. R. J., April 24, '09.]

New York City (N. Y.) Railway.—It is stated that this company will place an order this week for 3000 tons of grooved rails. The section called for in the specifications differs slightly from that previously called for by the company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company has just placed an order with the Pennsylvania Steel Company for 500 tons of 7-in. girder and high T-rails.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company has just placed an order with the Pennsylvania Steel Company for 400 tons of girder and high T-rails.

Morrisburgh Electric Railway, Morewood, Ont.—This company, which proposes to build an electric railway between Morrisburgh and Ottawa, 70 miles, advises that it has secured the right of way and is now ready to begin construction work. Williamsburg, Winchester, Chesterville, Morewood, Kenmore, Metcalfe and Greeley will also be connected by the line. C. M. Willard, Box 45, Morewood, president. [E. R. J., Jan. 23, '09.]

*Stratford, Ont.—N. M. Cantin, St. Joseph, has submitted a proposition to the City Council on behalf of New York capitalists to build an electric railway between St. Joseph and Stratford, a distance of about 65 miles, upon the condition that the city guarantee the bonds of the concern up to $250,000.

*Corvallis, Ore.—It is reported that Ernest A. Miller is interested in a proposition to organize a company to be known as the Corvallis & Southwestern Railway, to construct an electric railway from Corvallis to Alsea via Philomath.

Pittsburgh & Westmoreland Railway, Pittsburgh, Pa.—It is stated that this company is ready to extend its line north from Irwin and has agreed to build a bridge from the foot of Oak Street to North Irwin, at a cost, it is estimated, of about $50,000.

Nashville (Tenn.) Interurban Railway.—This company has begun regular operation of its line between Nashville and Franklin, Tenn., about 17 miles. Eleven cars will be operated each way daily.

Greenville, Tenn.—P. C. Ottinger, Route B, Greenville, writes that he represents New York financiers who are planning to establish an electric railway between Greenville and Newport. He is now at work securing the right-of-way. It is proposed to dam the Nolo Chucky River for the necessary power. [E. R. J., April 24, '09.]

San Antonio (Tex.) Traction Company.—J. J. King, general superintendent, advises that this company will purchase 450 35-ft. x 8-in. cedar poles and 4 miles of 55-lb. T-rails.

Cle Elum-Roslyn Railway & Power Company, Cle Elum, Wash.—Announcement is made that it is the plan of this company to begin the work of construction of its projected electric railway within two weeks. It will extend from Cle Elum to Roslyn, 12 miles. The proposed power plant will be located at Cle Elum. Frank S. Farquhar is one of the incorporators. [E. R. J., Jan. 30, '09.]

Pasco, Wash.—J. B. Hubrick, Pasco, writes that he intends to start construction, about June 15, on the proposed narrow-gage railway between Pasco and Kennewick, 3½ miles. The line will be equipped with two 4-cylinder, 60-hp gasoline motor cars.

Nooksack Valley Traction Railway, Seattle, Wash.—J. S. Wheeler, president of this company, writes that the right of way for this proposed motor railway has been secured and is now being cleared. The railway will be 60 miles in length and will connect the following cities: Bellingham, Ferndale, Blaine, Custer, Lynden, Sumas and intermediate towns. It will connect with the Vancouver & British Columbia Railway at Blaine and Sumas. No contracts have been awarded as yet. Headquarters, 914 Fourth Avenue, Seattle. Officers: J. S. Wheeler, Seattle, president and general manager; J. E. Morrison, Seattle, vice-president; J. W. Welch, Ferndale, secretary; W. P. Alward, Seattle, treasurer. Capital stock authorized and issued, $1,250,000. [E. R. J., Jan. 30, '09.]

*Grand Rapids (Wis.) Street Railroad.—It is officially announced that this company will begin work within two weeks on its proposed electric railway which is to extend from Grand Rapids to Port Edwards and Nekoosa, a distance of about 7 miles. No definite arrangements have yet been made in regard to power to operate the line. It will reach the City Park, but the company also contemplates establishing others. Officers: Neal Brown, Wausau, president; L. M. Nash, vice-president; G. M. Hill, secretary; F. J. Wood, treasurer, all of Grand Rapids. Capital stock authorized and issued, $125,000.

SHOPS AND BUILDINGS

Washington, Alexandria & Mt. Vernon Railway, Washington, D. C.—This company will begin shortly the erection of a passenger station on its line about half way between Washington and Alexandria. Plans have been prepared by Vogt & Morrell, architects. The station will be one story in height; the entire building will be of concrete. J. F. Rodgers has the contract for the building.

Boston & Northern Street Railway, Boston, Mass.—This company has awarded a contract to C. G. McLean for the erection of a new car house at Melrose Highlands to replace the one destroyed by fire on Feb. 6. It will adjoin the present car house, which was not damaged, and will be 72 ft. x 200 ft. in size. There will be five tracks with accommodations for 28 cars. It will be of wood construction with a flat roof and skylights. On the side nearest the car house the construction will be of concrete, thus acting as a fire wall. There will be a lobby, superintendent's office, rooms for the employees, lockers and machine shop.

Second Avenue Railroad, New York, N. Y.—The general contract for the reconstruction of the car house for this company on the east side of Second Avenue at Ninety-sixth Street at a cost of about $300,000 has just been awarded to Charles H. Peckworth, 415 Hudson Street. Plans prepared by Maynicke & Franke, 298 Fifth Avenue, call for using the old foundation and a building measuring 201 ft. x 482 ft., three stories, of reinforced concrete and brick.

Oregon Electric Railway, Portland, Ore.—This company has begun work on its depot at Forest Grove. The building will be in the shape of a triangle and will be 94 ft. 6 in. x 16 ft. on the west end and 52 ft. 10 in. on the east end. There will be 44 ft. on the west end occupied by waiting room and ticket office.

POWER HOUSES AND SUBSTATIONS

Slate Belt Electric Street Railway, Pen Argyle, Pa.—This company contemplates making a number of improvements to its power plant.

Manufactures & Supplies

ROLLING STOCK

Pacific Electric Railway, Los Angeles, Cal., it is reported, will build 50 new cars in its own shops.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., has ordered 13 cars from the G. C. Kuhlman Car Company.

Clinton (Ia.) Street Railway has purchased two second-hand GE-52 motors from the Dorner Railway Supply Company, Chicago.

Great South Bay Ferry Company, Freeport, N. Y., has purchased two 9-bench open second-hand cars complete from MacGovern, Archer & Company, New York.

Marshall (Tex.) Traction Company, which is building an electric railway at Marshall, is in the market for one or two second-hand open motor cars with a seating capacity of 25 to 35.

Lincoln (Neb.) Traction Company has purchased three sets of Taylor improved short wheel-base trucks. These trucks will be used under 35-ft. car bodies and will be mounted on 33-in. wheels.

Pittsburgh & Kansas City Railway, Pittsburgh, Kan., which was reported in the Electric Railway Journal of May 8 as making inquiry for interurban cars, has placed an order for four cars with the American Car Company.

Los Angeles & Redondo Railway, Redondo Beach, Cal., mentioned in the Electric Railway Journal of April 17, 1909, as contemplating the construction of six new cars in its shops, does not expect to have these cars ready until early in 1910.

Topeka (Kan.) Railway, which was reported in the Electric Railway Journal of May 8, 1909, as being in the market for 10 city cars, has placed an order through the L. E. Myers Company, Chicago, with the American Car Company for 12 cars.

Michigan United Railways, Lansing, Mich., mentioned in the Electric Railway Journal of April 3, 1909, as being in the market for five double-truck city cars, has ordered the cars from the St. Louis Car Company, St. Louis, Mo., for delivery within 30 days.

Grand Valley Railway, Brantford, Ont., mentioned in the Electric Railway Journal of April 17, 1909, as being in the market for cars and trucks, has purchased four sets of double trucks from the Curtis Motor Truck Company, Decatur, Ill., and one set of single trucks from the Taylor Electric Truck Company, Troy, N. Y. The order for cars has not yet been placed.

Ocean Electric Railway, Far Rockaway, N. Y., reported in the Electric Railway Journal of May 8, 1909, as having purchased six double-truck cars from the St. Louis Car Company, has drawn the following specifications in addition to those mentioned in previous issues:

Seating capacity 48	Curtain material...Pantasote
Weight ..... 21,000 lb.	Gears and pinions....Nuttall
Length over vestibule..46 ft.	Heaters ..... Consolidated
Width over all....8 ft. 6 in.	Headlights ..... Neal
Body ..... wood	Journal boxes.....St. Louis
Interior trim .....mahogany	Motors .....2—West., 112
Underframe ..... metal	Push buttons...Consolidated
Air brakes ...Westinghouse	Registers .....New Haven
Brakeshoes..Am. B. & F. Co.	Roofs ..... Monitor
Curtain fixtures ...National	Seating material .....rattan

Illinois Central Electric Railway, Canton, Ill., has placed an order with the McGuire-Cummings Manufacturing Company for one double-truck combination baggage and passenger car and two double-truck closed motor passenger cars. The baggage car is to have an over-all length of 49 ft. 1½ in.; inside length of baggage compartment, 9 ft. 8¾ in.; length of passenger compartment, 32 ft. 10½ in.; length of vestibule (inside measurement), 4 ft. 4½ in.; width over all, 8 ft. 9½ in.; over side sills, 8 ft. 6 in.; width (inside measurement), 7 ft. 9 in. The passenger cars are to have an over-all length of 44 ft.; length of vestibule, 3 ft. 10¾ in.; width over side sills, 8 ft. 6 in. The cars are to be equipped with National air brakes, McGuire-Cummings hand brakes, Peter Smith heaters, Hale & Kilburn seats, GE-80 motors, McGuire-Cummings 10-A trucks, Pantasote curtains and Curtain Supply Company's fixtures. They are to have double-end vestibules. The interior finish is to be of mahogany with solid bronze trimmings. The date of delivery has been set for July 1, 1909.

TRADE NOTES

Northern Engineering Works, Detroit, Mich., have furnished the Southern Wisconsin Power Company, Madison, Wis., with a 30-ton Northern traveling crane and a 6-ton electric mono-rail hoist.

MacGovern, Archer & Company, New York, N. Y., have sold two second-hand, 150-kw rotary converters to the Long Island Railroad for use at the Huntington substation. They have also sold a 500-kw rotary converter to the Elgin, Aurora & Southern Traction Company.

Electric Service Supplies Company, Philadelphia, Pa., has received an order from the Railway Equipment Company, New York, for six Imperial arc headlights, 18 single International fare registers, 12 oil headlights and 12 Knutson No. 2 trolley retrievers for use on the 12 cars recently bought from the Wason Manufacturing Company for the Conestoga Traction Company.

Arthur D. Little Laboratory, Boston, Mass.—Dwight T. Randall, M. E., member of the American Society of Mechanical Engineers, late engineer in charge of fuel tests, technologic branch, United States Geological Survey, has associated himself with the Arthur D. Little Laboratory of Engineering Chemistry, of Boston, in charge of the Department of Fuel Engineering. Mr. Randall, who is a graduate of the University of Illinois, was formerly connected with R. W. Hunt & Company and Westinghouse, Church, Kerr & Company, and later in charge of the steam engineering laboratory of the University of Illinois and of steam and boiler tests at the St. Louis Exposition.

Bird-Archer Company, New York, N. Y., announces that, owing to the increasing demand for its boiler compounds in the Far East, agencies have been established in the following cities: Honolulu, J. P. Lynch, 42 Young Building; Manila, Lambert Springer Company, 99 Plaza Santa Cruz; Yokohama, T. M. Laflin, Exchange Market; Hong Kong, Shanghai and Singapore, United Asbestos Oriental Agency, Ltd. The Bird-Archer boiler compounds have been used successfully in the Philippine Islands, where magnesium and other sulphates in boiler feed-water have always caused serious trouble with scale. Similar scale-forming impurities are found in most of the boiler waters used in China and Japan.

McLeer Electric & Manufacturing Company, Brooklyn, N. Y., has recently been incorporated by C. B. McLeer, J. F. McLeer and Edward McLeer, Jr. A factory has been equipped in one of the Bush Terminal Buildings at the foot of Thirty-sixth Street, Brooklyn. These buildings are located on the Upper New York Bay, and therefore have excellent receiving and shipping facilities. The shop occupies between 7000 sq. ft. and 8000 sq. ft. of floor space, has plenty of light and air and is equipped with machine tools and labor-saving appliances. The company will do general repair work, such as rewinding and reshafting of armatures, repairing motors, generators, transformers and controllers, and will manufacture armature, field and magnet coils on a large scale. It will make a specialty of vacuum drying and impregnating process of treating coils. Two machines are installed for that purpose; one for oil repelling and the other for repelling water and moisture. The company will also carry a complete line of electric railway supplies.

ADVERTISING LITERATURE

Dean Brothers Steam Pump Works, Indianapolis, Ind., have issued catalog No. 77, containing lists of parts of their pumps, directions for operating them and detail data.

Frank Ridlon Company, Boston, Mass., calls attention in its May list of second-hand machinery to a considerable number of 500-volt d. c. motors suitable for shop purposes.

Sterling Varnish Company, Pittsburg, Pa., has issued its 1909 catalog on insulating material for field and armature coils. The booklet also contains considerable information on specific gravities and solvents, coil baking, coil dipping, dipping tanks, etc.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has mailed Bulletin No. 83, dated May 1. It lists second-hand rails and other track material for sale, locomotives, cars, trucks and miscellaneous power plant, repair and construction apparatus.

Niles-Bement-Pond Company, New York, N. Y., give some interesting tire turning records in the *Progress Reporter* for May. One of the best records is that of the Third Avenue Railroad, New York, which has turned 12 to 16 pairs of wheels in one day.

Ohio Brass Company, Mansfield, Ohio, has issued catalog No. 20, which is devoted entirely to catenary construction. This catalog not only illustrates materials in detail with numerous views of installations, but also contains much valuable information on engineering features. The latter data gives the proper calculations and allowances to be made for different forms of catenary construction and for the ordering of material.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MAY 22, 1909 No. 21

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Freight Revenue in Rhode Island

Gross freight revenue of the street railways of Rhode Island in the year ended June 30, 1908, according to the report of the Commissioner of Railroads for 1908, amounted to $182,442, as compared with a total passenger revenue in the same period of $4,317,465. The freight revenue was but 4.2 per cent of the amount received by the roads from the transportation of passengers. When these results are compared, however, with those of the preceding year, a significant aspect of the development of the business during the 12 months is disclosed. The increase in the gross revenue from passenger traffic over the year ended June 30, 1907, was equivalent to 1.2 per cent; the increase in the freight revenue was 13.8 per cent. Of the total freight revenue the Rhode Island Company, operating the electric lines of the New York, New Haven & Hartford Railroad in the State, reported $142,842, or 78.3 per cent. The number of miles of road operated by this company in the State was 284.13, indicating an average gross revenue from freight traffic of $502 per mile. The number of freight cars reported by the company was 45, while the total shown by the street railway companies of the State was 84. Unfortunately, no statistics bearing on the tonnage transported or the rates received are given, but it is evident from the gross results as published that the volume of business handled is increasing at an encouraging rate.

Preparing Shop Employees for the Witness Stand

The increasing number of cases in which the mechanical department of a street railway is required to co-operate with the legal branch of the company's service in the settlement or contest of claims justifies reference to the matter of testimony on the witness stand under direct and cross-examination. It is a fact that most people who have not had experience on the stand labor under considerable nervousness when confronted by opposing counsel. It is very important, therefore, that shop employees who are called into a case shall be encouraged so far as possible to maintain their self-possession, to say as little as is necessary to answer the questions asked, although avoiding any appearance of concealment and not to volunteer statements not directly requested. Simple, direct and responsive answers create the best effect on the jury.

In this connection the preparation of accident reports deserves comment. Through loyalty to a company it often happens that the employee who witnesses an accident or who reports upon the condition of the car after it reaches the shop fails to state the precise facts in so far as they are damaging or apparently injurious to the company's case. This is a mistaken course, for progressive claim departments desire to settle in cases where the company is to blame, rather than fight a case which may be lost in the end at heavy cost. Wherever the responsibility lies, the company can conduct its case only on the strength of a full and unbiased report of the situation. If the legal department knows the worst it can act intelligently, but if some of the facts are withheld out of a false regard for the company's position, the opposition secures just so much advantage before the jury. It is hard enough at best to obtain a fair hearing before the average jury, and any impression of secretiveness or indirectness on the company's part is a sure cause of trouble.

Proposed Merger of Chicago Elevated Roads

The details regarding the proposed merger of the Chicago elevated roads that have been made public by the committee which has the negotiations in charge relate to the financial, rather than the operating, features of the consolidation, and indicate that many questions still remain unsettled. It is proposed that the outlying elevated lines shall be leased by a corporation to be styled the Central Terminal Company, or other similar name, which is to have a paid-in capital of not less than $4,000,000, and is also to acquire the loop in the central business district. How the purchase or control of the loop is to be financed has not been made public. Of the capital of the Terminal company it is proposed that $4,000,000 shall be somewhat in the nature of a reserve fund, since until this sum is expended, it may be invested in marketable interest-bearing securities; it may be expended, however, under the broad terms of the leasing plan made public by the committee, only for the acquisition by the company "through construction, purchase or otherwise, of plant equipment or other property for use in its business." Whether the provision for this fund is preliminary to an extension of the loop or to an enlargement of existing facilities, or both, or as a safeguard in the event that the need for extraordinary improvements should arise, is not discussed by the committee.

The expenses of operation, "repairs and replacements," as well as all damages, taxes and legal expenses accruing during the term of the lease are to be borne by the Terminal company. The extent of the expenses for repairs and replacements will be regulated by the requirements of the Terminal company under the clause of the plan which provides that each of the companies, before turning over its property to the leasing corporation, shall put it in "good condition, in accordance with a standard to be agreed upon." The Terminal company then will agree to maintain that standard during the term of the lease. The tentative plan makes specific mention of only one company in this connection; that is the Chicago & Oak Park Elevated Railway, which is to "make large expenditures for track elevation and to bring the road up to the required standard." Contemplating extensions of the various properties, the plan provides that each lessee company shall agree to make such extensions of and improvements of its lines as may be requested by the Terminal company subject to conditions on this subject that may be stated in the lease. Such extensions and improvements shall be financed through the issue of bonds by the lessee companies to be purchased by the Terminal company or otherwise, as may be agreed upon in the lease. While future financing will therefore be conducted by the leasing corporation, the individual companies are to be delivered free of floating debt and car equipment notes, which are to be taken up by such bonds as it may be necessary to issue. Interest on "extension and improvement" bonds will be treated by the Terminal company as additional rental.

A number of readjustments of existing conditions will have to be made before the plan can be completed. The plan states that in treating with the Northwestern Elevated Railroad and the Chicago & Oak Park road the two properties are considered as one, subject to the agreement that the total amount of mortgage indebtedness of the combined properties shall not exceed $19,000,000. The total amount of outstanding bonds on the two roads is now in excess of this sum, but if no other adjustment should be arranged some of the Northwestern bonds might be exchanged for preferred stock under the conversion clause or the issue might be redeemed. Since, however, the Terminal company could not carry out the plan of acquiring the Union Loop, as projected, without some substantial consideration for the equity in this property, which is an important asset of the Northwestern company, it is evident that the latter corporation has an advantageous starting point from which it can trade.

Including the South Side Elevated Railroad, the Chicago & Oak Park Elevated Railway and the Northwestern Elevated Railroad, together with the Union Loop, comprising part of the Northwestern property, the miles of single track operated by the properties would be about 117. If the Metropolitan West Side Elevated Railway is added the total would be about 168 miles of single track. The Manhattan Railway of New York operates 118 miles of track, so that if the Chicago consolidation includes all of the companies it will involve much the greater track mileage.

Drawbacks of Hydro-Electric Service

Many a railway manager operating his own steam-power plants has sighed profoundly at the size of fuel, labor and repair bills and wished he could change places with those of his confrères who buy power from some hydro-electric company for perhaps 1 cent per kw-hour delivered at the distributing points. But there are other considerations than mere cost of power. No railway company likes to have its service literally stranded by low water in the summer or left out in the cold because of frozen penstocks in the winter. Such interruptions are annoying to any user of power, but are more serious to a railway company than to a manufacturing company, which can stop its work with less inconvenience to the general public. Moreover, the manufacturer can usually purchase power at a lower price per kw-hour than the railway company because of his higher load factor. From the standpoint of the passenger, the breakdown of a railway in towns of moderate size may not be so bad if his destination can be reached in, say, less than an hour's walk, but in blizzard weather, on an interurban road, it is quite a different matter. On one line the delays from the interruption of an hydro-electric transmission exceeded the total time losses of all other troubles whatsoever. The ironical feature of this case is that the equipment of this road was but recently changed from steam to electricity. Whenever the wires are reported dead the roundhouse doors are opened and the old steam locomotives are sent out to keep the service going. Under these circumstances further electrification in this territory can hardly be expected. As a rule, the contracts with water-power companies provide that the power company is responsible for breakdowns caused by mechanical and electrical troubles to the extent of the value of the power which would have been delivered if the line had remained intact, but the company is not penalized for low water or other conditions over which it has no control.

Economical Conditions in Power Plant Operation

Recent observation of the work of a number of electric railway power plants suggest several points which tend to increased economy of production. In one station a reduction in the rate of coal consumption per kw-hour delivered at the switchboard was attributed to the installation of new air pumps and the consequent maintenance of a better vacuum under the variable load conditions of the station. The absence of leaks also tended to reduce the steam consumption of the auxiliaries. In another installation it was found profitable to assign the same firemen on each watch to the same boilers, so far as practicable. Operating conditions were thus met more skilfully, since it is a practical fact that there are differences in the behavior and characteristics of even similar boilers in the same room or group of batteries. Constant familiarity of the firemen with a certain set of boilers led to much better handling than where the firemen were permitted to work at their will anywhere in the range of the boiler room.

In another case the economies were attributed to a reduction in the draft between the economizer and the stack. This was clearly a local problem, and one from which general conclusions could not be drawn, except to emphasize the value of investigating all the conditions in the steam end of the station. Some plants suffer from too little draft through the economizer; others, perhaps, from too much. That increased efficiency was obtained shows the value of analyzing the situation in specific cases. Another plant found better economy in the construction of flues of equal cross-section on all boilers of the same size. A point of this kind is often overlooked, since it would be taken for granted in a new station that similar apparatus would have similarly dimensioned fittings. In actual practice, however, incongruities creep into old and long-established installations as changes and additions are made, and often these are so distinctive that the higher efficiency of production suffers. Symmetry in design and extensions has a closer bearing on economy of operation than is always realized.

Improvement of costs through the suppression of boiler scale is a familiar method of securing the results which modern conditions demand. One plant had scale on its tubes to an average thickness of 7/16 in. for a recent year. Treatment of the scale by chemical methods practically eliminated it, and the coal consumption fell from 3.04 to 2.81 lb. per kw-hour. In another station improved efficiency followed the installation of an additional battery of boilers which permitted the old equipment to be kept in a cleaner condition, resulting in a higher rate of evaporation per unit of fuel. The imposition of a heavier load and a longer run per day on the boilers of another plant brought about savings in the expense of operation. In the less efficient year the average hourly boiler rating in service was 400 kw, the monthly output being 56,000 kw-hours and the fuel consumption 8.19 lb. per unit of energy delivered at the busbar. In the last year the average boiler rating in service was 715 kw per hour; the output for the month was 60,000 kw-hours and the fuel consumption 7.23 lb. The energy output only increased a little, but the distribution of the load was improved. Losses from banking were decreased. This was a plant of old-time design, operated only on peak loads, but it was improved in efficiency none the less. In another instance leaky door frames on the boilers gave poor results, and in another a feed water temperature of about 140 deg. Fahr. failed to give the good results that followed the installation of heating apparatus capable of supplying the boilers at over 200 deg.

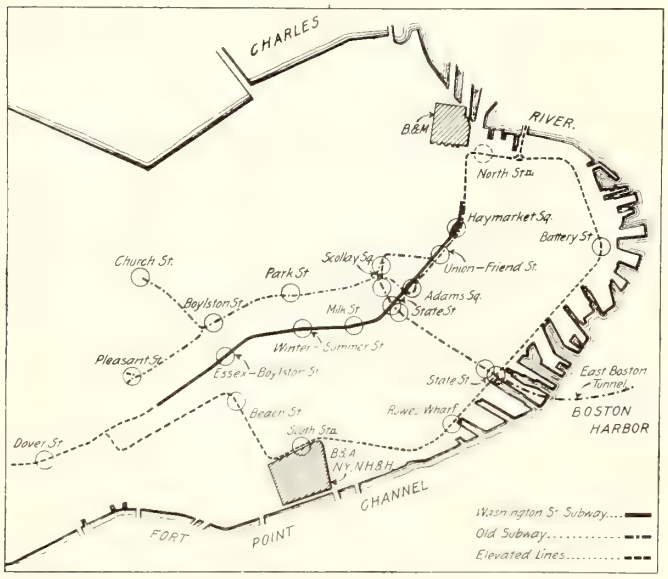
Farm Lore and Railroading

Herbert Spencer, in writing about what constitutes useful knowledge, said that if a man were to memorize the distances between all the towns in the United Kingdom he would know something of undoubted value, but yet not worth the time of learning. It is quite possible that many readers of this paper will render a similar dictum if we venture to point out a couple of cases where the managers' bucolic knowledge turned two railway enterprises from failure to success. The first instance involves the purchase of horses, success in which is considered the acme of shrewdness. For some years a certain city and interurban system had endeavored to make a success of its combined fast freight and wagon delivery. The business was easily secured, but the expense of maintaining the horses and frequently buying new ones made the profits of the department decidedly negative. Eventually, the business was put in charge of a railroad man whose freckles and tan had been gained on a farm. In very little time all of the sickly brutes foisted on the company at high prices were replaced by sound animals quartered in a neat brick and cement stable, and from that time forward the freight and express business has been most successful. It might be added that the good horses cost considerably less than the lame, blind and halt.

The second tale concerning useful knowledge deals with an interurban railway within half-a-day's journey of the other. The territory through which it passes is rather sparsely peopled, while the farms yield very little, owing to the intense cultivation to which they have been subjected for generations. Apparently, the prospect of working up a profitable farm freight business was very small, but here the railway manager's farming experience came to the rescue. He was sure that this territory, because of its abundance of rich grasses, would make fine dairying country. First, he induced many of the farmers to enlarge their herds and, later, at his suggestion, several persons bought large tracts for the sole purpose of sending milk to market in the large cities near one of the terminals. Our farmer-railroader was not content merely to point out the availability of the land for the milk business, but made a thorough study of the market conditions and the cost of keeping the cows. This enabled him to discuss the subject in a businesslike manner and permitted him to fix a transportation rate which would insure a profit for his shippers as well as for his company. To-day the district served by this company is one of the best dairy sections in the State, and, to paraphrase a famous saying, a dozen kine chew their cuds where but one cow ruminated before. In a greater or less degree cases like those quoted have occurred elsewhere, but these two are enough to prove that in at least one department of electric railroading hard common sense knowledge wrung from the soil may find wide and profitable application in electric railway work.

ELECTRICAL EQUIPMENT OF THE WASHINGTON STREET SUBWAY, BOSTON

The Washington Street subway in Boston, which was opened for traffic on Nov. 30, 1908, is the latest example of an installation designed to facilitate safe and flexible train service at high speeds underground in the heart of a large city. The architectural features of the tunnel and stations were described in the Electric Railway Journal



Map of Subway and Elevated Lines in Boston

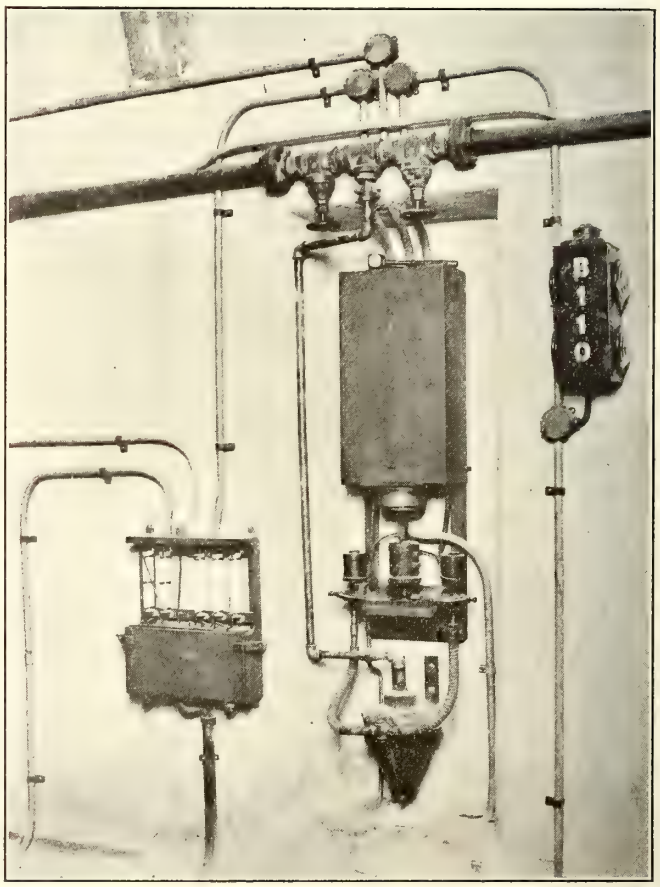
of Nov. 28, 1908. They were designed with special regard for public convenience and safety, and the arrangements made for the supply of power for the different services in the new tunnel similarly exhibit a comprehensive plan for continuous operation under both normal and emergency conditions. The tunnel services include power supply to the third rails, lighting supply, power supply for drainage pump, moving stairway and fan operation, automatic block signals, ticket office heaters and illuminated signs in the stations, trolley supply for construction, repair and emergency car service, and private company telephone and telegraph lines, as well as provision for public telephone service at all stations. This equipment, with the track construction, feeder installations, and station fittings required solely for transportation service has been installed by the Boston Elevated Railway Company, which operates the tunnel in connection with its elevated lines as a part of a through route between Forest Hills, Dudley Street and Sullivan Square. The tunnel proper was constructed by the Boston Transit Commission. The total cost of its construction, including administration, engineering, interest and all other expenditures, except for real estate and easements permanently taken, will be about $5,500,000.

The tunnel is of double-track construction throughout. In general, the station platforms have been staggered, with separate platforms for the traffic in each direction, entrances to which are in most cases on private property or side streets. The two tracks are at slightly different levels at most points. The State Street station is at an unusually low level, and an installation of moving stairways has been made at this point. The greatest depth of the top of the rail in the tunnel below the surface of the street is 43 ft. Each platform is 350 ft. long, to accommodate 8-car trains, and each has at least two exits and two entrances. The total length of the tunnel, including open inclines, is 6110 ft. The shortest curve has a radius of about 500 ft.

The general character of the track construction in the tunnel at station platforms and on curves between stations is shown on page 938.

The track in the tunnel consists of 85-lb. A.S.C.E. section T-rails, laid on hard pine ties set in broken stone ballast. The track is bonded at each joint with two 350,000 circ. mil bonds under the joint plates. The ties are treated with "Woodolene," and are 6 in. x 8 in. x 8 ft. long. Every third tie is 9 in. longer to carry the third-rail insulator. The rails are fastened to the ties with ¾-in. x 5½-in. screw spikes. Continuous joints are used, and the ties are spaced about 23 in. apart, or 17 to a 33-ft. rail length. The third rail is also an 85-lb. section. The lower portion of the track drawing shows the construction used on the sharper curves. Here a guard rail is used, the section being Pennsylvania Steel Company's No. 96. Filler blocks are installed between the guard rail and the running rail, and the guard rail is supported by rail braces. All cables are run in vitrified clay, concrete-incased conduits which form a narrow walk on each side of the tunnel. Safety niches are built in the walls at short intervals.

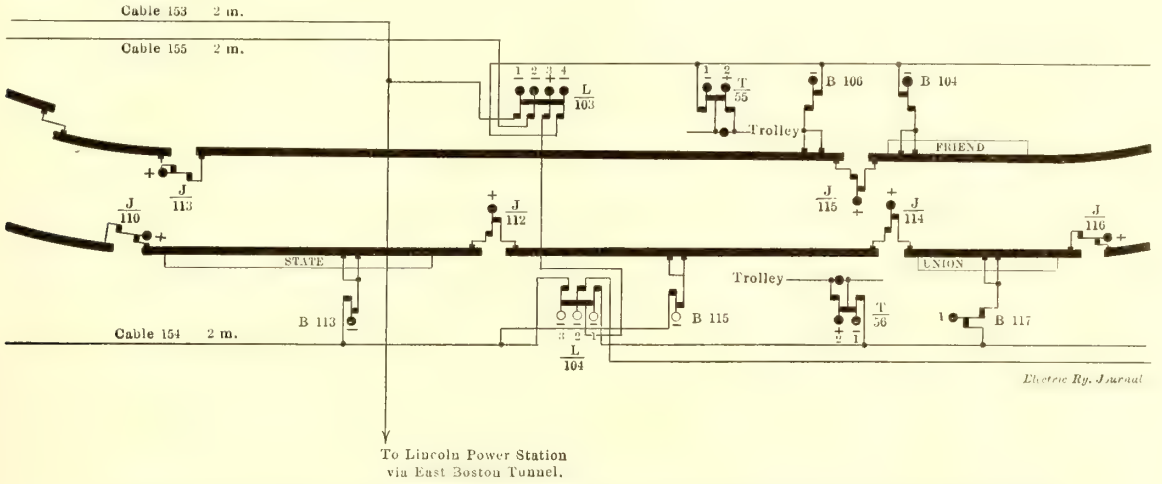
The drainage of the tunnel is cared for by three pumping stations located, respectively, at Beach, Elm and Union Streets. In each of these chambers two pumps are installed, one with a capacity of 100 gal. per minute and the other with a capacity of 1000 gal. per minute. The smaller pump



Washington Street Subway—Automatic Block Signal and Accessory Apparatus Mounted on Wall of Tunnel

in each chamber is direct-driven by a 3-hp, 550-volt, direct-current motor, and the larger pump by a 20-hp motor. All pumps are of the centrifugal type, located in the bottom of a well in each case. The smaller pumps are designed to handle the leakage and drainage of the tunnel under normal conditions, while the larger units start up automatically in case of an excessive flow of water, such as would be occa-

sioned by a break in a large street main. Each pump is controlled by a float in the well of each chamber, the smaller pump being arranged to start first and to stop last. The motors are of the shunt type, and are started by automatic rheostats controlled by contactor switches and solenoids in the float circuits. Power is derived from either a special motor cable run through the tunnel or from a tap connecting with the third-rail feeder lines nearest each pump chamber. In case of the failure of the cable which regularly supplies current to the pump motors, and to fan motors in the ventilation chambers, the tap leading to the third-rail feeder is automatically thrown into connection. The pump chambers are designed to operate without the presence of an attendant, although regular inspection of the apparatus is necessary.

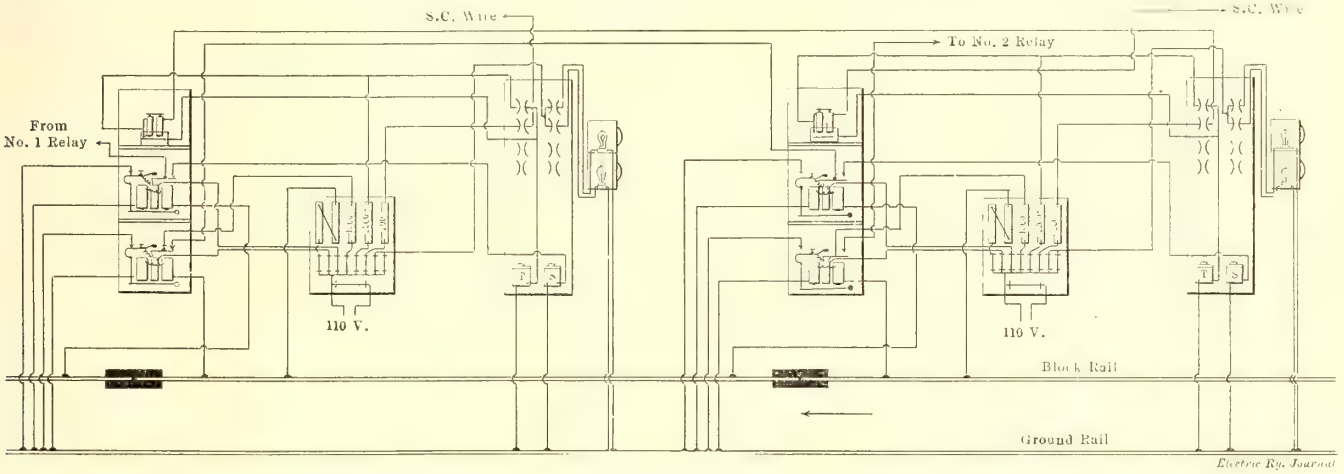


Washington Street Subway—Third Rail Feeder Connections and Sectionalizing Switches

As in the Tremont Street subway and the East Boston tunnel, fresh air is admitted at the stations and portals and withdrawn from the tunnel at points about midway between. It was not thought in general practicable to discharge the vitiated air directly into the outer air at the points where the former is taken from the tunnel, nor was it deemed practicable to discharge through grated areas in the sidewalks, the latter during the day being densely crowded. Air admitted at the portals and at the station entrances and leaving the tunnel at intermediate points is drawn through specially constructed ducts, in some places underneath and in others above the tunnel, but opening into the tunnel between stations, having a minimum cross-sectional area of about 40 sq. ft., and a length of from 270 to 430 ft. to fan chambers. These chambers are located at Lagrange Street, Hayward Place, Milk Street and Adams Square. Each is equipped with two single inlet centrifugal fans, direct-driven in each case by a 6.5-hp, 550-volt direct-current motor, one motor being apportioned to each fan. The capacity of each fan is 25,000 cu. ft. of air per minute, giving an average velocity in the tunnel of about 1 ft. per second, and providing three changes per hour in each section of the tunnel. The ventilating equipment of the subway was described in the ELECTRIC RAILWAY JOURNAL of April 24, 1909, page 780.

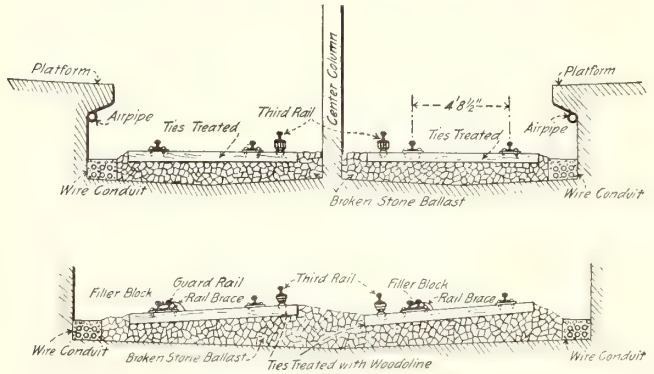
A short section of the feeder connections which supply current to the third rails is shown in the upper diagram on this page.

The third rails are divided into sections which correspond with the signal blocks, and the easterly track is supplied with current independently of the westerly track, so that in case of breakdown the trouble will be minimized. The ends of the third rails at each section are connected by single pole knife jumper switches which are normally kept open. If one of the large cables supplying any third-rail section fails the jumper switches can be closed by hand so as to maintain a continuous feed from adjoining third-rail-sections. The feeders for the northern end consist of three 2,000,000 circ. mil underground cables brought to the tunnel from the company's Lincoln Wharf power station on Atlantic Avenue. These cables terminate on a bus in a switch box at the North elevated station. From this point connection is made with the tunnel distribution system through taps to the third rails. At the State Street station an additional 2,000,000 circ. mil cable from the Lincoln



Washington Street Subway—Wiring for Automatic Signals for One Block

Wharf power station is brought into the tunnel for feeding the westerly track in each direction. Switch boxes are installed near State Street station, and these are provided with an emergency cross connection between the positive busbars in each box, so that if the cables on one side go out of service, the opposite lines can be connected up. Normally the tie line switch in one cable box is open, the switch in the other side of the tunnel being closed so that only one change is needed to throw the two sets of feeders together. South of State Street three 2,000,000 circ. mil feeders are



Washington Street Subway—Cross-Sections at Platform and on Curves

carried through to the vicinity of Essex Street, where a second pair of group switch boxes is installed, with tie line connections for emergency service. Beyond this point the third-rail sections are served by two 2,000,000 circ. mil cables, which terminate in a box near the southerly end of the tunnel, where the switches are arranged to connect each side of the tunnel with a separate cable leading to Central power station, on Albany Street. A cross-over is installed south of Boylston Street, and to carry out the separation of north and south bound feeders, the cross-over is sectionalized, half being fed from the east side of the tunnel and half from the west side. There are no circuit breakers on any of the feeder lines supplying the third rails in the tunnel, these devices being installed only at the power stations.

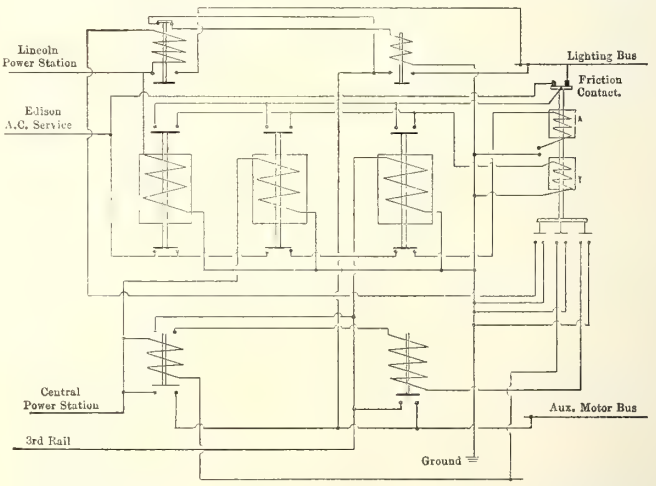
Throughout the tunnel over each track is carried a No. 00 round trolley wire for use in case of emergency. This is supported by hangers and span wire construction with wall fastenings between stations, while at stations it is hung from the girders by wooden supporting blocks. The trolley wires are fed by taps from the same cables which supply the third-rail sections, but there are only five section breaks in each wire. At each section break a two-point switch box is installed, with connections for feeding around the break or for feeding in each direction independently. Normally each trolley section is fed from but one end. In addition to the section breaks in the tunnel, provision is made for the complete isolation of the tunnel trolley at each portal. All cables in the tunnel are triple braided rubber insulated; no lead-covered power cable was installed.

Plans of the tunnel feeder system have been prepared by the company to facilitate the operation of trains by trainmen in case of trouble. These drawings are arranged to show, in instruction book form, what sections of the third rail can be killed or made alive by given switches in any locality in the tunnel. In case a train becomes disabled so that it is necessary to cut out the third-rail section on which it has stopped while repairs are made it is easy to determine from the drawings just what switches to operate.

The tunnel is lighted by about 1700 16-cp incandescent lamps, consuming 64 watts each, installed in series of five lamps each. No arc lamps are used in any part of the tunnel. All the wiring for the lighting distribution outside of the main vitrified clay conduits is run in iron conduit, the lights in different sections being controlled from fireproof distribution boxes. In general, the system of inter-station illumination is similar to that adopted in the East Boston Tunnel. The station lights are installed about 12 ft. above the platform. A special feature is the use of a line of lamps 10 ft. apart and from 15 ft. to 20 ft. above the platform edge, to illuminate the edge of the platform. The edge itself is painted with a broad white band that makes it conspicuous. The total number of lamps per station averages about 150. Special care has been taken to keep the lamps out of the direct vision of passengers. Frosted bulbs are used generally in exposed locations, such as in lobbies and passageways. Throughout the tunnel "H K" wall outlets are used, the size and shape of the white porcelain being altered according to location. Illuminated transparencies for announcing train destinations are installed at all stations at right angles to the track, centrally above the platform.

In each station are two switchboards, one being located at each end of the platform. Each of these boards controls half the station lamps. The switch for controlling the power supply to the section of third rail in front of the platform is located in the same chamber as the lighting control. At one of the boards in each station is located a double-throw single-pole automatic switch, which, in case of failure of the main lighting cable which runs through the tunnel, throws the lights for half the station on the third rail. At the other switchboard of the station is located a single-pole double-throw hand switch which throws the other half of the station lamps on the third-rail feeders. Snap switches are located in the switchboard booths at the ends of the platforms to control the individual lighting circuits.

In the tunnel between stations two staggered lines of char glass bulb lamps are installed. The lamps in each line



Washington Street Subway—Wiring Diagram of Automatic Lighting Connections

are spaced 24 ft. apart. All track lights are provided with shields to protect motormen's eyes. At intervals of 500 ft. distribution boxes are installed on each side, each box controlling 50 lights arranged in 10 circuits. These circuits are taken off the central point of a double-throw single-pole switch, hand operated, through a busbar and fuse connection. The switch connects the lights of the section of the tunnel with the trolley wire when thrown upward, and with the main lighting cable when thrown downward.

Care has been taken to preserve continuous lighting of the tunnel under all circumstances. At State Street station a switchboard has been installed with automatic equipment for supplying the tunnel lights in normal and emergency conditions. South of State Street the lights on the northbound side of the tunnel are supplied by a No. 00 cable running to a point opposite Winter Street station. Beyond this point the balance of the lights on this side is supplied by a No. 0 cable in series with the first, and connected with it through a knife switch in a wall box, so that if trouble occurs on the cable north of the switch the lights on the No. 0 section can be supplied from the trolley or third rail. Similar cables are installed between State Street station and the South tunnel portal, on the southbound side of the tube. North of State Street station the tunnel lights are fed by a No. 0 cable on each side. The auxiliary motors and heaters for ticket booths are furnished with current through a No. 0000 cable running south from State Street to Summer Street, where the cable is reduced in size to No. 00.

The scheme of automatic operation of the lighting and power supply at State Street station switchboard is shown on page 938. All lighting cables are brought to a common bus, and all auxiliary power cables are similarly concentrated at the center of distribution and control. The sources and order of supply for lighting service are: Lincoln Wharf power station, Central power station, the tunnel third rail, and the service of the Edison Electric Illuminating Company of Boston. The order of supply for auxiliary power distributed from State Street station is, first, Central power station, and second, third-rail connection. The switchboard consists of a motor service panel, a lighting service panel, and an automatic control panel on which are mounted solenoid switches for automatically throwing the services from one source of power to another. These switches are arranged so that only one source of supply is connected at any one time. If the current from one source fails, the switches, which are of the General Electric contactor type, open and close by gravity, throwing the lighting or power cables instantly on the next source. The wiring is so arranged that no matter if the current supply fails on an alternative source, any source remaining will at once take up the load. If all the sources fail, the first source to have current restored takes up the load, and as the different sources come back into service, the emergency supplies are cut off until finally the normal supply is once more at work. Interlocks are provided to prevent the connection of the Edison service, which is 550-volt alternating current, with the auxiliary motors, which are all wound for direct current only. Under no circumstances do the Edison current and the railway company's current come on the circuits together. The Edison current is supplied through a step-down transformer located at State Street, the secondary line being grounded on one side.

The tunnel is equipped with 16 automatic block signals of the electropneumatic type, designed for the Boston Elevated Railway. The longest block is about 1500 ft., and the shortest block 600 ft. The compressed air supply is furnished by compressors located at Sullivan Square, Central power station, and the Guild Street shops. A 2-in. pipe line is carried through the tunnel for distribution of air at a pressure of about 90 lb. per sq. in., and at each end the pipe is connected with the line on the Atlantic Avenue elevated structure, to provide for emergency feed in case of trouble at any point in the tunnel.

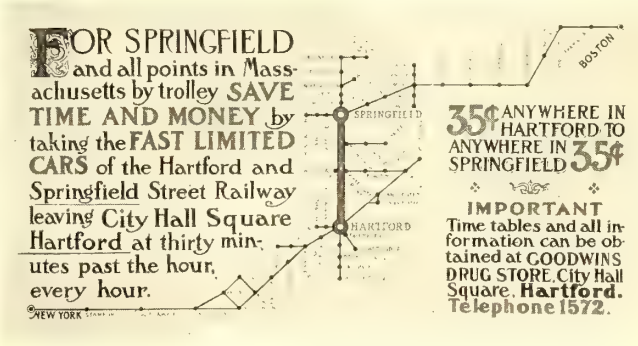
The wiring of the signals for a complete block is shown on page 937. A modified Brown polarized relay is used. The design of the signal equipment was made under the immediate personal supervision of Paul Winsor, chief engineer of motive power and rolling stock, and W. C. Smith, inspector of signals. The indications to trainmen are given by red and green lamps mounted in a narrow case at the right and above the track. The contactor equipment occupies a space only 47 9/16 in. high by 14¼ in. wide. At each signal is an automatic stop which is practically the same as that in use on the present elevated division in Boston.

At State station there are installed four moving stairways, built by the Reno Inclined Elevator Company, of New York. The vertical rise of these machines is 21 ft. There are three single file moving stairways, each having a capacity of 3500 passengers an hour, designed to carry traffic up or down as the conditions require. They are made reversible by operating a switch. There is also one double file moving stairway with a capacity of 7000 passengers an hour. The single file machines are operated by 7½ hp, 550-volt motors wound for 450 r.p.m., and connected to the stairways by Renold silent chain drive.

The moving treads have attached at each side 3-in. flanged rollers 12 in. apart, which are self-lubricating and run on steel tracks. The treads are bolted to a special steel bushed chain which passes around sprocket wheels at each end of the stairway. In an official test 31,000 passengers were carried during a period of three hours. The double file machine carried 7000 passengers per hour with 14 hp developed at the motor. The single file machines carried 3500 per hour with 7½ hp. The efficiency of all the machines, including the motors, was over 80 per cent. The power consumption per 1000 passengers lifted 21 ft. per hour was about 2 hp. In order to stop the escalators instantly in case of accident or failure of the current supply, all the machines are provided with a safety clutch, which comes into action and prevents the stairways from running backward with the load on. The speed of the treads is 100 ft. per minute. Switches are located so that the moving stairways can be stopped and started from either top or bottom, or from the switchboard room. The stairway motors are supplied with current from the same circuits which operate the other auxiliary tunnel motors.

HARTFORD & SPRINGFIELD POSTER

The Hartford & Springfield Street Railway uses posters in cars to advertise the advantages of the service offered



Hartford & Springfield Street Railway's Striking Poster

by the company. These posters have been placed in cars operated east of Springfield, Mass., and south of Hartford, Conn. A copy of the poster has been received from Thomas C. Perkins, vice-president of the company.

ANNUAL MEETING ARKANSAS ASSOCIATION

The second annual meeting of the Arkansas Association of Public Utility Operators was held at the Arlington Hotel, Hot Springs, Ark., May 12, 13 and 14. With few exceptions all of the lighting and railway companies in the State were represented. The supply dealers were also well represented. Through the courtesy of Edward Thomas Hardin and the Hot Springs Street Railway Company enjoyable entertainment was provided for the ladies and guests.

D. A. Hegarty, president of the association, was in the chair.

In the annual report of Secretary J. E. Cowles attention was called to the publicity campaign carried on from his office during the past year. More than 3000 documents had been distributed among the public utilities of Arkansas with a view to improving legislative conditions.

The annual address of the president was read by D. A. Hegarty, general manager, Little Rock Railway & Electric Company. An abstract follows:

ADDRESS OF PRESIDENT D. A. HEGARTY

We are now living in an age where the manufacture and distribution of electricity, gas, water and service rendered by electric railways, both city and interurban, is attaining its highest efficiency. The accomplishments and advancements have been made while public utility companies, classed the same as manufacturing corporations called trusts, were being assailed by demagogic politicians and legislation in the forms of tax commissions, public service commissions and laws framed that are practically confiscatory to corporations, depriving them of earning fair remuneration on the money invested.

As the public utilities are the greatest factors in the growth of a city they should be treated with fairness in the granting of franchises and terms in order to give them a chance of expanding and helping the city to expand. We have had several examples during the past year where the franchises of public utility companies have expired or are about to expire, as the cities and the companies have not been able to reach any agreement; stagnation has come to a great many businesses connected directly or indirectly with the companies and investments in the cities have been prevented as capitalists will not invest any more except where they know they will get a square deal; and limited franchises without a renewal clause do not give the investor protection.

The position public utility corporations occupy at the present time is this: That the cost of electricity, gas, water and car fare was much higher 20 years ago than it is to-day when land values and food products were only one-third of what they are to-day. The increase in costs of food and rentals has made a higher cost of labor, so it is the increase in land values that is the greater reason for the increased cost of living and not the corporations as the people are led to believe. If the law-makers and commissions would be fair in legislation they would legislate to reduce the cost of rentals and foodstuffs, which would give the greatest benefit to the largest number of consumers and not place all the burden on the corporations.

This State of Arkansas is one of the richest in natural resources in the United States and is practically undeveloped. This can only be done by inviting capital to invest by liberal laws for taxation and protecting the investment when it has been secured. We should not make the mistake of some of our sister Southern States of getting capital to invest within our borders and, after it has been safely secured, enacting laws that practically destroy the investment.

During the legislative session just closed a number of measures were introduced containing drastic and confiscatory laws against public utility companies as well as other corporations, but the majority of the Senators of the State of Arkansas, being farseeing and progressive men with the love of the upbuilding of this great State, defeated each and every one of these measures as they were placed on the calendar for their judgment. One bill that has passed both the House of Representatives and the Senate provides for the appointment of a tax commission with unlimited power, and all we can hope is that the commission will always be composed of honest, fair-minded men who will deal with us justly and squarely and not try to have the corporations bear an unjust burden of the taxation.

At the second session J. M. Hewitt, president, Marianna Electric Light & Power Company, was in the chair. The first paper was presented by C. J. Griffith, superintendent, Little Rock Railway & Electric Company, and was entitled "The Use and Abuse of Transfers." This paper will be found elsewhere.

Edward T. Hardin, Hot Springs Street Railway, called attention to the satisfactory reduction in the number of transfers issued that had been made by his company. From June 1 to Dec. 31, 1908, a reduction of 11 per cent in the number of transfers issued had been brought about with no decrease in the fare passengers. This had been accomplished by requiring care on the part of the conductors when issuing the transfers and by introducing a regulation arranging for the issue of transfers at junction points only and with short time limits. Mr. Griffith stated that the Little Rock Company has obtained good results by insisting that the conductors use every care in punching transfers. With an average of 3500 transfers issued per day but four or five are ever found to be wrongly punched.

A paper on "Damage Suits," by L. E. Sawyer, attorney, Hot Springs Street Railway. This paper will be found elsewhere. In discussing this paper W. A. Sullivan, of Ford, Bacon & Davis, Little Rock, related the circumstances surrounding a damage suit against the Philadelphia & Western Railroad which was won by the company because of the valuable evidence presented in the form of systematic reports made by foremen.

The Question Box was introduced by D. A. Hegarty, who spoke in particular regarding the saving to be effected from buying coal on specification. Arkansas coal might have from 15 per cent to 20 per cent ash and if it were bought on specification a penalty or bonus could be received from or paid to the coal dealer according to whether the ash component was greater or less than the specified per cent.

The Little Rock and Pine Bluff companies had tried to get coal dealers to sell them coal according to specifications drawn up from those of the United States Geological Survey, but the dealers refused to sell in this way because there was a market available which did not require such close watching of the product. The specifications formulated by Mr. Hegarty placed a penalty of 10 cents a ton for every increase of ¼ per cent of sulphur. Concerted action on the part of all public utilities in the State was urged so that the dealers might be induced to sell according to specification. A committee was appointed to study the situation and draft specifications. Arkansas coal runs from 12,000 to 13,000 b.t.u. per pound and has about 15 per cent to 20 per cent ash when properly burned. R. Swartz, Hot Springs Light, Water & Gas Company, had arranged testing apparatus in his plant so coals could be easily tested under actual working conditions. He had found the Arkansas washed slack to be the most efficient according to cost. The firing of coal had largely to do with the amount of ash. Some hand-fired coal gave from 20 per cent to 30 per cent ash, while the same coal fired with the Jones underfeed stokers in his plant left but 15 per cent ash.

Several papers were presented on electric lighting, gas and other utility subjects.

The executive committee announced that the next meeting would be held at Pine Bluff, Ark., in 1910, the exact

date to be announced later. The following officers were elected and installed to serve during the coming year:

NEW OFFICERS

President, B. C. Fowles, general manager, Pine Bluff Corporation.

First vice-president, J. M. Hewitt, president, Mariana Electric Light & Power Company.

Second vice-president, S. A. Stern, Home Water Company, Little Rock.

Third vice-president, C. J. Griffith, general superintendent, Little Rock Railway & Electric Company.

Secretary (re-elected), J. E. Cowles, electric engineer, Little Rock Railway & Electric Company.

Treasurer, E. T. Hardin, superintendent, Hot Springs Street Railway Company.

THE USE AND ABUSE OF TRANSFERS*

BY C. J. GRIFFITH, SUPERINTENDENT RAILWAY DEPARTMENT, LITTLE ROCK RAILWAY & ELECTRIC COMPANY

The transfer was introduced in good faith by street railway companies for the purpose of permitting a passenger to continue a journey on a line other than the one on which he pays fare. It was not intended to be used in a reverse direction or that a transfer should be issued upon a transfer. However, since its introduction the transfer has gained in popularity and is almost universally used and in many cases with very few restrictions, and it is issued and accepted indiscriminately by a great many companies. The writer believes that responsibility for the conditions existing to-day in a great many cases rests with the operating officials of street railway properties. True, city councils have passed in many cases ordinances which have created conditions and imposed hardships that street railway companies did not anticipate and which in some cases have resulted in great loss to the companies affected, caused by the extension of the transfer privileges.

Previous to the adoption of electricity as a motive power for street railways many small companies were operating mule-car lines, consisting of one or more routes, and issued transfers only to their own lines and not to foreign lines, but when the electric cars began to displace the mule cars many consolidations of interests took place; lines were extended and additional lines were built, reaching far out into the suburban districts. Naturally the transfer system was extended by the new combination of interests without the least regard for future results. Being as these interests were so eager to complete and equip their new originations, a thing so small as a transfer was entirely overlooked and, in fact, its effects on the earnings of a company have just recently been discovered.

DANGER IN EXTENSIONS OF TRANSFERS

Little did the traction companies believe when the transfer privileges were being extended that they were creating a condition that would some day cause them great loss of revenue and even bankruptcy. The earnings per passenger and the cost of the service rendered have been gradually approaching each other, due to the extension of the transfer privileges and the increased distance one rides for a 5-cent fare, and sooner or later must result in some new method yet to be adopted that will give to street railway companies a just compensation for service rendered. Whether or not it will result in the adoption of the fare zone system, as in Europe, or a charge for a transfer, will remain to be seen; but certainly present conditions cannot always obtain.

The writer does not believe that one can dispute the fact that the transfers affect materially the earnings of a company. If the transfer is issued and accepted indiscriminately and no check of it is made it invites abuse both by the public and by dishonest employees; and there is practically no end to the amount of abuse that can be perpetrated.

With this condition obtaining the earnings per passenger will be reduced to an alarmingly low figure. Statistics show that the percentage of transfer passengers to cash passengers have increased in the last 10 years about 50 per cent and the earnings per passenger have decreased in many cases as much as 30 per cent. This is indeed an alarming condition and one worthy of much thought and consideration by those engaged in the operation of street railway properties.

The employees, of course, are responsible for a portion of the abuse of the transfer privilege, but not to the extent most people believe. The favorite method used by employees to perpetrate fraud is trading transfers among themselves. They may in some cases issue transfers in trade for other commodities, but this practice, as well as any other, can be readily discovered by properly checking all transfers accepted for each day.

The writer is of the opinion that the public is the greatest offender in the abuse of the transfer privilege and will resort to almost any means to defraud a company of that which justly belongs to it. Passengers have been known to secure a transfer on returning from lunch and give it to some friend to use in going to lunch, resulting in three persons going to lunch for 20 cents, for which service they should pay 30 cents. In an establishment employing a great number of people this endless chain can be worked with little fear of detection by officers of the street railway company.

Many forms of transfers have been introduced with the idea of preventing abuse by the public and employees. Some companies have even gone so far as to use transfers with pictures supposed to represent a likeness of the passenger using the transfer. In the writer's opinion the transfer has not yet been designed that will entirely eliminate abuses. The writer believes that the condition existing in a great many cases is directly due to the non-enforcement of operating rules. If you have transfer rules and disregard them nothing can prevent fraud on the part of both the public and employees.

TO PREVENT ABUSE

To prevent abuse of the transfer privilege the first necessity is a set of operating rules that deal directly with the transfer question, and the second is to see that these rules are rigidly enforced. The time limit on a transfer should be so extended as to permit a passenger to catch the next car on the line to which the transfer is issued and a conductor should not accept this transfer when he knows positively that the passenger could have caught the preceding car.

Transfers should not be accepted at other than transfer points, and this rule should be rigidly enforced. A transfer should be requested by the passenger and issued by the conductor at the time the fare is paid. A transfer should be refused if the passenger should neglect to ask for it until some time after paying his fare unless the conductor is absolutely positive that the passenger is really entitled to it. Even when the transfer is given in such a case the conductor should not forget to remind the passenger that the transfer should have been requested on payment of the fare and that it is against the rules of the company for the conductor to issue a transfer under any other conditions. This will have a tendency to impress upon the passenger the necessity of asking for a transfer at the time the fare is paid.

In conclusion the writer believes that both "the use and abuse of the transfer privilege" can be greatly reduced by requiring the conductor to mail all transfers taken up on each trip. A suitable envelope should be provided showing the date, line, trip number, run number and terminal leaving time. It should show on its face the number of transfers accepted on out-bound trip and the number accepted on his inbound trip, and should be signed by the conductor.

These transfers should be deposited in a suitable box placed at one or more convenient points on the system and should be taken up periodically by a clerk, whose duty should be to check the time of issue with the time of acceptance and determine whether or not the transfers were issued and accepted correctly and the conductors held personally responsible for all errors and the proper discipline administered. It would seem to be a rather expensive business for large companies to check all transfers issued and accepted, but the writer has found from experience that it is a paying investment and that enough clerks to perform the duty will earn their salary many times over.

*Abstract of address delivered before the Arkansas Association of Public Utility Operators, Hot Springs, Ark., May 12 to 14, 1909.

DAMAGE SUITS*

BY L. E. SAWYER, OF RECTOR & SAWYERS, ATTORNEYS, HOT SPRINGS STREET RAILWAY

Public utility corporations especially are being held day by day to a greater responsibility not only to the public, but to their employees. The tendency of juries in following public prejudices and the temptation of complaining litigants to overreach the truth are making the legal department of a public utility corporation a matter of great moment.

Damage suits grow out of what is termed "negligence." It is bound to be of negligence of the employees of the company. Stockholders do not operate the road, but those employed by them, be they directors, managers, superintendents, foremen or laborers. A damage suit can grow out of the negligence of the directors of a corporation in requiring certain things to be done or not to be done, in requiring the purchasing agent of a corporation to purchase a certain class of material or to sanction the purchase by a purchasing agent of machinery or appliances that are not of the best. Sometimes the very policy that is encouraged by the directors and management of the road leads to very serious consequences that find their end in a court of law. For the purpose of this address we will confine ourselves to the subject of damages growing out of defective machinery and appliances in construction and maintenance and operation and the personal negligence of the employees in operating and handling equipments.

DEFECTIVE EQUIPMENT

The tendency of the Legislature is to hold a corporation more directly accountable for defective machinery, not only to the people, who are not supposed to detect a defective car wheel, a defective step or a defective coupling, but to the employees of the company themselves, although they may know the danger and the reason that attend the use of the particular defective appliance; yet if they operate it and use it under order of the superior office their contributory negligence is absolved and the company is held liable in some States or there is a comparative degree of negligence to be settled, which no jury on earth is able to measure. All that we can say is that the testing department of a public corporation is becoming one of the most important wherein "an ounce of prevention is worth a pound of cure." Everything connected with the operation should be subjected constantly to the most rigid examination and test and records kept of it; for no corporation should be held to a greater degree of care than this, and it should have at hand whenever called upon by the legal department records to show the condition and defects of any appliance of machinery and the report of the very latest inspection.

Manufacturing and wholesale houses that sell appliances and equipments should have them thoroughly tested and the company purchasing appliances and equipments should have them thoroughly tested and the construction and repair departments should be vigilant and exhaustive and the testing department should have its records kept properly with correct dates and by proper officers and always ready at the command of the legal department.

NEGLIGENCE OF EMPLOYEES

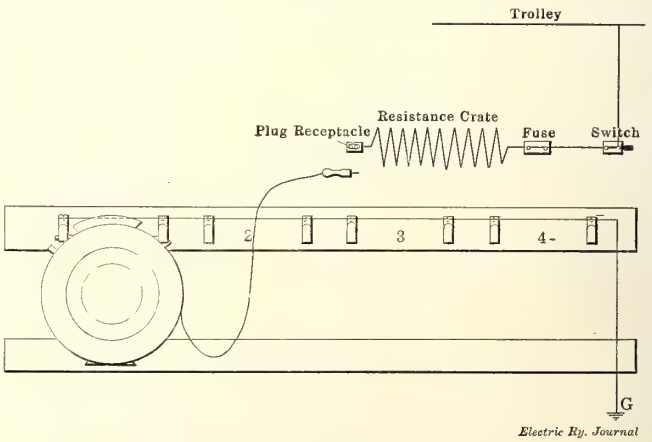
The personal negligence of employees is a matter of great importance; those whose duty it is to employ what we term in law "servants" of a corporation should exercise just as much care and judgment in the selection of their men as the time and circumstances will permit. Not only men who are qualified to do the work, but men who, when called upon to face the juries, have, by their conduct and bearing, the confidence of the people with whom they associate and who will make an impression upon the jury. We can take a good case of defense on the facts and yet have those facts detailed in a bad way by a witness in the employ of the company who has no moral standing in the community and lose the case. We can take an uncertain case with an employee who is a good witness of good moral standing and win it. Employees should be thoroughly trained, lectured and instructed before assuming responsibility to the public in operating a public utility. A negligent employee by his negligence will permit bad conditions to exist in the equipment; a negligent employee by his own negligence and carelessness will permit bad customs to grow up and even violations of a strict order of the company will be permitted to continue until they become a matter of custom and then a matter of practice, which often becomes the turning scale in a lawsuit. We can safely say that there is not one case out of 20 where the employee was negligent and his negligence caused the accident; but very often we will lose the case because the employee after the accident or at the time of the accident was not diligent in getting the names of the witnesses, statements of the witnesses, calling the attention of bystanders to conditions as they exist which clearly showed the negligence of the parties injured, and very often for this reason the suit is lost and the company is mulcted. We, the legal department, want everything; expressions and statements of bystanders, what the bystanders saw; we want distance, speed, conditions. Every employee of a public utility corporation should get all the facts connected with the accident and get them down so that when he is called upon by the legal department they can be presented. This should be done at once; it should be done by a record and the employees should be instructed along this line.

Whenever judgments amounting up into the thousands begin to concern a corporation it means a lessening of salaries, dissatisfaction to stockholders and public censure; it means saturating the minds of the people who become possessed with the idea that a public utility corporation is absolutely indifferent to property, human suffering or human life. Every person connected with a public utility corporation should have these principles at heart and do all he can in every respect to see that the public mind is disabused and that the best appliances and equipment are used, constantly tested, and that men of sterling worth and integrity are employed and that everything possible is done at all times to prevent injury.

*Abstract of address before Arkansas Association of Public Utility Operators, Hot Springs, Ark., May 12 to 14, 1909.

USEFUL HEADLIGHT RACK

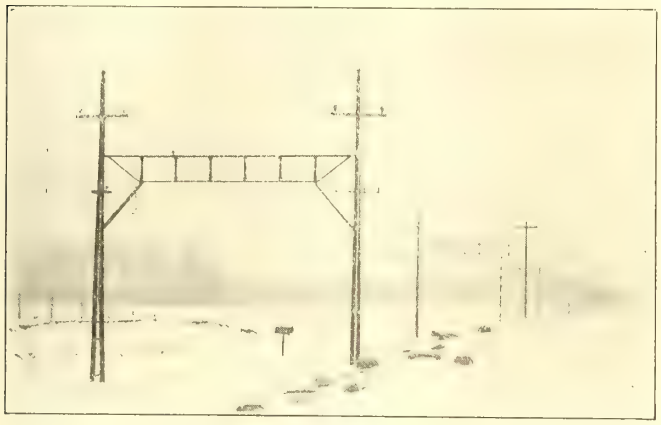
At the shops of the Sterling, Dixon & Eastern Electric Railway at Dixon, Ill., a headlight rack has been so arranged that but a moment's time is required for a motorman to make certain that his headlight is in operating condition before he hangs it on the car. As shown in the sketch, the rack is provided with hooks for supporting four headlights. These hooks are connected to ground, and above the rack is a plug receptacle connected with the trolley circuit through a resistance grid, fuse and switch. During the day the headlights for the four cars operated are hung on this rack, and at night, before placing one on a car, it is only necessary to put the lamp plug in the nearby receptacle to ascertain whether the lamp is in good operating condition. Acknowledgment is made to Wayne P. Hendricks, superintendent, for the accompanying sketch.



Useful Headlight Rack

STEEL CATENARY BRIDGES FOR LINES IN CENTRAL NEW YORK

Several articles have been published in this paper on the catenary bridge construction erected by the Archbold-Brady Company, Syracuse, in New York for the Syracuse, Lake Shore & Northern Railroad and the Rochester, Syracuse & Eastern Railroad. This overhead construction is the result of a study made by Thomas H. Mather, chief engineer of the railroad companies, and the contractors on





Two Types of Direct-Current Catenary Construction on Syracuse, Lake Shore & Northern Railroad

the subject of a light overhead bridge construction which should be comparable in price with the ordinary wooden pole construction. In the latest work, which is on the Rochester, Syracuse & Eastern Railroad, a design has been secured in which the cost is not materially greater than where wooden poles with spans have been used.

Two styles of bridges were used on the Syracuse, Lake Shore & Northern Railroad. In one style the high-tension transmission lines are carried on extensions of the bents; the other style was used where the high-tension lines had to be carried around cities or villages and the high-tension attachments were omitted. Both styles of bridges are shown in the illustrations. On the Rochester, Syracuse &

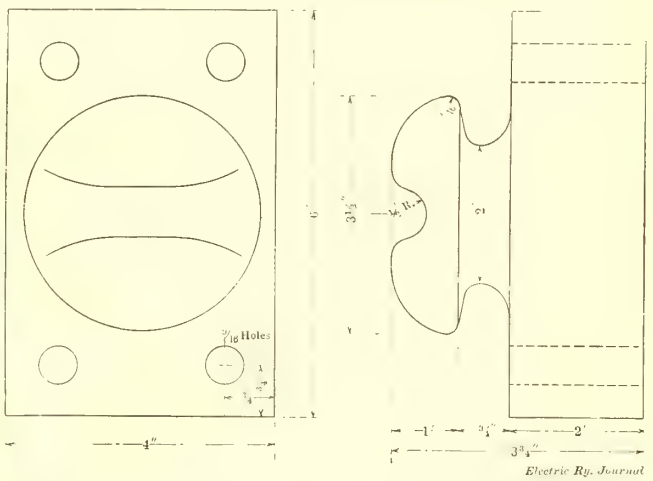


Wooden Pole Line on Rochester, Syracuse & Eastern Railroad

Eastern work it is not necessary to carry the high-tension lines around any of the villages, and, therefore, all the bridges for that road are to have the high-tension attachments.

The standard spacing of the bridges is 300 ft. on both tangents and curves, but some spans are reduced to 200 ft. to give proper spacing for highway crossings, etc. The standard height of the trolley wire is 18 ft. and the bents of the bridges are 28 ft. center to center. Anchor bridges are placed only where the construction changes from catenary trolley to ordinary trolley, as in city streets. No. 0000 grooved copper trolley wire is used and the catenary hangers are spaced 30 ft. apart. On curves pull-off poles are used with a bridle construction and the pull-offs are run to each hanger rod, that is, every 30 ft. On the construction on the Syracuse, Lake Shore & Northern Railroad, where the photographs shown in the illustrations were made, 7-16-in. strand high strength steel messenger wire was employed, mounted on porcelain pin insulators attached to steel pins on the top member of the bridge. On the construction on the Rochester, Syracuse & Eastern Railroad it is proposed to use the two 500,000 circ. mil copper feeders as messengers, and thus eliminate the cost of the steel messengers.

The copper messenger is to be carried on a porcelain saddle, recently designed by Thomas H. Mather, chief engineer, and R. A. Dyer, Jr., electrical engineer of the railroad company, and illustrated in the line engraving.



Plan and Side Elevation of Saddle Insulator for Messengers

These saddles, which are to be furnished by the Ohio Brass Company, are to be lagged to a timber which will be protected from decay by preservative compound, and are to be mounted on the tops of the catenary bridges. This timber provides additional insulation and is a safety precaution against grounding in case the insulator should break.

The cost of the construction per mile of double track on

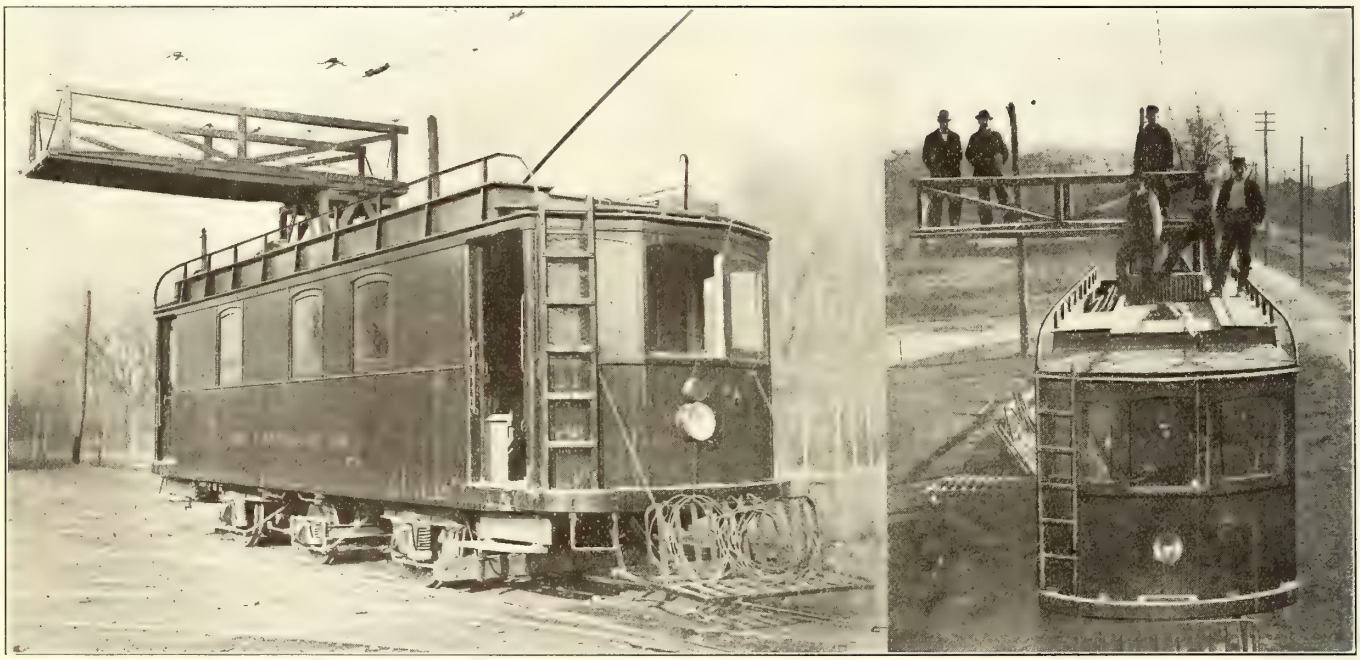
the Syracuse, Lake Shore & Northern Railroad was, approximately, $4,100, where two high-tension attachments were used on each bridge. This figure includes the cost of placing the foundations, erecting and painting the bridges, special construction on curves, the catenary insulators, the two messenger cables, hanger rods, messenger clips, trolley clamps, necessary strain insulators, yokes and clamps, and also the labor of stringing the trolley wire, high-tension wires, feeder wires and four telephone wires. It does not include the high-tension insulators nor the cost of the wires themselves, which in this case consist of two No. 0000 trolley wires, six No. 2 copper high-tension wires, two 500,000 circ. mil copper feeders, and four No. 10 copper telephone wires.

The cost of the wooden pole construction as shown in the illustration on the Rochester, Syracuse & Eastern Railroad, including labor and material, outside of the wires and cables, was, approximately, $3,325 per mile, so that the additional cost of the bridge construction, as stated above, is less than $800. On the Rochester, Syracuse & Eastern it is believed that this would not be more than $200 per mile, even under extreme conditions, and here the cost of wooden pole construction would be increased also.

THE HARRISBURG LINE CAR

The Central Pennsylvania Traction Company, of Harrisburg, Pa., has been using for some time the novel line car shown in the accompanying illustrations. Perhaps its most interesting feature is the adaptation of the roof for storage purposes, the top being covered with bins which are 8 in. to 10 in. deep and have hinged flat trap doors. These bins contain all the tools and material usually needed in line repair work, and are readily accessible. An extra long bin on one side of the car contains the digging and raising tools. Each side of the car is furnished with hooks to carry poles or ladders. At night the roof is amply lighted with clusters of incandescent lamps.

The car body is 30 ft. long, 8 ft. wide and 6 ft. 6 in. high, and is mounted on a six-wheel Robinson radial truck.



Side and End Views of the Line Construction Car Built by the Central Pennsylvania Traction Company, Harrisburg, Pa.

bridge work the elimination of the steel messengers will make a saving of about $400 per mile, including material and labor. On account of the reduced price of structural steel, the price of the bridges was reduced about $275 per mile, so that the catenary construction on steel bridges with concrete foundations will cost, approximately, $3,425 per mile, or only $100 per mile more than the wooden pole construction.

On the new construction it is planned to put the telephone wires on 25-ft. poles, spaced 150 ft., adjacent to the fence line. The cost of this telephone construction over and above the cost where the telephone wires placed on the bridges, will be, approximately, $160 per mile. This plan will have the advantage of separating the telephone wires from the high-tension wires a considerable distance.

The $160 added to the $100 difference would make a difference of about $260 per mile under the conditions on the Rochester, Syracuse & Eastern, and it is believed that those conditions would not vary greatly from those on most roads. Variation in cost would come principally through the difference in cost of foundation material, but

The tower has a motor and worm gear hoist, with an automatic circuit-breaker to prevent it from rising out of its frame. The tower is raised to its maximum height in half a minute by the motor, or in one minute by hand. The motor is controlled either from the inside of the car or from the top of the tower. The maximum height from the rail to the top of the 13-ft. x 4-ft. table when the tower is raised is 19 ft. Two trolleys are used.

The inside of the car is equipped with a work bench, vise, anvil, pipe jaws, tool lockers, ropes, pole truck, etc. One reel of trolley wire is always carried on the car. This reel is mounted, and in stringing a line the wire is passed over the sheaves through the frame at the tower, so that the car can receive power from the new wire. The car is furnished with four electric heaters.

The specifications for this line car were drawn up by P. Frank Gerhart, C.E., electrician of the company, and built under his supervision in the company's shops. Smith & Wallace, of Woburn, Mass., have secured the specifications from Mr. Gerhart and are now building this type of line car for general sale.

BLOCK SIGNAL INSTALLATION AT SPOKANE

An interesting block signal installation has just been completed for the Spokane & Inland Empire Railroad Company to protect the operation of the trains of its Inland and Cœur d' Alene divisions while on or near a single-track bridge over the Spokane River. At one end of this

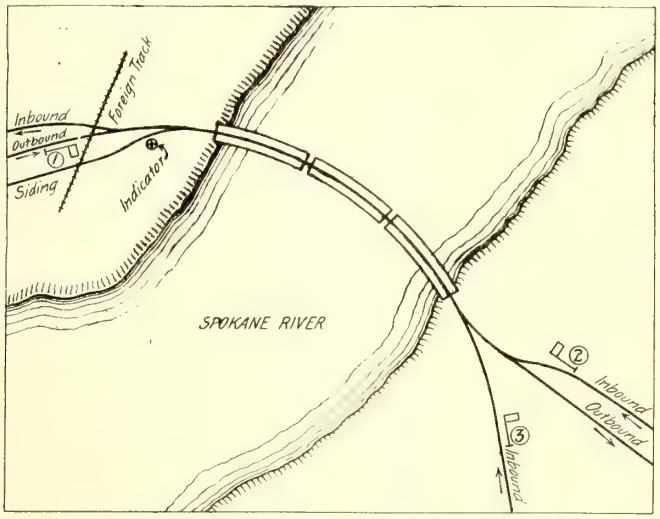


Diagram Showing Location of Block Signals

bridge are the shop yards and at the other the junction of the two main lines. The installation of signals was made by the General Railway Signal Company, Rochester, N. Y., and includes three electric motor semaphore signals for



Block Signal at Spokane

governing main line movements; one lamp switch indicator for governing movements from a siding to the main line; four sections of track circuit and the necessary batteries, transformers, relays, etc., for the operation and control of the signals.

An accompanying diagram shows the relative location of the bridge and the branching tracks at both ends. The movement of trains over this bridge, which is located on a curve, is very frequent, because the bridge serves as the entrance to the shops and the city terminal for all the traffic of the Spokane & Inland division to Colfax and Palouse, Wash., and Moscow, Idaho, and for the older double-track line to Cœur d' Alene and Hayden Lake, Idaho. The bridge, including approaches, is 500 ft. long.

Electrically operated normal danger semaphore signals are installed 400 ft. from the ends of the bridge on the outbound track on one side of the river and the two inbound tracks on the other side. The signals and the polyphase relays used are similar to those installed on the electrified zone of the New York Central. Twenty-five-cycle alternating current taken from 55-volt mains and reduced in voltage through suitable transformers is used on the track circuits to operate the track relays. The signal lamps are supplied directly from the same mains. The track relays will not operate on direct current or alternating current of any frequency other than 25 cycles. The signal motors are actuated by current from 10-volt primary batteries placed in shelters, and are controlled by model 9 d.c. relays, which are in turn controlled by the polyphase track relays.

Only one of the running rails is given up for signal circuits, and this rail is sectionalized by insulated joints. No reactance bonds are used, suitable reactance being inserted in the relay control circuits. The track circuits and signal control are so arranged that when a train enters the approach section in advance of any one of the signals it causes the signal to clear if the single-track section on the bridge is unoccupied, the siding switches are properly set and no cars are standing within fouling distance of the main line on any of the branching tracks. The movement of any signal to the clear position holds the other two signals in the stop position and causes a red light to burn in the siding indicator.

GROWTH OF COMMUNITIES AS AFFECTED BY CORPORATIONS

George H. Davis, vice-president, American Cities Railway & Light Company, and member of the firm of Ford, Bacon & Davis, has contributed an interesting article to the *Manufacturers' Record* on the "Growth of Communities as Affected by Corporations." In discussing the proper return on the investment in public utility enterprises, Mr. Davis says:

In discussing the proper return on the investment in public utility enterprises, Mr. Davis says:

Exclusive of returns on borrowed capital, which should be approximately 5 per cent per annum, agricultural, mining, manufacturing and mercantile businesses should, and do, yield when efficiently operated, at least 15 per cent per annum on the money invested by equity holders. Ten per cent of this is for the hazard, labor and responsibility of management, which fall entirely upon the stockholder. If a city regulates plants manufacturing and selling gas, electricity or other public conveniences through extortionate taxation or reduction of rates to a point of less profit than suggested, it will result in the paralysis of the industry to which such regulation is directed. This is simply an application of the law under which money flows in the course of least interference to the safest harbor. If any State or city has ambitions to be great, let it seize the present opportune moment and announce to the world a fixed policy toward investments for the next 50 years in which individual businesses and corporate businesses, private or public, are treated absolutely on a parity in regulation, taxation and the general exercise of police power or other necessary interference.

PERFORMANCE OF ELECTRICAL EQUIPMENT ON THE LIVERPOOL & SOUTHPORT RAILWAY

The performance of the electrical equipment of the Liverpool & Southport Railway, a branch of the Lancashire & Yorkshire Railway, of England, was made the subject of the presidential address before the Institution of Mechanical Engineers, London, April 23, by John A. F. Aspinall. The equipment of this line has been described in several previous issues of the Electrical Railway Journal. The line is 18½ miles in length, and is part of the Lancashire & Yorkshire Railway, one of the principal steam railroad

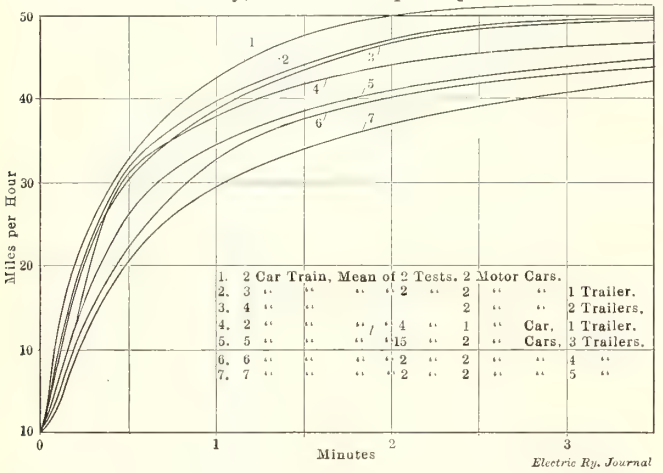


Fig. 1—Speed Time Curves for 2, 3, 4, 5, 6 and 7-Car Trains

lines of England. There are 15 passenger stations between Liverpool and Southport, and the entire length of electrified line amounts to 4 miles of four tracks and 25 miles of double tracks. The electric rolling stock consists of 38 motor cars and 53 trail cars, with a total of 5814 seats. All cars are approximately 60 ft. over all. The former steam equipment consisted of 30 locomotives and 152 cars, with a total of 5084 seats.

CONDITIONS FAVORABLE FOR ELECTRIFICATION

In discussing this subject Mr. Aspinall says that every case has to be considered with the utmost care to determine whether some great commercial advantage will be shown—otherwise electrification is not desirable. He does not believe, for instance, that on a long run, say that between London and Manchester or Liverpool, where the steam trains make a speed of 55 m.p.h., it would be commercially desirable to go to the expense of electrical equipment in order to double the speed.

The great advantage of electricity is to gain an increase in traffic by more frequent service, and also to increase the earning capacity of the rolling stock, track and station platforms.

INCREASED CAPACITY ON THE LIVERPOOL & SOUTHPORT RAILWAY

On his own line between Liverpool and Southport there are four tracks for part of the way, but although the frequency of the trains has been more than double since electrical equipment was installed, the rapid acceleration and high average speed of the electric trains have permitted the company to dispense with the use for passenger service of two of the four tracks in the four-track section. This has resulted in a saving of the expense of maintaining the passenger stations on these tracks which are now given up to freight. It is also interesting to note that in spite of the fact that the number of passengers carried has increased 14 per cent, the total weight of rolling stock moved per day, as compared with steam service, has decreased from 78,393 tons to 69,160 tons.

ECONOMY IN ELECTRICAL SERVICE

During the transition stage electrical and steam service were conducted on the same tracks under the same condition. This afforded an opportunity of comparing the coal consumption of the locomotives and of the power house. It was found that the six-wheeled coupled tank engines which did the work in 1904 consumed 80 lb. of coal per train-mile with express trains, and 100 lb. with local trains. This excessive locomotive consumption was due to the high acceleration required. The consumption of coal at the power station in 1908 works out to 49 lb. per train-mile, or 0.412 lb. per ton-mile, for the electrical trains. The consumption of energy at the train is 112 watt-hours per ton-mile for express and local trains, including all switching work.

THIRD-RAIL

The center of the third-rail is located 1 ft. 7¼ in. outside the gage line of the nearest track rail, and its top is 3 in. above the top of the track rail. Mr. Aspinall states that it would have been impossible on account of platform clearance conditions to have used the New York Central type of inverted third-rail. The Liverpool & Southport Railway also employs a fourth-rail, or return, but it is not insulated as in the London lines. It is bonded to the track rails and acts simply as an auxiliary return.

RAIL WEAR

Considerable wear and corrosion have been experienced on the track rails and third-rail, and corrosion in the fourth-rail. The wear on the track rails is attributed by the author largely to the low center of gravity and rigid support of the electrical equipment. Thus 12 tons of the weight of a motor with its four axles, or more than 25 per cent of the total, is not carried on springs. It is probable that with a higher center of gravity and a greater amount of the weight spring supported, the rail wear would be much less. But the advantages of direct drive would be lost, and as Mr. Aspinall says the gears wear extremely well, he concludes that it may be desirable commercially to wear out a cheap rail instead of expensive mechanism. It must also be remembered that it has not been practicable to operate steam trains at the same schedule as that usually adopted for electric service, and consequently there is no

Table I—Particulars of Accelerations for 2- to 7-Car Trains

No. of Cars in Train	Composition of Train		Maximum Speed in M.P.H.	Time in Seconds to Attain M.P.H.					Speed in Miles per Hour After Minutes						Mean Acceleration up to					
															Minutes			Miles per Hour		
	Motor Cars	Trailer Cars		m.p.h. 10	m.p.h. 20	m.p.h. 30	m.p.h. 40	m.p.h. 50	½	1	1½	2	2½	3	¼	½	1	10	20	30
2	2	..	51.5	5	11.5	25.5	49.5	120	32.5	42.75	47.75	49.8	50.5	51.2	2.3	1.59	1.04	2.92	2.54	1.72
3	2	1	49.625	7	14	27.75	60	..	31.5	40.0	44.2	46.9	48.6	49.4	2.8	1.54	0.97	2.09	2.09	1.59
4	2	2	49.25	7.5	15	29	65	..	30.3	39.0	43.75	46.5	48.2	49.2	1.95	1.472	0.95	1.94	1.94	1.51
2	1	1	46.75	9.5	17.5	28	72	..	31.0	38.5	41.8	44.0	45.3	46.3	1.71	1.52	0.69	1.54	1.67	1.56
5	2	3	44.75	9.5	20.75	40	106	..	25.6	34.65	38.5	41.0	42.7	43.8	1.56	0.92	0.847	1.54	1.4	1.09
6	2	4	43.875	11.5	26	50	116	..	22	32.8	37.6	40.3	42.0	43.1	1.29	1.09	0.803	1.27	1.12	0.88
7	2	5	42.0	13.0	30	64	162	..	20	29.4	34.0	37.0	39.3	40.9	1.14	0.978	0.72	1.12	0.95	0.68

information as to how the tracks would have been affected if they had been so operated.

CARS

The cars used are of the end-door type and the doors are opened and closed by the passengers. The most crowded cars are emptied during the rush hours in about 50 seconds at terminal stations. Intermediate stations only require 15 seconds to pick up and set down passengers. With considerable baggage to handle, local trains can be operated with two guards and a motorman, while express trains need simply one motorman and one guard. An

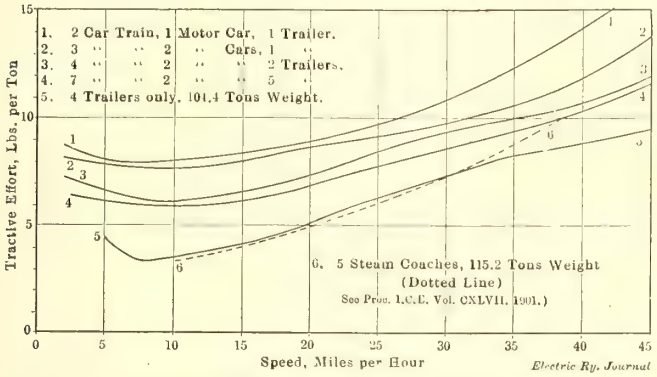


Fig. 2—Tractive Effort for 2, 3, 4 and 7-Car Trains

effort is being made to induce the passengers to enter at the rear door and leave by the front door at intermediate stations. The cars are equipped with automatic vacuum brakes.

STORAGE BATTERIES

An attempt was first made to operate without storage batteries. The railway was originally equipped with a power station containing four 1500-kw generators and one 750-kw generator and four substations, each equipped with four 600-kw rotaries and one with three 600-kw rotaries. There were 12 trains, each taking a maximum power during acceleration of 1000 kw to 1200 kw. The fluctuations of load were great. When the battery substations were installed they were placed between the rotary substations, rather than at them, partly to improve the voltage conditions on the line. The results have amply justified the policy that was adopted. The coal consumption was reduced by 8.5 per cent and the consumption for train service became the substation output. The total efficiency from alternating-current busbars to circuit-breakers on the trains is then about 81 per cent.

In considering the question of coal consumption per unit, Mr. Aspinall says that the most reliable figure to take for comparison is the coal burned at the power house per unit of direct current delivered to the third-rail—that is, with all losses due to conversion. This, for the 12 months ended Dec. 15, 1908, was 3.28 lb. per kw-hour.

TESTS AND RECORDS

In the appendix the author publishes interesting diagrams and data. Among them is a series of speed-time curves based on different schedules, station stops and lengths of train. With the same rate of acceleration, about 1 m.p.h.p.s., these diagrams indicate the rapid increase in the energy of consumption with an increase in speed.

Table III—Mileage Between Overhaul

Halt Year Ending	Standard Bogies	Wheels between Turning up of Tyres	150 h.p. Armature	All Classes Armature Bearings	Life Brushes	Life Shoes	Life Brake Blocks
	Miles	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*	*Miles*
June, 1906	17,750	..	..	..	11,000	....	1,683
Dec., 1906	28,800	39,000	124,000	44,000	11,680	112,500	1,784
June, 1907	32,700	38,000	115,000	41,700	12,640	127,300	1,915
Dec., 1907	32,600	49,400	87,300	49,000	15,550	116,000	2,150
June, 1908	32,800	42,300	128,000	63,000	13,400	78,500	2,320
Dec., 1908	28,500	30,300	171,030	87,100	10,900	102,000	2,680

Figs. 1 and 2 show speed-time and tractive effort-speed curves for trains of different lengths. In each case allowance has been made for the effect of grades, and the tests were made in both directions to eliminate as far as possible the effects of head winds. The author remarks that in Fig. 2, curves 2 and 3 do not follow paths parallel to curves 1 and 4, but they are true representations of the figures obtained. He explains that this is probably due to sudden variations in the wind.

Tables I and II correspond respectively to Figs. 1 and 2. In these tables "tons" are the English tons of 2240 lb. each. Table III gives mileage between overhaul for different parts of the equipment.

The original diameter of commutators was 17½ in., the present average diameter being 16⅝ in., representing a loss in diameter of ⅞ in., or about 0.175 in. per annum, 0.003 in. per 1000 miles; about one-half of this is due to wear, and one-half to turning up. The commutators can be worn down at least to 15½ in. diameter, so that their total life will probably be about 12 years.

Table II—Particulars of Train Resistance

Curve No.	No. of Cars	Composition of Trains: Motor Cars	Composition of Trains: Trailer Cars	Weight of Train	Length of Train		Train Resistance at Various Miles per Hour in Pounds per Ton: 5	10	15	20	25	30	35	40	45
				Tons	*Ft.*	*Ins.*									
1	2	1	1	71.537	121	8	8.5	8.0	8.5	9.0	9.5	10.75	12.5	14.0	.....
2	3	2	1	117.175	183	4	7.75	7.75	8.0	8.6	9.0	9.75	10.5	12.0	13.75
3	4	2	2	143.275	248	6	6.5	6.0	6.5	7.25	8.5	9.25	10.0	11.0	12.0
4	7	2	5	221.575	430	0	6.25	5.75	6.25	7.0	7.75	8.5	9.5	10.5	11.5
5	4	Trailers only		104.4	246	8	4.52	3.55	4.18	5.2	6.34	7.09	8.36	8.81	9.45
6	5	Ord. bogie coaches		115.2	285	0	....	3.3	.....	5.0	.....	7.4	....	10.5	....

0.412 lb. per ton-mile. The load factor was increased from 0.68 in 1905 to an average of 0.94 between 1906 and 1908.

EFFICIENCY OF TRANSMISSION

Tests were made to determine the over-all efficiency of transmission. Between the a.c. busbars and the third-rail the percentage of power-house output lost was found to be as follows: Cables, 1.97 per cent; transformers, 2.95 per cent; rotaries, 5.37 per cent. Total, 10.29 per cent. It is exceedingly difficult to ascertain the exact losses in the live rails; calculations made, however, in various ways seem to indicate that these losses amount to about 9 per cent of

It is proposed to build between Milan and Genoa, Italy, an electric railway which will require 19 tunnels through the Apennines and about 372 bridges. The distance is 176 km, or 109 miles, and the estimated cost of the work about $46,000,000. The line is to be double track and is to run 20 three-car trains a day, each car seating 50 passengers. The line is to be operated by water-power.

MEETING OF THE COMMITTEE ON POWER DISTRIBUTION, ENGINEERING ASSOCIATION

A meeting of the committee on power distribution of the American Street & Interurban Railway Engineering Association was held at the headquarters of the association, 29 West Thirty-ninth Street, New York, on May 14 and 15. There were present James Heywood, chairman and superintendent of lines and cables, Philadelphia Rapid Transit Company; G. W. Palmer, electrical engineer, Boston & Northern and Old Colony Street Railway; W. J. Harvie, chief engineer, Utica & Mohawk Valley Railway Company, and E. J. Dunne, superintendent of distribution, Public Service Railway Company, Newark, N. J. The other two members of the committee, S. L. Foster, chief electrician, United Railways of San Francisco, and W. G. Matthews, superintendent of overhead lines, Denver City Tramway, were unable to be present, but both sent letters expressing interest in the work and reporting on various subjects which had been assigned to them by the chairman.

Mr. Heywood announced at the opening of the meeting that the executive committee of the association had suggested certain topics for consideration by the committee. These topics had been assigned to different members of the committee, who reported on them. They were considered seriatim.

The first was on the disposal of condemned underground cables, that is the question of rehabilitation vs. scrapping, and the methods of separating the lead, insulation and copper. A variety of practice was found to exist in the disposal of underground cables. Some companies in scrapping cables sell the cable in its original condition. Others separate the materials by hand, or in some other way. One of the members of the committee reported that he had been using a special furnace in which the insulation is burned off. In this process the lead falls into trays below the retort and the copper is left as bare rods. It was decided to embody particulars of this and other furnaces in the coming report.

Considerable time was given to discussing the proper design and construction of manholes. The relative merits of brick, concrete and other materials and the proper shape, method of drainage and ventilation of manholes were considered, as were also the methods of supporting the cables in the manhole and the proper design of cover. Mr. Heywood agreed to prepare a drawing showing the ideal design of the manhole as a result of the discussion. Blue prints of this manhole will be sent to the members of the committee for further consideration and criticism before the next meeting of the committee. At that time the final form will be settled, and it is expected that in the report the committee will be able to recommend a type of manhole which, in its opinion, is the most desirable for general conditions.

The next subject discussed was that of bonds and bonding methods. Quite a full account of the methods followed in San Francisco was received from Mr. Foster. In the discussion it developed that while with nearly all rails the space between the angle plate and the rails is very limited for bonds, this condition is especially marked in certain sections of rails and angle plates. The committee decided to call this fact to the attention of the maintenance of way committee and the standardization committee, to learn whether it would not be feasible to design an angle plate which would be amply strong mechanically and yet provide more space for the bonds and bond terminals. The committee decided to prepare a series of recommendations on the most desirable methods of bonding.

It was found to be the general practice among railway companies to hold the superintendent of lines and cables, or the engineer of the distribution system responsible for the efficient condition of the return system, and it was the opinion of the committee that, under these circumstances, this engineer should have supervision over the installation of the bonds.

Another subject considered by the committee was that of economical maintenance. The first topic taken up under this heading was preservation of wood and iron poles, and it was decided that the report should give the latest data on this subject. The question of the requirements of overhead appliances was then considered, and it was suggested that a series of tests of the different overload appliances to determine their mechanical and electrical strength, absorption qualities and aging qualities be conducted by the committee. Such a test would include all the standard straight line hangers, such as the round top, cap and cone and West End; pull-offs of the West End and cap and cone types and all the different forms of strain insulators. The chairman agreed to take up the question of these tests with the president of the association.

The committee also gave considerable time to a discussion of the subject of specifications for overhead appliances, trolley wire and cables. If practicable, the committee will recommend for adoption to the association this year a series of specifications covering these materials.

The subject of lightning arresters was also considered. This will probably be made the topic of a special report at the next meeting.

Catenary construction also received attention. The principal topics considered were the relative merits of single and double catenary, the proper distribution of steady strains, the character of the working conductor, the spacing and character of the suspenders, the most desirable form and material for the insulators, and the design of the supports. Valuable information on the subject of catenary design appeared in the last report of the committee, and it is planned to bring this up to date this year by embodying the record of the improvements made during the past 12 months. The committee also considered the conditions under which poles of telephone, electric light or other companies should be used by railway companies and the conditions under which the wires of such companies should be put on railway poles, as well as the charges to be made under conditions of this kind. In some parts of the country local regulations require the use of the same set of poles by two companies, and several member companies of the association have reported that telephone and other companies are demanding compliance with stringent rules where these conditions prevail.

The committee will issue no data sheet this year. Another meeting of the committee will be held during the first part of July.

The National Board of Fire Underwriters has recently issued the 1908 edition of the rules and requirements for the construction and installation of fire doors and shutters as recommended by the National Fire Protection Association. Work carried out in accordance with these rules has a favorable bearing on the reduction of rates. The booklet is issued by the National Board of Fire Underwriters, 382 Ohio Street, Chicago, Ill.

PROGRESS IN DETROIT INVESTIGATION

The fourth meeting of the Committee of Fifty, which is investigating the street railway situation in Detroit, was held in the Common Council chamber, Detroit, on May 3. Reports of progress and of results accomplished were received from the various committees to which the consideration of special subjects had been allotted.

COMMITTEE ON STATISTICS AND REGULATION

This committee reported that it had requested traction companies in 12 cities to give answers to certain questions. Replies had been received from all but two of the companies.

COMMITTEE ON TAXATION AND PAVING

Statements of taxes paid by the Detroit United Railway and the lines which now form part of the Detroit United Railway system within the present corporate limits of the city of Detroit, from Jan. 1, 1900, to Dec. 31, 1908, were presented by the committee. The figures were taken from the books of the company by the company's accountant and verified by the accountant for the committee, W. D. Gridley. The committee stated:

These exhibits cover all taxes paid upon the company's property within the city limits or the one-fare-zone, that is, all of the company's lines over which city passengers are carried without extra charge, whether levied for city, State, county or township purposes or in the form of a special tax upon the gross earnings.

In the tabulation of these expenditures, the accountants have, pursuant to the request of your committee, charged to each calendar year the taxes paid for that year, irrespective of whether the same were paid in advance or otherwise, that is to say, the city taxes being paid in July or August for the city's fiscal year ending the June 30 following, one-half of these taxes are charged in one calendar year and the other half in the following year.

Included in this exhibit will also be found the cost of sprinkling car tracks for 1904 to 1908, inclusive; removing snow and ice from 1903 to 1908, inclusive, and the taxes on express cars from 1903 to 1908, inclusive.

The memorandum of F. H. MacPherson & Company, accountants, relative to the segregation of taxes for the years 1901 to 1908, inclusive, states in part:

The general taxes are shown in the aggregate, as it is impossible, or at least impracticable, to separate them as between lines or routes. In consultation with the officer in charge of the tax department, he states that, familiar as he is with the subject, he would not undertake to separate them and do so with any degree of accuracy.

In arriving at the specific tax, the gross passenger earnings are divided by the total mileage in operation. Having arrived at the earnings per mile this is multiplied by a fixed figure, representing the number of miles in operation at the time the tax went into effect. This figure was arrived at in a conference between Messrs. Hutchins, Brooks, William B. Thompson (then city treasurer), and P. J. M. Halley, about 10 or 11 years ago, as we are informed.

With the exception of the special taxes, all other taxes are included within the year in which imposed, regardless of the date of payment, and where the tax year does not coincide with the fiscal year of the Detroit United Railway the taxes have been apportioned.

The cars on all suburban lines are assessed in the city, both for city and State and county purposes, and are not assessed in any of the outlying towns or villages.

DETROIT UNITED RAILWAY RECAPITULATION OF TAXES PAID IN ONE-FARE ZONE, 1901 TO 1908, INCLUSIVE

Year.	Inside City.	Outside City.	Total.
1901	$103,191.61	$2,325.88	$105,517.49
1902	114,520.44	2,928.90	117,449.34
1903	130,516.44	3,086.41	133,602.85
1904	135,644.42	2,891.07	138,535.49
1905	119,162.30	3,605.09	122,767.39
1906	123,746.51	4,366.46	128,112.97
1907	130,008.26	1,613.22	131,621.48
1908	134,842.63	2,279.90	137,122.53

EXTENSIONS AND REARRANGEMENT

This committee kept the following objects in view:

1. To have as many double tracks and as few loop lines as possible.
2. To secure an even and fair distribution of service.
3. To render all educational institutions and manufacturing centers easy of access.
4. To so arrange that a person boarding a car in any part of the city may reach any other part by the most direct route and in the shortest time possible.
5. To relieve the congestion of traffic in the center of the city by diverting it in other directions.

The committee stated that very little extension of tracks had been made for 15 years, and that the growth of the city and the establishment of many new manufacturing industries made the extension of the street railway service imperative. A list of lines that, in the opinion of the committee, are needed, was given. The report continued:

The present main track mileage for "city service" is

DETROIT UNITED RAILWAY

EXPRESS TAXES PAID TO CITY OF DETROIT, 1903 TO 1908, INCLUSIVE

Year	D.U.R. Total Trips	D.U.R. Total Amount	Flint & Pontiac Trips	Flint & Pontiac Amount	Orchard Lake Trips	Orchard Lake Amount	Wyandotte Trips	Wyandotte Amount
1903	6,984	$3,492	4,398	$2,199	1,346	$673	1,240	$620
1904	7,004	3,502	4,444	2,222	1,344	672	1,216	608
1905	7,020	3,510	4,392	2,196	1,400	700	1,228	614
1906	7,340	3,670	4,692	2,346	1,414	707	1,234	617
1907	7,544	3,772	4,942	2,471	1,360	680	1,242	621
1908	7,674	3,837	5,048	2,524	1,394	697	1,232	616
	43,566	$21,783	27,916	$13,958	8,258	$4,129	7,392	$3,696

DETROIT UNITED RAILWAY

REMOVAL OF SNOW AND ICE—SPECIFIC CHARGES AND PAYROLL DISTRIBUTION

	1903	1904	1905	1906	1907	1908
Jan.	$2,026.13	$15,788.63*	$3,817.19	$1,055.08	$1,839.64	$1,560.94
Feb.	2,162.55	7,465.30	6,226.93	558.68	1,470.99	5,340.23
Mar.	79.90	3,850.18	1,211.37	1,069.28	650.23	1,355.72
Apr.	79.95	318.65	106.77	122.17	149.84	.....
Nov.	549.60	83.64	250.58	153.60	83.50	44 35
Dec.	4,031.49	1,238.72	450.37	1,077.10	1,587.60	1,528.41
	$8,929.62	$28,745.12	$12,063.21	$4,035.91	$5,781.80	$9,820.65

*The winter of 1903-4 was the worst in the history of the railway in the particular of many and heavy storms, making the cost of repairs to the electrical equipment of cars so excessive that it was decided to charge a portion of the expense to removal of snow and ice, and in January, 1904, an arbitrary charge of $9,000 was made accordingly.

DETROIT UNITED RAILWAY

SPRINKLING TRACKS—SHOWING NUMBER OF TANKS OF WATER USED, MILEAGE AND COST, 1904 TO 1908, INCLUSIVE

	1904 Tanks	1904 Mileage	1904 Cost	1905 Tanks	1905 Mileage	1905 Cost	1906 Tanks	1906 Mileage	1906 Cost	1907 Tanks	1907 Mileage	1907 Cost	1908 Tanks	1908 Mileage	1908 Cost
January	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
February	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
March	....	....	....	163	739	$54.15	....	....	....	30	100	$11.95	....	....	....
April	90	394	$34.30	918	3,801	274.20	826	3,108	$255.62	909	3,419	305.85	413	1,697	$150.35
May	958	5,806	335.00	975	3,861	279.70	1,759	6,878	574.55	2,350	8,709	718.45	913	3,651	274.80
June	1,547	8,250	523.50	1,393	5,538	391.80	1,847	7,752	623.80	2,647	9,331	789.45	2,242	7,894	586.40
July	1,216	6,016	391.25	1,340	5,650	382.53	2,195	9,334	722.55	3,240	10,448	988.55	2,691	8,855	700.40
August	1,599	7,923	503.60	1,458	5,906	429.40	2,880	11,652	853.70	3,272	11,690	975.00	2,257	9,249	622.70
September	834	3,969	249.15	1,117	4,601	333.50	2,316	10,049	706.85	2,467	8,722	787.65	2,439	10,176	698.75
October	833	3,854	269.00	768	3,690	243.40	870	4,122	288.05	2,492	9,397	857.40	1,910	7,632	580.85
November	645	2,880	211.80	64	363	28.35	292	1,756	91.55	156	652	70.00	205	926	85.65
December	....	....	1.40	....	....	....	23	188	5.25	....	....	....	10	80	12.20
	7,722	39,092	$2,519.00	8,196	34,149	$2,417.03	13,008	54,839	$4,121.92	17,563	62,468	$5,504.30	13,080	50,160	$3,712.19

NOTE.—In preparing this statement it was necessary to refer to the daily reports of the track department. The figures arrived at are substantially correct, but owing to the depending on the judgment of compiler, might vary slightly on rechecking. The reason is this: When not in use for sprinkling, the tank cars are used for hauling purposes, and some days are used partly for each purpose. If the regular run of a car is, say, 73 miles for a day and it uses 12 tanks of water, a trip was figured at approximately 6 miles, and if a day was found where the car ran 60 miles, yet only used, say, 5 tanks, it was figured that 30 miles was sprinkling and 30 miles hauling.

195.746 miles, of which 167.206 miles is within city limits. Of the above there is to be removed 9.364 miles, leaving a balance of present "city service" main track of 186.382 miles. New double main track to be built, 57.633 miles. New main track to be built to change single into double track, 26.164 miles. Total "city service" main track under proposed plan, 270.179 miles.

Any treatment of the traction problem in Detroit purporting to be exhaustive would be incomplete, in view of our rapidly growing population, which may be estimated at 1,000,000 10 years hence, without anticipating the demands of a future subway system.

Chicago and Boston began their subway construction by building a short, central subway with outlets in various directions. This seems the logical process of construction, as subways can be readily extended in such directions and at such future time as the needs of the city demand.

This method of construction renders possible the undertaking of producing a subway system in a gradual manner, one commensurate with the city's requirements and the state of the public treasury.

It is imperative to form now the nucleus of a subway, for in no other way can we contribute so much to the rapid growth and development of the city.

The subway system should be constructed and owned by the city and leased, at a fair rental, to whatever company is, for the time being, operating the street car lines; or until such time as our city is ready to take over the entire street car system.

The city should not seek to indemnify itself for the cost of the subway by making the rent rates oppressively high. Increase in taxable values will take care of the cost of the subway before the bonds mature.

Absence of heavy grades in Detroit will materially reduce the cost of subway construction here, as compared with the cost in other cities.

REPORT ON CLEVELAND TRACTION SITUATION

A special committee made a report, of which the following is an abstract:

We recently, at our own expense, made a brief visit to Cleveland, to secure at first hand, such information as might be available regarding the history and future possibilities of street railway transportation in that city.

The street railway question is in Cleveland, as in Detroit, the problem of the hour.

Your committee visited Mayor Johnson and his advisers, City Solicitor Newton D. Baker and City Clerk Peter Witt; United States Judge Tayler, under whose jurisdiction the receivership exists; the present receivers, Warren Bicknell and F. A. Scott, officials of the Cleveland Railway, and many men prominent in both professional and private life, among these President Andrews, of the Cleveland Railway; Frederick L. Taft, the attorney who, on behalf of certain creditors of the Municipal Traction Company, started the first suit that threw the properties into the present receivership; Fred H. Goff, president of the Cleveland Trust Company; A. B. duPont, former president of the Municipal Traction Company; John J. Stanley, one of the vice-presidents of the Cleveland Railway; Henry J. Davies, secretary and treasurer of the Cleveland Railway, and Prof. E. W. Bemis.

Four months were required to complete the appraisal of the Cleveland properties, the railway companies employing, at their own expense, 15 or 16 men to look after their interests. The city utilized the force of the city engineer to a large extent, but expended during this time between $8,000 and $9,000 for stenographic work alone.

This company, under Mayor Johnson's direction, operated for six months, between May and November, 1908, on a 3-cent basis, with 1 cent for transfers. During these six months a deficit accrued, the sum of which is variously estimated, Mayor Johnson claiming the deficit to be only $100,000, while the receivers state it will amount to $800,000. The reason for the discrepancy between the statements of Mayor Johnson and the receivers of the Cleveland Railway as to the actual amount of the deficit at the time the receivership was instituted can only be arrived at after a careful and exhaustive analysis of the various items in the accounting.

Mayor Johnson claims that assets are omitted which should be included, thus reducing the deficit. The receivers' statement to the court omits many possible assets on the ground that they are "ear-marked" assets and of such character as to render them not immediately available for the payment of preferred claims.

The actual deficit will become definitely known only after final revision of the accounts by the court.

During this period, when every effort was being made to demonstrate the possibility of a 3-cent fare, transfers were cut off, wages lowered and the service reduced approximately 25 per cent. This radical curtailment in service was followed by a spontaneous resentment by the people against such inadequate service.

In connection with this period of operation by the holding company, the statement is made by F. L. Taft, that while practical municipal ownership was in operation, "there was a strong tendency to let out the old, experienced employees and give the places to others for political interests."

From various sources the committee gathered that the people of Cleveland are changing in their demand for cheap rides, and coming to the viewpoint that good service and necessary extensions are the most important matters.

From Nov. 13 last to Feb. 1, the receivers operated on the Johnson 3-cent basis. Mr. Bicknell stated that while expenses were cut by dropping superfluous employees, etc., still the deficit for the last half of November was over $19,000; for December, over $53,000, and for January, nearly $66,000, a total of more than $138,000. Meanwhile great dissatisfaction continued to prevail as to the quality of service.

On Feb. 1 the receivers raised the rate to a 5-cent fare on about 65 per cent of the lines, leaving the remainder of the lines operating under a 3-cent fare, and during February the roads earned a profit of $28,978,71. The present average profit under existing rates of fare is $45,000 a month, and the average rate of fare on all lines is 4.34 cents.

The committee found the interview with United States Judge Tayler, in whose jurisdiction the present receivership is being operated, of much interest. Judge Tayler stated that "the traction interests have agreed to accept the plan that is now pending in the Common Council, and I believe that in a very short time it will be adopted and put into effect. The entire philosophy of that plan is that the people shall have just as good service as the rate of fare will pay for, and no more, and if at any time better service is wanted the machinery is provided to give the service by simply increasing the rate of fare whatever may be necessary within the limit fixed.

"I think," said Judge Tayler, "it will be the first and only case in the United States where an important service corporation has been limited to 6 per cent net earnings on its appraised value, and I thoroughly believe myself that the experiment here will be a success, and point the way to a solution of the traction problem for all cities. There may be friction at the start between the city's commissioner and the company's officials, but that will be self-adjusting when the plan is once in full operation."

It is a question with some parties to the controversy whether this provision of a set rate of interest with no profit beyond is not destructive to the best ends, the theory being that such a limitation in returns removes all incentive, with a stagnatory tendency to reduce the efficiency of service.

The consensus of opinion among men who have their money invested in the Cleveland Railway Company seems to be that, while not believing that the ordinance as it is now being framed up will be a success as far as its practical workings are concerned, they are still willing to give it an honest trial.

While Mayor Johnson assured the committee that he still believes in 3-cent fares, he also tacitly admitted that he has abandoned hope of getting anything better now than a maximum rate of seven for a quarter. A. B. DuPont acknowledges the necessity for an increased rate of fare.

The question of a reasonable speed within the city limits is receiving considerable attention. The present rate in Cleveland is 9 m.p.h. as compared with 10 m.p.h. in Detroit. The tendency seems to be toward an 8-mile rate.

PROMOTING PROFITABLE TRAFFIC

BY ERNEST GONZENBACH, GENERAL MANAGER, SHEBOYGAN LIGHT, POWER & RAILWAY COMPANY

At the last convention, held at Atlantic City, a great deal of rhetoric was used up in discussing ways and means of promoting traffic on electric lines. Judging from the broadsides of ideas with which the subject was peppered and the heavy caliber of the artillery and artillerists who participated in the melee, the issue seems to be important. At that time I took a position ridiculing the ordinary summer park as a profitable traffic producer for electric railways, a position which I have maintained for a good many years. The craze for summer parks broke out about 15 years ago, and it ran through this country from Maine to California like the San Jose scale through a Jersey apple orchard. There have been a few electric railway executives who have been immune from this disease, and at the present time there are a good many more, who hastily invested thousands in air castles and midsummer nights' dreams, who are just beginning to realize that all is not gold that glitters. But the summer park is by no means a total failure. There are many roads where such a park has stood between the owners and a receivership; but even in these cases the enormous expenses of a park are a staggering percentage of the net revenue produced for the railway.

There is just one redeeming feature of this means of traffic promotion, and it is this: Whatever results are to be had will come in a hurry, and this effect, presumably, has been the motif underlying the excuse for continuing the summer park. It is a traffic cocktail which acts immediately. The answer to the argument against summer parks has always been, "What can you give us that is better?" This Yankee answer has been a poser, because, frankly, no one has ever suggested anything much better in the way of a traffic promotion scheme. In the case of the company I represent we have been looking for a long time for some means of increasing earnings without going to the extreme cost and doubtful success of a young Coney Island.

We look at it in this way: Our company operates an electric lighting department, and we are keeping one or two solicitors busy wearing out shoe leather and button-holing the prospective electric light consumer. It does not make very much difference whether the prospect intends to use two or three lights in his house or a 100-hp motor. We get after him, hammer and tongs, and usually we land him. Now, the average new consumer added to our services during the year produces a revenue considerably less than $30 per year. If we get this consumer at a soliciting expense of about 40 per cent of his first year's business, we consider ourselves lucky, and we know of a great many companies who are willing to spend 70 per cent of the first year's revenue to get a consumer. It took a good many years before electric lighting companies woke up to the necessity of getting after business with a fine-tooth comb and with well-trained, straight-shooting solicitors. Henry L. Doherty seems to have been the first one to do it, and the general impression is that he made a fortune out of it. Since that time most of us have meekly followed in his footsteps.

The electric railway business now is in exactly the same condition the electric lighting business was in before we had our well-organized soliciting department. To be sure, we are spending money liberally in all sorts of advertising schemes. We get up beautifully lithographed pamphlets and blare forth our wares with brass bands and bill-posters, like a circus parade. It reminds one of days of old, when the only campaigns known were the ones in which gunpowder and swords were used. When the invention of powder was as young as the electric railway business is to-day, guns of all sizes were loaded with heavy charges of fine shot, which were discharged into the blue atmosphere, which they punctured full of beautiful round holes, all with the hope of hitting *something*. Napoleon had notions of his own, and he encouraged the use of condensed solid arguments fired directly into the face of the party he wanted to convince. And usually he landed him. Arguments have been growing more condensed and direct in war and peace since then, and sooner or later we of the electric railway field will have to adopt the tactics of all the great war lords and our brothers in the lighting business, who load their guns with solid shot of heavy caliber, use expert gunners, aim at a definite mark, and usually *hit it*.

This is the way I looked at the situation when I undertook on behalf of my company to cultivate the elusive commuter. The first thing to do is to catch the commuter.

A passenger riding regularly every day on a 5-cent fare will produce a gross revenue of about $30 per year; adding to this the expenditure of his family and those of his friends who go out to see him, each commuter's family living within the 5-cent fare limit is worth at least $50 per annum. If we can get him to move out somewhere near the 10-cent fare limit, each family is worth from $90 upward per year, and that revenue comes without one cent of additional investment and without a cent of additional operating cost. In the lighting business we would break our necks getting a $70 a year consumer who will cost us no additional investment or operating cost. In the railway business we are apparently so rich and well satisfied with ourselves that we consider it beneath our dignity to go after this business. But the means of catching him has been the cause of much concern to us. General literature describing the beauties and advantages of a railway line would not make any particular hit with him. We tried the real estate men. They were enthusiastic, and each one knew two or three prospects, and for a while we were tempted to leave the whole matter in their hands. Then we happened to remember that some years ago, and even to-day, some electric lighting companies still insist that they do not need any solicitors, because the electric wiremen, being naturally anxious to get wiring jobs, were in themselves pretty good solicitors; however, we notice that the electric wireman is not depended upon these days for new business, and we decided that the wiremen and real estate men were in the same class.

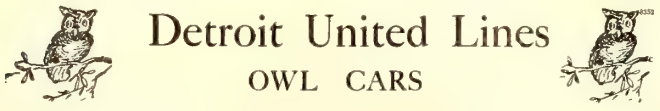
We then thought that a good plan would be to get up a list of prospects and send them copies of some recognized monthly magazine devoted especially to suburban living. It did not work particularly well, because these magazines are expensive and are written for the well-to-do man who can afford to live in the country and who already lives there. When it came to finding suitable literature to present to the man who is going to be induced to live in the country because it is going to benefit his pocketbook there was nothing to be had. We approached two or three publishing houses with a proposition to get out something suitable for our purpose, and they were all willing, even anxious—but we were not after we learned the price. The proposition finally boiled down to our getting up something which was written directly *at* the man, which would hit the nail on the head, and which could be distributed at

a low cost. Such a publication we compiled partly from original writings and partly from copy prepared by competent horticultural writers. We made it up in the form of a magazine after we decided that the plan was right and that we would stick to it. But the proposition looked too costly for a small road, even when produced under the most favorable conditions as to cost, and we therefore decided to invite other electric railways to participate, and sent out the invitations. We have had enough satisfactory responses to warrant our going ahead, but many of them were highly amusing and shed an interesting sidelight on the business. We are satisfied, however, that we are on the right track, and that we shall develop a line of traffic which is profitable, but will take somewhat longer to bring results than the well-recognized present methods. In other words, we are going to feed our revenue on solid, life-sustaining food instead of stimulating it with traffic cocktails.

We propose going even further than that, and shall put on one or more hustling solicitors to work in co-operation with real estate men, and they will go right after the individual man. We are going to train these men to talk persuasively on the subject of suburban living. We shall exploit some individual instances of successful and economical methods of living along our railway lines. We are seriously considering the construction of a model suburban home of about an acre and arrange with a competent occupant to give us figures on how much of his living expenses he can produce on the place, and such a model suburban place will be designed for occupation by some one above the laboring class. All this may seem far-fetched, visionary and impractical to some people steeped in tradition, and we expect to be laughed at in the same way Mr. Doherty was laughed at, and the same way in which dozens of others have been laughed at, but we cannot get it out of our minds that we are on anything but the right track in the way of traffic promotion. If our company were large enough to carry on a campaign of this sort alone, without any co-operation from other companies, we would not say a word about it, but inasmuch as we are a small road and the undertaking of supplying traffic-promoting literature is one which can only be handled by a combination of several companies, we have been obliged to seek co-operation. Of this we now have enough to warrant something like a well-organized campaign. Spring and summer are the seasons in which to present arguments in favor of suburban living, and the only inducement which prompts a somewhat early discussion of this subject has been the fact that numbers add strength to any campaign, and the more interest there is the earlier success will come.

ADVERTISING OWL-CAR SERVICE IN DETROIT

The Detroit United Railway distributes posters advertising the time at which the owl cars on all the city lines



leave the city hall or other terminal points. The poster also calls attention to the fact that "all interurban cars await the closing of theaters." A reproduction of the headlines is given herewith.

A bulletin issued by the Interstate Commerce Commission shows that the total length of road in the United States operated under the block signal system on Jan. 1, 1909, was 59,548.7 miles.

FOLDER DESIGN CONTEST ON BOSTON AND NORTHERN AND OLD COLONY LINES

The passenger department of the Boston & Northern and Old Colony Street Railway companies has recently concluded a prize contest for designs for the cover of its forthcoming summer timetable folder, the contestants being pupils of high schools located in the districts of the two companies or contiguous thereto. About a month ago H. A. Faulkner, passenger agent, wrote a letter to each high-school principal and supervisor of drawing on the lines of the system, stating that the companies offered a prize of $25 for an advertising folder design suitable to the department's uses and also offered to pay $5 each for any other designs of which use is made later, either in regard to the design as a whole or the idea contained. The designs were required to be submitted in two colors. The originality or adaptability of the idea for the purposes of advertising trolley trips counted largely in the decision as to the best design and a board of judges was secured by the company consisting of Henry T. Bailey, former State supervisor of art in the public schools, and at present editor of the *Art School Magazine;* George French, editor of *Profitable Advertising,* Boston, and G. Fred Crosby, illustrator, Boston. An abstract of Mr. Faulkner's letter follows:

Dear Sir—From time to time the passenger department of the Boston & Northern and Old Colony Street Railway companies is continually issuing advertising folders descriptive of the trips upon these lines. These require special designs upon the covers. It is always possible to secure plenty of these from professional artists, but it occurred to me that several good purposes could be served if we could interest in this matter the pupils in the drawing classes or others having artistic talent in the high schools.

To this end we are willing to offer a prize for the best design furnished by a pupil of the high schools of our districts and contiguous territory. For what we consider the most adapted for our uses we will pay $25. For any other designs submitted of which we make use at any time later either as a whole as submitted or for the idea contained, we will pay $5.

Designs should be drawn for use on a folder, the up and down dimensions of which are 7¾ in. with a width of 4¼ in. and should be drawn either this size or larger in the same proportion so that they could be reduced to this size, preferably larger. The designs should be in two colors, any two colors.

The originality and adaptability of the idea or suggestion in the sketch for our purposes of advertising trolley trips will count largely in the judgment, although these points being equal, of course, preference would be given the most artistically executed work. One pupil might have a very bright and original idea and not be able to execute it quite as effectively as another who could make a very artistic finished sketch of an idea that was much less new and adaptable. What I wish to impress is that all points will be considered and no pupil need hesitate to submit a sketch merely because of not being quite so far advanced in technique as another.

It seems to me that this should serve to put to practical use the instruction being received by your pupils and tend to stimulate strongly the interest felt by them in this branch of study. Therefore I ask for your co-operation and trust that you will present this offer to your pupils.

The board of judges passed upon upward of 200 different designs and awarded the first prize to George Haumann, of the Revere High School. So much interest was aroused by the contest that the company decided to give a second prize of $15 and a third prize of $10. Letters of thanks were received from many teachers for the companies' stimulation of interest in drawing, and the advertising secured has been most gratifying. A large demand for folders and resulting created traffic is anticipated.

PRIZE ESSAYS ON HOW TO AVOID ACCIDENTS

Early in February of this year the Nashville Railway & Light Company posted a notice on the trainmen's bulletin board, offering prizes of $10, $5 and $2.50, respectively, for the three best papers written by trainmen on the subject, "How to Avoid Accidents." Only motormen and conductors then in the employ of the company were eligible to enter the contest. The papers submitted were sent to the office in the author's own handwriting, and were then typewritten and given an identification number before being submitted to the judges. Five employees of the company's claim department were selected as judges, and all papers were passed on by them without knowing the author's name. No attention was paid to any deficiencies in grammar, spelling or punctuation, but the awards were made strictly on the merits of the suggestions contained in the papers.

Through the courtesy of H. A. Davis, superintendent, railway department, the three prize essays are reprinted here exactly as they were submitted to the judges:

FIRST-PRIZE ESSAY, BY B. D. HARGIS

The management of street railways should employ the most reliable men for motormen and conductors that they can procure, and should avoid overworking them if possible to do so, as they are liable to become negligent through fatigue. All cars should be equipped and kept in proper condition for signalling and running. No person should be permitted to ride on front vestibule except it be an official of the company who is interested in the transportation of the public. Unless it becomes necessary to do so in case of overcrowded cars, and in such cases the motorman should be allowed sufficient room to handle his car easily.

Motormen, as well as conductors, should endeavor at all times to carry out all rules and regulations of the company pertaining to running cars and handling the public. Motormen should be cool-headed, energetic and submissive, and always on the alert, and be persuaded that drivers, pedestrians, etc., do not understand manning a car as you do, and possibly do not realize the danger that there is in crossing the track in front of a moving car. You readily see the danger and should protect against it and not take any chances for an accident, even though you are entitled to the right of way. Motorman should see that his headlight is burning by night or whenever occasion demands it. Avoid running at dusk with the headlights switched to rear of car, as some one is liable to mistake the direction of the car and carelessly drive in front of another car, displaying no headlights. Always be in a position to see any object that chances to come into the car's way, and be ready to stop the car at once if necessary. Be very cautious when running upon a slick track, and do not excuse yourself by exclaiming "slick track." Acquire the habit of knowing the condition of your track, and when slick reduce speed until you can properly control your car and begin in time to stop. Great care should be exercised in running through fog or upon dimly lighted streets. Under the conditions never run your car at a speed that would require a greater distance to stop than you can see clearly ahead of your car. Avoid conversing with any one while you are running your car, as this invariably distracts your attention to some extent and gives a chance for an accident. Approach all curves and switches in a manner to insure safety to the car and passengers and observe all slow or stop signals. Notice very carefully at all street crossings, alleys, etc., for carriages, loose stock, etc., and remember to ring your bell. Approach a meeting car slowly and be prepared to stop instantly if necessary, especially if the car you are meeting is standing, as you might strike some one who passes from behind the standing car. Learn to make graduating stops at stations and avoid jerking the car when you leave the station, for you are liable to throw some infirm persons, or even others who are not expecting it. Don't get the habit of passing the station a few feet before you stop, for the majority of people will think that the car is going to pass, and they will catch it while in motion and are liable to receive injuries from the jerk. Never start your car until you get the proper signal, and then not be too quick to start where there are several to get on.

Conductors should devote their attention to their duties at all times, and should give all signals to motormen clear and distinct.

He should see that there isn't anything left along the passways for people to stumble over. And he should not permit any intoxicated or infirm person to stand near the edge of the platform, or even approach the edge of platform while the car is running. Do not permit a lady under any circumstances to pass to the outer edge of platform in order to be ready to get off as soon as the car stops, as she is apt to misjudge the speed of the car or her ability to leave a car in motion, and sustain injuries which you could have prevented. This also applies to infirm persons. Don't allow any one to ride upon the car bumper, as they are liable to get knocked or thrown off, or might be struck by a trolley wire in case of a broken wire. Remain on the rear end of the car as much as possible and train yourself to observe any one trying to catch the car at any time, and if they catch the car assist them in getting on. Never try to get them to let go after they once catch the car, for if they do they are most sure to fall. While collecting, be most careful about signalling ahead, and if you have the least doubt about all being safely aboard, you go to the rear and see that they are aboard before you signal car ahead. Never depend upon any passenger for information regarding this point unless you know they are absolutely reliable and understand the work, and then you rely upon your own judgment.

Do not allow any one to signal car ahead for you while you are collecting except it be a conductor or division superintendent in the present employ of the company. When passengers are leaving your car, allow them sufficient time to get clear of everything that might catch their clothing and damage them and possibly throw the person. Don't ever signal car ahead while ladies are leaving it until you are absolutely certain that they are clear of the car. Notice that no passenger leaves your car and passes around in front of a car on the opposite track. Always get your passengers on safely and give old and disabled persons a chance to get seated before starting car.

SECOND-PRIZE ESSAY, BY W. T. CLARK

1. Cars cannot be operated without a track to operate them on. Consequently, the track should be as near perfect as possible, especially where there are curves and switches, as the car is more apt to jump the track there than on straight tracks, and might cause a serious accident. For this reason there should be a track inspector to go over the different lines from time to time and report any deficiency in the track whatever, and probably avoid many accidents.

2. The trolley wire should be kept in as perfect position as possible, as the trolley pole is more apt to jump on imperfect trolley wire than one in its proper place, and break some connecting wire, and it strike some one or something living and cause a serious accident.

3. No car should be operated on the road unless it is in as perfect running order as it can be. For this reason the shed foreman should never allow a car to leave the shed to be operated on the road without everything being in good order. First, the brakes should be equalized and in perfect condition. The sanding device should be in perfect order. The sand in the sand boxes should always be dry, and never wet or clogged. The gong bell should always be easily rung, and the bell punch should always be in such condition as not to hang and thereby prevent the motorman from ringing the bell at the proper time. In fact, everything should be in perfect order. By having the car in good running order when they leave the sheds many accidents may be avoided.

4. As the motorman has to operate the cars, the greatest responsibility rests on him in regard to accidents, consequently, he should be a man of good judgment, perfectly sober, not easily excited, not quick to become angry. A man that is a perfect judge of distance, he should have perfect hearing and good eyesight in order that he may

hear and see any object that may be approaching near his car. He should never enter a curve or switch with his car running fast or out of switch on full current, as his car is liable to jump the track and cause an accident. He should never run down steep grades on full current. In passing other cars and objects that may obstruct his view from anything that may come from behind the car or object, he should have his car running slow in order that he could stop his car at once in case any one or any thing should come out in front of his car. He should always observe the bell signals and act accordingly. He should observe all stop signs and never allow himself to operate a car on the road when not in good running order. If he will observe these rules many accidents will be avoided. A car never should be run fast in dark places at night. I believe that the streets should be lit up better along the car lines in many places at night. If so, I believe accidents would be avoided.

5. Conductors should always be on the watch and be very careful and not too hasty in ringing the motorman ahead while passengers are getting on and off of cars, especially old and crippled people. He should never be too hasty in ringing the motorman ahead while feeble and delicate people are getting their seats. He should never be so negligent that he should not watch after such people. Conductors should always try to give the motorman the proper signal bells. He should try to stay on the rear platform as much as possible and stay near the right-hand side in order to catch any one that should lose his balance in boarding the car and start to fall. In coming in contact with boisterous characters he should be very careful how he approaches them in order to save trouble for himself and the company. By observing these rules, and many others of the company, he will avoid trouble and accidents.

6. Track greasers should never grease the top of the rails in the curve, as the wheel may get grease on it, and in bad curves some one might be in the way, and as it is impossible for the motorman to use sand in the curves it would be hard for him to stop the car, and he might have a bad accident. Also, I believe accidents may be avoided if so many passengers should be stopped from standing on the rear platform while the cars are crowded. The conductor has to be in the car collecting fares, and cannot always be where he can see passengers that may run around the car just as he may ring the motorman ahead; many accidents may be avoided by making some provision in regard to passengers crowding the rear platform and try to stop it.

THIRD-PRIZE ESSAY, BY A. J. ALLEN

The street car accident is a disease. Like a doctor in treating a disease in man, we must first get at the cause of the accident, then we can treat the same. The whole of the people in the city and country around are at times at the mercy of the men running street cars. Hence, to serve all these people to the best advantage with fewest accidents that injure health and take lives by reckless running, I would employ the best men, mentally, morally and physically, obtainable for foremen, to keep the whole chain of business in as near the right way as possible. Men of sober, sound business judgment, to know the kind of men to employ, to let go and to retain. As father used to say, if the land is well prepared for the seed, the crop is half made. So with this great business well organized and running under the best management, the accidents will be 50 per cent less. One great mistake some foremen make is speaking harsh and mad-like to some employees. Men are all more or less revengeful; it makes men worse to abuse them. While, if every man liked his foreman, he would have a better feeling for the company's interests, would strive hard to take the best care of the cars and keep down any kind of trouble connected with the business of which they are in charge. One of the worst things to cause bad accidents is the possibility of time being too little that is allotted to a given road for a trip. I would consider all switches to wait on, the length of the road, passengers to stop for, etc., and allow time enough that men will not have to run recklessly and cause smashups. Another very bad discord is cars coming from the barn on the road with the brakes so defective that a motorman cannot stop his car at all without great effort. Bad brakes cause many accidents. I would have a brake expert for keeping all brakes in repair, and have the master mechanic to vigilantly look after that particular, and accidents would be much less. Cars should be repaired at once when sent in for repairs, so that motormen can have less cause for accidents.

Now, a man, according to Page on "Practice and Theory," is best when he has a sound mind in a sound body. If you can have that kind of a man always for motormen and conductors, accidents will be less. To have these I would have monthly hygienic lectures for the men by the company's doctor. Men should have regular hours to work, to sleep, to eat, etc., to be healthy and run cars well. Men working too long hours may get sleepy, tired, worn out, have a don't care feeling, neglect some important part in the business, run over wagons or anything anywhere on the track because his mind is not clear for want of the required rest. It is done before he is conscious of it. A teacher once said to me, "the use of a bad pen is poor economy." I say the use of wornout street car men, or overtaxing their minds and bodies, is breeding accidents. New men are always dangerous; they are unskilled and do not know when to act. Seventy-five per cent of the accidents, I think, are caused by new men. By skilled men, having regular habits, being excused when sick, etc., the company will have less use for new men, for the old ones will be stouter and last longer. Motormen, to keep from having accidents, should exclude all people from the front platform; they attract his attention from his duty; should see that his gong rings clearly, that his brakes are working right, ring his gong at all cross streets, see that people do not run in front of his car when passing a car stopped unloading people; not depend too much on his skill in holding or stopping that he runs up too close to wagons, etc., on the track going down hill and mash into things with bad results. A motorman should always keep in his mind the places or switches to meet each car on the road, and never pull out on a single track until the last car coming meeting him that he is due to meet has passed. Some of the worst accidents we have had in Nashville were due to this one cause. Motormen should never pass a car under full current that is stopped, for people may run in front of their car. Conductors should keep the rear step clear, not allow men to get on step a block before getting off. If drunk they will fall off.

When up to the front of car loaded, can't get back, post a reliable man on platform to signal conductor when all are on, and avoid people falling. The conductor can bar his doorway with his hands when cranks and drunkards start to jump off when the car is running, and avoid bad accidents. I have kept hundreds of men and women from falling by catching them when "hopping" a running car and they made missteps, feet slipped, etc. The conductor must keep three bells indelibly fixed in his mind and be ready to snatch them in a second. He should watch for women, etc., coming around behind his car; they get onto the step as the car starts, unseen, and may fall. Watch old men, drunkards and cranks as they leave the car, and never signal the motorman ahead until they are safely landed. Better to stop the second time at a station than have a man who is tardy in getting off at first stop to jump off of a running car and get crippled, then bring suit for damage.

The Allgemeine Electricitate Gesellshaft has secured an order from the Midi (France) Railway for an electric locomotive for freight and passenger service. The normal speed of the locomotive will be 45 km (27.9 miles) per hour and the maximum 75 km (46.5 miles) per hour. The line potential is 10,000 volts, single-phase. The locomotive will carry two Winter-Eichberg motors, each of 800-hp capacity on an hour rating, and 600-hp capacity on a continuous rating. The locomotive has three driving axles and two trailing axles. The motors will be connected to driving rods without the use of gearing.

EXPENSES FOR OPERATION, RENEWALS AND DEPRECIATION OF MILWAUKEE CITY SYSTEM

During the hearing of the Milwaukee fare case by the Railroad Commission of Wisconsin, C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, submitted in evidence a letter written by him to Edward W. Bemis, superintendent, City Water Department, Cleveland, Ohio, regarding operating expenses, renewals and depreciation. The statistical information contained in the letter of Mr. Duffy relates to the charges of the Milwaukee City railway system to these accounts during the year 1907, and is published herewith. An abstract of the letter of Mr. Duffy, dated Feb. 29, 1908, which accompanied the tables, follows:

THE MILWAUKKEE ELECTRIC RAILWAY & LIGHT COMPANY, MILWAUKEE CITY RAILWAY SYSTEM—YEAR 1907.

(1) OPERATING EXPENSES EXCLUSIVE OF RENEWALS AND DEPRECIATION.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures	4.46	1.18
Maintenance of equipment	5.75	1.51
Operation of power plants and substations	8.58	2.25
Operation of cars	23.47	6.14
General expenses	10.01	2.62
	52.27	13.70

(2) OPERATING EXPENSES AND RENEWALS EXCLUSIVE OF DEPRECIATION.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures	10.58	2.78
Maintenance of equipment	6.25	1.64
Operation of power plants and substations	8.58	2.25
Operation of cars	23.47	6.14
General expenses	10.01	2.62
	58.89	15.43

(3) RENEWALS.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures	6.12	1.60
Maintenance of equipment	.50	.13
	6.62	1.73

(4) OPERATING EXPENSES AND DEPRECIATION EXCLUSIVE OF RENEWALS.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures	14.34	3.76
Maintenance of equipment	14.59	3.85
Operation of power plants and substations	8.58	2.25
Operation of cars	24.47	6.14
General expenses	10.01	2.62
	70.99	18.60

(5) DEPRECIATION.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures	9.88	2.58
Maintenance of equipment	8.84	2.32
	18.72	4.90

Your letters requesting certain information relative to the operating results of the street railway system of this company in 1907 were referred to the writer by the president and general manager.

Enclosed herewith please find the operating expenses in "per cent of gross earnings" and "per car-mile (cents)" of the Milwaukee city railway system, only, for the year 1907, in the following tables:

(1) Operating expenses, exclusive of renewals and depreciation.

(2) Operating expenses and renewals, exclusive of depreciation.

(3) Renewals.

(4) Operating expenses and depreciation, exclusive of renewals.

(5) Depreciation.

The figures shown are based on an average annual depreciation charge of 7 per cent on the cost of reproduction new of the physical property covered in "way and structures" and "equipment," approximately as valued by the Wisconsin State Railroad Commission, as of Jan. 1, 1907, plus additions and betterments made in the year 1907, subsequent to the date of the valuation.

The depreciation charge of 7 per cent per annum is intended to provide only for depreciation resulting from deterioration and wear and tear incident to use, without regard to obsolescence or supersession.

The figures shown represent the actual cost of renewals and replacements of the physical property of the company covered in "way and structures" and "equipment," made in the year 1907, but not included in "operating expenses" as shown in (1).

The foregoing information supplements the full reports of the hearing regarding the Milwaukee fare case before the Railroad Commission of Wisconsin, which appeared in the issues of the ELECTRIC RAILWAY JOURNAL for March 6 to April 24, 1909, both inclusive.

RESTORING TENSION TO BRUSH-HOLDER SPRINGS OF COMPRESSOR MOTORS

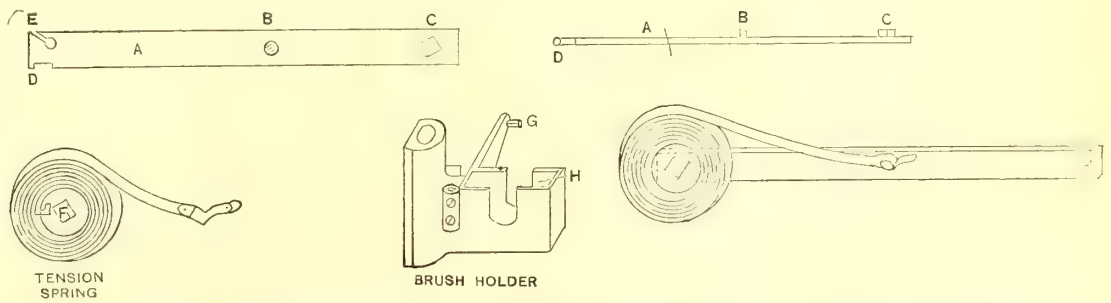
BY GEO. M. COLEMAN

On type D and D E G Westinghouse air compressors it is found very difficult, after the tension of the brush-holder spring has weakened from constant use, to restore the tension of the spring without removing the front or back of the motor. In so doing one is apt to spill the oil and experience other inconveniences. The device shown in the accompanying drawing was designed to overcome this difficulty and it has the further merit of doing so for very little money. It is constructed as follows:

A is a piece of iron ¾ in. wide, ⅛ in. thick x 8 in. long. *B* is a 1/16-in. rivet, ½ in. long, securely fitted in the iron strip *A*. *C* is a square lug ½ in. long firmly attached to the strip *A*. *E* is an opening provided to hold a cotter pin so it can be inserted in the brush-holder stud which holds the brush spring. *D* is a small projection made to pull out the cotter pin before removing the spring.

With this little device the brush-holder spring is easily removed by pulling out the cotter pin with the projection *D*. The brush spring is then placed on the square lug *C* at any position so the desired tension can be had. The lug *C* is made ¼ in. long, just one-half the depth of the square hole in the brush-holder spring. Next, place the square hole of the spring on the brush-holder lug *G*, which will receive it. (As stated before, the lug *C* fills half the hole.)

The end of the spring is then lifted on the holder *H* and the iron can be removed. The cotter pin is placed in the opening provided by *E* and inserted in the hole of the stud *G*, thus completing the operation.



Device for Restoring Tension to Brush-Holder Springs of Compressor Motors

COMMUNICATIONS

PECULIAR ACCIDENT

Eastern Wisconsin Railway & Light Company,
Fond du Lac, Wis., May 6, 1909.

To the Editors:

The accompanying photograph (see illustration) shows the result of an unusual circumstance. The broken trolley and light pole shown was struck by the dome of a boiler from a heating plant which exploded more than a block away. This flying piece of metal weighed a little more than 200 lb. and passed entirely over the court house, which has a tower more than 100 ft. high. The dome struck the pole several feet from the ground driving it into the second-story window of a vacant store, as illustrated. The boiler which exploded was supposed to be carrying about 5 lb. pressure.



Peculiar Accident at Fond du Lac

R. T. Gunn, General Manager.

DISCHARGED EMPLOYEES

New York, May 15, 1909.

To the Editors:

I have read with interest the letters in your recent issues advocating the maintenance of a record bureau to investigate the past history of all applicants for employment upon railway systems, but doubt whether it would be of much value to secure this information. Testimonials, even when genuine, can hardly be relied upon greatly. Too many people will prevaricate to get a position for a friend and afterward reconcile their conscience to doing so on the plea that if the man could have another chance he might reform. Again, testimonials are often faked, and even the man who comes to a road with a good record may go wrong under temptation. But even if every testimonial told the truth it is doubtful whether a company which hires perhaps hundreds of men during a month can make any serious investigation as to their previous records.

The only safe plan is not to depend upon the past, as suggested by your recent correspondents, but to detect the dishonest man after he gets on the road. This cannot be done from behind a roll-top desk. The company should have both the proper equipment for detecting the grafter and the proper methods for inspecting that equipment. Some purchasing agents will haggle over a few dollars in the price of a register or urge the manager to keep antiquated registering devices in service, when the cost of a modern machine would be saved within a week. The use of good registers should be accompanied by a careful and logical system of register inspection. A great deal can be said on this latter point, but it is hardly pertinent here. It is safe to say, however, that if the companies will watch their fare collections carefully they will have little need to investigate the pedigrees of their employees.

Secret Service Man.

PHILADELPHIA TRANSIT SITUATION

At the meeting of the board of directors of the Philadelphia Rapid Transit Company on May 17 an increase of wages was voted to all motormen and conductors in the employ of the company, raising the wages of these employees from 21 to 22 cents an hour. This increase goes into effect on July 1, and involves the addition of about $300,000 a year to the company's payroll.

Various communications from individuals and associations were received in reference to new lines, extensions, additional transfer points, etc. All these communications were referred to a special committee, composed of Mayor Reyburn, of Philadelphia; George D. Widener, A. B. Loeb, William H. Shelmerdine and J. J. Sullivan. This committeee was instructed to investigate the merits of the various communications sent to the board, and report its conclusions at the earliest practicable date.

It was reported to the board that $350,000 had been spent for track improvements since March 1 of this year. The board voted $300,000 for additional improvements of this nature, this amount to be made available immediately.

A reply was approved to the letter of George Burnham, Jr., president of the City Club, of Philadelphia, asking the co-operation of the company in an investigation of its affairs. The reply, written by John B. Parsons, president of the company, stated:

I am instructed by the board of directors, before whom I laid your letter of May 4, to say that they decline to embark with the City Club in the enterprise suggested in your communication.

The reports of this company are full and explicit; its affairs have been twice examined into recently by disinterested committees, and the results of these examinations have been published and are accessible to all inquirers. Moreover, under the contract between the city and this company, its books are open to the investigation and inspection of the city comptroller at all times, and the Councils of the city have recently appropriated $4,000 to defray the costs of a new audit of the company's business.

In view of these facts, the board of directors of the Philadelphia Rapid Transit Company feels that no possible good would be accomplished by the acceptance of your proposal.

ASSOCIATION CIRCULARS

A confidential circular has been issued by the American Street & Interurban Railway Association describing the practice of various electric railways regarding averages and shortages.

Data sheet No. 38 has been issued, asking for information concerning the wages of conductors and motormen on city and interurban lines.

Certain of the English lines have adopted the practice of marking points at which motormen can cut off the current and coast to the next stopping point.

CONFERENCE ON INTERURBAN RULES

The conference on rules for interurban electric railways, of which an announcement was published last week, will be held at 10 a. m., Tuesday, May 25, in the New Willard Hotel, Washington. The conference will be conducted under the auspices of the committee on interurban rules of the American Street & Interurban Railway Transportation & Traffic Association. J. N. Shannahan, general manager, Washington, Baltimore & Annapolis Electric Railway Company, is chairman of the committee. The purpose of the meeting is to receive and consider any suggestions to the code of rules for interurban electric railways presented by the committee at the 1908 meeting of the association at Atlantic City. It will be remembered that when this report was presented the association decided to continue the committee, and asked it to submit the rules contained in the code of the different railway companies and railroad commissions for criticisms. This has been done, and a number of criticisms and suggestions have been received. These will be considered at the Washington meeting.

In addition to the members of the committee who will be present, a number of officials of interurban railways who are interested in the subject of rules have expressed an intention of attending the conference, which is open to all. Invitations have also been sent to the railroad or public service commissioners of New York, Indiana, Wisconsin, Illinois and other States, as well as to the Interstate Commerce Commission, and it is expected that delegates from a number of these commissions will be in attendance.

ROLLER AND BALL BEARING TROLLEY BASE

The Trolley Supply Company, Canton, Ohio, has added to its extensive line of electric railway devices the "National" combination roller and ball-bearing base shown. It is equally applicable for city and interurban service, is but 4¾ in. high and weighs only 80 lb.

The roller bearing feature of this design resembles the same manufacturer's "Peerless" base, but in addition it is supplied with a ball race around the center pin to take off the end thrust friction and thus render it frictionless in its



Combination Roller and Ball-Bearing Base

sidewise motion. The uniform tension maintained by the spring up and down is another important point emphasized by the maker of this combination base.

Every effort has been made to secure a simple and rugged base to the end of keeping the maintenance cost at the lowest level. The castings are of malleable steel; the rollers of cold-drawn steel working in a cage which prevents binding; and the ball race set in a phosphor bronze ring, from which the balls cannot work out or seat themselves. In general, the base requires little inspection, as no oil is needed for either the roller or ball bearings and the spring adjustment is practically permanent.

MULTI-VAPO-GAP LIGHTNING ARRESTERS

The Lord Electric Company, New York, has just put on the market a new type of lightning arrester which has no moving parts. It is based on the principle that static current, or lightning, will pass through a highly hygroscopic mass, through which it is impossible to transmit dynamic current, just as lightning will travel through the clouds, which are composed of myriads of moisture globules. The arrester, as thus constructed, consists of a hygroscopic material, inclosed in a closed porcelain housing, and connected across the line. The impedance is practically nil, owing to the fact that the moisture globules, though mechanically separated, are infinitely close together, but the composition of the body of the material prevents the flow of the normal current, as it is of course impossible to establish or maintain an arc between the globules. Owing to the multiplicity of vapor gaps no air-gap is necessary. These features, together with the low impedance, make the building up of static on the line impossible.

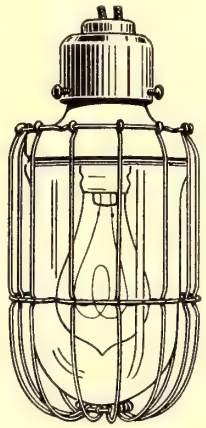


Station Type Arrester

The arrester is equipped with a tell-tale which indicates and records the passage of the discharge. This adjunct can also be used to open the circuit, a valuable feature when testing. The arrester contains no metal, aside from the terminals, and no charcoal, coke, carborundum, graphite or any other form of carbon. It is designed for use in stations on lines, and also on cars.

COMBINED RECEPTACLE AND WATERPROOF GLOBE

The F. Bissell Company, Toledo, Ohio, is offering to electric railway companies the "Newgard" combined receptacle and waterproof globe shown in the accompanying cut. This lamp is especially serviceable for open places, like railway platforms and in the exposed portions of the car houses, repair shops and power plants. It is made entirely of non-absorbent and non-corrosive materials. The cap or receptacle part is made of strong, highly-glazed porcelain, and the clear globe of flint glass. The latter is threaded to a screw in the porcelain cap, the two parts being kept watertight by a rubber gasket. The contact wires entering at the top of the receptacle are rubber insulated and of No. 14 B. & S. gage. The top is filled with a composition that will not soften under heat, crack or absorb moisture. As the braid on the rubber-covered wire is carried just beneath the surface of the cap and then discontinued, it does not carry moisture to the interior of the receptacle. The diameter of the globe opening is 2¾ in. and the length of the globe 6 in.



Guarded Waterproof Globe

For special cases, where the lamp is liable to be struck by heavy objects, it is desirable to use a special wire guard, as illustrated. This guard is made of heavy steel wire, so shaped that the globe is held directly in the center and in a position which permits its easy adjustment.

News of Electric Railways

Transit Affairs in New York

On the recommendation of Commissioner McCarroll, the Public Service Commission has dismissed the proceedings brought against the Nassau Electric Railroad and the Brooklyn Heights Railroad for improved service on the Sixty-fifth Street and Eighty-sixth Street, the Fifth Avenue, the Sixty-fifth Street and Fort Hamilton, and the Sixty-fifth Street and Bay Ridge lines. The companies have increased the service on all the lines, and the dismissal of the complaint by the commission is made without prejudice to resumption of the proceedings in case the companies do not maintain a service which the commission deems satisfactory.

The Appellate Division of the Supreme Court of New York handed down a decision on May 14, sustaining the report of Benjamin F. Tracy in reference to the debt limit of New York City on June 30, 1908. The report was made as the result of suits to enjoin the issuance of bonds for the construction of the Fourth Avenue Subway in Brooklyn. Mr. Tracy found that the city of New York had a borrowing capacity of approximately $106,000,000 on June 30, 1908.

The Public Service Commission has received from the Secretary of War at Washington permission for the construction of the four-track Harlem River tunnel, which is to take the proposed Broadway-Lexington Avenue subway into the Bronx. The tunnel is to run from Lexington Avenue and 130th Street to Mott Avenue, the Bronx, and will be about 1208 ft. long.

The application of the Hudson & Manhattan Railroad for a franchise to extend its subway from Thirty-third Street and Sixth Avenue, New York, up Sixth Avenue to Forty-second Street and thence to the Grand Central Station at Fourth Avenue and Forty-second Street, which has been approved by the Public Service Commission, has been referred by the Board of Estimate to a special committee consisting of P. F. McGowan, president of the Board of Aldermen, John F. Ahearn, borough president, and Herman A. Metz, comptroller.

The Public Service Commission has modified the order issued on April 28 directing the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad to install fenders on all their cars, and has extended the time in which the companies may submit to the commission drawings and specifications showing the types of fenders which they propose to use. The modification consists in limiting the fender installation to one fender on the forward end of each car, instead of on both ends, and excepting from the operation of the order cars equipped for operation by the third rail. The fenders are to be installed by July 15 and the drawings and specifications are to be submitted to the commission for approval by May 25.

Residents and property owners in the vicinity of 175th Street and St. Nicholas Avenue have petitioned the Public Service Commission for the construction of a subway station at St. Nicholas Avenue and 175th Street.

On motion of Commissioner Bassett, the Public Service Commission has discontinued the proceeding against the Brooklyn Heights Railroad on motion of the commission in regard to the number of cars to be operated on the Flushing-Ridgewood line. Recent observations showed that during the morning, westbound, between 6 a. m. and 9 a. m., 36 cars were being operated past the maximum load point as compared to a previous average of 25 cars, the count showing only two overload half-hour periods as against five in the first inspection. Between 5 p. m. and 8 p. m. the corresponding increase in eastbound traffic was from 30 to 33 cars, and the overloading decreased from three half-hour periods to one.

The Public Service Commission issued a formal order on May 14 requiring the Interborough Rapid Transit Company to convert five additional trains into side-door trains by Aug. 15 and to continue the process at the same rate until all the cars to be used in the express service have been turned into side-door cars. The company is also ordered to increase its equipment by the purchase of new side-door cars until it shall be able by Oct. 15, 1909, to maintain an express service in the subway during the rush hours on a headway of 1 min. and 30 sec. The company is given the privilege of adopting either the center side door, which the company favors, or the double-end side door, which Bion J. Arnold, consulting engineer to the commission, recommended. The order of the commission requiring the company to construct a second experimental train of eight double-end side-door cars has been rescinded.

Engineering Association Data Sheets

Data sheets Nos. 10a, 10b and 10c have been issued by the committee on equipment of the American Street & Interurban Railway Engineering Association. The letter transmitting the data sheets says that the answers to the questions will be used by the committee in the preparation of its report, and adds:

"The benefit that has accrued to street railway companies through the work of this committee in the past, as is particularly instanced in the advances made in the quality of carbon brushes, may be cited in justification of the earnest consideration of these data sheets that we solicit.

"We respectfully request that prompt attention be accorded these data sheets as the time is short in which the committee has to work.

"Please forward replies to L. L. Smith, chairman, master mechanic, Chicago & Milwaukee Electric Railroad, Highwood, Ill.

"Paul Winsor, President.
"John W. Corning, Secretary-Treasurer."

The data sheets ask for the following information:

STEEL-TIRED VS. ROLLED-STEEL WHEELS.

STEEL-TIRED WHEELS.

1. What is the outside diameter of your tires when new?
2. What is the outside diameter when scrapped?
3. What is the thickness of your tires when scrapped, or to what thickness do you allow them to run before you consider them unsafe?
4. How many turnings are given them?
5. What is the approximate mileage between each turning?
6. Do you have trouble with loose tires after they are worn approaching the limit of wear?
7. How is tire secured to wheel? (*a*) Straight bore tire, shrinkage only; (*b*) Lipped tire and shrinkage; (*c*) Lipped tire and Gibson retaining ring; (*d*) Double lip retaining ring, riveted; (*e*) Double lip retaining ring, bolted; (*f*) Mansell retaining ring, riveted; (*g*) Mansell retaining ring, bolted; (*h*) Interior tire flange, riveted to center; (*i*) Interior tire flange, bolted to center; (*j*) Tire fused to center.
8. Which type do you consider the best?
9. Do you have any broken centers or tires?
10. Give make of centers and tires used.
11. Are the centers cast iron or steel?
12. Are the wheels used in city or high-speed interurban service?

ROLLED-STEEL WHEELS.

1. What is the outside diameter of your wheels when new?
2. What is the outside diameter when scrapped?
3. What is the thickness of your rims when scrapped?
4. How many turnings are given them?
5. What is the approximate mileage between each turning?
6. Do you find the temper or hardness of steel uniform throughout, or are they softer at the last turning than at the first?
7. Which do you consider the safer for high-speed interurban service, rolled-steel or steel-tired wheels?
8. Which of the above do you consider the more economical, scrap considered?
9. What diameter of hub face which bears against collar of axle liner do you regard most desirable for equipment having motors: Not over 45 hp. Over 45 hp and less than 100 hp. 100 hp and over.

CARBON BRUSHES.

1. Have you as yet any specifications for carbon brushes? If so, what are they?
2. What test, if any, are they given after they have been received from the manufacturer?
3. Have you experimented with chatter wheel, slip ring or other tests recommended last year, and what results did you obtain?
4. Have you made any changes by using a better grade of brush since last year; if so, did you find the higher-priced brush more economical both as to brush renewals and commutator wear?
5. Give make and grade of brush used on representative types of your motors, stating whether commutators are grooved or ungrooved.
6. Give average mileage of brushes on representative types of your motors.
7. Have you noted any improvement in the manufacture of brushes since last year?
8. Give any other information regarding your experience with carbon brushes, with either grooved or ungrooved commutator, that might be of interest.

Cleveland Traction Situation

Owing to the absence of Mayor Tom Johnson from the city, no definite steps were taken last week toward the street railway settlement in Cleveland. On his return to Cleveland on May 15, the Mayor stated that he would be ready to take up negotiations again on May 17. The original time for reaching a conclusion on the matter, as fixed by the Mayor, expired on May 15, after which he said bids would be received for grants on lines whose franchises expire in the spring of 1910, but consideration of this matter has been extended for three days. So far as known, no responsible parties have arranged to bid on these routes.

Dangerous tracks in various parts of Cleveland are causing the receivers concern. They can put only the amount of money allowed by the court into repairs, and have already been compelled to suspend repair work on some of

the lines. The prospect of securing more money decreases as the time approaches for the payment of the principal of some of the bonds. It is believed that the bondholders will object to further expenditures until there is a settlement and their claims have been taken care of through payment of the obligations or renewals under satisfactory conditions.

Fred C. Alber, former assistant to A. B. du Pont, president of the Municipal Traction Company, has filed with the receivers an accounting of the $3,500 which was charged against him on the books of the company when the receivers took charge. Of this amount, he stated that $2,900 was paid out in strike bills in May, 1908. Vouchers for the remainder spent by him were filed with the receiver, together with a check for $160, the balance on hand. This account caused much discussion during the hearing before the master commissioner on claims, but no explanation was given at the time as to what had been done with the money, other than that it had been turned over to Mr. Alber.

At the meeting of the Council on the morning of May 17, most of the time was taken up in discussing the question whether the ownership of the pavement laid by the Cleveland Railway in building its tracks should be submitted to arbitration. City Solicitor Baker commended a motion made by Dr. Waltz to the effect that a board of arbitration should decide what portion of the cost of the pavement shall be included in the capital account of the company, and it was passed. This pleases the company, as ownership of the pavement could not be established, although the company paid for it in the belief that the cost would be considered a part of the expense in constructing the lines. From the discussion preceding the vote on this motion, it would seem that some members of the Council are opposed to allowing a board of arbitration to decide the very point that will be placed before it through the passage of the motion.

After considerable discussion on May 17, the Council voted against the proposition of Mr. Andrews to consider all stockholders alike in any settlement that may be made. Mr. Andrews stated that a settlement seems out of the question if the administration insists upon considering the stockholders of the Cleveland Electric Railway and the Forest City Railway separately, and extending to one any rights and privileges that are not extended to the other. He says there is only one company and that the stockholders must all receive equal consideration.

On Monday evening, May 17, the company presented to the Council a new franchise calling for six tickets for a quarter and omitting many objectionable features. F. H. Goff explained the gentlemen's agreement that had been entered into, and said that it had been lived up to by the company. He also repeated the statement, previously made by Mr. Andrews, that the stockholders would all have to be treated alike, as Mayor Johnson had insisted on the delivery of new certificates to the stockholders of the Forest City Railway a year ago, at which time Mr. Goff advised against it. On May 18 the Council committee of the whole refused to recede from its demand of seven tickets for a quarter, despite the fact that the company reaffirmed the statement that this rate cannot be accepted. The Mayor then proposed that the system be managed through a holding company, half of the directors of which shall be appointed by the city and half by the stockholders of the company. Mr. Andrews objected to this.

Cost of Snow Removal in Boston.—It cost the Boston (Mass.) Elevated Railway less to remove snow last year than during any winter since 1905. In fact, the expense on this account last winter was the smallest in the history of the company. The average expense per winter for the past five years has been about $85,000, whereas for last winter the total cost was only $26,000. In 1905 the expense of removing snow was $190,104; in 1906, $51,413; in 1907, $116,407; in 1908, $36,473, and in 1909, $26,000.

Illinois Traction System in St. Louis.—W. B. McKinley, president of the Illinois Traction System, Champaign, Ill., and other officers of the company were in St. Louis recently to consider the location of freight and passenger terminals there for the system. No announcement has been made, however, regarding the conclusion of negotiations for proposed sites. For some time the company has owned a tract of land at the foot of Salisbury Street and the statement is made that this will be used as a freight yard. It is understood that the construction of a loop in down-town St. Louis for the exclusive use of the interurban railways is favored.

Employees and Officers of Connecticut Company Confer.—Representatives of the employees of the various divisions of the Connecticut Company in New York and Connecticut conferred with J. K. Punderford, general manager of the company, in New Haven recently regarding the modification of the rules governing employees and a change in the wage schedule. The men desire that the time limit for reaching the maximum wage be reduced from five years to three years. The session between the representatives of the employees and the company was an executive one, and no official statement has been issued regarding the subjects which were discussed.

Interurban Trainmen Meet.—The fourth annual convention of the Brotherhood of Interurban Trainmen was held in Muncie, Ind., on May 11 and 12. The meeting was opened with an address by Rev. Ralph C. Jones, a former railroad man, on "Railroad Men and Their Troubles," which was delivered on the evening of May 10. Subsequent sessions were devoted to routine business and the detail work of organizing and establishing an insurance department to collect assessments and pay death and accident benefits. The delegates to the convention were taken over the lines of the Indiana Union Traction Company on an inspection tour. The selection of a meeting place for the next annual convention of the Brotherhood was left to the judgment of the executive committee.

W. B. Parsons on London Underground Railways.—Wm. Barclay Parsons, formerly chief engineer of the New York Rapid Transit Commission, who is a director of the London (Eng.) Underground Railway, is quoted as having said: "The traffic returns and increased net earnings of the London underground roads clearly demonstrate that the way the underground systems are now worked is the right one. Elevators at the tube stations no longer crawl up and down; trains travel faster and on shorter headway, and stops at all stations are very brief. Londoners undoubtedly can get about now with as little waste of time as in New York and Chicago. Cars built on the American pattern and the disappearance of the three classes of accommodation have appealed to Londoners."

Brooklyn Rapid Transit Employees' Benefit Association Elects Officers.—At the annual meeting of the Brooklyn Rapid Transit Employees' Benefit Association, held at the club house on Jamaica Avenue on May 1, the members of the association voted to elect a vice-president and three trustees. The successful candidate for vice-president was George Bauman, a motorman attached to the East New York depot, and the successful candidates for trustees were: John Stoll, a motorman attached to the Ridgewood depot; Henry Heithoff, a motorman on the elevated division, and John Keenan, a motorman attached to the Canarsie depot. E. W. Winter, president of the Brooklyn Rapid Transit Company, under date of May 1, announced the following appointments as trustees for the ensuing year: C. E. Roehl, electrical engineer; W. W. Atwood, train master of the elevated lines, and E. C. Shaler, assistant engineer. The polls were open from 8:00 a. m. until 10:00 p. m., and each candidate was entitled to two properly accredited watchers during the balloting and counting. John Stoll, who was elected a trustee, is now serving his sixth term in that office.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The advocates of public service legislation have succeeded in jamming through the House a resolution for a joint select committee of nine members and two Senators to go into the subject of public utility legislation and draw up and submit a bill to the House not later than June 8.

Massachusetts.—The House has given a third reading to the resolve for an investigation of the advisability of authorizing the Boston & Eastern Electric Railroad to construct a tunnel and subway in Boston and has sent the measure to the Senate for concurrence. The investigation is to be made by the Boston Transit Commission and the Massachusetts Railroad Commission. The House has killed the bill to enable street railways to increase stock and bonds under the jurisdiction of the Railroad Commission to supply working capital, in amendment of the existing law passed in 1906. In the House an effort was made under the leadership of Mr. Weeks, of Everett, to effect a reconsideration of this measure, but an adverse vote was sustained. The House has concurred with the Senate in the resolve to provide for an investigation by the Railroad and the Transit Commissions of the advisability of constructing additional subways, tunnels and elevated structures in Boston. The report to the Senate by the committee on street railways referring to the next Legislature the bill to define further the purposes for which capital stock and bonds may be issued by street railways has been accepted by the Senate and sent to the House for concurrent action.

Minnesota.—Despite the fact that several important measures affecting electric railways were introduced at this session, the Legislature has adjourned without passing any

of the bills, only one measure receiving approval that can be construed to affect the electric railway companies even indirectly. This requires the restitution of overcharges by railroads. The bill placing street railway companies under the jurisdiction of the Railroad and Warehouse Commission and the Zelch bill designating interurban railways as common carriers were lost. The Nolan bill, as the measure placing the electric railways under the Railroad and Warehouse Commission was known, had a checkered career. The judiciary committee of the House finally concluded that it "would not hold water." Then the Washburn measure was introduced in the House. It was drawn to overcome the objections pointed out in the Nolan measure by the members of the judiciary committee, but died in committee.

Missouri.—On May 10 Governor Hadley sent a special message to the Senate urging that body to pass the State utilities bill creating a public service commission and abolishing the Railroad and Warehouse Commission. Despite this and the fact that the public utilities bill had already passed the House, the measure was reported adversely by the Senate committee on ways and means on May 12, and if it is ever called for passage, which is very unlikely, will probably be killed. The special measure prepared at the instance of the St. Joseph Railway, Light, Heat & Power Company and the Business Men's League of St. Joseph, which authorizes street railways to purchase, lease or consolidate with interurban railways or effect operating arrangements with them, has been reported favorably in the Senate, where it has been amended. The opinion is confidently held that this measure will pass both houses by a safe majority.

New York.—Mayor McClellan of New York has signed the Travis-Robinson rapid transit bill providing for the building of subways by private capital, and has vetoed the Cassidy bill, which was intended to prevent the issuing of assessment bonds for public improvements. In speaking of the Cassidy bill, the Mayor said: "If I accept this bill I shall deprive the Public Service Commission of one of the methods suggested by it for providing better railway facilities." Under the Travis-Robinson bill the Public Service Commission will have authority to execute contracts for indeterminate franchises, reserving the right to the city to take possession of the route at the expiration of certain periods. The bill also provides for dividing the profits of operation between the company and the city and for the building of subways on the assessment plan. The Mayor has signed the bill giving the Interborough Rapid Transit Company the right to extend the Lenox Avenue branch of the subway through the Bronx. The Governor has signed the bill to facilitate the collection of $40,000,000 franchise taxes, $26,000,000 of which is due in New York City. Mayor McClellan has vetoed the Eleventh Avenue bill giving the New York Central & Hudson River Railroad, with the approval of the Public Service Commission of the First District and the Board of Estimate and Apportionment of New York, the right to construct a combined subway and elevated railway on Eleventh Avenue, New York, to take the place of the company's present surface tracks. Mayor McClellan also has approved the bill passed by the Legislature which provides for the consolidation of the New York, West Chester & Boston Railroad and the New York & Port Chester Railway.

Ontario.—The legislative session recently brought to a close was short compared with some previous sessions; but the measures passed were diversified and many in number considering the length of the session. In all, the bills passed totaled 166. Further legislation was found necessary to facilitate the work of the Hydro-Electric Commission and enable the Government to supply electricity through the commission at a minimum price to the public while observing its obligations to investors. A number of acts were passed incorporating electric railways, and the prospects are that the construction of several important lines will soon be begun under the provisions of the bills. Among the companies incorporated were the Beliville Radial Railway, Cobing, Port Hope & Havelock Electric Railway, Coburg Radial Railway, Dunnville, Willandfort & Beamsville Electric Railway, Eastern Ontario Electric Railway and the Ottawa & St. Lawrence Electric Railway. The Public Service act was amended to provide for the hiring of additional help from time to time in emergencies. The South Western Traction Company was given permission to issue additional mortgage bonds not exceeding $6,000 per mile of line under operation to present holders of bonds of the company, the bonds to be sold at not less than 90 per cent of their par value. The charter of the Toronto Suburban Railway was also amended in detail. These acts have all been in force since April 13, when they received royal assent.

Financial and Corporate

New York Stock and Money Market

May 18, 1909.

After 10 days, during which there had been evidence of considerable quiet liquidation, with prices somewhat lower, the stock market to-day became stronger and there appeared a general desire to buy. Even during the period when profit taking was in progress the general tone was good, and when those who sold last week tried to rebuy to-day prices advanced so quickly that many failed to get back as low as they sold. Traction shares have been fairly active, with small price changes.

In spite of the heavy exports of gold, the money market is cheap and cash plentiful. Quotations to-day were: Call, 1¾ to 2 per cent; 90 days, 2½ to 2¾ per cent.

Other Markets

Trading in Rapid Transit has been very active on the Philadelphia market during the last week, and the stock has resisted all selling pressure with remarkable strength. At no time has there been any tendency to break, and the price to-day is higher than it was a week ago. Union Traction also has been active at firm prices.

In the Boston market, tractions have been practically neglected, Massachusetts Electric showing the only semblance of activity. Price changes have not been significant.

Outside of a few sales of Kansas City Railway & Light and Chicago Subway little has been done in traction securities in the Chicago market. Prices have been firmly held.

In Baltimore, United Railways bonds continue to be very active and prices have shown some advance. Incomes have sold at 58¾, 4s at 87¾ and funding 5s at 80¾.

At the auction sale of securities in New York last week, the only traction securities sold were $250 Lexington (Ky.) & Eastern Railway preferred debenture certificates, $50 each, at 39.

Quotations of various traction securities as compared with last week follow:

	May. 11	May 18.
American Railways Company	45½	a46
Aurora, Elgin & Chicago Railroad (common)	a37½	*38½
Aurora, Elgin & Chicago Railroad (preferred)	a87½	*89
Boston Elevated Railway	128½	127
Boston & Suburban Electric Companies (common)	*16	*16
Boston & Suburban Electric Companies (preferred)	72	*72
Boston & Worcester Electric Companies (common)	12	12
Boston & Worcester Electric Companies (preferred)	a58	a58
Brooklyn Rapid Transit Company	79⅜	79½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	87½	88¼
Capital Traction Company, Washington	135½	*133
Chicago City Railway	*190	a190
Chicago & Oak Park Elevated Railroad (common)	*4¼	*4
Chicago & Oak Park Elevated Railroad (preferred)	*11	*15
Chicago Railways, ptcptg. ctf. 1	*110	a110
Chicago Railways, ptcptg. ctf. 2	*39	a38½
Chicago Railways, ptcptg. ctf. 3	*28	a28
Chicago Railways, ptcptg. ctf. 4s	*9½	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a78	*78
Consolidated Trac. Co. of N. J., 5 per cent bonds	a107	a107½
Detroit United Railway	*57	*58
General Electric Company	159½	160½
Georgia Railway & Electric Company (common)	85	a86
Georgia Railway & Electric Company (preferred)	*48	a85
Interborough-Metropolitan Company (common)	16½	16¼
Interborough-Metropolitan Company (preferred)	46	45⅜
Interborough-Metropolitan Company (4½s)	79½	79
Kansas City Railway & Light Company (common)	49¼	a50
Kansas City Railway & Light Company (preferred)	85¼	86
Manhattan Railway	146	*146
Massachusetts Electric Companies (common)	a14½	a14
Massachusetts Electric Companies (preferred)	a71½	70½
Metropolitan West Side, Chicago (common)	*19	a18
Metropolitan West Side, Chicago (preferred)	*50½	a53
Metropolitan Street Railway	*26	27
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83	82¾
Northwestern Elevated Railroad (common)	*24	a24
Northwestern Elevated Railroad (preferred)	*71	a72½
Philadelphia Company, Pittsburg (common)	a43½	43
Philadelphia Company, Pittsburg (preferred)	a44	a44½
Philadelphia Rapid Transit Company	a33	34⅞
Philadelphia Traction Co	93	92½
Public Service Corporation, 5 per cent col. notes	a100¾	a101
Public Service Corporation, ctfs	a86½	a89½
Seattle Electric Company (common)	*91	97½
Seattle Electric Company (preferred)	99	99
South Side Elevated Railroad, Chicago	*60	a58
Toledo Railways & Light Company	9	*10¼
Third Avenue Railroad, New York	33⅞	30¾
Twin City Rapid Transit, Minneapolis (common)	103½	*106½
Union Traction Company, Philadelphia	56⅜	57
United Railways & Electric Company, Baltimore	a12	a12½
United Railways Inv. Co., San Francisco (com.)	35	*36⅜
United Railways Inv. Co., San Francisco (pfd.)	56¼	54½
Washington Railway & Electric Company (common)	a42	*42⅞
Washington Railway & Electric Company (preferred)	a92½	*92⅞
West End Street Railway, Boston (common)	a95	93½
West End Street Railway, Boston (preferred)	109	*110
Westinghouse Electric & Manufacturing Company	83⅛	84¼
Westinghouse Elec. & Mfg. Company (1st pref.)	a120	120

aAsked. *Last sale.

Report of Coney Island & Brooklyn Railroad to Public Service Commission

The New York Public Service Commission, First District, has made public a preliminary abstract of the report of the Coney Island & Brooklyn Railroad for the year ended June 30, 1908. Following is the income account, with a comparison with the preceding year:

	Year ended June 30, 1908.	Increase over preceding year.
REVENUE.		
Passenger revenue (including chartered cars)	$1,542,774.02	*$70,150.00
Mail and other car earnings	3,451.09	2,651.09
Advertising	5,740.56	*121.36
Rents	3,452.69	2,952.65
Miscellaneous earnings	2,038.81	550.53
Total street railway operation earnings	$1,557,457.17	*$64,117.09
EXPENSES.		
Maintenance of way and structures	$41,093.58	*$40,686.65
Maintenance of equipment	137,143.43	*28,003.66
Operation of power plant	297,237.78	82,905.66
Operation of cars	453,421.69	*2,224.39
Damages (including legal expenses)	91,630.48	*5,630.76
General expenses	125,729.41	11,048.10
Total street railway operating expenses	$1,246,256.37	$17,408.30
Taxes accrued	62,400.00	4,127.37
BALANCE.		
Oper. income (earn. over expenses and taxes)	$248,800.80	*$85,652.76
Non-operating income	4,604.52	4,563.52
Gross income applicable to corporate and leased properties	$253,405.32	*$81,089.24
DEDUCTIONS.		
Deduct interest on funded and other debt	$148,003.14	*$5,446.67
†Rentals	100,000.00	.....
Total charges to income	$248,003.14	*$5,446.67
SURPLUS.		
Surplus for the year	$5,402.18	*$75,642.57
Previous surplus	5,274.97	*100,261.75
Total surplus	$10,677.15	*$175,904.32
Dividends on stock	.....	*$120,000.00
Charges to corporate surplus	$2,171.80	*59,134.70
Surplus June 30, 1908	$8,505.35	$3,230.38

*Decrease.
†Interest.

The operating expenses amounted to 80 per cent of gross earnings from operation. Of the total operating expenses, $178,237 was used for maintenance of way and structures and equipment; this sum is equal to 11.4 per cent of the gross earnings. Damages, including legal expenses, absorbed 5.9 per cent of gross earnings.

The following additional information was contained in the report:

	Year ended June 30, 1908.	Increase over preceding year.
Total track mileage owned and leased	48.302	.....
Passenger cars (exclusive of open cars)	200	.....
Total seating capacity	23,374	.....
Average number of cars operated	165	.....
Total number of trips made	496,383	.....
Total (passenger) car-miles run	6,768,992	*12,731
Total number of (passenger) car-hours	.....	.....
Passengers—number of 5-cent fares	29,860,969	*1,799,093
Passengers—number of other paid fares	1,600,036	
Pasengers—number of transfers collected	5,928,261	29,733
Passengers—number carried free	452,517	72,842
Number of officers and employees, June 30	1,067	131
Number of motormen, June 30	322	21
Number of conductors, June 30	365	42
Total compensation of officers and employees	$621,327	$13,099

*Decrease.

Baltimore (Md.) Terminal Company.—George T. Bishop, president of the Washington, Baltimore & Annapolis Railway, has announced the sale of $500,000 bonds of the Baltimore Terminal to the General Electric Company at 84. These bonds are a portion of the $2,500,000 bonds offered some months ago. Mr. Bishop states that the work of equipping the Washington, Baltimore & Annapolis Railway for operation by direct current instead of alternating current will be completed within six months.

Boone (Ia.) Electric Company.—E. C. Brown, New York; George D. Roper, Rockford, Ill., and E. G. Pratt, Chicago, have secured an option on the property of the Boone Electric Company, Boone Suburban Railway and the Boone Central Heating Company.

Brooklyn (N. Y.) Rapid Transit Company.—The directors of the Brooklyn Rapid Transit Company have declared a regular quarterly dividend of 1 per cent payable on July 1. The previous dividend was paid on April 1, but the directors at that time declined to state whether the rate was to be quarterly or not.

Camden & Trenton Railway, Camden, N. J.—The bondholders of the Camden & Trenton Railway have ratified the agreement of the reorganization committee on the plan of reorganization. The court will be asked to set an early date for the sale of the property of the company under foreclosure, at which it will be bought by the committee and the reorganization effected.

Cleveland (Ohio) Railway.—Henry J. Davies has resigned as a member of the board of directors of the Cleveland Railway and has been succeeded by H. P. McIntosh, who had previously retired from the company with the intention of spending some time in Europe.

Egerton Tramway Company, Ltd., Stellarton, N. S.—The Egerton Tramway Company has purchased the property of the New Glasgow Electric Light & Tramway Company, New Glasgow, N. S.

Lewistown & Reedsville Electric Railway, Lewistown, Pa.—Dodge & Day, Philadelphia, Pa., have purchased all of the capital stock of the Lewistown & Reedsville Electric Railway for the Utilities Corporation, which they were largely instrumental in creating to purchase electric light, street railway and gas properties where there is an opportunity for expansion and to increase earnings by centralizing the management. The Utilities Corporation is capitalized at $2,000,000, of which $1,000,000 is 6 per cent preferred stock and $1,000,000 common stock.

Norfolk & Portsmouth Traction Company, Norfolk, Va.—Middendorf, Williams & Company, Baltimore, and Chandler Brothers & Company, Philadelphia, have sold $800,000 of 5 per cent first mortgage bonds of the Norfolk & Portsmouth Traction Company. The company proposes to anticipate the payment of $486,000 of its convertible 6 per cent notes, due March 1, 1910, with the proceeds of the sale, and to complete payments covering recent improvements and extensions.

Second Avenue Railroad, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has extended the time for taking testimony in foreclosure proceedings brought by the Guaranty Trust Company, New York, against the Second Avenue Railroad until Aug. 9, 1909.

Third Avenue Railroad, New York, N. Y.—The United States Circuit Court filed a decree on May 17 ordering the sale of the Third Avenue Railroad under foreclosure of a mortgage held by the Central Trust Company, New York, on Sept. 2, 1909. The mortgage on which interest is in default is for $37,560,000, and with interest at 4 per cent from July 1, 1907, totals $40,381,173. The sale is made subject to the lien of the $5,000,000 first mortgage made by the Third Avenue Railroad to the Farmers' Loan & Trust Company on July 1, 1887. The purchaser will be required to give a bond of $200,000 before the sale of the tangible property and a bond of $100,000 before the sale of the stocks and bonds; and will further be required to make up any deficiency between the price realized and the total amount of claims due. The decree provides for two distinct divisions of property to be sold, the first being the real estate, rolling stock, improvements, appurtenances, etc., and the second stocks and bonds, of which the equity of redemption is claimed by the New York City Railway and its receiver, William W. Ladd.

United Railways Investment Company, San Francisco, Cal.—At a special meeting of the stockholders of the United Railways Investment Company on May 17, they authorized the issue of $10,000,000 of preferred stock by the company and the sale of $10,000,000 of authorized and unissued common stock of the United Railroads of San Francisco and approved contracts entered into by the United Railways Investment Company with a protective committee of the Stanislaus Power Equipment Company for the purchase of the property of that company, and the property of the Tuolumne Water Power Company. For the purchase of the property of the Stanislaus Power Company $1,000,000 of the preferred stock and $1,000,000 of the unissued common stock will be used. The remaining $9,000,000 will be held in the treasury to provide for future requirements of the company. The $10,000,000 of common stock of the United Railroads of San Francisco will be sold to the corporation to be organized and controlled by the United Railways Investment Company. The new corporation will take over the San Francisco Electric Railways Company.

Wisconsin Electric Railway, Oshkosh, Wis.—The original reorganization plan of the Winnebago Traction Company, which contemplated first and second mortgages, has been modified by eliminating the second mortgage bonds. The present outstanding issue of 5 per cent first mortgage bonds aggregating $738,000, due Aug. 1, 1908, but subject to call at 105 on six months' notice, are guaranteed as to principal and interest by endorsement by the Eastern Wisconsin Railway & Light Company, which owns the stock of the Wisconsin Electric Railway.

Traffic and Transportation

Publicity on the Boston Suburban Electric System

A policy of co-operative publicity has been inaugurated recently by M. C. Brush, general manager of the Boston Suburban Electric Companies, with the object of improving the service through the criticisms and suggestions of patrons and bringing about a better understanding among the communities served of the conditions under which the roads are operated. An advertisement was sent to the principal daily and weekly newspapers in the 22 towns on the street railway system represented by the Middlesex & Boston, Lexington & Boston and Newton & Boston lines, addressed to the patrons of the company and reading as follows:

"The management of the above company, appreciating fully the value and importance of reliable, efficient and courteous service on the part of a street railway company, and the cordial co-operation of its patrons, respectfully requests criticisms and suggestions. We do not fear, but welcome honest criticism.

"It is our earnest desire to so operate the cars that patrons can absolutely rely upon regularity of service, connections, courteous treatment by employees, etc., and there is nothing which conduces more to such proper service than the honest criticism of patrons.

"You are earnestly urged to advise the management verbally, by mail or by telephone of anything which comes to your attention which you believe could be improved or corrected, and you may rest assured that the management will heartily welcome such criticisms or suggestions, and in addition to giving same proper and prompt personal attention will, wherever consistent, carry out same in part or in whole, or correct irregularities."

As a result of this request the company has received a large number of letters and telephone suggestions from its patrons, either commending the work of the roads or pointing out some way in which certain changes might be made. Among the suggestions received from patrons have been requests to have running times altered, connections made, criticisms of incidents in the car service and comments regarding stops.

It is the policy of the management to pay personal attention to all the communications; a letter of acknowledgment is sent immediately by the general manager stating that the matter is in hand and will receive prompt investigation and attention. The communication is then usually forwarded to the division superintendent concerned, with a request for a report. The latter official investigates and in many cases makes a personal call upon the party who originally wrote to the company. This call affords opportunity for explanation of the conditions at issue, and in some cases the conductor or motorman concerned is also taken to the home or residence of the patron and the case discussed freely.

This course has been found to create good feeling between the management and the public, as it enables the latter to come into personal touch with the system and its administration in a way that is out of the question when such matters are handled in a routine way through correspondence alone. Upon receipt of the report of the division superintendent the general manager writes a letter to the patron who started the proceedings, thanking him for his interest in the service and stating what measures are to be taken or what facts were developed as a result of the inquiry. If the changes suggested are impracticable, the reasons are given clearly; if the patron is at fault the company's position is explained courteously and the request added to call the management's attention in the future to any similar points which arise.

The results have been so satisfactory that a little later another advertisement will be printed renewing the suggestions of the first and showing how it has been a benefit to have the friendly criticisms and suggestions of the patrons. It is also probable that some specific instances of changes made as a result of these suggestions will be mentioned in the press.

Pay-As-You-Enter Cars in Louisville.—The Louisville (Ky.) Railway has placed 30 pay-as-you-enter cars in service on its Portland Avenue and Shelby Street line.

More Pay-As-You-Enter Cars in New York.—The Third Avenue Railroad, which controls the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, has placed pay-as-you-enter cars in operation on the lines of that company.

Ohio Commission Rescinds Distance and Rate Order.—As a result of a conference between representatives of the electric railways and members of the Ohio Railroad Commission, the order to electric railways to prepare schedules showing the distances and fare between stations on their lines in Ohio has been cancelled. The commission will depend upon the investigation of individual complaints as to fare charges.

Historical Folder of the Berkshires.—The Springfield (Mass.) Street Railway proposes to issue an historical folder of the Berkshires which will show all the points of interest along the company's lines. The historical points will be designated by a neat sign upon which will be a number which will correspond with a number on the folder. The reading matter under a certain number will give a condensed account of the history of the place.

Restoration of 5-Cent Fare Unit.—Referring to the restoration of the 5-cent fare unit on the Western division of the New Hampshire Electric Railways on May 1, President D. A. Belden writes: "We have found that the 6-cent fare has produced a gain of about 10 per cent on lines where there is no competition and the travel is steady, but in places where competition exists the loss in the volume of travel has overcome the additional 1 cent per passenger and the result has been a distinct loss of receipts."

Hearing on Worcester Consolidated Street Railway Waiting Room.—The Massachusetts Railroad Commission gave a public hearing in Boston on May 15 on the petition of the Mayor and Aldermen of Worcester for waiting-room accommodations on the Worcester Consolidated Street Railway, specifically at the business center of the city, near Harrington Corner. No one appeared on behalf of the petitioners. The company was represented by President Francis H. Dewey. The board has taken the case under advisement.

Washington, Baltimore & Annapolis Electric Railway Distributing Map of Annapolis.—The general passenger agent of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., is distributing as a traffic circular Riley's map of historic Annapolis with descriptions of the United States Naval Academy and other places of interest. The map was originally published to sell at 15 cents cash or 18 cents by mail. It contains 77 references to points of interest in Annapolis, all numbered with a key in one corner for ready reference.

Music Souvenir of Willow Grove.—The Philadelphia (Pa.) Rapid Transit Company has printed a very handsome souvenir in marbled covers of the music attractions at Willow Grove Park for the coming season. The organizations which will play at the park are Pryor's band, Stock's Theodore Thomas orchestra, Victor Herbert's orchestra and Sousa's band. The conductor of each of these organizations has contributed to this publication a strong appreciation of the value of Willow Grove Park as a music center. The souvenir also contains portraits of the conductors and reproductions from their compositions in manuscript.

Summer Schedule on Twin City Lines.—The Twin City Rapid Transit Company, Minneapolis, Minn., recently announced the following summer schedule for its suburban lines, effective May 15: From Minneapolis for Excelsior at 4:03 a. m. and 6:03 a. m., and every 30 minutes thereafter until 7:03 p. m., thereafter at 8:03 p. m., 9:03 p. m. and 11:03 p. m. For Tonka Bay: At 6:03 a. m. and every hour thereafter until 9:03 p. m. The last car will leave at 11:03 p. m. For Deephaven: At 6:58 p. m., 7:58 p. m. and 9:58 p. m. There will be hourly express boats from Excelsior to Wayzata between 6:15 a. m. and 6:15 p. m., and to Minnetonka Beach between 6:45 a. m. and 6:45 p. m. For Spring Park and Zumbra Heights the boats will leave hourly from 7 a. m. to 7 p. m.

Aurora, Elgin & Chicago Railroad Issues Traffic Circulars.—The Aurora, Elgin & Chicago Railroad, Chicago, Ill., has issued a trio of circulars descriptive of River View Park, Natural Park at Glenwood and of Aurora, where the 43d State Encampment of the G. A. R. is to be held on May 18, 19 and 20. The circular on Aurora describes that place as an encampment city and gives the principal points of interest. In addition, there is a brief sketch of Aurora Post No. 20 of the G. A. R., which is the local organization of the G. A. R. at Aurora. The inside of the folder contains a panoramic view of the route of the Aurora, Elgin & Chicago Railroad. Another feature of the publication is a complete program of the meeting of the G. A. R. Richard Breckinridge is traffic agent of the company.

Indiana Interurbans to Handle Baggage on Same Basis as Steam Roads.—At a meeting of interurban railway managers held in Indianapolis, Ind., on May 12, arrangements were made to handle baggage on the same basis as steam railroads, beginning July 1. The Railroad Commission of Indiana has been informed by a committee of the action taken at the meeting and a schedule will be filed with the

commission about May 25. The following companies were represented at the meeting: Indianapolis, Crawfordsville & Western Traction Company, Chicago, South Bend & Northern Indiana Railway, Evansville & Southern Indiana Traction Company, Indianapolis & Louisville Traction Company, Louisville & Northern Railway & Lighting Company, Indianapolis, Columbus & Southern Traction Company, Indianapolis & Cincinnati Traction Company, Terre Haute, Indianapolis & Eastern Traction Company, Fort Wayne & Wabash Valley Traction Company and the Indiana Union Traction Company.

The Question of Fare Between Trenton and Yardley.—It is reported that the city of Trenton will institute proceedings in the Court of Chancery to ascertain whether or not the New Jersey & Pennsylvania Traction Company has the right to charge a fare of 10 cents between Trenton, N. J., and Yardley, Pa. The franchise of the company provides that a fare of 3 cents may be charged within the city, and 5 cents for any point within five miles of the city limits. Inasmuch as the Calhoun Street bridge charges 2 cents toll, the fare totals 10 cents. When the Yardley, Morrisville & Trenton Street Railway, which forms most of the line between Trenton and Yardley, was first placed in operation, a fare of 10 cents was charged from Yardley to Morrisville, and the passenger was compelled to walk across the Delaware River bridge, paying 2 cents toll, and an additional 5 cents to ride to the center of Trenton, or 17 cents altogether. The 5-cent rate was in effect from 1901 to Feb. 22, 1909. The New Jersey & Pennsylvania Traction Company operates each of its lines under a different charter in order to comply with the laws of New Jersey and Pennsylvania.

Narrower Cars in Chicago.—The Board of Supervising Engineers of the City of Chicago has decided that the width of the 450 new cars for which specifications have been drawn by the Chicago Railways Company shall be 8 ft. 6 in., which is 6 in. narrower than the first pay-as-you enter cars placed in operation and 3 in. narrower than the second lot of cars placed in service. When the new cars are placed in service the space between them on the street will be 14½ in., sufficient materially to reduce the liability of serious injury to persons caught between cars. Bion J. Arnold, chairman of the Board of Supervising Engineers, in commenting on the action taken in reducing the width of cars, is reported to have said: "This will help, and if it had been possible to have brought the board to this point of view sooner I am convinced that many lives would have been saved. I am unalterably opposed to the perpetuation of death zones. I do not believe that the argument that the public will avoid the space between the cars if they know it means death and therefore be safer with the narrower space, is a sound argument. No one stands between passing cars, in my opinion, because he wants to. When a man gets caught there he should be given a chance for life. Such a chance the new space of 14½ in. provides. It has been obtained at a slight loss of room within the car, but the seats are of the same width as formerly and the aisle is 24 in. wide."

Traffic Circulars About the Twin Cities.—A. W. Warnock, general passenger agent of the Twin City Rapid Transit Company, Minneapolis, Minn., has issued a series of booklets describing the facilities of the company for reaching the territory to which its lines extend. The pamphlets are entitled "Twin City Trolley Trips," "How to See the Twin Cities" and "Beautiful Big Island Park." "Twin City Trolley Trips" is similar to a circular issued by the company last year and is enclosed in a cover showing a scene along the company's lines by night which resulted in many favorable comments when first issued. It is illustrated with halftone engravings showing scenes along the company's lines and at Lake Minnetonka. The panoramic view of the Twin Cities, their famous lakes, rivers, parks and resorts, which was a feature of last year's publication, is reprinted this year. The territory embraced by the view extends 16 miles north and south and 48 miles east and west, and has a population of more than 500,000 served by 368 miles of electric railway and 65 miles of steamboat routes, all under the management of the Twin City Rapid Transit Company. "How to See Twin Cities" contains general information about the company's lines, including fares and schedules, and is designed to give visitors a good idea of the geography of Minneapolis and St. Paul. "Beautiful Big Island Park" describes the pleasure resort of the company at Lake Minnetonka. The park contains 65 acres, and is reached by ferry from Excelsior, to which the lines of the Twin City Rapid Transit Company extend. In reality, Beautiful Big Island Park is a charming wooded picnic park for rest, relaxation and recreation. The folder contains a scene at the park by night. Descriptions of these park properties have been published in recent annual park numbers of this journal.

Personal Mention

Mr. E. H. Richards has resigned as superintendent of transportation of the Union Street Railway, New Bedford, Mass.

Mr. W. H. Evans has resigned as master mechanic of the International Railway, Buffalo, N. Y. It is reported that he will be succeeded by Mr. R. T. Senter, assistant master mechanic of the Chicago (Ill.) City Railway.

Mr. W. J. Tunnah has been appointed master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala. For the last five years Mr. Tunnah has been master mechanic of the Little Rock Railway & Light Company, Little Rock, Ark.

Mr. Jacob W. Gerke has been appointed master mechanic of the Tri-City Railway, Davenport, Ia. Mr. Gerke was formerly superintendent of the Washington, Arlington & Falls Church Railway, Washington, D. C., and at one time was master mechanic and assistant superintendent of the company.

Mr. Dow S. Smith, formerly general superintendent of the Brooklyn (N. Y.) Rapid Transit Company, has been elected vice-president of the Panhandle Electric Railway & Power Company, Spokane, Wash., which he and his associates have organized to develop a hydro-electric plant on the Priest River in Idaho and build a 30-mile standard-gage electric railway from Priest River to Coolin, Idaho.

Mr. M. E. Nash has resigned as assistant superintendent of the Boston & Worcester Street Railway, Boston, Mass., to practise law in South Framingham, Mass. Mr. Nash began his railway career in 1896, with the Milford, Hollis-ton & Framingham Street Railway, Milford, Mass., and was employed by that company until June 18, 1903, serving as conductor, clerk, starter, dispatcher, claim agent and superintendent. Mr. Nash went to Porto Rico in 1903 to accept a position with the Ponce Railway & Light Company, but returned to the United States within a few months and entered the employ of the Brooklyn Rapid Transit Company. In August, 1903, he accepted a position as dispatcher with the Boston & Worcester Street Railway and in September, 1903, was made a division superintendent of the company, with offices in Marlboro. In April, 1905, he was appointed assistant superintendent of the company, with offices at Framingham Junction. Mr. Nash was admitted to the bar of Massachusetts on Aug. 20, 1907, and has done considerable work for the claim department of the Boston & Worcester Street Railway in settling accident cases.

NEW PUBLICATIONS

Stationary Transformers. By William T. Taylor. New York: McGraw Publishing Company, 1909; 169 pages; illustrated. Price, $1.50 net.

The author has succeeded in preparing a very readable and handy book on a subject usually treated with too much mathematics. Mr. Taylor's work will certainly be helpful to those practically engaged in transformer operation.

Electric Lamps. By Maurice Solomon. New York: D. Van Nostrand Company, 1908; 320 pages; illustrated. Price, $2 net.

One of the most welcome features of this book is the practical treatment of lamp testing. The descriptions of lamps are concise and free from the catalog flavor too prevalent in other technical books. The chapter on metallic filament lamps, including osmium, tantalum and tungsten, is exceptionally interesting.

Design and Construction of Induction Coils. By A. Frederick Collins. New York: Munn Publishing Company, 1909; 272 pages, with index; illustrated. Price, $3 net.

The author first discusses the theory and development of the induction coil. He then describes methods of winding and impregnating the coils, and the construction of accompanying apparatus, like condensers, reversing switches, commutators, fittings, etc. The cost of manufacture is also considered and a number of useful formulas and tables presented in connection with induction coil practice.

High Tension Underground Cables. By Henry Floy. New York: Electrical Publishing Company, 1909; 135 pages (5 in. x 7½ in.) with tables. Price, $2 prepaid.

In examining this book one can only regret that many other engineers do not place before the public such valuable epitomes of their experiences. Mr. Floy's notable work as consulting engineer in connection with high-tension underground cables is the best guarantee of the value of this book. The author presents an extended history of underground cable installations, discusses in detail the insulating and testing of cables and presents a wealth of data on cable capacities, weights and costs. Mr. Floy has refrained from

setting up a formal specification, believing that each engineer should prepare one directly suited to his needs, but ample assistance is afforded for that task by the general contents of the volume.

American Electric Railways. By Eugen Eichel, of Berlin Brussels International Street & Interurban Railway Association.

The International Street & Interurban Railway Association has just issued in pamphlet form the paper presented at the Munich convention Sept. 7-10, 1908, by Eugen Eichel, on "American Electric Railways." The paper attracted so much attention from the delegates that the association voted to print it in advance of the issue of the regular proceedings, in which it will also appear in due course. Mr. Eichel gave a description of the New York subway, the New York Central and New Haven electrifications, several of the Niagara power installations and the Spokane & Inland Empire Railway, and described some of the features of the electrical equipment of the Illinois Traction Company, United Railways of Detroit and the Brooklyn Rapid Transit Company. He also gave an account of the methods of advertising for traffic followed by the Old Colony Street Railway of Massachusetts. The paper was very fully illustrated.

Development and Electrical Distribution of Water Power. By Lamar Lyndon. New York: John Wiley & Sons, 1908; 317 pages; illustrated. Price, $3 net.

This book is divided into two equal parts, one on the subject indicated by the title and the other an appendix containing hydro-electric power plant descriptions abstracted from several periodicals. In this book Mr. Lyndon presents a concise discussion on water power engineering problems ranging from the stream to the transmission circuit. The book is well written, but might more properly have been termed an introduction to hydro-electric development, as it is impossible to compress the important points of this vast subject into some 150 pages. For instance, practically nothing but an outline is presented on such fundamental matters as the accurate determination of stream flow. However, the references given to apparatus and transmission work are more extended and are reinforced by the valuable descriptions of modern plants. The latter feature is one of the most commendable of Mr. Lyndon's book.

Experimental Electrical Engineering. By V. Karapetoff. New York: John Wiley & Sons, 1908; 790 pages; 538 illustrations. Price, $6 net.

The author, who is assistant professor of experimental electrical engineering at Cornell University, has aimed to produce a laboratory manual suitable for general electrical-engineering work such as is covered during the junior and senior years in most American colleges. The experiments described cover the principal types of electrical machinery and auxiliary devices and the most important commercial applications of electricity. The book is divided into 34 chapters, the governing idea being to make the different chapters independent of each other as far as lines of demarcation could be drawn. Mr. Karapetoff acknowledges assistance in the preparation of the work from instructors in the electrical engineering laboratory at Cornell, and especially acknowledges support from Professors Carpenter, Norris and Ryan, of Cornell. Chapter 31 is entitled Electric Railway Work, and for convenience the subject matter has been treated under these headings: Drum-type electric car controller; multiple-unit control of trains; acceleration and retardation tests on cars, and air brakes. On the whole, the book is an excellent first attempt to create a work that shall be to electrical engineering what Prof. Carpenter's "Experimental Engineering" is to general engineering.

Internal Combustion Engines. By Wm. M. Hogle. New York: McGraw Publishing Company, 256 pages. Price, $3 net.

The aim of the author has been to confine the subject to the more practical and applied phases of the internal combustion engine by eliminating as far as possible the more involved mathematical formulas. The historical review is brief, being designed merely to convey an intelligent understanding of the forerunners of the present engines. The relative merits of the two-cycle and four-cycle engines are briefly stated, the greater dependability of the four-cycle engine with perfect ignition being pointed out clearly. It would seem that a better order for the chapters could have been selected. Chapter IV is entitled "Comparison of Cycles" and is followed by the chapters entitled "Practical Operation," "Care of Engine," "Troubles and Remedies," which in turn are followed by the chapters on the starting devices, carbureters, vaporizers, producers, etc. The chapters on operation properly belong toward the end of the book and would make a fitting prelude to those on testing.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (* indicates a project not previously reported.

RECENT INCORPORATIONS

Rogers, Pea Ridge & Northern Interurban Railway, Rogers, Ark.—Incorporated to build an interurban electric railway to connect Rogers, Pea Ridge and Bentonville. Officers: A. P. Potter, president; W. T. Patterson and J. F. Walker, vice-presidents; Bryan Snyder, secretary; J. J. Pittman, treasurer. Capital stock, $50,000, of which $30,000 has been subscribed. [E. R. J., May 15, '09.]

***Hebron Street Railway, Pittsburgh, Pa.**—Chartered to build a 2-mile street railway out Frankstown Avenue and Frankstown Road from Oakwood Street, Pittsburg, to the Sandy Creek Road. Directors: John S. Hershey, Philadelphia, president; B. M. Sharp, D. W. Hoffman, C. W. Van Artsdalen and John S. Hershey. Capital stock, $50,000.

***Duquesne & Dravosburg Street Railway, Duquesne, Pa.**—Chartered to build a 3-mile street railway in Duquesne Borough and Mifflin Township. Capital stock, $18,000. Directors: John C. Cato, president; A. J. Kull, T. F. Van Kirk, A. C. Purdy, Chas. McGinley, M. G. Conlin and F. W. Scott.

***Somerset & Bakersville Railway, Somerset, Pa.**—Chartered to construct an electric railway from Rockwood to Bakersville, a distance of 9 miles. Charles F. Hood, Connellsville, president.

***Washington Traction Company, Walla Walla, Wash.**—Incorporated to construct a system of electric railways radiating out of Walla Walla to various points in the eastern parts of Washington, Oregon and Idaho. Capital stock, $3,500,000. Incorporators: Gilbert Hunt, Ben C. Holt, J. B. Catron, J. C. Armstrong and J. L. Mohundro. Coincident with this, articles of incorporation were filed for the Interurban Construction Company. Capital stock, $100,000. Incorporators: J. B. Catron, F. C. Hindle and J. C. Armstrong. This latter company will operate in conjunction with the former one, doing its construction work.

FRANCHISES

Fairfield, Cal.—The Board of Supervisors has granted Randall, Trowbridge & Wright, Oakland, a franchise to construct an electric railroad connecting Vallejo, Benicia and White Sulphur Springs. [E. R. J., Feb. 6, '09.]

Oakland, Cal.—The Board of Supervisors has granted a franchise to the Oakland Traction Company for a new line on Hopkins Street.

San Diego, Cal.—Application has been made to the Board of Supervisors by E. W. Peterson, representing the South San Diego & Imperial Beach Railway, for a franchise to construct an electric railway along certain streets of San Diego. [E. R. J., Dec. 12, '08.]

Santa Barbara, Cal.—A franchise for a trackless trolley from Santa Barbara to the Hope ranch has been awarded by the City Council to the Pacific Improvement Company. [E. R. J., April 10, '09.]

Moscow, Idaho.—The Spokane & Inland Empire Railroad, Spokane, Wash., has filed application for more right of way through the western part of Moscow to the corner of South Main Street and Sixth Street.

Peoria, Ill.—W. T. Irwin, president of the Peoria Railway Terminal Company, has applied to the City Council for a franchise to build a passenger and freight line along South Washington Street.

Bluffton, Ind.—The Bluffton, Geneva & Celina Interurban Railway has applied to the County Commissioners for a franchise to build an electric railwaw over certain of the public roads between Bluffton and Adams County. [E. R. J., May 1, '09.]

Warsaw, Ind.—The County Commissioners have granted a franchise to J. A. Barry in the interest of the Wabash & Northern Traction Company for an electric railway from Warsaw to the south boundary of the county. The company proposes to build an electric railway from Warsaw to Wabash. [E. R. J., May 1, '09.]

Utica, N. Y.—The Common Council has granted the Utica & Mohawk Valley Railway a franchise for a new line on Whitesboro Street.

Tulsa, Okla.—The Oklahoma Union Traction Company recently organized to build an electric railway from Tulsa to Sapulpa, has been granted a franchise to enter Tulsa. Albert A. Small and E. T. Tucker, Tulsa, are said to be interested in this company. [E. R. J., April 17, '09.]

Cincinnati, Ohio.—The ordinance granting the Cincinnati, Wilmington & Xenia Traction Company a 20-year franchise in Cincinnati has been read for the first time and referred to the committee on street railways. It is stated that the company proposes to put up a cash deposit of $50,000 as an evidence of good faith, which will be forfeited if it does not begin construction work within one year and complete the line within two years. A bond is also proposed to insure the performance of all agreements. The franchise contains a clause which will allow arrangements to be made for any other interurban railway to come into the city over its lines. [E. R. J., Dec. 26, '08.]

Brantford, Ont.—The City Council has given the Brantford Street Railway a renewed lease of its 50-year franchise. The company filed a bond for $70,000 that it would meet with the terms of its agreement with the City Council.

Newville, Pa.—The Town Council has granted the Cumberland Railway, Carlisle, a franchise for an electric railway through Newville. The proposed line will extend from Carlisle to Newtonville, a distance of 12 miles. [E. R. J., April 17, '09.]

Ellensburg, Wash.—The Kittitas County Commissioners have granted an electric railway franchise to Frank S. Farquhar, representing the Cle Elum-Roslyn Electric Railway & Power Company. The railway will run from 1 mile south of Cle Elum through that city to Roslyn, thence through Jonesville to Lake Cle Elum over a bridge across the Yakima, to be built jointly by the county and the Milwaukee Railroad. The total length will be 17 miles. [E. R. J., May 15, '09.]

TRACK AND ROADWAY

British Columbia Electric Railway, Vancouver, B. C.—It is officially announced that this company will start work at once on extensions to its lines east of Vancouver, aggregating nearly 15 miles in length. The program outlined includes the construction of an initial line in Burnaby, about 6 miles in length. The company has awarded a contract to Boyd, Short & Craig for preparing the right-of-way for the line on Hastings Street east from Campbell Avenue to the eastern boundary of Hastings townsite. This extension calls for about 7 miles of new track.

Point Loma Railroad, San Diego, Cal.—This company has completed and placed in operation a section of its electric railway. The whole system, connecting San Diego with Roseville, Point Loma and Ocean Beach, 9 miles, is to be in operation by July 1. Power is purchased from the San Diego Electric Railway. D. C. Collier, Union Building, San Diego, president and general manager. [E. R. J., Nov. 28, '08.]

Pacific Electric Railway, Los Angeles, Cal.—This company has awarded contracts to S. E. Talbert, Talbert, Cal., and to the Robert Scherer Company, Los Angeles, for the construction of an extension from Delhi to Huntingdon Beach, 10 miles.

Denver, Colorado Springs & Pueblo Interurban Railway, Denver, Col.—Louis M. Pfeiffer, a director of this company, is quoted as saying that this company will have its proposed electric railway between Denver and Pueblo in operation within a year. The promoters have virtually entered an agreement with the Colorado Springs & Interurban Railway to use its lines and terminals in Colorado Springs, and thus eliminate the necessity of securing a franchise from that city. The same arrangement is to be made with the Denver Tramway for entrance and terminals at Denver. The bond issue authorized will provide for the construction of the first division of the railway from Denver to Colorado Springs, and the company expects to have the bonds underwritten and construction started within six weeks. Practically all of the right of way has been secured between Denver and Colorado Springs. The line will be 65 miles in length from the city limits of Denver to the city limits of Colorado Springs, and the maximum grade will be 1¼ per cent. Power is to be furnished by the Central Colorado Power Company from Denver, but the company will erect several substations along the line at points yet to be determined. Until the line to Colorado Springs is well under way or in operation it is probable that no action will be taken toward extending the line to Pueblo. [E. R. J., April 10, '09.]

Lebanon (Conn.) Street Railway.—This company has decided to begin at once the sale of its preferred stock, which amounts to $100,000, preparatory to the construction of the proposed electric railway between Yantic and South Manchester, a distance of 28 miles. The preliminary survey of the line has been completed. [E. R. J., Jan. 23, '09.]

Fitzgerald & Ocilla Electric Railway & Power Company, Fitzgerald, Ga.—This company has filed for record at Fitzgerald a mortgage to the Windsor Trust Company, New York, N. Y., as trustee to secure an issue of $250,000 of 5 per cent gold bonds. It is planned to construct an electric interurban railway to connect Fitzgerald and Ocilla, 12 miles. [E. R. J., April 10, '09.]

Chicago, Wheaton & Western Railway, Chicago, Ill.—W. C. Carrington, Gary, Ind., has been awarded the contract for constructing that section of this proposed electric railway from Wheaton to Geneva. Headquarters, 707 Rookery Building, Chicago. Henry C. Wood, president. [E. R. J., Feb. 27, '09.]

Galesburg & Rock Island Traction Company, Rock Island, Ill.—Official announcement is made by this company that by July 1 work on the construction of this proposed electric railway will be under way at four points. Work will probably begin at Galesburg. The right of way between Galesburg and Alexis, 15 miles, has been secured. Between Alexis and Rock Island 75 per cent has been secured. The estimated cost of the railway is $2,000,000, and the capital stock of the company is to be increased to $1,500,000 within the next few days. Cars will be operated into Rock Island from Milan over the tracks of the Tri-City Railway. The permanent survey of the line is direct from Galesburg to Alexis; from Alexis to Preemption; from Preemption to Milan, and thence to Rock Island. The Empire Trust Company, New York City, is trustee of the bonds and mortgages of the railway. The mortgage will be filed next week in Rock Island County and in Mercer, Warren and Knox Counties. The Security Bank Note Company, Philadelphia, is preparing the bonds and securities of the company. [E. R. J., March 13, '09.]

Chicago, Fox Lake & Lake Geneva Railroad, Chicago, Ill.—M. B. Louis, vice-president of this company, which contemplates the construction of an electric railway to connect River Grove, Franklin Park, Riverview, Desplaines, Fox Lake and Lake Geneva, 70 miles, advises that it is the plan to begin work during the summer. The repair shops will be located at Franklin Park. [E. R. J., Dec. 19, '08.]

Chicago (Ill.) Railways.—Bids will be received by this company until May 27 for the construction of the Washington Street tunnel of reinforced concrete, between Clinton Street and Canal Street.

Gary, Hobart & Valparaiso Traction Company, Hobart, Ind.—Ground was broken at Hobart on May 14 for the new electric railway which this company proposes to build from Hobart to Gary. Blake A. Mapledoram, general manager. [E. R. J., April 3, '09.]

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—The Union Trust Company, 116 East Market Street, Indianapolis, receiver for this company, writes that new bids will be received until May 24 for completing, equipping and operating this railway between Indianapolis and New Castle. The American Pipe Manufacturing Company, Philadelphia, Pa., was the only bidder for this work on May 13, at a total of $446,500.

Vincennes, West Baden & Louisville Traction Company, Vincennes, Ind.—A. M. Yelton, president of this company, which proposes to build an electric railway from Vincennes to Jasper, Ind., has announced that the work of building will be started in a short time, possibly within 60 days. The St. Louis Trust Company, it is said, will take $500,000 as soon as the company disposes of $250,000 worth of stock. Already $100,000 of stock has been subscribed for, and in addition $125,000 in subsidies has been voted by townships through which the line will pass. [E. R. J., March 27, '09.]

Kentucky & Ohio River Interurban Railroad, Paducah, Ky.—John J. Freundlich, general manager, writes this company contemplates beginning work on its proposed electric railway about June 1. It will connect Paducah and Cairo, Ill., 35 miles.

Twin City Rapid Transit Company, Minneapolis, Minn.—It is announced that this company will place in operation on July 1 its new line between Minneapolis and St. Paul. The new bridge at Fort Snelling, which had to be built before the cars could cross the river here, is completed and tracks laid. All the work that remains is the putting in of the connecting links between the Fort Snelling and the Seventh and Robert Street lines. On the east side of the river part of the old right of way had to be given up and a new and more direct approach secured. The grading for this is now going on. The final details in the negotiations with the government to run cars through the Fort Snelling reservation are also being completed. The new interurban line will be 17.4 miles long from Hennepin Avenue and Fifth Street in Minneapolis to the East Seventh Street station in St. Paul and the trip will be made in an hour.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—Samuel Barnes, general manager, advises that this company is overhauling its tracks and overhead construction. A contract has been placed with the Com-

mercial Electric Company, St. Louis, Mo., for line material. An order was also placed with the Elliot Switch & Manufacturing Company, St. Louis, Mo., for 2 150-ft. turnouts.

*Gardinerville, Nev.—A company headed by H. H. Springmeyer and A. Jensen has been organized at Gardinerville for the purpose of building a street railway from the terminus of the Carson Valley branch of the Virginia & Truckee Railroad to Gardinerville, a distance of 1 mile.

Titusville Northern Railroad, Weston, N. J.—This company is considering the purchase of electrical supplies and material for its proposed electric railways at Titusville, Union City and Cambridge Springs, Pa., and the connections thereto. Grading has been completed and construction is now under way. Jesse L. Straus, Weston, N. J., treasurer.

Brooklyn (N. Y.) Rapid Transit Company.—The Court of Appeals has handed down a decision in favor of this company in the matter of the proposed extension of the Nostrand Avenue line from Nostrand Avenue and Flatbush Avenue to Nostrand Avenue and Avenue Q, a distance of about 1½ miles. The company will at once begin work on the extension.

Long Island Railroad, New York, N. Y.—This company has begun work on its proposed electric railway, which will establish connection between Huntington and Amityville. The 6 miles between Huntington and Melville are already in operation, and the contract for the 9 miles between Melville and Amityville has been awarded to the Seaboard Construction Company, Brooklyn. The line will traverse Huntington, Melville, Farmingdale and Amityville, and under the specifications prepared by J. R. Savage, chief engineer of the company, 25,000 ft. of 7-in. girder rail are to be used through the village and about 25,000 ft. of T-rail through the outskirts.

Kanauga Traction Company, Gallipolis, Ohio.—This company, which for the last two years has been operating a 5-mile gasoline motor line between Gallipolis and Kanauga, is now converting it into an electric railway. J. S. Howard, secretary and treasurer of the company, writes that the line will probably be extended during the summer.

Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.—It is stated that steps are being taken to begin work immediately on this proposed electric railway. The company has taken over a steam railroad between Ravenna and Hudson and will immediately electrify the line and extend it from Hudson to Cleveland by way of Twinsburg, Randall and Woodland Hills. The company has also purchased a line between Ravenna and Warren, and will also electrify it at once for service between those two points. Headquarters, Electric Building, Cleveland.

*Zanesville & McConnelsville Traction Company, Zanesville, Ohio.—It is stated that A. W. McDonald, Pittsburgh, and R. C. Burton are at the head of a movement to build an electric railway between Zanesville and McConnelsville. Rights of way have been partially secured between Duncan Falls and McConnelsville.

Cincinnati, Wilmington & Xenia Traction Company, Wilmington, Ohio.—This company, which proposes to connect Cincinnati, Wilmington and Xenia with an electric railway, announces that it has about completed the preparatory work and has made a partial prospectus of the enterprise. As this company was organized for preliminary purposes, it is likely that another company will be organized to carry out the work. It is probable that the company will have construction under way about June 1. [E. R. J., Dec. 26, '08.]

Memphis (Tenn.) Street Railway.—One line which this company is rebuilding includes 35,000 ft. of 9-in. girder and 75-lb. T-rail track. The street on which this track is being relaid originally was the private right of way of a steam dummy line. For one-half of the length of this street the right of way has been given over to the city in return for the double-track franchise. The outer half of the street's length also has been given to the city with the exception of a neutral strip along the center in which the T-rail tracks are being relaid. This neutral strip has curbing on either side and the track is rock-ballasted with sheet-concrete street intersections. The section of the street nearer the business part of the city in which 9-in. girder rail is being laid is being paved with asphalt. The rails are supported on creosoted ties spaced 5 ft. on centers with tie rods between. The track substructure comprises mass concrete.

Temple, Tex.—At a recent meeting of the Temple Commercial Club, a communication was received from Albert Hershey, secretary of the Waco Commercial Club, with reference to the organization of a company among the financial interests of the two places to construct an interurban electric railway between Temple and Waco. A committee was appointed to co-operate with the Waco committee and perfect the organization of the company.

Fairmount & Clarksburg Traction Company, Fairmount, W. Va.—This company has authorized the construction of an extension from Clarksburg to Bridgeport, about 3.3 miles in length. Bids were received on May 17 for this work, which is to be completed within about three months. The company is just completing another extension, 1½ miles in length, from Fairmount to the Fairmount Fair Association's race track at East Fairmount. An 80-lb. A. S. C. E. rail is being used on both extensions; standard roadbed and track also.

Slate Belt Railroad, Poultney, Vt.—It is reported that this company will begin making surveys for an electric railway between Granville and Fair Haven, via Poultney. Franchises have been secured in Fair Haven and Poultney. William Nathaniel, Poultney; A. Mulholland, New York, N. Y., and A. Y. Gray, Middletown, are said to be interested in this company.

*People's Improvement Company, Lynchburg, Va.—R. J. Hughes, president, advises that this company has been incorporated for the purpose of constructing an electric railway from Fairview Heights to Lynchburg, 1 mile. It is the intention to start work on the line about June 1. The company will need rails, ties, poles and overhead material. When completed the line will be operated as part of the Lynchburg Traction & Light Company. R. J. Hughes, Post Office Box 81, Lynchburg, president; R. C. Blackford, Law Building, Lynchburg, secretary and treasurer.

Seattle, Wash.—E. L. Blaine, Seattle, who recently applied for a franchise to build an electric railway from Renton to Issaquah, writes that as soon as the franchise is granted a company will be organized and other plans perfected to construct and operate the proposed railway. No details concerning the line or its promoters will be given out until after the County Commissioners act on the franchise, which will be on May 25. The proposed railway will be about 12 miles in length. [E. R. J., May 1, '09.]

Panhandle Electric Railway & Power Company, Spokane, Wash.—Vernon M. Smith, president, writes that preparations are being made by this company to begin work about July 1 on the proposed 30-mile electric railway between Priest River and Coolin. A power station having a capacity of 30,000 hp will be built on the Priest River. Besides operating the railway power will also be furnished for mining and manufacturing purposes. [E. R. J., April 24, '09.]

Wheeling (W. Va.) Traction Company.—It is stated that this company plans to extend its line through Rayland in addition to making other track improvements. The track in Steubenville will be partially replaced with heavier rails and about 1½ miles of the track on the Moundsville division will be replaced.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company is said to have begun surveying for an extension between Eau Claire and Altoona.

POWER HOUSES AND SUBSTATIONS

New Hampshire Electric Railways, Haverhill, Mass.—This company has awarded a contract to E. A. Peabody & Son, Lawrence, for the construction of a substation which is to serve its western division. The station will be of brick. It will be situated in Methuen, half way between Haverhill and Lawrence, on the line of the Lawrence & Methuen division.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—This company has recently placed the following orders for new apparatus: With the Weston Electric Company, St. Louis, Mo., for switchboard instruments; switches and circuit breakers from the Westinghouse Electric & Manufacturing Company.

Geneva, Waterloo & Cayuga Lake Traction Company, Seneca Falls, N. Y.—Announcement is made that this company will construct an auxiliary power plant at Cayuga Lake Park. It will be equipped with a 200-kw generator and a 200-hp Ball engine. W. C. Gray, manager.

Interborough Rapid Transit Company, New York, N. Y.—This company contemplates enlarging its power plant, but has not definitely decided on the equipment it will purchase.

Manor Valley Railway, Irwin, Pa.—It is announced that this company will build a power plant to supply current for the operation of its line between Irwin and Herminie.

El Paso (Tex.) Electric Railway.—Construction has been begun by this company for the extension of its power plant, to cover the present site on South Santa Fé Street and an adjoining lot 330 ft. x 260 ft. The work is being done by the Stone & Webster Engineering Corporation. The addition will be equipped with a 1500-kw Allis-Chalmers horizontal turbine engine, direct connected to a 2200-volt, two-phase generator, together with new switchboard gallery, traveling crane, boiler plant and condensing arrangements for the operation of the new unit.

Manufactures & Supplies

ROLLING STOCK

Memphis (Tenn.) Street Railway is building an express car at its shops.

United Railways & Electric Company, Baltimore, Md., will not purchase the cars for which it was reported to be in the market.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y., has issued specifications for 10 city cars which it proposes to purchase.

Puget Sound Electric Railway, Tacoma, Wash., will purchase two cars, through Stone & Webster, Boston, Mass., general managers.

Port Arthur (Ont.) Electric Street Railway will shortly ask for bids on the four pay-as-you-enter cars for which it was mentioned to be in the market in the ELECTRIC RAILWAY JOURNAL of March 13, 1909.

Tri-City Railway, Davenport, Ia., mentioned in the ELECTRIC RAILWAY JOURNAL of March 20, 1909, as being in the market for 10 single-truck closed cars, will place the order for this equipment within the next few weeks.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., is reported to have placed an order for a combination passenger and baggage car and a trail car with the Niles Car & Manufacturing Company.

Springfield (Mass.) Street Railway will purchase 12 new box cars for city service, 32 new motors and controllers to replace equipment on box cars and 10 new trucks and controllers to replace equipment on some double-truck cars.

Northern Texas Traction Company, Fort Worth, Tex., will buy four cars through Stone & Webster, Boston, Mass., within the next two weeks. Mention of the contemplated purchase of 10 cars by this company was made in the ELECTRIC RAILWAY JOURNAL of May 8, 1909.

Illinois Traction System, Champaign, Ill., mentioned in the ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909, as contemplating the purchase of 20 or 25 cars for operation on its line entering St. Louis, advises that it has practically completed plans for purchasing 30 cars to be used in this service.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo., mentioned in the ELECTRIC RAILWAY JOURNAL of March 13, 1909, as contemplating the purchase of car equipment, has bought motors from the Westinghouse Electric & Manufacturing Company to be used on summer cars which it has on hand.

Portland Railway, Light & Power Company, Portland, Ore., mentioned in the ELECTRIC RAILWAY JOURNAL of May 8, 1909, as having bought 50 more pay-as-you-enter cars, has ordered only 40 cars 28 ft. 8 in. long from the American Car Company. Brill maximum traction trucks and General Electric No. 218 65-hp interpole motors especially made for cars of 3 ft. 6 in. gage will be used.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., has ordered type 21-E single trucks from The J. G. Brill Company and several sets of GE No. 80 motors. The company will in the near future be in the market for two double-truck cars to be equipped with air brakes for use on an extension it is now building. Reference to the fact that this company was in the market for equipment was originally made in the ELECTRIC RAILWAY JOURNAL of April 3, 1909.

Blue Hill Street Railway, Canton, Mass., mentioned in the ELECTRIC RAILWAY JOURNAL of March 6, 1909, as contemplating the purchase of rolling stock to replace cars destroyed by fire, has ordered 12 cars through Stone & Webster, Boston, Mass., from the Wason Manufacturing Company. Seven of the new cars will be 21 ft. long and of the semi-convertible type and five will be 10-bench open cars. Each will be equipped with the Standard Motor Truck Company's single trucks, two GE-80 motors and K-11 controllers.

Chicago (Ill.) Railways, mentioned in the ELECTRIC RAILWAY JOURNAL of Feb. 13, 1909, as contemplating the purchase of 350 cars, is sending out specifications for this number. The bids are returnable May 26, 1909. The cars, which are to be of the pay-as-you-enter type, are to have an over-all length of 46 ft.; length over corner posts, 31 ft. 6 in.; length over crown pieces, 45 ft.; width over drip rails, 8 ft. 4 in.; over posts at belt rail, 8 ft. 4½ in.; over guard rail, 8 ft. 6 in.; height, top of rail to top of trolley boards, 11 ft. 8½ in.; wheel base, 19 ft. 11 in.; 34-in. steel wheels; seating capacity, 40. The cars are to have a metal bottom framing, cast-steel body bolsters, round clam-shell type vestibules at each end, and are to have 11 single windows on each side of the car. Some of the special devices called for in the specifications are Taylor automatic ventilators (or equal); "Walk-Over" 199A seats; Pantasote side curtains; Samson bell cord; Keystone (or equal) pneumatic bells; electric heaters; Consolidated push-button system; Hunter illuminated signs; Crouse-Hinds type Z headlight; Wilson trolley catcher; International (or equal) registers. The cars are to be lighted by nine 16-cp frosted incandescent lamps on each side of the deck and three 32-cp frosted lamps placed in a row in the center of the ceiling. The inside of the cars are to be cherry with a mahogany finish, and bronze trimmings are to be used. The roofs are to be of the monitor deck type.

Hagerstown (Md.) Railway, mentioned in the ELECTRIC RAILWAY JOURNAL of April 24, 1909, as having ordered one car from the Cincinnati Car Company, Cincinnati, Ohio, has specified that the new car shall be a combination baggage and passenger coach with the following details:

Seating capacity.....44	Underframe ..... Composite
Weight .....19,000 lb.	Couplers ..... Cincinnati
Bolster centers, length, 19 ft. 6 in.	Curtain fix....Curtain S. Co.
	Curtain material...Pantasote
Length of body.....32 ft.	Hand brakes.....Peacock
Over vestibule.....4 ft. 6 in.	Heating system.Consolidated
Width over sheathing, 8 ft. 2 in.	Headlights ..... Dayton
	Sanders ..... Cincinnati
Sill to trolley base.....9 ft.	Seats .....H. & K.
Height from top of rail to sills.....31 in.	Seating material.....Rattan
	Step treads, Cincinnati safety tread
Body ..... Wood	
Interior trim.....White oak	Trucks.....Peckham No. 25

TRADE NOTES

Standard Brake Shoe Company, Aurora, Ill., has moved its Chicago office from the Railway Exchange to 518 Fisher Building.

Chicago Steel Car Company, Chicago, Ill., has increased its capital stock from $50,000 to $250,000 and the number of its directors from four to five.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has appointed H. C. Slemin sales manager in addition to advertising manager.

Roger's Journal-Packing Company, Chicago, Ill., has appointed Willis C. Squires general sales agent for its improved journal packing and receptacles.

General Fire Extinguisher Company, Providence, R. I., has removed its Chicago office from the Royal Insurance Building to Room 500, 184 La Salle Street.

W. P. Stevens, who has been associated with the Chicago office of the Consolidated Car Heating Company for the past 18 months, has resigned from the company.

Arthur D. Little Laboratory, Boston, Mass., has been recently incorporated under the name of Arthur D. Little, Inc., in order to extend the facilities of the laboratory for handling work involving industrial application of chemistry.

C. A. S. Howlett, of the Western Electric Company, Chicago, Ill., has been elected president of the National Sales Managers' Association. This association was organized last fall and has a membership of about 200 salesmen connected with wholesale and retail firms in Chicago.

Electro-Mechanical Engineering Bureau, Chicago, Ill., has recently opened offices in the Monadnock Block for consultation, inspection and tests along mechanical, electrical and chemical lines, and to give expert attention to the development and design of new devices, processes and patentable ideas.

B. Elshoff, for 12 years assistant superintendent of the Allis-Chalmers-Bullock Company, Cincinnati, Ohio, and for the past two years superintendent of the electrical department of the Allis-Chalmers Company, Milwaukee, has recently severed his connection with the last-named company. Mr. Elshoff will remain in Milwaukee for the present.

I. R. Nelson & Company, Newark, N. J., have received a contract from Wonham, Magor & Sanger, New York, to install the "H. B." life guard on all the cars of the Third Avenue Railroad and the Union Railway, New York. I. R. Nelson & Company are also repainting all the cars of the New Jersey & Pennsylvania Traction Company using Sherwin-William colors and Hildreth varnish.

Darley Engineering Company, 149 Broadway, New York, N. Y., has discontinued its Pittsburgh office and has removed its engineering, purchasing and sales departments to 149 Broadway, New York. The Chicago office of the company, which is in the Monadnock Building, will be continued. The new officers of the company recently elected are: W. A. Stadelman, president and general manager; C. L. Inslee and

W. G. Hudson, vice-presidents; W. W. Ricker, treasurer, and M. D. Chapman, secretary.

Wagner Electric Manufacturing Company, St. Louis, Mo., has opened an office in the Ideal Building, Denver, Col., to handle its business in Colorado, New Mexico, Utah, Montana and eastern Idaho. The office is in charge of O. H. Davidson, of the Electric Manufacturers' Sales Company, who has a wide acquaintance in this district, having been located in Denver for several years.

Rooke Automatic Register Company, Providence, R. I., has installed the Rooke system of fare collection on the Templeton Street Railway, East Templeton, Mass. This register was adopted largely because of the favorable results secured on the Norton & Taunton Street Railway with the system. The Gardner, Westminster & Fitchburg Railway has also installed these portable registers. Fifteen of them were put in service May 4. The daily papers speak very highly of their reception by the public.

American Blower Company, Detroit, Mich., announces that L. E. Burton, formerly associated with J. T. Mooney & Company, Nashville, Tenn., and the W. J. McPherson Company, Portland, Ore., has been appointed to take charge of the company's sales in Washington, Oregon and Idaho, with headquarters at 388 Arcade Annex, Seattle, Wash. Thomas W. Fitch, until recently sales manager of the Capell Fan & Engineering Company, now represents the Sirocco mine fan department of this company in the bituminous coal district, with headquarters at the Pittsburgh sales office, 218 Empire Building.

James Beggs & Company, New York, N. Y., manufacturers of the Blackburn-Smith feed-water filter and grease extractor, have appointed the following sales agents: Walter G. Ruggles Company, Boston, Mass.; M. J. Daly & Sons, Watertown, Conn.; Buffalo Mill Supply Company, Buffalo, N. Y.; National Valve & Manufacturing Company, Pittsburgh, Pa.; Murdock Manufacturing & Supply Company, Cincinnati, Ohio; A. Harvey's Sons Manufacturing Company, Detroit, Mich.; R. B. Whitacre & Company, St. Paul, Minn.; Plant Rubber & Supply Company, San Francisco, Cal.; H. W. Petrie, Montreal; H. W. Petrie, Ltd., Toronto, Ont., and Vancouver, B. C.; Lebedjeff & Company, San Juan, Porto Rico; W. G. Harry & Company, Georgetown, British Guiana, South America. The Blackburn-Smith filter first became popular for removing oil from the condensed exhaust steam where this condensation must be fed back to the boilers. The filter has been found very effective, and is now widely used for the removal of oil from hot well water, open-heater returns, etc. It is also efficient in removing mud, slime and organic impurities in suspension in the water supply.

Trolley Supply Company, Canton, Ohio, has furnished some further details on the interesting semaphore light described in the Electric Railway Journal of May 15. The semaphore is an exceptionally well made lamp, having a case and door frame of cast iron. The reflector is spun from No. 18 gage brass and heavily nickeled. When used in combination with this company's 9-in. semaphore lens, it gives a far more effective light than can be obtained from the old-style lamp. Each light is furnished with one standard 16-cp 110-volt incandescent lamp in series with the interior car lights. One advantage of this semaphore light over similar headlights is in its method of fastening. It is bolted directly to the dash of the car, so that the objectionable feature of cutting the dasher is eliminated. Besides being a dash headlight for city cars, the semaphore can be used as a signal light with a lens colored red, blue or green. The method of fastening this lens is another very good feature. The lens is held in place by four brass cleats, which is quite an improvement over the brass ring and spring fastening. The advantages of a semaphore lens are many. The principal one is its durability, as it is practically indestructible and is not broken when fenders and other obstacles are thrown against it.

W. A. Garrett, president of the Seaboard Air Line Railway, Norfolk, Va., and since the receivership executive officer for the receivers, has been elected vice-president of the T. H. Symington Company, Baltimore, Md. Mr. Garrett's new duties will require a severance of his connection with the Seaboard Air Line not later than Nov. 1, 1909, until which date he has consented to remain as executive head of the system. Mr. Garrett entered the railway field in 1876, and before becoming connected with the Seaboard Air Line was general manager of the Cincinnati, New Orleans & Texas Pacific Railway and the Alabama Great Southern Railroad. He served consecutively with the St. Louis Union Depot Company as office messenger, clerk of the car department, timekeeper, assistant paymaster, purchasing agent, superintendent's secretary and assistant superintendent. From March, 1893, until Jan. 1, 1896, he was superintendent of the Terminal Railroad Association, and from December, 1893, to Jan. 1, 1896, also was terminal superintendent of the Wabash Railroad at St. Louis. From Jan. 1, 1896, to April 1, 1897, Mr. Garrett was superintendent of the Western Division of the Wabash Railroad, and from April 1, 1897, to Aug. 7, 1899, he was superintendent of the Middle Division of the same company. Mr. Garrett next entered the employ of the Philadelphia & Reading Railway and served in turn as superintendent of the Philadelphia division, superintendent of the New York division and general superintendent of the company. On May 1, 1903, he was appointed general manager of the Cincinnati, New Orleans & Texas Pacific Railway and the Alabama Great Southern Railroad.

ADVERTISING LITERATURE

Pettingell-Andrews Company, Boston, Mass., show great variety of condulets in the May number of *Juice*.

Graphite Lubricating Company, Bound Brook, N. J., has issued a small card showing a box of 50 Bound Brook bushings sealed with a green label.

Meyer Safety Guard Company, Omaha, Neb., has printed a booklet showing various applications of its adjustable safety barrier for open and closed cars.

Canton Culvert Company, Canton, Ohio, has printed a new catalog showing some interesting electric and steam railway installations of its non-corrosive "Acme" corrugated metal culverts.

Trolley Supply Company, Canton, Ohio, has published a pamphlet describing and illustrating its national roller and ball-bearing trolley base and setting forth eight reasons why it is better than others.

Hurley Track-Laying Machine Company, Chicago, Ill., has printed an illustrated booklet on its track-laying equipment. This machine lays 2 to 4 miles of track a day, depending upon the character of labor employed.

Crocker-Wheeler Company, Ampere, N. J., in Bulletin No. 112, describes motor-driven exhaust fans. Bulletin No. 113 from the same company illustrates and describes large direct-current motors and their component parts.

Barrett Manufacturing Company, New York, N. Y., is issuing a new catalog showing roads constructed with Tarvia, a tar binder which the company recommends for preventing dust and preserving macadam roadways.

Lord Electric Company, New York, N. Y., has issued Bulletins I and J, descriptive of the Garton multi-vapo-gap lightning arrester, and also of the company's "Hydro-ground." A price list and table of dimensions are appended.

Shepard Electric Crane & Hoist Company, Montour Falls, N. Y., announces bulletin No. 502, illustrating cranes and hoists. Among these are three motor-cage-controlled traveling cranes and single-girder bracket jib cranes.

Standard Steel Works Company, Philadelphia, Pa., has published a catalog on steel-tired wheels for electric and steam railroads showing designs recommended by the principal railroad associations. The booklet contains sections of 39 types of wheels.

Southern Railway Supply Company, St. Louis, Mo., has just issued Catalog No. 10, an imposing cloth-bound volume of over 600 pages. It contains illustrated descriptions and price lists of thousands of objects used in electric railway construction and operation and an addenda comprising many practical tables.

H. W. Johns-Manville Company, New York, has published an extensive, illustrated catalog on "Noark" service and subway boxes, which differ in important respects from those described in this company's 1905 catalog. The company has also issued a booklet on "Permanite" sheet packing for steam machinery.

Joseph Dixon Crucible Company, Jersey City, N. J., gives in *Graphite* for May, an interesting article on the manufacture of Dixon pencils, a letter on the value of Dixon air-brake grease, and another article on the prevention of corrosion of car machinery. The company has also issued a new booklet on graphite products including grease, flake graphite, pipe-joint compound, belt dressing and carbon brushes.

General Electric Company, Schenectady, N. Y., has recently issued Bulletin No. 4658, describing type US-14 ball-bearing trolley base. The double ball-bearing used on this base produces an extremely sensitive action which, by eliminating the arcing, pounding, wrenching, etc., inherent in ordinary forms, insures decreased wear on trolley wheel and overhead construction. A cushioned top is provided to protect the pole from bending or breaking should the wheel leave the wire. This publication contains, also, a list of supply parts for this base.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, MAY 29, 1909 No. 22

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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UNIVERSITY OF MICHIGAN LIBRARY MAY 28 1909

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United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

Removal of Snow and Ice and Track Sprinkling

Costs of the removal of snow and ice and the sprinkling of tracks of the Detroit United Railway System, published in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, page 949, constitute one form of partial taxation and public benefit with which the public, as a rule, has little, if any, familiarity. The removal of snow and ice is necessary, in part if not in whole, for safe and speedy operation of the railway, while travel is made more pleasant for passengers if the dust on the streets is laid by systematic sprinkling; yet these are some of the costs that may reach excessive amounts. Whether or not these expenses are considered as legitimate elements in the cost of operation, they are, in many communities, requirements that add materially to the outgo which has to be met before earnings on the investment can be computed, and the better understanding there is by the public of this fact, the nearer will come the time of solution of problems of the utility corporations.

Following Up Wheel Records

When car wheels are purchased under a guaranteed life it is clearly most important for all transportation and mechanical department employees to co-operate in securing accurate records of the service performance obtained. The failure to keep proper records of all specially numbered test wheels means that the company may not obtain the full life gurantees on doubtful sets, and may therefore lose wear which should be obtained on unmarked lots. Unless a company can show by its records that the guarantee has not been met, assuming that the wheels do not wholly fulfill the requirements, the only thing it can do is to buy new wheels at the market price. Too much care cannot be insisted upon in the accuracy of these records, kept, as they must be in the main, by subordinate employees in charge of car houses. If a tag is attached to a truck when it is shipped from the car house to the shop, the correct wheel numbers and the total mileage they have made should be written on it, and if an index card is kept in the car house for a truck and its wheels, the same care should be observed.

Economy in Brake Shoe Operation

The importance of securing the maximum wear from brake shoes that is consistent with safe service is generally realized as a principle of economical operation in electric railway circles, but the cost of throwing away or rather scrapping a shoe before its useful life has expired is not always appreciated in its effect on the operating expenses of the system as a whole. On a road with a large number of car houses it is most instructive to keep records of the weight of the scrap brake shoes which come in from time to time. If the question has not been followed up before the weighing begins, the chances are that some interesting differences in the scrap weight of the same types of shoes will be found. Even on a road where the car-house men have been cautioned not to scrap the shoes too soon, the differences in the records of the several houses will often be large enough to justify a special study of the subject. Thus, in one case, the average shoe weight was 9.5 lb., while a neighboring house on the same system

scrapped its shoes of the same type at 17.2 lb. The weight of scrapped shoes of a type used on some large semi-convertible cars varied from 14.4 to 18.2 lb. per shoe. Now, on a large system where from 20,000 to 30,000 shoes are used per year, a small difference per shoe amounts to an appreciable sum of money. In the case of one company which uses about 600 new shoes per week, it was figured that an average difference of 3.7 lb. of brake-shoe scrap per shoe costs the company 9.25 cents. This meant that if the car house foremen scrapped their shoes at an average weight of 6.3 lb. instead of at 10 lb., there would be a saving of $1,875 per year, after allowing for the scrap value. The company would have to carry almost 40,000 more passengers in the year to pay for the unused shoe material.

A Study of Franchises

A criticism of the existing standard form of franchises for street railroad companies in Greater New York, written by Delos F. Wilcox, chief of the bureau of franchises of the Public Service Commission, First District, has been published in pamphlet form by the commission. While substantially all the important franchises now outstanding in the city are perpetual, and do not, therefore, enter into a consideration of the form of future grants, the subject is of extreme and of increasing importance as the population and resultant transit needs develop. The pamphlet has been sent to the Board of Estimate and Apportionment of the city, accompanied by a letter from the commission requesting a conference with the board on the subject.

Since Jan. 1, 1908, several applications of relative unimportance have been presented to the commission for approval of franchises granted by local authorities, and favorable action taken thereon; and others, some of considerable importance, are either pending or will come up soon for consideration. Mr. Wilcox says that examination of the franchises presented to the commission for approval indicates that the Board of Estimate and Apportionment makes use of a standard form, "modified in any particular case only so far as may be necessary to meet the peculiar conditions of the case." This form was developed before the broad regulative powers of the State were embodied in the Public Service Commissions law, which took effect on July 1, 1907. Before taking up in detail the criticisms which his study brought out, Mr. Wilcox states that the enactment of the Public Service Commissions law (which was passed in spite of the opposition of the authorities of New York City) rendered unnecessary certain features of the standard form, other features of which were in conflict with the new policy of State regulation.

The principal points of the present franchise policy of New York City, relating to street railways, are discussed in the pamphlet in the following order: (1) Period of grant. (2) Compensation. (3) Reversion of the property. (4) Assignment of franchise. (5) Joint use of tracks. (6) Motive power. (7) Consents and time of construction. (8) Municipal supervision of construction and service. (9) Rate of fare. (10) Paving obligations and removal of snow and ice. (11) Readjustment of tracks. (12) Annual report. (13) Forfeiture and penalties. (14) Franchises subject to railroad law. (15) Time allowed for securing approval of Public Service Commission.

These titles are sufficiently comprehensive so that readers who are familiar with the requirements of the Public Service Commissions law will understand the points of possible conflict.

The discussion by Mr. Wilcox of the topic of compensation leads naturally and, in any fair consideration, inevitably to the question of fares and service. "It appears to be the policy of the city division of franchises," he writes, "to secure from each grantee the largest possible initial payment and the largest possible annual payments thereafter." Time, which alone can bring about the solution of many troublesome problems, has shown the folly of this course in more than one community; and we cannot agree wholly with the conclusion that "this policy and the provisions of the charter upon which it is founded * * * until very recently appeared to be progressive and necessary." Many concessions have been exacted from public utility corporations which were not at any time in the interest of the whole community, however desirable they may have "appeared" to be to the taxing bodies or to those municipal officials who, for political or other reasons, tried to make the closest bargains possible. Mr. Wilcox recognizes clearly that the burdens of illogical and unbusinesslike arrangements in such cases are transferred to the public "by means of inefficient service, high rates or the neglect of equipment." Although this ultimate development may thus seriously incommode the traveling public, the accumulating burdens are always of more dangerous import to the owners of securities of the properties; and the conservation of their investment should be as much a public charge as any that can be undertaken.

Discussing further the fundamental requisites demanded by proper consideration of these measures, the author declares that "the main purpose of a franchise as now conceived is to provide the best possible service at the lowest rate consistent with the financial stability of the undertaking." There is no doubt that, if all relations between municipalities and public utility companies were conceived and carried out in pursuance of this doctrine, assuming that "financial stability" means profitableness, the permanence of such corporations would be assured.

Like many other documents emanating from similar authorities, the report is evidence of the new point of view in public utility corporate affairs—one which, if taken wisely, consistently non-political, seeking the fair balance between various interests, safeguarding property rights—can be of unmeasured public service.

Revenue Mileage Records as a Gage of Shop Efficiency

The managers of some of the large electric railways have found it valuable to issue monthly comparisons to the maintenance foremen showing the relative number of pull-ins or other delays occurring in the territory served by each inspection depot. The simplest bulletins of this kind present only the number of cars maintained on each division and the percentage of crippled cars as derived from the reports of the transportation superintendents to the head office. It is much more desirable, however, for the sake of fairer comparisons to base "defect" percentages on the reports of the maintenance forces, as motormen either through ignorance or design may turn in good cars as bad.

These monthly comparisons can be made of even greater worth by preparing them on a revenue mileage basis as is done by the Brooklyn Rapid Transit Company. The records on this line show what each division has done in operated mileage as compared with the losses through bad up-keep and also the losses due to collisions, broken windows and other causes beyond shop control. By checking such figures with the average mileage of the cars operated by each division it is not difficult to determine whether careful maintenance is profitable in the end. Thus, on a division where the average daily service from a car is 80 miles, an increase to 88 miles through the elimination of breakdowns would make it possible to get along with 10 per cent less rolling stock without changing the motors or the gear ratio. Except when in for painting every appropriate car on the road should be available during the rush hours. While this ideal is rarely attainable on an extensive city system it can be approximated by having enough reserve equipment to permit a car unit to leave the shop just as quickly as it is possible to substitute sound trucks, motors, controllers or other equipment. The exact value of such practice can be determined only by a revenue mileage record which shows from month to month the proportion between lost mileage and service mileage on every division of the system.

Apprenticeship Course in New York

It is interesting to record this week the first public announcement of an electric railway company to establish an apprenticeship course, or, as it is called, a street railway training school, for young men desiring to start in the electric railway business. This is a plan which has been urged by the committee on education of the American Street & Interurban Railway Association, and has also been followed with great success by a number of the electrical manufacturing companies, as well as by many electric lighting and gas companies. In these industries, as our readers know from the reports of the committee on education, it has proved very successful. No one now claims, least of all the college authorities, that a man who has passed through college is immediately able to take up any specialized line of business. But he has had a mental training extending over a number of years, and, other things being equal, after a few years to allow him to acquire a practical experience, he should be superior to the man who has not had the same education or advantages. If there is no opening in the electric railway business for these men, they will go into other lines of work, where there is a desire and competition for their services. The need of trained men, however, is probably as great, if not greater, in the railway business than in any of those mentioned, and there seems to be no reason why a plan of providing a way by which young men can be trained to an acquaintance with part of the details of the street railway business should not be equally, if not more, successful.

The plan of the Metropolitan Street Railway Company, as outlined in its statement published elsewhere, is to commence the school in a modest way. At present, it is proposed to limit the membership at any one time to approximately eight men, or two to each of the main departments—maintenance of way, electrical, equipment and transportation. But we presume that if the experiment proves successful, the number of students will be increased. Candidates are limited to those who already possess a good scholastic training, and they must bring testimony to this effect from the dean or other presiding officer of the school from which they come. We presume that the company does not expect that the three to six months allowed for each department will make the student an expert in that branch of the business, but it will at least afford an opportunity for those in charge to determine whether he has an aptitude for the work which can be developed by longer service. If the candidate succeeds at the end of that time in securing a permanent position he will certainly be assisted by the experience which he has gained in the other departments, and be a better all-round man.

In this connection it is interesting to notice the emphasis laid upon the qualification of general knowledge in the Union Pacific and Southern Pacific systems of railroads. When Mr. Harriman assumed the presidency of practically all of the corporations comprising these lines he was confronted with the problem of designing an organization which would economically and efficiently supervise their operations. The task was no easy one, as the lines included 22,000 miles of track, but the success secured is a matter of common knowledge. Some features of the methods employed were outlined in the paper read last week by Mr. Kruttschnitt, vice-president and director of maintenance and operation, Southern Pacific Company, before the New York Railroad Club. It includes not only a student course, but office work, for all the engineers of the company, and a plan of rounding out the experience of the most important outside officials of the company by detailing them to temporary special duty at the Chicago office, and also to other branches of the company's work. In this way the official returns to his own division or department with the viewpoint of the Chicago office, some knowledge of the other properties and a better appreciation of the problems of their correlation. During his absence his understudy in his own position has been tried out for future advancement. The latter plan not only teaches the assistant how to assume responsibility, but it gives him an insight into the difficulties of management, and thus assists him to co-operate better with the manager in the future.

It is an almost inevitable tendency, when a person is doing one thing constantly, to get into a rut and not do that one thing as well as he might otherwise. Everything which affords an opportunity of broadening his horizon, such as visits to other properties, attendance at conventions, reading the technical papers and learning what others are doing along the same general lines, and how other allied departments in the same industry conduct their work, is beneficial to the man and to the company which employs him. We know of instances where very satisfactory results to all concerned have followed the transfer of men in responsible positions from one road to another belonging to the same financial interest. Each man had exhausted the possibilities, so far as he was concerned, of the office which he had held, but under new surroundings and with a different force, although each simply changed places, he was able to accomplish more. This is not probably often necessary if a man has the capacity within himself to develop, but indicates what can be done.

ROLLING STOCK STANDARDIZATION IN BROOKLYN—RECORDS AND FORMS

The Brooklyn Rapid Transit Company is now completing the rebuilding and standardization of nearly 4000 passenger, mail, freight and service cars operated over a city and suburban system comprising 71 miles of elevated and 528.3 miles of surface lines, measured as single track. This imposing task is in itself but a part of the thorough rehabilitation program which was laid down six years ago when the present administration took hold of Brooklyn traction affairs. Since that time fully $40,000,000 has been appropriated for betterments and new construction in all departments. Of this sum, $10,000,000 has been spent for new rolling stock and the sums of $2,500,000 and $1,500,000 laid out, respectively, for the reconstruction and standardization of the elevated and surface rolling stock. Now the greater part of the equipment consists of new or modernized cars which are adequately maintained in first-class shops and car houses. In consequence, the splendid improvement in the transportation service and the reductions in maintenance cost are demonstrating fully that these great disbursements have been wisely made for the benefit of both the public and the company.

REHABILITATION OF THE ROLLING STOCK.

Of all the departments which were to undergo renovation none presented a greater diversity in apparatus and maintenance than that devoted to the rolling stock. There was not only a most perplexing variety of cars and motive equipment, but few facilities, and no definite standards existed for keeping the equipments in running order. Every foreman had his own ideas as to the proper intervals for inspection and general overhauling, while record systems to check the value of their practices were entirely absent. These vital problems had to be attacked by the organization of a mechanical department, to which the following labors were intrusted: Rebuild all operative cars to standards harmonizing with new designs to be originated for the surface and elevated lines; equip adequate car houses and shops; formulate maintenance practice for each class of rolling stock; devise a record system for planning and following out from the executive office as a clearing house every detail of the mechanical department's activities. During the entire period when this extensive program was being carried out, and despite the large amount of rolling stock passing through the shops, the car-mileage in the passenger, freight and mail service kept on rapidly increasing. Thus it will be noted from the accompanying mileage table that in January, 1909, the elevated passenger mileage was 2,496,313 car-miles against 1,485,773 for the same month of 1903. The comparative figures on the surface lines for the same periods were 3,495,776 car-miles and 2,754,356 car-miles. In addition, it was necessary to operate a very heavy mileage of non-passenger cars.

STANDARDIZATION PROGRAM

The standardization of the rolling stock was laid out according to a definite schedule, which has been very closely maintained. The work on the elevated cars was begun in January, 1904, and completed in June, 1906. The surface cars were then taken up and will be completed about the end of June of this year. The changes in rolling stock are classified in the accompanying table, which shows that 3423 cars were reconstructed, 1626 cars purchased or built in the shops, and that 704 out of 944 single-truck cars were withdrawn from service. The total number of cars of all types available for the schedules of 1909 is 3924.

The standardization of the elevated equipment was described in the Street Railway Journal of Aug. 13 and 20, 1904. These reconstructed cars have been in service for four years, yet few essential alterations have been required in them since they left the shops. Slight changes have been made in such items as drawbars and contact shoes. More recently, the company has been experimenting with slack adjusters, and has decided also to equip its elevated cars with the latest form of the Westinghouse gradu-

Month.	Elevated passenger.	Surface passenger.	Freight.	Mail.	Express.	Miscellaneous.	A.R.T. ash.
1903.							
January....	1,485,773	2,754,356	507	14,066	13,592	297,375	2,153
February..	1,329,217	2,433,849	1,712	12,108	11,370	253,231	1,766
March.....	1,522,497	2,825,883	988	13,948	13,097	272,306	1,536
April.....	1,516,077	2,865,586	1,611	13,882	14,651	272,930	4,076
May.....	1,647,291	3,235,459	4,548	13,548	15,495	274,885	4,688
June.....	1,903,050	3,172,632	1,386	13,882	21,207	270,088	3,816
July.....	2,189,798	3,456,241	1,646	14,057	21,949	303,150	4,202
August....	2,117,754	3,253,477	1,759	13,983	17,384	270,780	3,247
September..	1,864,952	2,826,982	2,233	13,536	17,000	172,940	3,255
October....	1,710,780	2,603,497	3,918	14,403	17,000	152,785	2,049
November..	1,566,121	2,521,149	5,453	12,753	17,000	142,099	2,767
December..	1,517,478	2,757,590	3,408	14,081	12,403	145,257	1,975
1904.							
January....	1,452,267	2,645,456	3,993	13,620	10,825	125,682	1,929
February..	1,372,919	2,528,497	8,957	12,669	10,251	101,179	8,454
March.....	1,517,218	2,785,103	6,412	14,403	11,212	88,224	24,592
April.....	1,540,018	2,771,636	18,976	13,882	10,813	69,704	29,078
May.....	1,781,370	3,177,722	20,596	13,529	12,193	102,568	33,321
June.....	1,887,195	3,421,127	19,141	13,882	15,779	156,440	29,112
July.....	2,066,860	3,615,880	18,566	13,659	16,473	155,847	28,606
August....	1,992,528	3,498,816	20,908	14,403	17,436	140,496	29,953
September..	1,733,190	3,082,662	20,815	13,093	15,964	98,466	34,554
October....	1,491,864	2,781,876	22,614	13,543	13,027	67,018	36,876
November..	1,477,387	2,764,800	18,294	12,762	12,365	59,174	38,174
December..	1,605,395	2,882,173	16,890	13,680	13,449	65,269	43,241
1905.							
January....	1,625,092	2,757,685	14,358	13,243	10,578	65,348	43,653
February..	1,518,682	2,570,377	13,236	14,507	9,100	70,127	42,772
March.....	1,780,177	3,060,715	13,354	17,530	11,586	68,235	52,523
April.....	1,761,431	3,097,505	15,617	16,046	11,050	77,214	47,825
May.....	2,044,634	3,476,399	16,538	16,739	14,225	80,757	45,502
June.....	2,184,128	3,730,904	21,785	16,517	17,628	88,908	44,120
July.....	2,494,270	3,985,534	31,647	16,267	17,265	132,688	41,215
August....	2,311,134	3,781,603	28,713	17,131	17,433	115,516	39,860
September..	1,996,331	3,329,927	28,938	16,125	15,530	78,756	46,304
October....	1,805,213	3,179,393	31,822	16,659	12,737	63,552	41,787
November..	1,735,581	3,082,328	31,211	15,733	12,560	57,566	56,456
December..	1,792,091	3,178,727	25,303	16,268	13,952	50,699	63,665
1906.							
January....	1,895,991	3,184,507	25,118	16,739	13,319	56,514	61,334
February..	1,777,002	2,891,257	18,128	14,507	11,459	52,231	58,166
March.....	1,981,590	3,275,928	20,491	18,357	13,262	61,384	63,714
April.....	2,001,226	3,271,920	23,855	14,819	12,999	60,837	55,667
May.....	2,249,036	3,655,562	27,175	16,739	15,448	80,864	48,884
June.....	2,346,591	3,752,417	32,649	16,517	17,851	83,470	44,171
July.....	2,771,394	4,011,649	34,724	16,268	18,709	85,178	37,469
August....	2,718,840	3,873,523	39,977	17,131	19,729	71,923	35,752
September..	2,380,536	3,557,729	37,620	14,204	17,104	58,366	35,954
October....	2,094,394	3,322,360	27,003	15,522	15,351	57,777	47,749
November..	2,041,056	3,206,729	18,966	14,281	12,511	53,415	53,539
December..	2,205,113	3,299,743	17,188	19,022	13,346	52,730	64,662
1907.							
January....	2,205,722	3,276,886	19,544	20,145	13,551	57,479	60,622
February...	1,974,386	2,825,002	11,084	17,585	12,013	65,414	51,602
March.....	2,258,658	3,333,461	19,955	20,064	13,012	65,319	64,363
April.....	2,274,656	3,400,498	30,453	19,826	13,603	60,692	60,825
May.....	2,536,879	3,702,035	34,991	20,157	14,060	64,927	49,843
June.....	2,678,053	3,766,900	38,274	19,339	16,416	56,949	41,172
July.....	3,121,603	4,096,038	45,173	20,157	17,887	61,798	37,003
August.....	3,049,982	4,090,437	44,144	20,551	17,997	63,872	35,499
September..	2,511,118	3,632,910	20,795	18,944	14,862	62,013	33,059
October....	2,331,837	3,572,595	18,938	20,551	13,349	60,014	48,114
November..	2,239,806	3,397,896	16,467	19,037	11,926	53,039	55,117
December..	2,362,934	3,521,519	10,983	19,669	11,952	55,577	64,230
1908.							
January....	2,403,145	3,490,822	11,392	20,188	9,025	63,022	66,702
February...	2,288,239	3,229,939	9,829	18,338	8,540	62,206	64,506
March.....	2,395,394	3,561,662	12,840	20,096	13,270	63,872	69,199
April.....	2,416,257	3,561,890	15,569	19,861	10,888	67,912	61,205
May.....	2,625,889	3,770,450	15,441	10,710	11,709	61,232	48,623
June.....	3,094,091	3,992,492	14,126	10,816	13,584	58,828	43,270
July.....	3,282,108	4,034,213	17,431	20,188	13,589	50,506	38,659
August.....	2,860,222	3,901,334	16,415	20,108	13,475	50,948	34,415
September..	2,544,126	3,685,125	12,262	19,462	13,060	49,500	40,591
October....	2,414,584	3,624,018	11,162	20,587	12,214	62,312	47,785
November..	2,346,377	3,420,884	9,057	18,585	10,305	56,702	55,630
December..	2,524,577	3,606,136	6,693	20,188	11,424	60,350	59,207
1909.							
January....	2,496,313	3,495,776	5,731	19,710	.....	55,918	1,795
February...	2,258,541	3,226,534	6,045	17,612	.....	50,554	787
March.....	2,567,190	3,672,469	8,816	20,587	.....	57,756	.....

Statement of Brooklyn Car Mileage for the Years 1903, 1904, 1905, 1906, 1907, 1908, 1909 to March 31.

ated release, quick recharge air brakes to insure even better braking than the present apparatus affords. The 269 elevated trailers are absolutely identical in every important respect.

The very extensive changes in the surface rolling stock will be described in a series of articles, taking up each portion of car equipment by itself, showing also how the

company has made adaptations in apparatus and created new car designs for its peculiar traffic conditions. These descriptions will be supplemented by articles on auxiliary matters which were brought up during standardization, such as manufacturing, specifications for metal products, shop management and methods, etc.

When standardization began all the elevated rolling stock for the Eastern Division at East New York had to be cared for in a small engine shed and an old combination paint and carpenter shop, neither of which had any pits. Even at Thirty-sixth Street, on the Southern Division, nothing better was available than the remnant of a burnt shed which had housing and short pits for six cars only. In contrast to this the company has since provided fireproof storage and shop facilities as follows: Ninth Avenue and Maspeth surface car houses, elevated car house at Fresh Pond and the combined storage and elevated shops at East New York and Thirty-sixth Street. All of these

Cars.	
	ROLLING STOCK ADDED SINCE 1902
555	Surface, semi-convertible.
452	Surface, convertible.
218	Elevated, convertible.
203	Elevated, closed.
4	Electric locomotives, one for surface only (built by railway).
161	Surface utility.
19	Surface utility (built by railway).
4	Snow plows (pneumatic operation throughout).
10	Elevated utility cars, including an instruction car.
1,626	
	Note.—All of the foregoing are motor cars except 30 freight trailers.
	ROLLING STOCK RECONSTRUCTED SINCE 1903
77	Surface single-truck, closed.
505	Surface double-truck, closed.
462	Surface double-truck, semi-convertible.
202	Surface double-truck, convertible.
163	Surface single-truck, open.
750	Surface double-truck, open (under way).
100	Surface double-truck, semi-convertible (standardized only).
251	Surface double-truck, convertible (standardized only).
67	Surface single-truck, sand and salt.
15	Surface wreckers (rebuilt from single-truck closed passenger).
204	Surface, miscellaneous.
269	Elevated trailers (from steam coaches).
183	Elevated motors (from steam coaches).
175	Elevated motors.
3,423	
	ELIMINATION OF SINGLE-TRUCK CARS
430	Open cars operated in 1902.
163	Open cars operated in 1909.
514	Closed cars operated in 1902.
77	Closed cars operated in 1909.
704	Cars withdrawn in all.
	CARS IN SERVICE FOR 1909 SCHEDULE
605	Surface, closed.
554	Surface, semi-convertible.
453	Surface, convertible.
919	Surface, open.
398	Surface, miscellaneous.
507	Elevated, closed.
203	Elevated, semi-convertible.
218	Elevated, convertible.
67	Elevated, miscellaneous (including locomotives).
3,924	

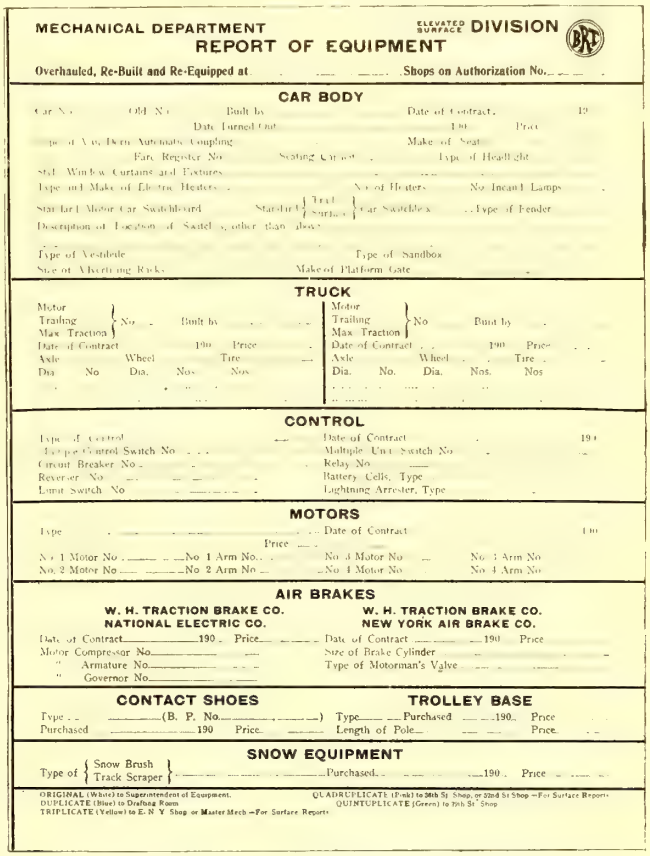
Changes in Brooklyn Rolling Stock Since 1902.

have been described at various times in the STREET RAILWAY JOURNAL, the ELECTRIC RAILWAY REVIEW and the ELECTRIC RAILWAY JOURNAL. The company also converted during 1902 and 1903 the Thirty-ninth Street terminal for the reconstruction of all elevated cars and the surface convertible cars. All other surface cars have been changed over at the Fifty-second Street shops.

THE PLACE OF THE RECORD SYSTEM IN CAR MAINTENANCE

The figures which have already been given to indicate the size of the Brooklyn Rapid Transit system are sufficient to indicate the necessity which existed before standardization could even be started for a plan of keeping equipment records of the many cars, of their progress through the shops and of their behavior in operation. In fact, it would be difficult to exaggerate the important position the record system has come to hold, as it has gradually been amplified to attain the same accuracy which exists in a modern factory. To-day not the smallest detail in inspection, repair and manufacture fails to drop into the groove prepared for it. Despite the immense number of items which are thus classified, the forms are not very numerous and do not require a large clerical force to keep them up to date.

The great interlocking feature of the system is that every record, except duplicates, is filed at the executive offices of the mechanical department. This has made it a simple matter to compare the performance of every class of car and apparatus used on the different lines, and has made it possible to fix upon the most suitable inspection and maintenance standards for elevated and surface equipments. For example, up to the end of 1908 the time interval was the only feasible practice for inspection and overhauling, but since then the mileage basis has been found practicable for the surface cars and the same principle will soon be applied to elevated cars. Records of all important car parts now are kept according to mileage, but the reduction in


MECHANICAL DEPARTMENT
ELEVATED SURFACE DIVISION
REPORT OF EQUIPMENT
Overhauled, Re-Built and Re-Equipped at ____ Shops on Authorization No. ____

CAR BODY
Car No. Old No. Built by Date of Contract 19
Date Turned Out 190 Price
Type of Vestibule Automatic Coupling Make of Seat
Fare Register No. Seating Capacity Type of Headlight
Style Window Curtains and Fixtures
Type and Make of Electric Heaters No. of Heaters No. Incand. Lamps
Standard Motor Car Switchboard Standard { Trail / Surface } Car Switchboxes Type of Fender
Description of Location of Switches other than above
Type of Vestibule Type of Sandbox
Size of Advertising Racks Make of Platform Gate

TRUCK
Motor / Trailing / Max. Traction { No. Built by
Date of Contract 190 Price
Axle Wheel Tire
Dia. No. Dia. Nos. Nos.
Motor / Trailing / Max. Traction { No. Built by
Date of Contract 190 Price
Axle Wheel Tire
Dia. No. Dia. Nos. Nos.

CONTROL
Type of Control Date of Contract 19
Type of Control Switch No. Multiple Unit Switch No.
Circuit Breaker No. Relay No.
Reverser No. Battery Cells, Type
Limit Switch No. Lightning Arrester, Type

MOTORS
Type Date of Contract 190
Price
No. 1 Motor No. No. 1 Arm No. No. 3 Motor No. No. 3 Arm No.
No. 2 Motor No. No. 2 Arm No. No. 4 Motor No. No. 4 Arm No.

AIR BRAKES
W. H. TRACTION BRAKE CO. NATIONAL ELECTRIC CO.
Date of Contract 190 Price
Motor Compressor No.
" Armature No.
" Governor No.
W. H. TRACTION BRAKE CO. NEW YORK AIR BRAKE CO.
Date of Contract 190 Price
Size of Brake Cylinder
Type of Motorman's Valve

CONTACT SHOES
Type (B. P. No.)
Purchased 190 Price

TROLLEY BASE
Type Purchased 190 Price
Length of Pole Price

SNOW EQUIPMENT
Type of { Snow Brush / Track Scraper }
Purchased 190 Price

ORIGINAL (White) to Superintendent of Equipment.
DUPLICATE (Blue) to Drafting Room
TRIPLICATE (Yellow) to E. N. Y. Shop or Master Mech.—For Surface Reports
QUADRUPLICATE (Pink) to 36th St. Shop, or 52nd St. Shop—For Surface Reports
QUINTUPLICATE (Green) to 79th St. Shop

Fig. 1—Brooklyn Records—Car Equipment Sheet Filled Out at the Shop (8 3-4 In. x 12 In.)

types of equipment has already made it possible to measure brake shoes on the ton-mile unit. The record system is also of great value in checking up the true costs of the numerous articles now made by the mechanical department for both itself and other divisions of the Brooklyn Rapid Transit System. In fact, manufacturing has become such an important factor that the department's records and practices in this respect will have to be treated in a separate article.

THE PRINCIPAL RECORD FORMS IN MAINTENANCE WORK

The fundamental form of the entire car record system is the "Report of Equipment" shown in Fig. 1. This is filled out by the local shop superintendent for every car that comes in for general overhaul or the installation of its original equipment. It gives every important item of information on the car body, the trucks, the electrical apparatus, the current-collecting devices and the snow equipment.

PERMANENT DATA AND DIMENSIONS

Car No.
Standardized 190 Originally Car No. Later No.
Type of car
Builder
When built
Side doors { Original / Converted
Total weight of car body
" " " inc. trucks and equipment
Length of car body
" over platforms
" face to face of car couplings
Height of car body
" above rail to top of trolley stand
" to center of draw bar head
Width over step
" " eaves
" of platform opening at gate
" " bolster { Built in / Supplementary
Distance C. to C. of king bolts

Make of automatic car couplings
" " fare registers
" " platform gates
" " heaters Type
" " seats
" " trolley pole and stand
Style of seating Capacity
" " curtains and fixtures
Number of heaters
Size of advertising sign racks
Standard motor car switchboard
" trail car switchbox
Heat and light couplings
Adapted to Type of motor
Truck wheel base No. 1 end { Motor / Trailing
" " " No. 2 end { Motor / Trailing
Adapted to Type of truck { Motor / Trailing Size of wheels

Fig. 2—Brooklyn Records—Permanent Data Card (5 In. x 8 In.)

WHEEL RECORD Shop

Wheel No.	Diam. of Centre	Material	Wheel Fitted by	Pressed on by
	Made by	Purchased	Put in Service	Tons Pressure
	Diam. / Material	Made by	Purchased / Put in Service	Fitted by
Axle No.				
Tire No.				

Put in			Removed			No. Days	Tire			
Car No.	Date	Measurement	Date	Cause	Measurements	in Service	Loss	Turned	Ground	Work Done by

Electric Ry. Journal

Armature No. Purchased Date of Contract

Type Sold or Scrapped

CAR	DATE		COILS				COMMUTATOR				LEADS	INSPECTION Out Rounding	SHAFT				PINION		BANDS		Rew'd	MECHANICAL DEFECTS					CAR
NO.	In	Out	Gd.	S.C.	O.C.	Bk.L.	W.O.	S.C.	Gd.	Rgh.			Bk.	Spg.	Cut	W.O.	Loose	W.O.	Loose	Bk.		Rub P.P.	Hot or W.O. Bearings	Struck S.in S.	Struck by L.	Damaged W.or S.	SHOP

Electric Ry. Journal

Compressor No. Mfd. by
Type Owning Co. Date of Purchase

Date Installed	Car No.	Date Removed	Shop	Cause	Overhauled	
					Date	Shop

Motor No.
Type Mfd. by
Rating H.P. Owning Co. Date of Purchase

Date Installed	Truck No.	Car No.	Date Removed	Shop	Cause

Truck No. Mfd. by
Type Owning Co. Date of Purchase

Motor or Trailing Truck	Date Installed	Car No.	Date Removed	Shop	Cause

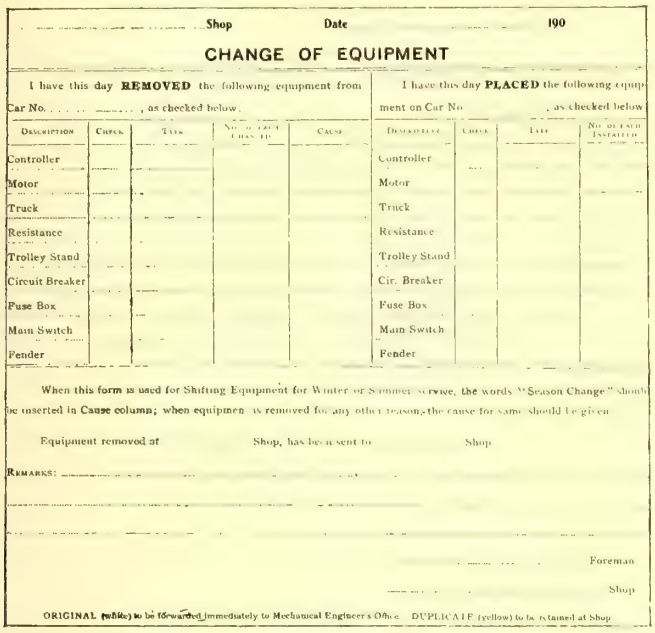
Controller No.
Type Owning Co. Mfd. by
Date of Purchase

Date Installed	Car No.	Date Removed	Shop	Cause	Overhauled	
					Date	Shop

Electric Ry. Journal

Fig. 3—Brooklyn Records—Headings of Differently Colored Record Cards (5 In. x 8 In.) for Wheels, Armatures, Compressors, Motors, Trucks and Controllers

When thus filled out, the original form goes to the superintendent of equipment, who adds the contract prices of the items and parts listed. The four copies without prices are distributed to the shops and drafting room, as indicated on the bottom of Fig. 1. Thus each form is a complete



Shop Date 190

CHANGE OF EQUIPMENT

I have this day **REMOVED** the following equipment from Car No. , as checked below.

Description	Check	Type	No. of Last Change	Cause
Controller				
Motor				
Truck				
Resistance				
Trolley Stand				
Circuit Breaker				
Fuse Box				
Main Switch				
Fender				

I have this day **PLACED** the following equipment on Car No , as checked below

Description	Check	Type	No. of Last Installation
Controller			
Motor			
Truck			
Resistance			
Trolley Stand			
Cir. Breaker			
Fuse Box			
Main Switch			
Fender			

When this form is used for Shifting Equipment for Winter or Summer service, the words "Season Change" should be inserted in Cause column; when equipment is removed for any other reason, the cause for same should be given.

Equipment removed at Shop, has been sent to Shop

REMARKS:

Foreman

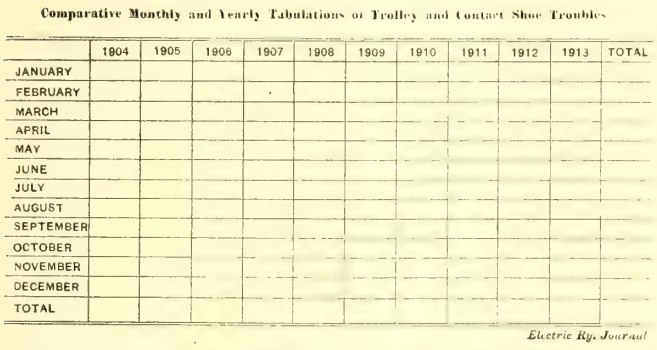
Shop

ORIGINAL (white) to be forwarded immediately to Mechanical Engineer's Office. DUPLICATE (yellow) to be retained at Shop.

Fig. 4—Brooklyn Records—Shop Foreman's Report on Transfer of Apparatus (8 1-4 In. x 10 3-4 In.)

story of any given car, even to the number of the authorization which specified the work to be done on that car when it went into the shops.

When Fig. 1 is received from the shop the information

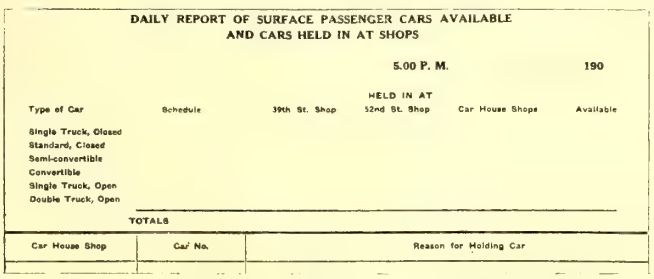


Comparative Monthly and Yearly Tabulations of Trolley and Contact Shoe Troubles

	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	TOTAL
JANUARY											
FEBRUARY											
MARCH											
APRIL											
MAY											
JUNE											
JULY											
AUGUST											
SEPTEMBER											
OCTOBER											
NOVEMBER											
DECEMBER											
TOTAL											

Electric Ry. Journal

Fig. 5—Brooklyn Records—Specimen of Monthly Card Summary of Different Equipment Defects (5 in. x 8 in.)



DAILY REPORT OF SURFACE PASSENGER CARS AVAILABLE AND CARS HELD IN AT SHOPS

5.00 P. M. 190

Type of Car	Schedule	HELD IN AT 39th St. Shop	52nd St. Shop	Car House Shops	Available
Single Truck, Closed					
Standard, Closed					
Semi-convertible					
Convertible					
Single Truck, Open					
Double Truck, Open					
TOTALS					

Car House Shop	Car No.	Reason for Holding Car

Fig. 7—Brooklyn Records—Heading of Superintendent of Equipment's Report on Cars Held in or Available (8 In. x 10 3-4 In.)

on the same is transferred to a permanent data card, Fig. 2, which is accompanied by a group of differently colored cards bearing separate heads, as follows: Car body; motor truck; trailing truck; motors and armatures; controller reverser and operating head; limit magnet and switches; storage batteries, jumpers and grids; operating box and circuit-breaker; motor compressor and governor; M valve, triple and brake cylinder; air piping and hose; sleet scrapers, brushes and snow equipment; contact shoes, beams and trolley. These detail cards are for the running record of defects to equipments, an entry being made whenever the particular part has been reported in trouble by the transportation department to the shops. Detail wheel, armature, controller, motor shell, motor compressors and truck frame record cards are kept also in separate files, with blanks for the cars on which they are used successively. The headings of these cards are reproduced in Fig. 3. The information for these cards is transferred from the daily logs from each shop, which in turn are based directly on operating trouble reports. The permanent data card, Fig. 2, is not affected unless a change in type of equipment has been introduced. When changes are made, particularly from open to closed cars and vice versa, the shop foreman sends in the "Change of Equipment" sheet shown in Fig. 4.

The reported defects of equipment are also totalized daily on cards for every day of a year, and then for entire months of succeeding years, as shown in Fig. 5. These defect tabulations give the data for the curves of different kinds of troubles which are prepared from time to time by the drafting department, and which are of great value

Shop.	Cars maintained per month.	Cars maintained per day.	Cars "run in" found defective.	Cars "run in" found O. K.	Cars "run in" total all causes.	Average % maintained March, including all "run ins."	Average % maintained March, minus cars found O. K.	Average % maintained April, including all "run ins."	Average % maintained April, minus cars found O. K.
Eastern Division (Surface):									
Ridgewood	8,280	276	52	20	72	0.9	0.7	0.9	0.6
Halsey Street	1,890	63	13	2	15	0.9	0.8	0.8	0.7
Maspeth	2,070	69	21	3	24	1.8	1.7	1.2	1.0
Crosstown	4,680	156	55	10	65	1.0	0.8	1.4	1.2
East New York	7,680	256	98	6	104	1.4	1.3	1.4	1.3
Southern Division (Surface):									
Ninth Avenue	5,880	196	46	31	77	1.7	0.7	1.3	0.8
Fifty-eighth St.	5,730	191	41	18	59	0.9	0.9	1.0	0.7
Flatbush	3,870	129	32	3	35	1.7	1.6	0.9	0.8
Canarsie	3,540	118	40	10	50	1.9	1.5	1.4	1.1
Bergen Street	4,140	138	71	37	108	2.0	1.4	2.6	1.7
Totals	47,760	1,592	469	140	609	1.4	1.1	1.3	1.0
Elevated Division:									
Eastern	14,490	483	123	16	139	1.4	1.3	1.0	0.8
Southern	9,990	333	115	16	131	1.2	1.1	1.3	1.2
Fresh Pond	3,360	112	17	1	18	0.5	0.5	0.5	0.5
Totals	27,840	928	255	33	288	1.2	1.1	1.0	0.9

Monthly "Run-in" Comparisons of Passenger Cars on Percentage Basis

when the question of buying equipment is under consideration.

The original defect record begins with the motorman who turns in a report of the type shown in Fig. 6. In general, all that he has to do is to indicate the kind of trouble by a check mark opposite the printed line for the same. Whether the car is taken out of service immediately or not, a copy of the report must go to both the shop foreman and the division trainmaster so that a check is placed on the shop foreman immediately. The shop foreman in transmitting his daily report of cars turned in to him as defective places side by side the motorman's assumed cause and the actual cause as determined in the shop, in addition to giving a record of the time lost on the line and in making repairs.

Both the motormen's and shop foremen's defect reports are summarized daily for elevated and surface divisions on a report, which is signed jointly by the supreintendents of transportation and equipment, and which goes to the general manager as a condensed and undisputed account of the day's troubles. At the end of every month the superintendent of equipment sends out to all shop foremen two comparative reports. One of these shows the number of cars maintained at each car house for the preceding two months, with the number and percentage of "run ins." It is rather interesting to note from the accompanying reproduction of this report that in almost every instance some of the cars reported defective were found all right upon inspection. The second report sent to the foremen compares the depots on a revenue mileage basis. Two columns are reserved in this report for incorrect motormen's reports and for mileage lost through causes beyond the control of the mechanical department.

In connection with the run-in reports it is of importance to know how many cars are available for the heaviest service, namely, between 5 p. m. and 7 p. m. This information is secured by telephone and given to the transportation department on separate forms for the elevated and surface equipments. Fig. 7 shows the form used for the reports of the surface equipments, and Fig. 8 that for the elevated equipments. Confirmations of these reports (Fig. 9) are sent daily to the trainmasters interested to enable them to check up the figures with the shop representatives.

Shop	Revenue Mileage for Month	No. of Cars Maintain'd	Average Mileage per Day per Car Maintain'd	Cars "Run In": Found Defective Mechanically or Electrically	Found O. K. on Examination	Due to Collisions or Causes For Which Condition of Equipment is Not Resp'ble	Total all Causes	Number of Revenue Miles Made per Car "Run In": Found Defective Mechanically or Electrically	Found O. K. on Examination	Due to Collisions or Causes for Which Condition of Equipment is Not Responsible	Total all Causes
Surface—											
58th Street	449,862	176	82.4	26	4	24	54	17,302.4	112,465.5	18,744.2	8,330.8
9th Avenue	398,378	195	65.9	32	57	16	105	12,449.3	6,989.0	24,898.6	3,794.0
Flatbush	353,775	127	89.9	49	6	15	70	7,219.9	58,962.5	23,585.0	5,053.9
Canarsie	300,974	115	84.4	46	14	12	72	6,542.9	21,498.1	25,081.1	4,180.2
Ridgewood	582,888	268	70.1	49	13	14	76	11,895.7	44,837.5	41,634.9	7,669.6
Halsey Street	154,944	62	80.6	7	2	9	18	22,134.8	77,472.0	17,216.0	8,608.0
East New York	600,748	250	77.5	90	5	14	109	6,675.0	120,149.6	42,910.5	5,511.4
Bergen Street	306,369	136	72.7	48	23	14	85	6,382.7	13,320.4	21,883.5	3,604.3
Crosstown	321,639	157	66.1	33	8	9	50	9,746.6	40,204.9	35,737.7	6,432.8
Maspeth	198,155	70	91.3	33	4	4	41	6,004.7	49,538.7	49,538.7	4,833.0
	3,667,732	1,556	76.0	413	136	131	680	8,880.7	26,895.1	27,997.9	5,393.7
Elevated—											
South Division	981,829	333	95.1	106	15	11	132	9,262.5	65,455.3	89,257.2	7,438.1
East Division	1,161,258	483	77.5	191	21	3	215	6,079.8	55,298.0	387,086.0	5,610.5
Fresh Pd. Division	272,293	112	78.4	17	1	1	19	16,017.3	272,293.0	272,293.0	14,331.2
	2,415,380	928	83.9	314	37	15	366	7,692.3	65,280.5	161,025.3	6,591.2

Monthly Revenue Mileage Comparison of Cars Reported "Run in" at Car-Houses

STATEMENT SHOWING ELEVATED CARS AVAILABLE FOR SERVICE, 5 P.M.

.....190....

Held In At

Type of Car	Schedule	39th St.	E.D.L.	E.D.I.	F.P.I.	S.D.L.	Available
Trailers	269						
600's Motors	84						
700's "	58						
800's "	59						
900's "	37						
1000's "	100						
1100's "	20						
1200's "	100						
1300's "	100						
1400's "	100						
Total	927						

NUMBER OF CARS HELD IN AT EACH SHOP, AND DETAILED REASONS FOR HOLDING THEM

Material required to place these cars in service:

Fig. 8—Brooklyn Records—Daily Statement of Available Elevated Cars (8 1-2 In. x 10 3-4 In.)

DAILY REPORT OF CARS HELD IN

.....SHOP

5 P.M.....19....

Inspector of Equipment:

Confirming telephone message to your office, following cars were held in at 5 p.m., this date:

Car No.	Reason for Holding Car in

Original to Inspector of Equipment.
Duplicate to Depot Master or Train Master.

ORIGINAL.

.....
Foreman.

BROOKLYN RAPID TRANSIT SYSTEM.

Mechanical Department.

DAILY REPORT OF CARS HELD IN.

.....Shop.

5 P.M.,.....19....

Inspector of Equipment:

Confirming telephone message to your office, following cars were held in at 5 p.m., this date:

Car No.	Reason for Holding Car In.

Original to Inspector of Equipment.
Duplicate to Depot Master or Train Master.

.....
Foreman.

Fig. 9—Brooklyn Records—Confirmation of Daily Report on Cars Held In (8 1-2 In. x 10 3-4 In.)

Bases of Inspection and Overhauling

With the approaching completion of the work of standardization and the assistance of the record system it has become feasible to introduce the mileage system for all surface maintenance. Since Jan. 11, 1909, the surface air-brake cars are being inspected about every 800 miles and the hand-brake cars every 600 miles. The overhaul period

has not yet been fixed, but will probably range from 10,000 miles to 20,000 miles, according to the type of motor equipment. A larger mileage will be adopted if found safe. Miscellaneous cars have been on the mileage basis since November, 1908. Formerly all surface cars were inspected weekly, while the overhauling period was either 60 or 90 days, according to the motor equipments, as follows: 60 days for GE-800, GE-57, GE-64, West. 68 and West. 81 motors; 90 days for GE-80, West. 93, West. 93-A-2 and West. 101-B motors. The inspection and overhauling record of the individual surface cars is now kept at headquarters on a card of the type shown in Fig. 10. Every day each foreman receives the form, Fig. 11, giving a list of his cars which have approached the inspection or overhauling mileage. The shop foreman must then call on the depot master for these cars and turn in a report on Fig. 12 at the end of the day, showing how many of them were received for examination up to 5:30 p. m. of the same day and how many were overdue for attention. It also indicates the cars due for overhauling the following day.

Mechanical Department..... Division

INSPECTION AND OVERHAULING RECORD OF CAR EQUIPMENT

Total Mileage From ..... 19.... , To ..... 19....

Car No. ..... Inspection Basis ..... Miles. Overhauling Basis ..... Miles

INSPECTION						OVERHAULING					
Date of Inspection	Mileage Since Last Inspection	SHOP	Date of Inspection	Mileage Since Last Inspection	SHOP	Date of Overhauling	Mileage Since Last Overhauling	SHOP	Date of Overhauling	Mileage Since Last Overhauling	SHOP

Electric Ry. Journal

Fig. 10—Brooklyn Records—Mileage Card (5 In. x 8 In.)

At present the elevated equipment is still on the time basis. Both motor and trail cars are inspected on an alternate three and four-day period, as Sundays and holidays are omitted. The elevated utility cars are inspected weekly. All motor cars except those of the new 1400 series are overhauled every 60 days. The 1400 type is overhauled every six months, but after four months extra care is paid to the inspection of bearings and clearance between the armatures and pole pieces of the West. 300 interpole motors used on these cars.

BROOKLYN RAPID TRANSIT SYSTEM

Mr..... Division Date.....

Foreman..... Shop

DEAR SIR: As per mileage basis in effect at present, the cars numbered below will this date be placed over the pits for a thorough general inspection. Mileage made by each car since its last general inspection appears opposite the corresponding car number.

CAR NO.	MILEAGE	CAR NO.	MILEAGE	CAR NO.	MILEAGE	CAR NO.	MILEAGE	CAR NO.	MILEAGE

Fig. 11—Brooklyn Records—Heading of Order to Foreman on Cars Due for Mileage Maintenance (5 In. x 8 In.)

Brooklyn Rapid Transit System

MECHANICAL DEPARTMENT

.....Shop Date..... 19.....

Statement showing Numbers of Cars for Inspection and Overhauling

INSPECTION CARS (copied from N. S. 861 of even date)				OVERHAULING CARS	
			Numbers of cars on this statement which were not received up to 5.30 p. m. on above date.	Nos. of Cars for Overhauling 7 a. m. 19	Numbers of cars which were not received up to 5.30 p. m. on above date.

Fig. 12—Brooklyn Records—Heading of Foreman's Daily Report on Cars Inspected, Overhauled or Overdue (8 1-2 In. x 10 1-4 In.)

To simplify the inspection of all elevated cars, a large sheet, such as partially reproduced in Fig. 13, is printed, showing the numbers of the cars, the divisions over which they are operated and the days of the week on which they should be cared for. All that the shop foreman needs to do, therefore, is to hold certain cars on specified days without waiting for any notices from headquarters. At the end of the day, however, he sends in to the superintendent of equipment lists of all cars inspected and overhauled. The shops are provided with several forms of their own, including cards for the signatures of inspectors doing the different classes of work. In such accidental cases as when a car has been scratched up and requires a little painting or touching-up, the work is authorized on the special form illustrated in Fig. 14.

UNIFORMITY IN INSPECTION AND OVERHAULING

To avoid all misunderstanding as to what is implied by the terms "run-in," "inspection" and "overhauling," the head of the mechanical department has issued instructions on these points from time to time to prevent diverse practices on different divisions. A "run-in" is defined as follows: "When it becomes necessary for any reason to replace any car in service, the car replaced shall be considered a 'run-in.'" The following instructions are issued to foremen on the scope of elevated inspection and overhauling work, but the same practices apply largely to the surface cars.

Inspection consists of the thorough examination of and light repairs to all parts; the renewal of all worn, broken, bent, strained or burned parts that can be renewed or repaired within a reasonable length of time, and that will allow sufficient time for the inspection of all cars on the day on which they become due for inspection. When defects are found to be such that they cannot be repaired as outlined, the foreman must be immediately notified, so that

Motorman's Report of Defects in Motor Trailing Car No.

.....A.M.
Date ..... 190 Route.....
.....P.M.

Length of Detention ..... Min's. Train No .....

Place of Trouble.....

Motorman ..... No .....

Conductor ..... No .....

Place laid up.....

Car Body Troubles	Control Troubles
End Door	Circuit Breaker
Side Door	Circuit Breaker Magnets
Side Glass Broken	Operating Box
End Glass Broken	Controller
Door Glass Broken	Reverser
Curtain	Operating Head
Ventilators	Miscellaneous
Bell	Limit Magnet
Bell Cord	Hood Switches
Light or Light Switches	Series Multiple Switch
Heaters or Heater Switches	Resistance Grids
Platform Gate	Jumpers. Seven Point
Safety Gate	Four Point
Platform Chain	Receptacles. Seven Point
Pull Chain	Four Point
Broken King Pin	Jumps in Series
Draw Bar	Jumps in Multiple
Coupling Link	Slow in Series
Car Seats	Slow in Multiple
Car Floor Dirty	Storage Batteries
Trolley Pole	Storage Battery Switches
King Pin Cover	
Head Lights	**Air Brake Troubles**
Markers and Tail Lights	Brakes do not release quickly at times
Motor Troubles	Brakes release on lap
Armature Trouble	Brakes do not stop train quickly enough
Motor Flashed	Equalized Air Pressure
Motor Bucked	Motorman's Valve Stiff
Motor Leads	Low Train Line Pressure
Motor Bearings	Governor does not cut out
Truck Troubles	Compressor not working
Motor Truck	Compressor Fuse blown
Trailing Truck	Train Line Pipe
Flat Wheel	Reservoir Hose
Hot Box	Train Line Hose
Brakes Noisy	Air Whistle
Broken Brake Rigging	Dead Car
Truck Noisy	Track and Signal Defects
Contact Shoe Trouble	
Contact Shoe Beam	

Please check mark opposite defect reported. If the defect cannot be readily located give in addition to check mark, particulars which will assist in locating trouble. *Original* (white) of this report MUST be sent to Shop with defective car and given *Division Shop Foreman*; second (carbon copy yellow) to *Division Train Master*. In case the trouble is such as to allow the car to remain in service, report will be made out and both original and duplicate sent to *Division Train Master* who must *immediately* forward *original* to *Division Shop Foreman*.

Fig. 6—Motorman's Defect Report (4 In. x 8 1-2 In.)

△ 100 Books 2-18-9 O—29504

BROOKLYN RAPID TRANSIT SYSTEM

BRT Surface / Elevated } Division

Date..... 19

To Superintendent { 39th St. Shop / 52d St. Shop } No.....

Car No ..... is in need of the following repairs:

.....Shop

.....Foreman

Approved:

Supt. of Equipment

The above repairs are now completed.
If not satisfactory, please advise at once.

Date..... 19

.....Supt. { 39th St. Shop / 52d St. Shop }

ORIGINAL—To Supt. of Equipment for approval; then to Repair Shop. To be returned to Supt. of Equipment when work is completed, and then to point of issue.
DUPLICATE—To Superintendent of Equipment.
TRIPLICATE—To be retained in book by Shop Foreman

Fig. 14—Form Used for Scratch Repairs (4 In. x 7 1-2 In.)

he may have the repairs made in the overhauling shop or by men specially assigned to the work. The inspection also embraces the cleaning and lubrication of all easily accessible wearing parts, the renewal of weak springs and the proper adjustment of all adjustable parts. All parts are so inspected and maintained that the cars will run until next inspection without danger or without need of any further attention.

Overhauling in the case of motors and motor trucks consists of the renewal of all worn, broken or strained parts, including wheels, bearings, hangers, etc.; the tightening or renewal of all rivets, bolts, braces, etc.; the cleaning of all motors and parts, and the repainting of motor shells, fields and armatures with insulating and fireproof varnishes; the cleaning and alignment of brush-holders; the tightening and turning of all loose, flat, or rough commutators, the replacement of armatures when the commutator is worn to its limit or for any other electrical or mechanical defects. In general, the motors and trucks must be put in such shape that they could be kept in continuous

ninth Street elevated shops only, where it has been specialized. The overhauling of the brake cylinders of both the motor and trailer cars consists of the removal of pistons, the renewal of packing leathers, the thorough cleaning and relubrication of cylinders and the renewal of springs or other parts where necessary.

The periods for general inspection and overhauling of elevated cars have already been given, but the following should be added with reference to certain details: Motors and motor trucks are overhauled every 60 days, and the trailer trucks of motor cars when found to be necessary upon regular inspection. Line switches and circuit-breakers are overhauled every 60 days; controllers and reversers (both unit-switch group and drum type) once a year; batteries every six months; compressors once a year, and brake cylinders once a year. The trucks of the trailer cars are overhauled when found to be necessary upon regular inspection and the brake cylinders are overhauled once a year.

The three-day inspection of elevated motor and trailer-car equipment includes all parts, excepting batteries and

BROOKLYN RAPID TRANSIT SYSTEM

MECHANICAL DEPARTMENT EFFECTIVE_____190

ELEVATED LINES VOID AFTER_____190

STATEMENT SHOWING INSPECTION DAYS OF ELEVATED PASSENGER AND MISCELLANEOUS CAR EQUIPMENT

EASTERN DIVISION

MOTOR CARS

DUE FOR INSPECTION Mondays and Thursdays			DUE FOR INSPECTION Tuesdays and Fridays			DUE FOR INSPECTION Wednesdays and Saturdays		
CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.
656	925		600	900		628	913	
657	926		601	901		629	914	
658	927		602	902		630	915	

TRAILING CARS

DUE FOR INSPECTION Mondays & Thursdays	DUE FOR INSPECTION Tuesdays & Fridays	DUE FOR INSPECTION Wednesdays & Saturdays
CAR No.	CAR No.	CAR No.
122	34	
123	35	
124	36	

FRESH POND INSPECTION SHOP

738	747		700	708		719	727	
739	748		701	709		720	728	
740	749		702	710		721	729	

25	1	
26	2	
27	3	

MISCELLANEOUS CARS

DUE FOR INSPECTION

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
697	697	697	697	697	697
3	695	3051	3	695	3003
3008	3011	696	3151	3000	3007

SOUTHERN DIVISION

MOTOR CARS

DUE FOR INSPECTION Mondays and Thursdays			DUE FOR INSPECTION Tuesdays and Fridays			DUE FOR INSPECTION Wednesdays and Saturdays		
CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.	CAR No.
1066	1236		1000	1210		1033	1222	
1067	1237		1001	1211		1034	1223	
1068	1377		1002	1330		1035	1224	

TRAILING CARS

DUE FOR INSPECTION Mondays & Thursdays	DUE FOR INSPECTION Tuesdays & Fridays	DUE FOR INSPECTION Wednesdays & Saturdays
CAR No.	CAR No.	CAR No.
237	142	
238	157	
239	169	

MISCELLANEOUS CARS

DUE FOR INSPECTION

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
3009	3013	3015	3060	3001	3005
3012	3014	3016	3061	3004	3006
4	2	1	3050	2	1

THIRTY-NINTH STREET ELEVATED SHOP

Date	FEBRUARY		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th	31st	MARCH
Car Nos.	23rd-24th-25th-	3102 3103 698	3106 3107	3108 3105	698	3037	3038	3039	Sunday	3020	3021	698	3022	3023	3024	Sunday	3025	3026	698	3027	3028	3029	Sunday	3030	3031 3032	698	3033 3034	3035 3036	3100 3101	Sunday	3102 3103	3104 3105	698	

CORRECT

Electric Ry. Journal *Superintendent of Equipment*

Fig. 13—Brooklyn Records—Portion of Sheet Showing Inspection Days for Elevated Equipment

service for 90 days if necessary without causing any trouble or needing any repairs other than the light ones made on regular inspection. The trailer trucks must get the same attention as outlined for motor trucks.

Overhauling the line switches, circuit-breakers, controllers and reversers consists of the renewal of all worn, broken or burned parts; the cleaning of all parts and the repainting of insulating parts with insulating varnish; the cleaning and lubricating of all wearing parts, and the tightening of all nuts, screws, stud bolts, etc. Overhauling batteries consists of discharging, removing the elements and electrolyte from the jars; cleaning the jars and elements; renewing any plates that may be necessary; burning on of leads and the reassembling of batteries; refilling with electrolyte acid of the proper specific gravity and recharging the completed battery.

Overhauling compressors consists of the renewal of all worn or broken parts, and the regrinding of valve seats; the cleaning of motor parts and the repainting with insulating varnish; the removal of all oil and the cleansing and refilling of oil wells. This work is done at the Thirty-

arc headlights, as follows: Trolley wheels, poles and stands; lamps, lamp sockets, markers, light circuits and headlight stands; heaters, heater circuits and fire extinguishers; switch boxes, switchboards, switches and fuses; all parts of car body, including the bell cords, register cords, emergency cords, signal bells, ventilator opening device, sash, doors and locks, gates and railings, steps, traps, seats, seat backs, etc.; all brake apparatus, including motorman's valves, gages, conductor's valves, governors, compressors, whistles, triple valves, cylinders and reservoirs, hose, brake levers, rods, pins, carriers, hand brakes and rigging; all control apparatus, including unit-switch groups, drum type controllers, reversers, line switches, circuit-breakers, master controllers, motors, trucks and draft rigging; contact shoes and shoe beams, shoe leads and fuses, motor leads, and four and seven-point receptacles. Batteries are inspected every 30 days and arc lights every day.

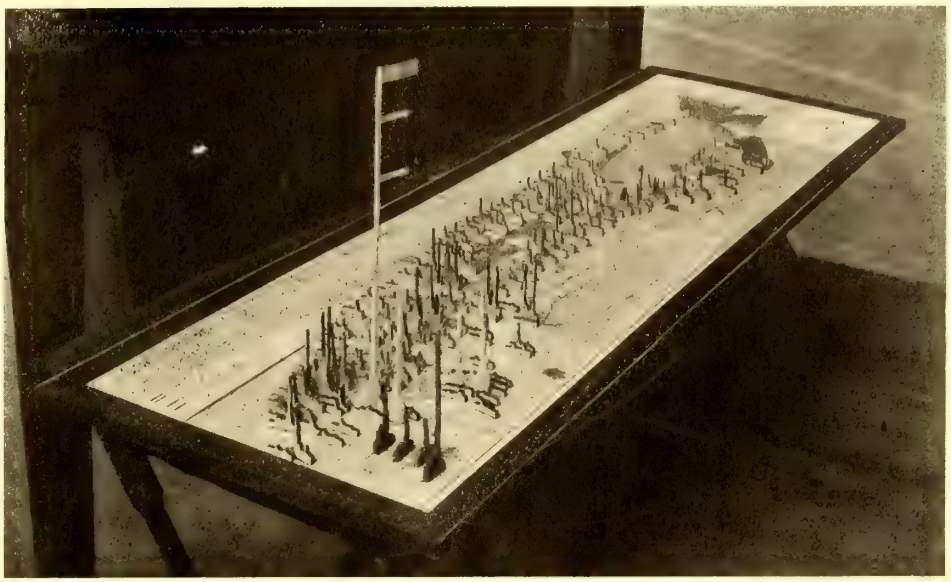
SECOND ARTICLE

The second article in this series on rolling stock standardization will classify the cars now in service and describe their power equipment standards and specifications.

TRAFFIC RECORDS OF PUBLIC SERVICE COMMISSION, NEW YORK CITY

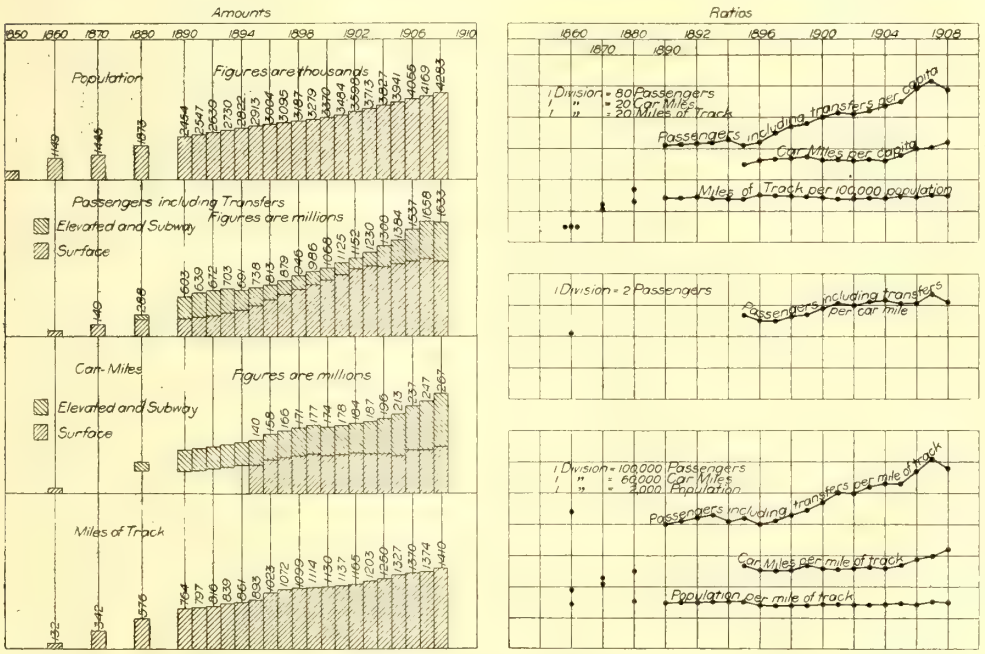
An account of the exhibits furnished by the New York Public Service Commission, First District, for the Conference on City Planning and Municipal Art, was published in the ELECTRIC RAILWAY JOURNAL of May 8, 1909, page 890. The exhibition, which was held at the Twenty-second Regiment Armory, New York, was concluded on May 16.

By the courtesy of the commission, statistical and other information which was used as a basis for part of the exhibit has been made available for publication. The illustrations and statistics which are published herewith relate to (1) a relief chart showing the ticket sales by hours on a typical day on subway and elevated lines in Greater New York and at each East River Bridge and ferry, and (2) to the increase in population, passenger traffic, car-miles operated and miles of track of the street railways in Greater New York.



Relief Chart, Showing Hourly Ticket Sales at Subway and Elevated Stations and at East River Bridges and Ferries

The relief chart, of which a photograph is published herewith, is a map of Manhattan Island, showing the routes of the various lines treated and the location of the stations, with blocks of wood to indicate the total sales of tickets at each station during every hour of what was assumed to be a typical day, Wednesday, Feb. 17, 1909. While the reproduction of the relief chart shows the scheme of display followed with this subject, it does not permit of sufficiently large or clear representation in these pages by photograph to indicate as well as the diagrams from which the blocks of wood were modeled, the results depicted. The accompanying diagrams relating to this feature of the exhibit show perfectly the hourly ticket sales at important stations of the New York subway during the typical day described. Each square, it will be observed, represents 200 people. It will be noted from these diagrams that there is a very sharp increase at some of the stations twice a day, where a rush-hour movement develops both morning and evening. This is the situation at stations like Grand Central, where the morning rush of in-bound suburbanites finds a counterpart in a heavy traffic in both directions at the close of the business day, and at Brooklyn Bridge, where the great rush of traffic, as at Grand Central, keeps up most of the day, with an accentuated movement at the usual morning and evening peak hours.



Historical Chart of Street Railway Traffic in Greater New York, Prepared by the Bureau of Statistics and Accounts, New York Public Service Commission of the First District, April, 1909. (Most of the statistics for the years prior to 1901 are derived from F. R. Ford's compilation in the "Street Railway Journal," Oct. 5, 1901.)

Another feature of the diagrams to which especial at-

An interesting record of traffic movement is presented by the chart indicating the hourly ticket sales at the Times Square station of the subway. While two rush-hour movements are indicated by the records of this station, they differ from the other noteworthy instances in that there no morning rush develops; the hours of busy traffic are at 6 p. m. and at 12 p. m., after the theaters have closed. Bion J. Arnold, in his report to the commission on the traffic of the New York subway [see ELECTRIC RAILWAY JOURNAL of Jan. 30, 1909], stated that the business at the Times Square station was increasing more rapidly than that at the Grand Central station, making it probable that the Times Square station may soon handle as many pay passengers as the Grand Central station.

tention should be called is the comparatively light number of ticket sales at the outlying subway stations.

The large amount of business offered at the Atlantic Avenue terminal in Brooklyn in the morning, as shown by the diagram, gives the subway the valuable and much-desired return haul which fills the vacant seats that existed in the subway cars on the return haul from the business section to the upper end of the island before the extension under East River was opened for traffic.

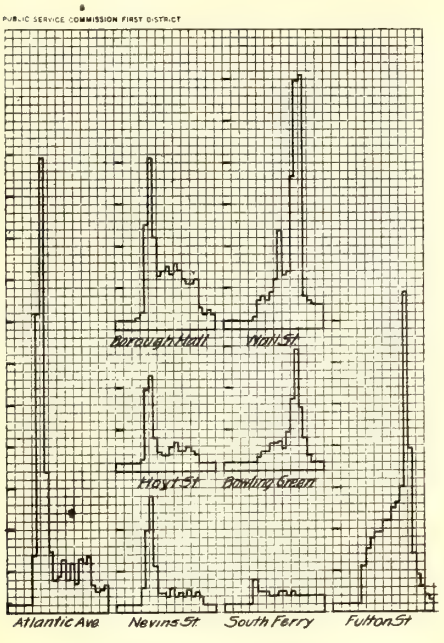
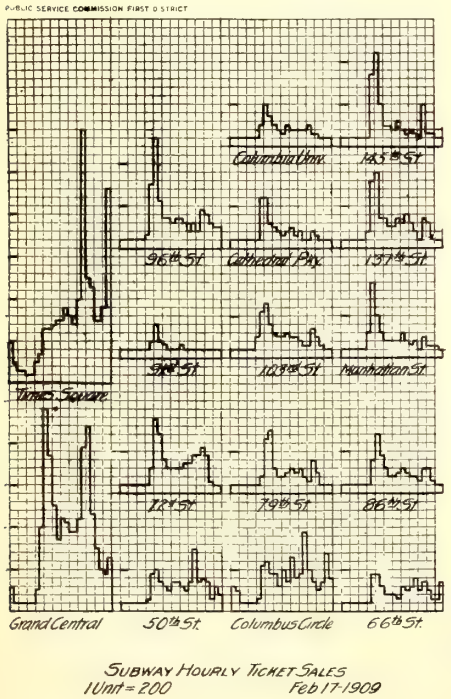


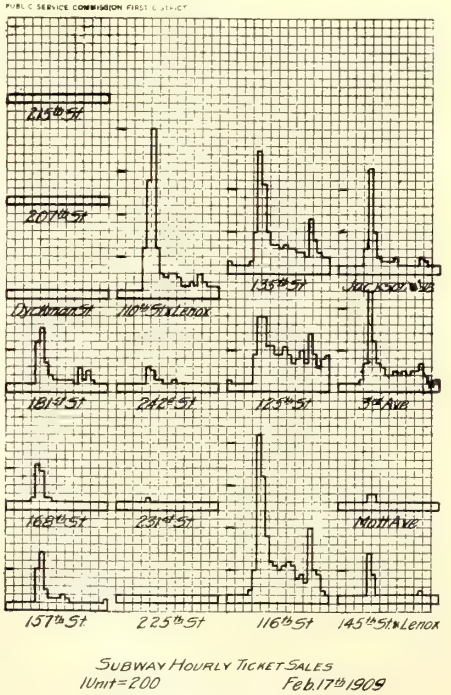
Diagram of Subway Ticket Sales

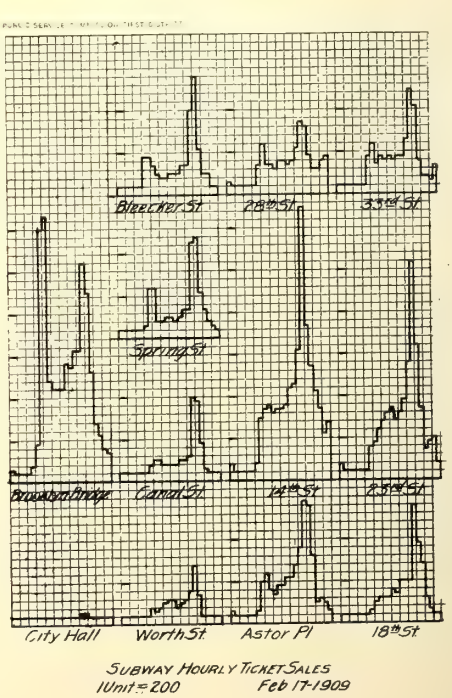
The table of figures of ticket sales at the subway stations on the typical day selected for the test shows the total sales during the 24 hours and also states separately the totals reported for the hours from 8 a. m. to 9 a. m and 5 p. m. to 6. p. m., respectively. During these two rush hours extra ticket-sellers and choppers are on duty at a number of the stations. While it is recognized that the totals of ticket sales at each station are not identical with the total passenger movement from that station, owing to the numbers of people who supply themselves with tickets in advance of their needs, it was believed that the compilation of the data would indicate reasonably well the traffic at the different stations and the relative importance of each from a traffic standpoint. The total number of ticket sales is shown to have been in excess of 800,000.

SUBWAY TICKET SALES BY STATIONS, FEB. 17-19, 1909.

Station.	Feb. 17, 1909.	8-9 a.m. Feb. 17, 1909.	5-6 p.m. Feb. 17, 1909.
Atlantic Avenue	37,118	10,900	1,304
Nevins Street	12,938	2,816	511
Hoyt Street	11,730	2,320	667
Borough Hall	24,915	4,100	1,100
South Ferry	4,718	503	305
Bowling Green	13,003	360	2,930
Wall Street	27,436	703	6,025
Fulton Street	37,026	1,480	7,676
City Hall	2,332	100	302
Brooklyn Bridge	51,100	6,303	5,208
Worth Street	7,725	280	1,445
Canal Street	10,752	462	2,003
Spring Street	14,707	1,160	2,322
Bleecker Street	14,211	700	2,003
Astor Place	21,148	1,201	2,914
Fourteenth Street	40,128	1,701	6,510
Eighteenth Street	14,931	500	2,805
Twenty-third Street	29,492	902	5,225
Twenty-eighth Street	15,940	1,200	1,710
Thirty-third Street	17,559	1,200	2,510
Grand Central	42,102	4,800	3,905
Times Square	37,790	1,300	6,025
Fiftieth Street	12,799	1,000	1,460
Columbus Circle	18,253	1,200	1,900
Sixty-sixth Street	10,124	940	800
Seventy-second Street	13,325	1,801	906
Seventy-ninth Street	8,922	1,302	560
Eighty-sixth Street	9,603	1,400	402
Ninety-first Street	4,625	800	221
Ninety-sixth Street	14,732	2,605	605
Lenox:			
One Hundred & Tenth St.	15,841	4,000	400
One Hundred & Sixteenth St.	21,206	3,000	651
One Hundred & Twenty-fifth St.	19,610	1,800	1,043
One Hundred & Thirty-fifth St.	16,465	2,110	461
One Hundred & Forty-fifth St.	4,850	700	200
Mott Avenue	2,320	200	160
Third Avenue	11,820	1,240	480
Jackson Avenue	8,545	1,014	218
Prospect Avenue	12,057	1,505	621
Simpson Street	6,362	902	504
Freeman Street	7,430	951	205
One Hundred & Seventy-fourth St.	1,190	160	20
One Hundred & Seventy-sev'th St.	4,200	340	240
One Hundred and Eightieth St.	2,865	280	90
One Hundred and Third Street	10,133	1,302	303
Cathedral Parkway	7,683	1,135	244
Columbia University	7,234	1,000	400
Manhattan Street	9,450	1,004	404
One Hundred & Thirty-sev'th St.	12,338	1,800	410
One Hundred and Forty-fifth St.	11,199	2,155	320
One Hundred & Fifty-seventh St.	6,892	1,410	242
One Hundred and Sixty-eighth St.	4,805	902	120
One Hundred and Eighty-first St.	7,880	1,500	590
Dyckman Street	608	130	100
Two Hundred and Seventh St.	390	60	42
Two Hundred and Fifteenth St.	120	4	5
Two Hundred & Twenty-fifth St.	885	140	71
Two Hundred and Thirty and Two Hundred and Thirty-first Streets	816	112	20
Two Hundred & Forty-second St.	3,983	500	240
Total	800,361	87,395	81,163







Diagrams of Subway Ticket Sales

POPULATION AND TRAFFIC STATISTICS

In preparation of the diagram published on page 979, illustrating the increases in population, passenger traffic, car-miles and miles of track, the figures used by the commission for the years prior to 1901 are based upon those given by Frank R. Ford in the article written by him which

SURFACE AND ELEVATED TRAFFIC RECORDS, NEW YORK CITY.

Year.	Population (000 omitted).	Passengers (including transfers) (000,000 omitted).	Car-miles operated (000,000 omitted).	Miles of track.
1901	3,484	1,125	178	1,137
1902	3,598	1,152	184	1,165
1903	3,713	1,230	187	1,203
1904	3,827	1,308	196	1,250
1905	3,941	1,384	213	1,327
1906	4,055	1,537	237	1,370
1907	4,169	1,658	247	1,374
1908	4,283	1,633	267	1,410

appeared in the STREET RAILWAY JOURNAL of Oct. 5, 1901. The figures for the subsequent years shown in tabular form, are partly estimated. The figures indicate a density of traffic in 1901 on the 1137 miles of surface and elevated track for which the returns are given of 989,000 passengers (including transfer) per mile of track; in 1908 this had increased to 1,159,000.

APPRENTICESHIP COURSE IN NEW YORK

The receivers of the Metropolitan Street Railway Company have decided to establish an apprenticeship course for young men desiring to learn the electric railway business. This step was announced in a circular recently issued by Oren Root, general manager for the receivers. Copies of these circulars were sent to the presidents of 20 of the principal Eastern engineering schools and universities. The institutions selected were as follows: Amherst College, Brooklyn Polytechnic Institute, Brown University, Cornell University, Cambridge Manual Training School, Dartmouth College, Hamilton College, Massachusetts Institute of Technology, Pratt Institute, Princeton University, Purdue University, Rensselaer Polytechnic Institute, Stevens Institute of Technology, Syracuse University, Tufts College, Union College, Williams College, Wesleyan University, Worcester Polytechnic Institute, Yale Sheffield Scientific School.

A copy of Mr. Root's circular follows:

It is my intention to establish a practical training school for young men, particularly graduates of high schools, manual training schools, colleges or universities, who have had more or less technical training and who intend to enter upon the vocation of operating street railroads.

It is the aim to make the conditions advantageous to the young man who has an inclination to enter upon work of this character, but who, from lack of knowledge of practical conditions, does not feel able to make a definite decision. Such a man, under the proposed plan, will be afforded an opportunity of acquainting himself with the details of this work, while at the same time receiving a salary which, with strict economy, will enable him to be self-supporting. He may thus determine for himself whether he is fitted and has a liking for employment of this character; on the other hand, the Metropolitan Street Railway Company will profit by the experiment in that it will be possible to test the capacity, ability and adaptability of applicants, who will constitute a body of candidates from whom men may be chosen when it becomes necessary to fill vacancies in the regular operating staff.

During the first year the student will be paid at the rate of $15 per week. In order to give him a general idea of the railroad system, he will be assigned to duty in the Maintenance of Way, the Electrical, the Equipment and the Transportation departments, spending three months in each department.

MAINTENANCE OF WAY DEPARTMENT

Students will be assigned to field work in connection with the renewal of rails and installing special track work in the streets, involving all of the various features which enter into this situation, such as the efficient and economical handling of men, the performance of tasks with a minimum amount of delay to car and street traffic, the laying of asphalt and other pavement, etc. Assignments will be made to other engineering works, such as the making of surveys, designing of special track work, compilation of estimates of cost, designing and construction of buildings, problems incident to fireproof car-house construction and miscellaneous matters such as distribution of charges, time-keeping, etc.

ELECTRICAL DEPARTMENT

During his three months' tour of duty in this department the student will be given an opportunity to familiarize himself with the conduit and feeder system, i. e., the location and character of the various cables, both high and low tension, by means of which the electrical energy is transmitted from the power station to the cars on the street. Questions involving the maintenance of this complicated system will be presented to the student. He will have an opportunity of observing the practical measures adopted to overcome difficulties incident to the work. He will also receive experience in electrical and steam engineering in the power house, where alternating current is generated at a high voltage, and in the substations, where the current received from the power station is reduced to low voltage and converted into direct current. Special assignments will be made to the students from time to time to ascertain the ability and capacity of these men.

EQUIPMENT DEPARTMENT

While working in this department the student will be given duties in the car houses and in the repair shops. He will become acquainted with the practical difficulties incident to the maintenance of car equipment under operating conditions and the methods followed in making minor repairs, as well as the more comprehensive overhauling—such as the rewinding of armatures, repairing of commutators, replacing of fields, etc. The student will also obtain some machine shop experience, covering blacksmithing, lathe turning and metal work in general.

TRANSPORTATION DEPARTMENT

Upon entering this department the student will be assigned to the school for motormen, where he will learn to operate a car, as well as become familiar with the function of each part of its mechanism. Subsequently he will be assigned to duty as a conductor or motorman for a short period. Following this experience, he will be given a thorough course of instruction by the officials of the Transportation Department, and thus become acquainted with the details of regulating the service under normal conditions and in emergencies. A certain period of time will also be devoted to learning routine work in the division offices, such as time-keeping, checking up of cash received from conductors, the making of accident and other reports, etc. The student will be assigned to special work from time to time for the purpose of testing his powers of observation, analysis and deduction.

MEMBERSHIP QUALIFICATIONS

It is expected that the membership in this school will be limited to approximately eight men at any one time, thus involving an assignment of two such men to each of the departments above mentioned during each three months' period, but the employment of students under such conditions will in no way constitute a guarantee that they will be continued in the service unless they are found to perform their duties in a satisfactory manner. On the other hand, they will be dropped if they prove incompetent; but if they complete the first year of apprenticeship, they will be definitely assigned to that department for the performance of the duties of which they havev manifested the greatest ability, and, dating from the time of such appointment, they will be paid at the rate of $20 per week.

After they have been so employed for one year, or, in other words, after the expiration of their second year's service with the company, if there are any vacancies in the permanent staff of the company, these men will be given permanent positions; but, if not, they will be awarded a certificate of service stating the character of the work

which they have performed and containing such recommendation as they may be entitled to receive.

It should be distinctly understood by those men who think they would like to take advantage of the opportunity thus afforded that the tasks which they will be called upon to perform will often involve night and Sunday work, as the street cars in New York City are operated 24 hours a day during the entire year. It is not recommended that any man should apply for such a position as above described unless he is strong physically and is prepared to perform hard work.

In considering applications, preference will be given to those men who have received a technical education, including such courses as electrical or mechanical engineering, as a knowledge of such subjects will be of material advantage to the student. The lack of such a training, however, will not preclude the consideration of an application, nor will it necessarily militate against the success of the student in departments of the company where this technical training is not indispensable. Applications will be received from men who have been out of school or college for several years, as well as from men who are to be graduated this year.

Any man who feels that he can fill the requirements and who desires to enter upon such an apprenticeship may file his application with F. T. Wood, assistant to the general manager for receivers, Metropolitan Street Railway Company, 621 Broadway, New York City. Such application, however, should be filed in person at the above-mentioned office before June 15, or between July 1 and July 15 of the current year.

Application blanks will be forwarded upon receipt of request therefor, addressed to Mr. Wood. Such applications should be indorsed by the president of the institution of which the applicant is a member, the dean of the faculty or some member of the faculty who is personally cognizant of the qualifications of the applicant; or, in the case of men who have been out of school or college several years, the application should be indorsed by present or recent employers of the applicant.

Copy of Application Blank

Application for Appointment to Training School

Name in full
Residence
Age
Previous business experience (if any)
Character of education, i. e., degree or diploma received
School or college (name of institution)
Sciences studied and to what extent
Name of parent or guardian
Occupation of parent or guardian
Address of parent or guardian
Signature of applicant

(Note.—Applications should be indorsed by the president of the institution of which the applicant is a member, the dean of the faculty or some member of the faculty who is personally cognizant of the qualifications of the applicant, or, in the case of men who have been out of school or college several years, the application should be indorsed by present or recent employers of the applicant.)

CHICAGO ORDINANCES

At a recent meeting of the committee of fifty, which is investigating the street railway problem in Detroit, a letter written by Walter L. Fisher, of Chicago, to Paul C. Renaud, secretary of the committee, was presented. Mr. Fisher, who is special traction counsel for the city of Chicago, wrote:

I am completely at a loss to understand upon what information or misinformation any one could have made the statement that the Chicago traction ordinances have in any way failed to accomplish all that was expected of them. In my opinion, and I think in the opinion of all disinterested and intelligent observers here, they have thus far been a complete success. Conditions have, of course, not been ideal, but no one has expected to achieve perfection under this or any other form of handling the street railway question. Under our ordinances there has been such a radical improvement in service as to amount to a practical revolution, and this improvement is rapidly increasing. It will continue to increase with the rehabilitation of our tracks and equipment. Not only have the Chicago traction ordinances not proved a failure, but, upon the exact contrary, their practical success has been recognized here and elsewhere, and steps are now under way, in Chicago and in other cities, to apply the principles which they embody to the settlement of other utility controversies.

PRODUCER GAS PLANTS FOR SMALL CENTRAL STATIONS*

By W. B. Head, Stephenville (Tex.) Light & Water Company

Few central stations in the small towns are paying interest on the money invested in them. The small steam plant at best is an extravagant affair. The load factor is usually very low. Nearly all small steam plants are equipped with engines which use 40 lb. to 50 lb. of steam per hp-hour. A common return tubular boiler which requires from ¼ lb. to 1/3 lb. of coal to make 1 lb. of steam is the kind generally found in the small central station. In such a plant we usually find steam pumps for boiler feeding and oftentimes a long-stroke steam pump attached to a deep well furnishes water, saturated with scale-forming minerals for steam purposes. The pumps require 100 lb. to 150 lb. of steam per hp-hour, and the scale puts a first-class insulation between the fire and the water. It is safe to say that 75 per cent of the small steam plants in Texas are operating under conditions which require from 10 lb. to 15 lb. of coal per brake hp-hour. A producer plant operating on Texas lignite will show an enormous saving over such plants.

Several builders of producer plants are guaranteeing a fuel consumption of 2 lb. to 3 lb. of lignite per brake hp-hour on a 50 per cent load factor. Texas lignite can be had at a cost of about one-half that of Oklohoma coals (the kind most generally used in steam plants in Texas).

The most important question uppermost in the minds of all prospective purchasers is the reliability of a producer plant. After a year's experience with a 100-hp unit the writer feels safe in saying that a first-class producer plant is as reliable in every respect as a steam plant. A somewhat better class of labor is needed to operate a producer plant than a steam plant. Skill on the part of the engineer is not so necessary as carefulness; this especially applies to the engine. Any piece of heavy machinery, of many parts, operating at high speed, requires the best of attention.

The cost of lubrication is about one-third more than that of a steam engine.

The question of the durability of the producer plant is one that pertains almost entirely to the engine, as there is almost nothing about the rest of the plant to depreciate. Compared with a steam engine, it is considerably more in the writer's opinion.

The cost of installation is about 40 per cent more than that of a steam plant.

There are a few points, it might be well to mention, that should be considered by the prospective purchaser: First, the amount of water necessary for the tar extractor and scrubber, also the amount needed for cooling the engine cylinders. There are many places where it would be almost impossible to secure sufficient water for these purposes without providing cooling systems, and thus using the water over again. Care should be exercised in locating the producer room. The floor should be high enough to give the water from the tar extractor considerable fall in order that it may get out of the building easily. In cold weather the tar becomes thick and is hard to pass through a sewer without considerable fall. Some sort of skimming device should be provided to separate the tar from the water, in order that the tar may be saved. Producer plants of 100 hp and larger should always have included with the installation a coal elevator for charging the producer.

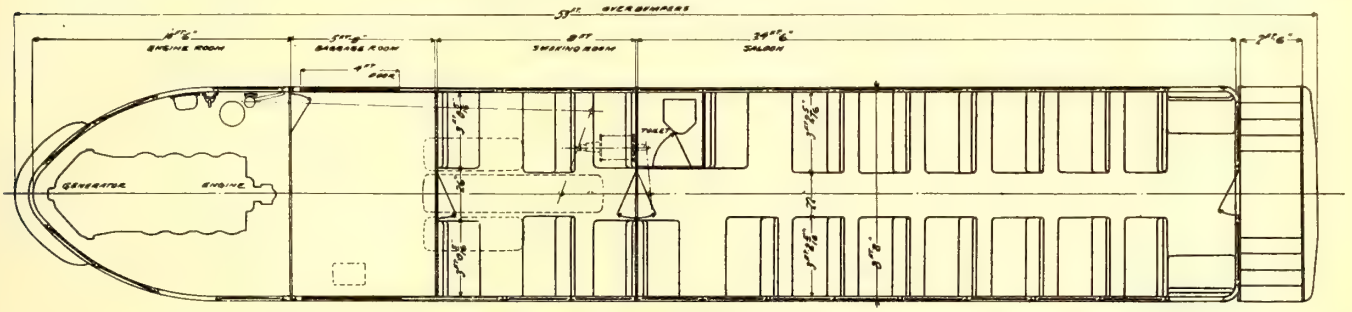
*Abstract of paper read before Southwestern Electrical & Gas Association, Dallas, Tex., May 20 to 22, 1909.

A NEW TYPE OF GASOLINE-ELECTRIC CAR

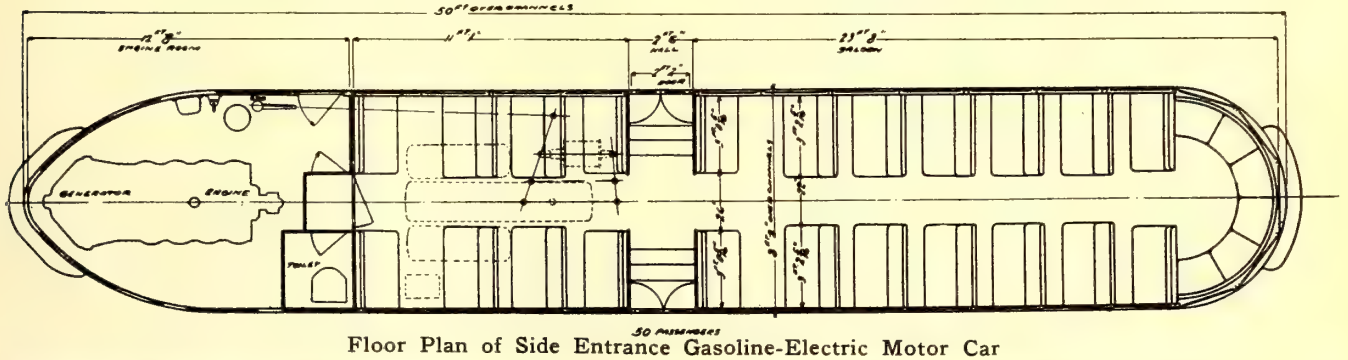
An account of the first gasoline-electric car built by the General Electric Company for the Delaware & Hudson Railroad was published in the STREET RAILWAY JOURNAL for Feb. 10, 1906, and a description of the second and lighter car was published in the STREET RAILWAY JOURNAL for June 29, 1907. Since the latter time the General Electric Company has given considerable attention to the subject of gasoline-electric cars and has designed a number. They are mounted on double trucks and the forward truck is equipped with two standard railway motors of 100 hp each. The power plant consists of a gasoline engine and an electric generator of 125 hp and a controller similar to a standard railway controller. The speed of the cars is from 50 m.p.h. to 60 m.p.h. and the car can be started, stopped and reversed without stopping or changing the direction of rotation of the gasoline engine. The company believes that the flexibility and easy operation afforded by the electric drive more than counterbalance any advantage secured by a mechanical connection between the engine and the axles.

The accompanying photographic engravings illustrate a car which has recently been built by the company with a seating capacity of 50 passengers and an 8-ft. baggage space. The line engravings show plans of cars of similar type designed by the company, but with slight modifications of seating arrangements.

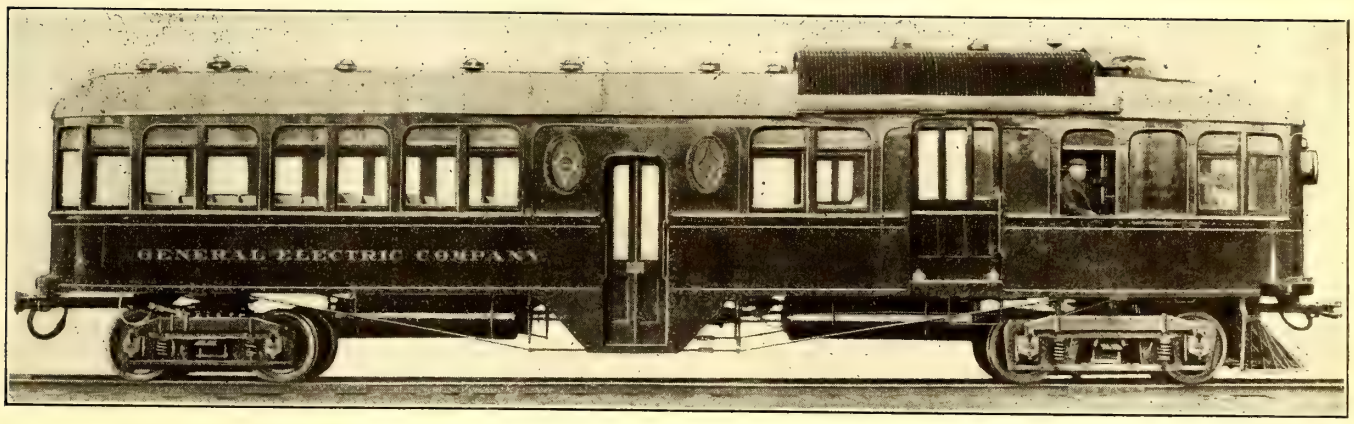
The car illustrated in the photographs is mounted on two trucks. The forward motor truck has a wheel base of 6 ft. 6 in., is equipped with 33-in. wheels and weighs 9500 lb. The rear truck is substantially the same as the motor truck, but with 5-ft. 6-in. wheel base and of somewhat lighter construction. It weighs 6750 lb. The motor truck is equipped with two GE-205, 600-volt commutating pole railway motors mounted directly upon the axles with nose suspension and equipped with standard gear cases.



Floor Plan of Gasoline-Electric Motor Car with Baggage Compartment



Floor Plan of Side Entrance Gasoline-Electric Motor Car



Exterior View of Gasoline-Electric Motor Car

The power plant consists of an eight-cylinder, 100/125 hp, 550 r.p.m., four-cycle gasoline engine of the "V" type, direct connected to an eight-pole, 80-kw, 600-volt commutating pole generator and direct-coupled, 3½-kw, 32-volt exciter.

The engine cylinders are 8 in. diameter by 8 in. stroke and are constructed of soft, close-grained, gray cast iron. Water jackets are cast integral with the cylinders. Exhaust and inlet valves are of nickel steel and are on the same side. Pistons are of the trunk type and connecting rods are drop-forged machinery steel. The crankshaft is

of high-carbon machinery steel, forged in a slab and machined to size. Lubrication is secured by automatic forced-feed oiler, supplying oil to all wearing surfaces. Engine cooling is provided by means of thermo-siphon circulation in radiators of the fin tube type of 2000 sq. ft. cooling surface and 60 gal. capacity, suitably placed on the roof of the car. The cooling system is arranged so that it may



Passenger Compartment of Gasoline-Electric Motor Car

be filled from the exterior of the car. All parts of cooler and engine can be readily drained.

The ignition system consists of high-tension magneto and plugs. The carbureter is of the overflow type with adjustable control for warm air supply. The gasoline is supplied to the carbureter by means of a plunger pump mechanically driven from the engine. An auxiliary hand pump is also provided for starting.

An air pump driven from the main crankshaft of the engine supplies air for the brakes and whistle. This pump cylinder is 4 in. diameter by 4 in. stroke and has a displacement of 16 cu. ft. of free air per minute when running at 550 r.p.m., which is the normal operating speed of the engine.

The gasoline tank is of steel and of 90 gal. capacity. It is located under the car body and is filled from the exterior of the car. Two strainers are supplied between gasoline inlet and engine. Only one pipe leads from this tank to the gasoline pump, leaving the former at the top.

The controller connects the motors progressively in series and in parallel and the voltage applied to them is controlled by varying the strength of the generator field. This is accomplished by the movement of a handle on the controller. The controller is provided with a reversing handle to change polarity of the armature current in relation to the field current of the motors and thus reverse the car. Substantial handles for regulating the engine spark and throttle are conveniently placed on the motor controller.

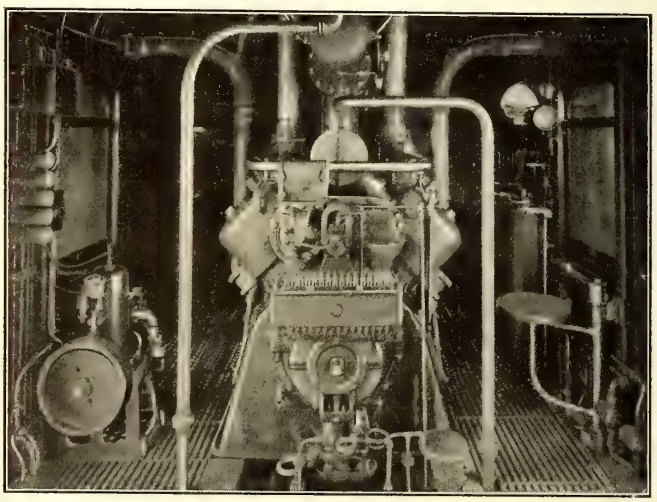
The manufacturers have developed a special controller, which can be arranged for operation from either the self-contained power plant or from the 600-volt overhead trolley circuit of an electric railway system. When operating from the self-contained power plant the speed of the motors is governed as described above. When operating from the overhead trolley the motors are controlled in the usual manner, i.e., series-parallel connections with intermediate steps obtained by placing resistance in the main circuit. The same handle accomplishes both operations. Interlocking devices are provided to prevent operation from one circuit when there is a connection with the other.

Combined straight and automatic air brakes are provided, the straight air being for use when the car is operated alone and the automatic air for use when hauling a trailer furnished with standard automatic brake equipment. The compressed-air supply is provided by the single-cylinder, single-acting pump direct driven from the main crankshaft of the gasoline engine, already described. An auxiliary ratchet hand brake is provided in the engine compartment.

The gasoline engine is started by compressed air from the main reservoir through a distributing valve to the several cylinders in succession. For recharging the reservoirs if necessary when the main engine is shut down a 3¼-in. x 4-in. single-cylinder, single-acting air pump direct connected to a 4-hp, single-cylinder, two-cycle gasoline engine is furnished as part of the equipment and is located on the left side of the engine compartment. This auxiliary air pump equipment is complete and includes all necessary accessories, such as carbureter, ignition outfit, cut-out cocks, valves, etc.

The car is electrically lighted by 25-volt incandescent lamps. Current is supplied from the exciter when the main engine is running and from a 12-cell storage battery located under the car body when the main engine is shut down. Automatic means are provided for switching the lights from one circuit to the other and also for charging the battery from the exciter. A 32-cp incandescent headlight is provided as part of the equipment.

The car body is heated by a system of hot water circu-



Power Plant of Gasoline-Electric Motor Car

lation on the thermo-siphon principle, the heat being obtained from the exhaust gases.

The car is also equipped with an air whistle, gong, suitable signal starting bell, etc.

At the annual meeting of the American Railway Association in New York on May 19, F. A. Delano was re-elected president. The association is composed of officers of the principal steam railroads of the United States, Canada and Mexico, and represents nearly 250,000 miles of road. Its committee on safety appliances reported that out of a total of 2,182,476 freight cars, 97 per cent were equipped with air brakes on Jan. 1, 1909. Of the locomotives in service, 58,425, representing 99 per cent, were equipped with air brakes.

ANNUAL CONVENTION OF SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION

The fifth annual convention of the Southwestern Electrical & Gas Association was held at Dallas, Tex., on May 20, 21 and 22. The meetings were said to be the most successful ever held and exceeded in numbers registered those of previous years. More than 340 members and guests were in attendance. The supply men not only made a very attractive exhibit of their materials, but also conducted one interesting session of the convention program.

At the first session, after an address of welcome by a city official and a response of Sam A. Hobson, and other introductory business, the annual address of the president was read by R. B. Stichter, general manager, Texas Traction Company, Dallas, Tex. Matters of association policy were considered in this address, and several recommendations were made. Later in the session a committee was chosen to draft resolutions regarding the president's suggestions, and the report of this committee (H. S. Cooper, Galveston, and L. L. Stephenson), as adopted by the association, follows in abstract:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS

Your committee on the president's address beg to report that they find in that paper several pertinent and important suggestions which they believe should be brought specifically to the attention of your body and action taken upon them by you.

(1) A committee on "uniform city laws" or ordinances.—From the context in the president's address your committee would judge that the principal duty of such a committee would be clerical and statistical and, therefore, the committee is of the opinion that this matter can better be covered by a fixed office and officer specially devoted to that and similar purposes.

(2) A "publicity department" to consist of certain members of the executive committee; your committee believes that the remarks above in regard to the "uniform city laws committee" applies equally as well to this subject.

STANDARDIZATION

(3) The appointment of two "standardization" committees: one on standardization of parts, materials, supplies, etc., one on standardization of accounts.

Your committee believes that both of the subjects are proper work for action by committees.

Your committee recognized the fact that final standardization of all matters connected with the business of the members of this association will be passed on and determined by the National Association and it is with this very fact in mind that it makes the recommendation for the appointment of these committees.

Such previous work by the national organizations has hitherto been somewhat circumscribed by time and by territory. Its only method of obtaining general information in regard to any subject of standardization has been by correspondence and the filling of fixed interrogating forms. To try to obtain information in such important matters over such an immense territory as the whole United States is too great a task for any one organization.

The only way to thoroughly accomplish these ends is to subdivide this work among the different State and divisional associations, to let them obtain the information desired on any standardization subject, not only from their own membership which, collectively, will number many companies not included in the national association, but from every company within their territory. Let these local and divisional associations appoint their own standardization committees to collect, collate and integrate the information and replies it receives and, in connection with the executive committee, decide on the phase or particulars of any desired standardization and with full regard to the needs, conditions or peculiarities of the special section or territory covered by each local or divisional association. These sectional or divisional final results can then be presented to the national associations and if necessary the national committees be composed of the chairman or a representative member of every local or divisional committee, which committee will then have before it the final and decisive results of the whole United States in only 10 or 12 sections instead of a mass of hundreds of indecisive and contradictory replies from only a portion of the many companies to be affected by the desired standardization. Such a method of procedure will not only greatly facilitate the final decisions, but such decisions will be more likely to be those that are most generally useful or most general improvements.

In such a method of procedure the characteristics or needs of any special section, say, such for instance, as is covered by this association, will be brought into full notice where by the present method of a few replies—perhaps contradictory—from this section these characteristics or needs might not be in any way emphasized.

"Standardization" is a compromise of opinions and an average of local or sectional conditions and the best compromise is where every one gives up a little and the closest average is where the largest number is taken to average from. Subdivision of this work of compromise and average will facilitate the results in time and will not only not affect those results erroneously but, on account of the subdivided information giving truer and fuller results from each section, the final results will be more generally accurate and acceptable.

For these reasons your committee urges that this association at this meeting not only take decisive and immediate action in regard to this matter, but that it authorize and empower its executive committee to urge on every sectional or divisional association in the United States a similar action to the end that the national association may obtain the benefit of such action at the earliest possible moment.

(4) The fixing of a permanent office of this association and the election or appointment of a permanent official whose exclusive business shall be to have charge of such office and to attend to all the business of the association that is not executive or financial or that is not placed in charge of special or general committees or officers. This will include such work as has been mentioned by the president under classes 1 and 2, which work, being purely statistical and clerical, would come under this official and could best be done by him.

The permanent assistant secretary will later be appointed by the executive committee.

SMALL PRODUCER PLANTS

The first paper, "Producer Gas Plants for Small Central Stations," was presented by W. B. Head, manager, Stephenville (Tex.) Light & Water Company. An abstract of this paper will be found elsewhere. When questioned Mr. Head stated that his producer plant had given no trouble from clinkers. If any clinkers did form from air holes through the fire bed they were taken out as they would be from an ordinary fire arch under a boiler. His gas engine was rated at 100 hp and the plant had a load factor of approximately 50 per cent. In a run of 12 hours but 2 bu. of ashes would accumulate, thus showing the good burning qualities of the producer. It was stated to be perfectly feasible to store producer gas in a reservoir for emergency use. To maintain a thick fuel bed Mr. Head's down-draft producer often was run with the firing doors open for admitting an extra amount of air.

The question of the safety of down-draft producers was discussed. One member cited the death of an employee killed while removing clinkers from such a producer in the San Angelo Power & Traction Company plant. Another member replied that such accidents were not due to the plant, but to carelessness and to the use of poor fuel.

H. M. Moore, Austin, called attention to a suction producer plant in Mexico which was not operating in a highly successful way because the quality of the gas was so poor that the engine cylinders frequently were fouled, requiring

extra engines for maintaining continuity of service. There were eight engines in the plant and a large tank was used for storage. Mr. Moore also stated that both large and small gas-producer plants were capable of generating current at low costs. One economy was effected by settling the tar out of the discharged water. This tar was salable and could be conserved by a simply built settling tank.

On the question of fouling Mr. Head said that this trouble depended, of course, largely upon the care in making the gas. His engine, which drove one 65-kw, two-phase, 1100-volt and one 20-kw, d.c., 220-volt machine, was rated at 100 hp and because the gas engine operated jointly with steam equipment an excellent opportunity was afforded for getting a close idea of its reliability and efficiency, both of which factors were excellent. The engine operated 24 hours per day for six days a week and was shut down only for six hours on Sunday. The engine was fully loaded all the time possible because in this way current could be had cheaply for deep-well pumping work and for running the steam plant auxiliaries. With an average load factor of 50 per cent the engine would deliver 1 hp per hour on 3 lb. of lignite. A reduction in the monthly cost of fuel from $1,000 to less than $200 had been brought about by the gas engine equipment.

Prof. A. C. Scott, University of Texas, said that he had analyzed many samples of lignites from all parts of the State and had found very little variation in the gas-making components of these fuels. With such vast quantities of this fuel available he thought the gas-producer field a very fertile one. It should be possible to purify the gas so that there would be no fouling. Professor Scott described the large installation of gas engines at Gary, Ind., operating on blast-furnace gas.

Mr. Head had had no trouble with scale in the cooling jackets because he kept the water rapidly circulating, not allowing it to become heated and deposit its impurities. The same water was used over and over for this purpose and was cooled in a pond.

Fred M. Lege, Jr., Brush Electric Light & Power Company, Galveston, said that the water cost for a gas-producer and engine plant was about one-eighth of that for a condensing turbine plant of the same horse-power. Even with low-priced lignite, higher efficiency as to fuel cost would be had if anthracite coal were purchased and used in an up-and-down-draft producer. Reliability so obtained was a most important factor and the lignite was comparatively expensive to handle on account of the amount needed to equal anthracite which also was far cleaner.

Professor Scott said that the manufacturers had not given the gas producer for burning lignite enough attention to put it on as perfect a basis as producers for burning other fuels.

Other members spoke of the good results had from lignite-burning gas-producer plants throughout the Southwestern States.

A representative of the Westinghouse Machine Company stated that his experience had shown that Texas lignite did not require a peculiarly constructed producer for good results, but care should be used to install a producer large enough to burn the extra amount of this fuel required on account of its low heat value. White lignite from the vicinity of Dallas made good clean gas. The process of making gas in producers was to burn coal as poorly as possible, using a very thick bed so that there would be a large amount of fuel gasified. The process was simple and would be of great value to Texas power users. The operation of a gas-producer engine plant did not require any higher degree of skill than for a steam plant, but there still was a scarcity of experienced operators.

RELATION OF LEGAL AND CLAIM DEPARTMENTS

H. S. Cooper, manager, Galveston Electric Company, read his paper on "The Scope of the Legal and Claim Departments and Their Relation to Each Other." A general discussion followed. Attorney Knight, of the Dallas Consolidated Street Railway Company, stated that 99 out of 100 personal injury cases were decided according to "accidents of trial" rather than points of law. Thus the present judge and jury system had largely to do with any hardships that might be inflicted against corporations. He favored Mr. Cooper's plan of segregating the work of the legal and the claim departments.

E. T. Moore, general manager, Dallas Consolidated Street Railway Company and Dallas Electric Light & Power Company, did not favor drawing the line closely between the two departments or between any other two departments. The departments should be able to get on without too great separation of authority.

Mr. Cooper held that there should be a line on one side of which would be the claim department and on the other the legal department. Thus neither would do the work of the other.

W. C. Forbess, general passenger and claim agent, Northern Texas Traction Company, Fort Worth, read a paper on "The Organization and Operation of a Claim Department." The present jury-choosing methods were criticised in the course of the discussion which followed this paper.

EXHAUST STEAM TURBINES

Fred M. Lege, Jr., Brush Electric Light & Power Company, Galveston, presented a paper on "Exhaust Steam Turbines." When questioned, Mr. Lege said that in a given plant it would be preferable to install two or more exhaust steam turbines rather than one large one on a common exhaust main, because unless the load were uniform and of the proper amount the reciprocating engines might sometimes operate with undue back pressure and at lower economy than if more than one exhaust steam turbine was used. The exhaust steam turbine was an emergency unit which should be connected flexibly with the exhaust trunks of the reciprocating engine plant so that the number of units could be adjusted to load conditions. The adaptability of the exhaust steam turbine to existing plants was discussed by several members, including H. D. Ratcliff, of the General Electric Company, who was familiar with the design of several successful exhaust steam turbine plants installed by that company, and stated that exhaust steam turbines for d.c. work were now being built with horizontal shafts to facilitate keeping the commutator clean. These turbines had commutating poles to prevent sparking at the brushes.

The association approved several changes in the by-laws, among which was a clause limiting the active membership of the association to the following States: Texas, Louisiana and New Mexico, U. S. A., and the Republic of Mexico.

The second afternoon session largely was conducted by the supplymen with C. W. Hobson in the chair. E. J. Pietzger thanked the active members for the courtesy extended to the manufacturers and their representatives and others spoke on the subject of co-operation between all interests.

At the beginning of the last day's session a paper on

"Why We All Should Become Members of the American Street & Interurban Railway Association," by Anton H. Classen, president, Oklahoma Railway Company, was read in the absence of its author by L. E. Gould, Western editor, Electric Railway Journal.

Professor Scott, editor of the association "Question Box," then took the chair and a general discussion of several subjects followed. The first question was: "Is the subdivision of accounts as suggested by the National Association a good one, either from an accounting or an operating standpoint? Is it of very great use to small or medium-size roads? Can you suggest a better one for the operating department? If so please give same and reasons therefore." Answering this group of questions, H. S. Cooper told of the reasons for the first promulgation of the standard accounting system which, he said, was a good schedule for financing or taxation work, but not perfect from an operating standpoint. For example, a car consisted of three distinct parts, body, trucks and electrical equipment. Yet the schedule of accounts did not subdivide the maintenance charges for these three parts. David Daly, manager, Houston Electric Company, said that the Stone & Webster property managers had subdivided several of the accounts into 15 or 20 divisions so that detail costs could be kept distinctly separate for comparative purposes. This practice had great value in determining the efficiency of any department from month to month as compared with that of another road or with the same road for a previous month.

Mr. Lege made the same criticism of the National Electric Light system of accounts as Mr. Cooper for the railway system and his company had subdivided several accounts as stated by Mr. Daly.

For a small property Mr. Head thought there was no other factor of management so important as "system." Small properties often found it difficult to get accurate and detail accounting, but any extra labor for such results would be well spent. His company tried to keep complete detail accounts so that the officers might know actual operating costs. Detail accounts were kept for plumbing, house-wiring, the storeroom, etc. Careful watch was kept over the tool- and stores-rooms. Mr. Head criticised the average small plant because it did not keep accounts accurately enough to show its operations effectively.

Mr. Cooper suggested that each company send to the permanent office of the association in Dallas a schedule of its accounts showing the variations from the standard system and presenting the reasons for such variations.

ELECTION OF OFFICERS

At the closing session the reports of the secretary and treasurer were presented and approved and the customary votes of thanks were given the officers. During the past year there had been a gain of 25 active and 34 associate members. The finances were in excellent condition. The following officers were installed to serve during the coming year: President, W. B. Head, Stephenville; first vice-president, W. B. Tuttle, San Antonio; second vice-president, J. E. Carroll, Beaumont; third vice-president, C. H. Dunbar, Houston; secretary, E. T. Moore, Dallas; treasurer, A. E. Judge, Tyler. The meeting place and date for the next convention will be announced by the executive committee.

The following firms were among those exhibiting at the Dallas convention:

American Electrical Works, Phillipsdale, R. I.
Atlas Railway Supply Company, Chicago, Ill.
Birney Pay-on-Platform Company, St. Louis, Mo.
Buda Foundry & Manufacturing Company, Chicago, Ill.
Chicago Fuse Wire & Manufacturing Company, Chicago.
Columbia Incandescent Lamp Company, St. Louis, Mo.
Duncan Electric Manufacturing Company, Lafayette, Ind.
Electric Appliance Company, Chicago, Ill.
Electric Service Supplies Company, Philadelphia, Pa.
Electric Traction Supply Company, St. Louis, Mo.
Gammeter Multigraph Company, New York.
General Electric Company, Schenectady, N. Y.
Goldschmidt Thermit Company, New York.
Hobson Electric Company, Dallas, Tex.
H. W. Johns-Manville Company, New York.
H. Mueller Manufacturing Company, New York.
Keystone Fibre Company, Chester, Pa.
Lagonda Manufacturing Company, Springfield, Ohio.
Moloney Electric Company, St. Louis.
Nernst Lamp Company, Pittsburgh, Pa.
Ohio Brass Company, Mansfield, Ohio.
Pacific Electric Heating Company, Ontario, Cal.
St. Louis Car Company, St. Louis, Mo.
Texas Machinery & Supply Company, Dallas, Tex.
Tunstolier Company, Cleveland, Ohio.
Wagner Electric Company, St. Louis, Mo.
Western Electric Company, Chicago, Ill.
Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.
Weston Electrical Instrument Company, Newark, N. J.
Wonham, Magor & Sanger, New York.

STANDARD LOCATION FOR THIRD RAIL WORKING CONDUCTORS

The committee on standard location for third-rail working conductors of the American Railway Association presented a progress report to the association at its meeting in New York last week. The committee, from all information which it has been able to collect, believes that the existing standards for third-rail working conductors are working well in actual practice, and that the question of location of overhead conductors is receiving attention on the limited number of roads which are using a traction system requiring same. The report continues:

No radically new electric traction systems have been developed since the date of last report, so that the committee does not believe that it can make any useful suggestions or recommendations at this time.

There has been, however, a modification proposed in the direct current propulsion system, which, if successful, may suggest some change in the standard location of third-rail. This system, using a direct current of from 1200 to 2000 volts on the third-rail is in the experimental stage, and it is too early to say whether or not it will be either successful or economical for heavy railway service. If it should come into use, however, it must be borne in mind that no more space will be available for insulation with these higher voltages. The committee considers it is inadmissable to encroach on the established clearances or to break the present standard third-rail gage.

As regards overhead working conductors, the committee has no new facts to bring before the association since the report of October last, and believes it is yet too early to determine finally the limitations for such conductors.

The cost of operation of the Filovia system of trackless trolleys in use in Italy is reported by an investigator for the Sheffield (England) Tramways Committee to be from 12 cents to 15 cents per car-mile. The cars are single decked and seat only 24 passengers and their weight is indicated by the fact that they are equipped with two motors of only 10 hp each. The Schiemann trackless trolley system used in Mulhausen, Alsace, is said to cost only 10 cents per car-mile. These cars have front-wheel drive. The Mercedes-Stoll system used in Vienna is said to cost 9 cents per car-mile to operate. The cost of overhead line for these systems is about $15,000 per mile and the cost of the motor cars with equipment is $3,000 a piece.

CONFERENCE ON INTERURBAN RULES

The conference to discuss the subject of rules for the government of employees on interurban railways, called by J. N. Shannahan, chairman of the committee on interurban rules of the American Street & Interurban Transportation & Traffic Association, was held at the New Willard Hotel, Washington, D. C., May 25. The following, among others, were present:

H. Clifford Eddy, Interstate Commerce Commission.
John P. Dohoney, Pennsylvania State Railroad Commission.
J. N. Shannahan, Washington, Baltimore & Annapolis Electric Railway.
H. A. Nicholl, Indiana Union Traction Company.
C. Loomis Allen, Utica & Mohawk Valley Railway.
W. H. Collins, Fonda, Johnstown & Gloversville Railroad.
J. A. DuBois, Cedar Rapids & Iowa City Railway.
C. D. Emmons, Ft. Wayne & Wabash Valley Railway.
J. L. Adams, Norfolk & Portsmouth Traction Company.
P. P. Crafts, Iowa & Illinois Railway, Clinton.
J. E. Duffy, Syracuse Rapid Transit Railway.
R. E. Danforth, Public Service Railway, Newark, N. J.
J. J. Doyle, Washington, Baltimore & Annapolis Electric Railway.
J. W. Brown, West Pennsylvania Railways, Connellsville, Pa.
B. V. Swenson, American Street & Interurban Railway Association.
Henry W. Blake, Electric Railway Journal.
Edmund J. Burke, Blake Signal & Manufacturing Company.

Mr. Allen called the meeting to order and explained that the conference would consider the rules which had been submitted by the committee on interurban rules at the meeting of the Transportation & Traffic Association last year at Atlantic City. Criticisms and suggestions on last year's report had been solicited by the committee, and a number of suggestions had been received by mail. Invitations to attend the present meeting had been extended to the various railroad and public service commissions in all States which possessed such commissions, and also to the Interstate Commerce Commission, and he was glad to see representatives of some of these commissions present.

Mr. Shannahan then took the chair and announced that the rules would be taken up consecutively as presented at the Atlantic City convention. He said the wording decided upon at this meeting would be tentative only, and, of course, might be changed at the Denver convention by the association.

GENERAL RULES

No changes were suggested under General Rules until No. 26 was reached. This read:

Packages.

Employees must not carry packages, letters or newspapers, for any one not having business with the company, without an order from the proper authority.

Mr. Shannahan said he had received a criticism of this rule from Mr. Peck, of Schenectady, to the effect that the rule was ambiguous. After some discussion, it was decided to omit the words "not having business with the company," but to make no other change in the rule.

Rules 27-30 were approved.

Rule 31 was amended by agreeing that rules required by the laws of the different States should be embodied in the books of the companies operating in that State.

DEFINITIONS

In Rule 50, definition of "train," it was decided to change the word marker to markers.

Mr. DuBois asked why the committee omitted the definition of "train of superior direction." Mr. Emmons replied that it was done intentionally, as the committee did not consider it desirable to establish one direction as superior. Mr. DuBois favored the American Railway Association practice in establishing such a superior direction, and suggested the following definition from the American Railway Association code:

Train of Superior Direction.

A train given precedence in the direction specified in the time-table as between trains of the same class.

Note.—Superiority by direction is limited to single track.

A discussion then ensued on the desirability of having a "superior direction." Mr. Crafts and Mr. Nicholl, among others, expressed themselves as opposed to the practice.

Mr. DuBois then read a communication, based upon a paper read by him before the Iowa Association and published in May 1, 1909, issue of the Electric Railway Journal, page 835. He said in part:

COMMUNICATION FROM J. A. DUBOIS

I have some very serious objections to the code of rules as proposed by this association, as stated in my paper before the Iowa State convention. Taking our line, for example, and there are many other lines probably similarly situated: We are operating both freight and passenger trains, and handling regular freight cars, such as live stock, coal and other cars, and interchanging same with steam roads. We have through freight rates over steam lines, do through billing over steam lines, make our reports to them, and in inspecting freight cars to and from connecting lines we are governed by M. C. B. Association rules.

We have been operating now for about five years, and we have used the standard rules of the American Railway Association, with but possibly a very slight change, and they have met the requirements fully. Our delays are few. We have at various times operated steam trains of other companies over our line, and in such cases it proved a very easy matter, as our rules were standard and men could readily understand them. The time is fast coming when there is bound to be more or less interchange between steam and interurban lines, and as long as our reports, billing, M. C. B. Association rules, per diem and demurrage rules have to be the same, why not have the same standard rules for operating our trains? Then, when it comes to operating steam trains over your line, as we have done at various times, and I suppose others have done the same, how much better and safer it will make it. I fully understand that there are small interurban lines which could not use the standard code entirely, but provision could be made for such roads which would meet local requirements.

Many interurban lines hire men who have formerly been in the employ of steam lines, and, with a few exceptions, they make the very best of employees, and it would be better to have rules that they have been used to than to have something different, to which they might attach a wrong meaning. Again, the rules of the American Railway Association are the result of years of actual experience—conditions which have been studied out and improved upon until they have attained the high degree of excellence they now have.

One point more I wish to bring out. Do not fill up a rule book with a lot of unnecessary rules. Make them brief and to the point. The ground can be covered, as a rule, in few words just as well as by using a lot of space.

Interurban lines of any length should be handled by time card prescribing class, number, direction and schedules of all regular trains and such other special instructions as are necessary. We do not, as a rule, issue many orders unless there are extras or freight trains out, and then only to help a train along as necessary. We have operators at various stations, and most of our orders are given through them to train crews, but each train crew has a telephone, with which they can secure their own orders at places where no operator is employed. If a superior train is not at a meeting point when an inferior train arrives, they plug in at once, and if dispatchers can help them any farther it can be done.

The same practice is followed when meeting by train

order. Most of our orders, when issued through an operator, are put out before the train arrives, a plan which saves time. We use a No. 31 and a No. 19 form. The conductor is required to sign a No. 31 order and complete obtained on his signature from dispatcher before being acted upon. Both copies are then delivered to the conductor, and he delivers one to his engineer, who reads it aloud to the conductor. Both most understand the order alike before acting upon it. No. 19 orders are handled in the same manner as No. 31 orders, except that no signature is taken, but complete is given by a dispatcher as soon as the order has been repeated correctly to him. This order can be handed on to train crew by operator without stopping them for it. No. 31 orders are used to restrict the rights of a train and a No. 19 only to confer right upon.

Our city business is not very extensive at the present time, so we have omitted city rules from our book and put a few necessary rules in our time table. As a great many of the interurban lines control and operate city cars, I think it well to include rules for same as far as possible, but I would suggest that they be confined to themselves and not mixed up with interurban rules.

Mr. Shannahan suggested that the points made by Mr. DuBois be taken up in connection with the different rules as they were reached by the committee.

Mr. Crafts stated that one of the points made by Mr. DuBois was in connection with freight trains, and thought it would be well for the representatives from the Middle West to explain the practice followed there.

Mr. Nicholl stated that on his road freight trains are second class and inferior to first-class trains, but have their positive meets. Mr. DuBois said that his road required second-class trains and extra trains to clear first-class trains.

Mr. Emmons said he had no second-class trains, but runs his freight trains as extras. The dispatcher gives meet-and-pass orders. The rules provide for the regular trains carrying flags in case the telephone is out of order.

Upon motion, it was decided not to establish precedence in direction.

Mr. Collins criticised the wording of Rule 62, giving a definition of "current of traffic."

Mr. DuBois suggested the wording of the American Railway Association, as follows:

Current of Traffic.
The movement of trains on a main track, in one direction, specified by the rules.

The wording finally selected was as follows:

Current of Traffic.
The direction in which trains will move on double track, under the rules.

The next point discussed was on the retention of the definitions of "meeting point" and "passing point." These terms were defined as follows:

Meeting Point.
A place where opposing trains, i. e., trains moving in opposite directions, meet by schedule or train order.

Passing Point.
A place where trains moving in the same direction pass by schedule or train order.

Mr. Crafts explained that he had found it desirable to make this distinction. Mr. Emmons also testified to the same necessity. It was decided to retain the definitions.

The chairman explained that the definitions of block signals (Rules 71-76) were the same as in the American Railway Association code. It was decided to retain them. No changes other than those mentioned were made in the definitions.

STANDARD CLOCKS

The next rules discussed were Nos. 77-80, on standard time. Mr. Emmons called attention to the fact that there was no definition of a standard clock. Under the Indiana rules the standard clock is that in the dispatcher's office. On motion, it was decided to incorporate the following additional definition in the rules:

Standard Clock.
The clock in the dispatcher's office and such others as may be hereafter designated are standard clocks.

Mr. Brown called attention to Rule 79, which provided a form of certificate for the watch inspector, and suggested a rule forbidding adjustment of watches except by the inspector. Mr. Emmons thought that if an inspector was suspicious of a watch he could hold it for a day or two, until he found out whether it was correctly adjusted. Mr. Crafts said that men might be compelled to set their own watches occasionally, and it would not be well to forbid them from doing so. No change was made in the rule.

TIME TABLES

Rule 83, the first rule under time tables, was approved.

Rule 84 read as follows:

Supersedure of Time Tables.
Each time table, from the moment it takes effect, supersedes the preceding time table, and all special instructions relating thereto, or conflicting therewith, and trains shall be run as directed thereby subject to the rules.

Mr. DuBois suggested the corresponding rule of the American Railway Association be substituted. This rule is as follows:

Supersedure of Time Tables.
Each time table, from the moment it takes effect, supersedes the preceding time table, and its schedules take effect on any division or subdivision at the leaving time at their initial stations on such division or subdivison. But when a schedule of the preceding time table corresponds in number, class, day of leaving, direction and initial and terminal stations, with a schedule of the new time table, a train authorized by the preceding time table will retain its train orders and assume the schedule of the corresponding number of the new time table schedules on each division or subdivision date from their initial stations on such division or subdivision. Not more than one schedule of the same number and day shall be in effect on any division or subdivision.

Mr. Collins said he was in favor of allowing the rule to remain as it was. A new schedule usually goes into effect at midnight, and on most interurban roads there are few cars out after that hour. He thought it would be safer to run these cars on train orders rather than to allow them to assume the rights of a new train. For interurban operation this is better practice. Mr. Adams, Mr. Danforth, Mr. Eddy and others expressed themselves in the same way. It was decided to make no change in the rule.

No changes were suggested in Rules 85 to 91.

SIGNAL RULES

Mr. Crafts suggested a modification of Rule 92. At present it reads:

Who Must Have Signal Appliances.
Employees whose duties may require them to give signals must provide themselves with the proper appliances, keep them in good order and ready for immediate use.

His own rule on this subject is patterned largely upon that employed by the Chicago & Northwestern Railway, and reads as follows:

Who Must Have Signal Appliances.
Employees whose duties may require them to give signals must provide themselves with the proper appliances, keep them in good order and ready for immediate use. Those giving signals must locate themselves so as to be plainly seen, and make them in such a manner as to be readily understood. The utmost care must be exercised by train men to avoid taking the wrong signal when two or more trains are passing each other at stations or in yards. Unless both the conductor and motorman are positive the signal is given for them they will not move their train until communication is made by word of mouth.

After some discussion, Mr. Craft's suggestion was approved.

No changes were made in Rules 93 to 94.

VISIBLE SIGNALS

No changes were made in Rules 95, 96 or 97, but there was considerable discussion of Rule 98. At present this rule reads:

Violent Signals.

Any object waved violently on or near the tracks signifies danger. Motormen must bring their train under full control and proceed at slow speed until they are sure the track is clear and that it is safe to proceed.

Mr. Crafts thought violent signals by any person should be considered as a stop signal. A train might be stopped unnecessarily occasionally, but in general it is a safer plan to follow this plan rather than not stop the car. This is the American Railway Association rule.

Mr. Emmons did not approve of stopping the car. He thought it would lead to abuse by persons who would want to board cars between stopping points. Practically the same degree of safety can be secured by slowing down as required by the rule. Mr. Shannahan thought that few roads would enforce the rule if the suggested change was made. It was decided to leave the rule as it was originally.

Upon motion of Mr. Nicholl, it was decided to add to the lamp signals, cuts of the signals to be used on the rear and front ends of trains as shown in the American Railway Association rules. On some double-track roads with narrow devil strips it may be necessary to change slightly the location of the inside markers if this is done, but this was not considered a serious obstacle. It was also decided to incorporate in the report of the committee the same illustrations showing the method of giving lamp signals for "apply air brakes" and "release air brakes" used in the American Railway Association code.

AUDIBLE SIGNALS

The question of audible signals was then discussed, but no change was made in them as printed.

In Rule 102 a suggestion was offered that the word "responsible" be omitted from the clause:

Any responsible employee or other person may take the place of the motorman in flagging, in order that he may attend to getting his car off of the crossing.

The chairman explained, however, that the word "responsible" was used to exclude Italian laborers or other irresponsible employees, and that the word "responsible" was understood by the context to apply to the phrase "or other person."

The next subject discussed was communicating signals. Mr. Emmons pointed out that the use of three bells for "when train is standing, back the train," and also for when train is running, "stop at once, emergency," was confusing. He knew of a serious accident due to this cause. A motorman had run past a stop and received three bells to back. While backing he received another three bells to stop, but, thinking it meant to back harder, did so and ran into a man.

Mr. Duffy read the American Railway Association rules on this point, as follows:

SOUND.	INDICATION.
(a) Two.	When train is standing, start.
(b) Two.	When train is running, stop at once.
(c) Three.	When train is standing, back the train.
(d) Three.	When train is running, stop at next station.
(e) Four.	When train is standing, apply or release air brakes.
(f) Four.	When train is running, reduce speed.
(g) Five.	When train is standing, call in flagman.
(h) Five.	When train is running, increase speed.

It was finally decided to adopt the following:

Communicating Signals.

CONDUCTOR TO MOTORMAN.

SOUND.	INDICATION.
(a) One.	When train is running, stop at next station.
(b) Two.	When train is standing, start forward.
(c) Three.	When train is running, stop at once, emergency.
(d) Four.	When train is standing, back the train.
(e) Four.	When train is running, reduce speed to four (4) miles per hour until two (2) taps of the bell or two whistle cord signals are given, when the train will proceed at scheduled speed.
(f) Five.	When train is standing, call in flagman.

MOTORMAN TO CONDUCTOR.

(a) One.	Come forward.
(b) Two.	Pull trolley down to roof.
(c) Three.	Set rear brakes.
(d) Four.	By motorman is signal to conductor that he wishes to back train, and must be answered by conductor before train is backed.
(e) Five.	Watch trolley.

Rules 105 and 106 were approved, it being understood that the motorman will answer the conductor by two short blasts of the whistle.

MAIN SIGNALS

Rule 107 relates to headlights. Mr. Eddy asked the opinion of the members about dimming arc headlights in cities. He said he was considering the recommendation of such a regulation for local conditions. Mr. Crafts thought it desirable to dim the headlights in cities. Mr. Emmons held the opposite view. Mr. Danforth thought the prejudice against undimmed headlights is passing away on account of the frequent use of four or five searchlights on automobiles. It was decided not to adopt any regulation in regard to dimming headlights in the rules.

No changes were made in Rules 107 to 109.

There was considerable discussion of Rule 110. It read:

Marker Signals.

Two green flags by day, and two or more red lights at night, will be displayed on the rear of every train.

Mr. DuBois objected to the green rear flags, as they made the rear of a train look too much like the front. A delegate pointed out that this similarity was especially the case on a third-rail train, where there was no trolley pole to indicate the direction of the train. It was finally decided to change the rule to the following, which is practically the same as in the American Railway Association code:

The following signals will be displayed, one on each side of the rear of every train, as markers, to indicate the rear of train: By day a green flag; by night green lights to the front and side, and a red light to the rear, except when the train is clear of the main track, when a green light must be displayed to the front, side and rear.

No change was made in Rules 111 to 116.

Mr. Crafts criticised Rule 117, which read as follows:

Car Repairmen's Signals.

A blue flag by day and a blue light by night, displayed at one or both ends of a car ,or train, indicate that workmen are under or about it. When thus protected it must not be coupled or moved. Workmen, before placing themselves in a dangerous position in or about a car or train, must display a blue signal, and the same workmen are alone authorized to remove such signals. Other cars must not be placed on the same track so as to intercept the view of the blue signals, without first notifying the workmen.

Upon motion, it was finally decided to adopt this rule, with the addition of the following, which is a slight modification of a sentence in the Iowa & Illinois rule on this subject:

When making repairs to cars in service repairman must see that motorman's circuit breaker is opened and reverse lever handle in his possession before doing any work.

No changes were made in Rules 118 to 120.

SEMAPHORE SIGNALS

No changes were made in Rules 121 to 124 under this section.

USE OF SIGNALS

No changes were made in Rules 125 to 133. It was suggested that extra trains might give a different signal as an additional warning to track men, instead of the regular signal required under Rule 130, but Mr. Emmons explained that the Indiana Railroad Commission had considered this subject carefully and had prescribed the rule as it appears at present.

CLASSIFICATION OF TRAINS

Rules 200 and 201 were unchanged. Upon motion of Mr. DuBois, Rule 202 of the proposed code relating to rights of extra trains was changed by the omission of the words shown in brackets below:

Extra Trains.

Extra trains are [of] inferior [class] to all scheduled trains of whatever class, and have no rights except those conferred upon them by train order.

MOVEMENT OF TRAINS

Rule 203, as contained in the 1907 report of the committee, read as follows:

Trains Leaving Initial Station.

A train must not leave its initial station on any division, or a junction, or pass from double to single track, until it has ascertained whether all trains due have arrived or departed. Where train register is maintained it shall be the duty of conductor to register and to note carefully whether all trains due have arrived. If the motorman or conductor cannot reach the dispatcher, the train will proceed on time table rights, then call from all succeeding telephone stations until he has succeeded in reaching the dispatcher.

Mr. DuBois suggested that the following clause from the American Railway Association code be adopted in place of the paragraph quoted above:

A train must not leave its initial station on any division or subdivision, or a junction, or pass from double to single tracks until it has been ascertained whether all trains due, which are superior, or of the same class, have arrived or left.

Mr. Nicholl read the Indiana rule on the subject, as follows:

Trains Leaving Initial Stations.

A train must not leave its initial station on any division, or a junction, or pass from double to single track, without orders or clearance, and until it is ascertained, by asking the dispatcher, whether all trains due have arrived or departed, mentioning particularly the last train due, giving the train number. If in such case the motorman or conductor cannot reach the dispatcher, the train will proceed on time table rights, "protected by the flag"; then call from all succeeding telephone stations until he has succeeded in reaching the dispatcher.

He said, however, that since putting the Indiana rules into effect his company had had a very serious sleet storm, which tied up all of its trains, destroyed all of its telephone lines, and in some instances its trolley lines; and it was found impossible to operate a train over the lines, if the Indiana rules had been followed precisely. This particular rule is going to be changed to read somewhat as follows:

If in such cases, in case the motorman or conductor cannot reach the dispatcher, the train will proceed on time table rights, protected by flag; then to call from all succeeding telephone stations until he succeeds in reaching a dispatcher.

Mr. Nicholl explained that they had another rule that a train does not necessarily lose its rights under such circumstances.

Rule 203 was finally approved as follows, the words added appearing in italics:

Trains Leaving Initial Station.

A train must not leave its initial station on any division, or a junction, or pass from double to single track, *without order or clearance,* until it has ascertained whether all trains due have arrived or departed. Where train register is maintained it shall be the duty of conductor to register and to note carefully whether all trains due have arrived. If the motorman or conductor cannot reach the dispatcher, the train will proceed on time table rights, then call from all succeeding telephone stations until he has succeeded in reaching the dispatcher.

Rule 204 was left unaltered. Rule 205 was made to agree with Rule 202 by changing the word "scheduled" to "such." As now approved, it reads as follows, the words omitted appearing in brackets, the word added in italics:

Trains of Inferior Class.

A train of inferior class must in all cases keep out of the way of trains of a superior class, and must clear the time of [scheduled] *such* trains five minutes unless a meeting or passing order has been given.

Rule 206 was changed by the addition of the words "between reporting stations." The revised rule is given in full below, with the added words appearing in italics:

Scheduled Trains Have Equal Rights to Meeting Points.

All scheduled trains of the same class, or sections of scheduled trains, have equal rights to scheduled meeting points *between reporting stations.*

Rule 207 was then considered. It read as follows:

Set Switches for Opposing Trains.

At meeting points between trains, either by schedule or train order, should the train that is to occupy the main track arrive first, it will be the duty of the conductor of such train to promptly set the switch for the siding, so that the train to be met can take the siding with the least possible delay.

Mr. Shannahan said that he had received a criticism of this rule as being ambiguous, from W. R. W. Griffin, general superintendent of transportation, Rochester lines. He read certain portions of Mr. Griffin's letter, which appears below:

ROCHESTER, N. Y., May 19, 1909.

MR. J. N. SHANNAHAN, Chairman,
Committee on Interurban Rules:

DEAR SIR.—Inasmuch as the electric interurban roads are operating closer each year to the standard operation of steam railroads, and also that a great many of the interurban roads are hiring and using men of steam railroad training, and in a great many cases where electric operation is taking place over steam tracks intermixed with steam operation, I believe it far better that the American Street & Interurban Railway Association adopt a standard code in which the general rules are not only identical, but numbered the same as in the American Railway code, making such specific changes as are absolutely necessary to meet the difference of conditions between the steam and electric motive power, also making a specific change between the method of receiving train orders by telegraph and telephone, all other mutual conditions remaining the same. This would leave a chance of free interchange of men without confusing rules and numbers, for the reason that the majority of rules are learned and referred to by number entirely.

Referring to the book specifically, under section of train signals, I believe that rules given under Nos. 110, 111, 112 and 113 should be worded and the operation to be the same as the American Railway Standard Code.

Rule 202, I should have the word "class" after "inferior" struck out entirely.

Under Rule 203, if the train is allowed to leave the terminal without an order from the dispatcher, I can see no reason why he should call up at all succeeding telephone stations, but continue under his time table rights as specified under the rule.

Rule 207 is ambiguous when compared with Rule 206.

Rule 212 I believe to be a detriment to any road, because if the time table of a road is correct there is no reason why extras cannot take care of themselves when the telephone is out of commission as easily as when telephone is in com-

mission. That being the case, Rule 213 should not be adopted.

Rule 230 should be as follows: "Regular trains ——— hours behind either their scheduled arriving or leaving time at any station lose both rights and schedule, and can thereafter proceed only as authorized by train order."

Under rules for movement by train order no provision is made of a specific rule as to receiving orders at a station where operators are maintained. A good many of our roads to-day maintain stations and operators at several points, and use them in connection with their train dispatching. I believe that the rules governing the receiving of train orders in the cases where operators are maintained should be identical to the American Railway Standard Code and up to the point of the completion of the order. This completion should be made by one of the crew, preferably the conductor, by signing the order with his train number and his name, reading the order and these signatures to the dispatcher, who will then, if the order is correct, give the completion and the time of completion, then the order to be treated the same as under the American Railway Standard Code.

In cases where orders are transmitted directly to the crew, one of the crew could act entirely in the same capacity as the operator did in the first instance, the other could complete the order in the same manner as in the first instance.

Referring to form of train order blank No. 275, personally I do not believe that this should be used or given any consideration whatever, and cannot see any good excuse for it. I am of the belief that any stereotyped form of order has a tendency to lead to carelessness. I fully believe that no order should be used except one that is handwritten. Such being the case, the party who reads the order to the dispatcher for its completion has surely got to read this order word for word on account of the difference in writing, and not repeat an order in a parrot fashion as in a stereotyped form.

The question has been raised that this form of order adds speed, but I do not see that this is the case. We have operated one road whose scheduled speed is from 28½ to 37½ m.p.h., which is divided into five blocks with six blocking stations. No train of any description can pass these stations without a specific order—either a clearance or "may go" order, or a regular "31" order.

These clearance or "may go" orders are issued by number and by the dispatcher, and records of them are kept the same as with the regular "31" order. During the last year in the operation of this road 282,000 orders were issued by the dispatcher, and at no time was there so much as a five-minute delay due to the issuing and handling of orders. Consequently, I am unable to see the philosophy of adopting this rule under the plea of gain of time.

Mr. DuBois suggested that the man who operates the switch should walk ahead a certain distance or else cross the tracks.

Revision of the rule was postponed. Rules 208 and 209 were accepted as printed.

There was considerable discussion on Rule 210, which prescribed the spacing of trains running in the same direction. The rule, as given in the code, reads as follows:

Distance Required Between Following Trains.

Trains running in the same direction must keep not less than three thousand (3000) ft. apart, except in closing up at stations or meeting points. When the view is obscured by curves, fog, storms, or other cause, they must be kept under such control that they may be stopped within the range of vision.

There was a division of opinion as to whether the spacing should be in distance or in time. Mr. Emmons suggested the rule be changed to read: "Unless some form of block signal be used, clearing at least five minutes apart, trains running in the same direction must keep," etc.

Mr. DuBois suggested that the reading be, "Unless some form of block signal is used, trains running in the same direction must keep five minutes apart, except in closing up at stations or meeting points." There seemed to be no satisfactory way of determining the time interval, and this motion was lost.

No change was made in Rule 211. Rule 212 appears below:

Defective Telephone.

When unable to reach dispatcher on account of defective telephone, all extra trains will lose their rights as extra trains, and such extra trains whose movement is essential to the maintenance of the passenger service, will become sections of regular scheduled trains as provided in Rule 213. All other extras at once clearing main track and remaining clear until telephone service is restored.

The chairman read the criticism of the rule by Mr. Griffin, of Rochester, as published above. He then explained that the rule compelled a train which is ordered to report at a station, and finds a telephone out of order, to lose its rights.

Mr. DuBois thought that the rule would delay the movement of trains. He said that an extra train is supposed to clear the regular trains (that is, those shown by the timetable) by five minutes. He thought there was no reason why an extra train cannot proceed and clear those five minutes with the telephone out of commission, just as it did when the telephone was in commission. This is the practice on a number of steam roads which use telephones for dispatching. Mr. Nicholl remarked that the steam roads were assisted by having a superior right of direction. No change was made in the rule.

Rule 213 is given below:

Arrangements for Sections When Telephone Defective.

When telephone line is out of order, any scheduled train when requested by conductor of any train, may carry signals for such, as a section following, without first obtaining orders from the ..... Scheduled train, under such arrangement, will immediately display signals, though extra train must not follow the regular train until it is certain that signals are so displayed.

It was modified by the addition of the following words suggested by Mr. Brown as an addition to the rule: "The conductor of trains desiring signals displayed shall issue second section order in duplicate, as per No. 3, Form F, Rule 280, to be duly signed by the respective conductors. Both copies of the order to be turned in by the conductor of the respective trains."

No changes were made in Rules 214 to 218.

Under Rule 219, Mr. Crafts stated that he thought the rule was not sufficiently explicit, and suggested his own rule on the subject. This rule is the same as that employed on the Chicago & Northwestern Railroad, and follows:

Protect Train When Stopped.

In case a train is stopped on the main line between stations, or is delayed under circumstances under which it may be overtaken by another train, the conductor or flagman must immediately go back with not less than two torpedoes, and a red flag by day, or red and white lanterns and two red fusees by night, and at night place a red fusee in the center of the track five hundred (500) ft. behind the rear of the train, proceeding by day or night to a point not less than fifteen hundred (1500) ft. distant from rear of train or until he reaches a point beyond that distance where the danger signal can be seen not less than one quarter of a mile by the motorman of an approaching train. The flagman will at once place one torpedo on the rail and will remain at such point until a train has arrived or until he is recalled. The motorman of approaching train on seeing flagman's signal will immediately acknowledge signal as evidence that it has been seen. When the flagman has been recalled and no approaching train has arrived, he will place a second torpedo on the rail two hundred (200) ft. nearer his train than the first and return with all possible dispatch to his train. On exploding one torpedo the approaching train will be brought to a full stop, and thereafter proceed with extreme caution, expecting to find some obstruction on the track. When the second torpedo is exploded, the motorman will know that the flagman has been recalled

and will proceed cautiously, keeping a sharp lookout for the train ahead. Immediately on the sound of the whistle recalling flagman, if there is not a clear view to the rear for one quarter of a mile (11 poles) the train should be moved ahead at a speed not more than six (6) miles per hour, until a point is reached where the track is straight for one quarter of a mile in the rear of train, always bearing in mind that the time of the flagman's return is the period of greatest risk.

When the character of the road or weather makes it necessary, the flagman should go to a greater distance with signals, so as to insure absolute safety. When any train has been stopped by a preceding train in the manner above mentioned, the conductor of the last train must use the same precautions with regard to any following trains as those heretofore described. When it is necessary to protect the front of a train, the same precaution shall be observed by the motorman or a flagman. In the case of a car break-down, however, the motorman after leaving protecting signals may return to his train to make necessary repairs and may call in his conductor to assist him.

The dispatcher shall immediately be notified of any stoppage between stations, and when orders have been received to proceed, train shall be run to front signals and same removed from track before proceeding.

Conductors and motormen are held jointly responsible for the proper protection of their train under all circumstances.

Mr. DuBois stated that the rule used on his road was similar to that of American Railway code.

The chairman explained that the rule of the committee did not permit as much latitude as that of the American Railway Association, as it specified at least 1000 ft., but did not limit the zone of protection to this distance. In discussing Mr. Crafts' rule, Mr. Emmons stated that if it was carried out literally in some places on his line the conductor would have to go back a long distance. He thought the present rule covered the case. Specific instructions could be issued to cover local conditions by any management, but these instructions need not be embodied in the rule book. The important point is that the conductor and flagman should go back immediately, and this is printed in the rule in large type.

The rule was adopted in the form originally recommended by the committee, as follows:

Protect Train When Stopped.

219. When a train stops or is delayed under circumstances under which it may be overtaken by another train, the CONDUCTOR OR FLAGMAN MUST GO BACK IMMEDIATELY WITH RED SIGNALS A SUFFICIENT DISTANCE TO INSURE FULL PROTECTION, NOT LESS THAN ONE THOUSAND (1000) FEET. When recalled he may return to his train, first placing two torpedoes on the rail when the conditions require it. The front of a train must be protected in the same way when necessary, by the motorman. The duty herein required of the conductor or motorman may be performed by the other when desirable for any reason.

There was no discussion on Rules 220 to 229.

The discussion of 230 brought up again the question of dispatching delayed trains. Mr. Nicholl urged that trains be allowed to proceed by flagging. Mr. Doyle pointed out that there was nothing in the rules to prevent this.

Mr. DuBois said that if trainmen were expected to proceed under the flagging method, they should be authorized to do so under specified circumstances and conditions.

Mr. Nicholl gave more in detail the particulars of the storm during which his telephone system was interrupted. He said that at one end of the line the storm was much more severe than at the other, and the sleet on the rails and on the wire prevented the train leaving the terminal. Therefore, when the other train got to the waiting point it stopped there and could go no further. The next train stopped, pushing his meeting point back. Trains were leaving the other terminal every hour, until four or five were bunched at the switches. The only thing to do then was to send a train to tell the last one to tell the one ahead of him to flag ahead, and for that man to do the same, and in that way finally to open up the block. It would not have been possible to have moved the traffic under the proposed rules.

Mr. Allen suggested there might be a provision for use in the event of a great storm or other emergency, so as to get the car to a place of safety, but did not think a situation of that kind could be covered by the same rule as one designed to provide for a 10-minute or 20-minute or 30-minute delay. The conditions are not the same.

Mr. Nicholl replied that the provision proposed was only when the telephone was out of commission and goes into effect rarely. In the case of a 10-minute or 20-minute or a 30-minute or an hour delay the telephone is used. His plan had been submitted to the Indiana Railroad Commission, and was being considered favorably. Mr. Nicholl said the Indiana rules add a provision to exemplify what "protected by a flag" meant. Then there was another rule to call the dispatcher, supposing the train had not arrived. There are also two other rules, as follows:

When a train reaches a meeting point and finds a train or trains have not arrived, the motorman or conductor shall call the dispatcher for orders, as provided in Rule 51. If the train is a regularly scheduled train, the motorman and the conductor of the train may proceed under flagging, under Rule 113-A, keeping in mind that the approaching train might be approaching at high speed.

When trains running in opposite directions are to be moved toward each other by train orders, the train whose rights are to be restricted, when possible must first receive the order and the complete before the order is given to the train to be moved against it or toward it, where the train whose rights are to be restricted is blocked by authorized agents or operators, as per Rule 152.

The latter rule was found to be necessary where a train is leaving a terminal and the telephone wire between the blocking station and the terminal is down. The dispatcher would be unable to give any orders against that train, because he had not first given that train an order to control its operation. Therefore by sending a block to one of the blocking stations it would block that train and give the operator an opportunity to advance other trains against it. The company's rules are the result of long study on the subject and experience of operating under the old rules.

Mr. Emmons suggested that in view of the importance of the subject, Mr. Nicholl be requested to formulate suggestions in regard to rule or rules for advancing trains under flags, and that his suggestion be made a subject of discussion at the next meeting of the rules committee, so that it could be taken up at the Denver convention. This was put in the form of a motion and carried.

It was decided to strike out Rule 231 as unnecessary. No changes were made in Rules 232 to 234.

RULES FOR MOVEMENT BY TRAIN ORDERS

Upon motion of Mr. Emmons, the following words were added to Rule 250: "Train orders shall be numbered consecutively, commencing with No. 1 at midnight."

Upon motion of Mr. Nicholl, the word "motor" was substituted for "car" in Rule 254.

The committee then took up Rule 256. In the present rules, it will be remembered, the rule provides for the dispatcher giving the order to the motorman, who repeats it to the conductor while the conductor writes the order. Mr. Shannahan explained that the committee had decided instead to recommend a different rule, in which the motorman writes the order. Other changes are made as indicated in the parallel columns on the next page:

Original Rule.

To obtain orders at telephone stations, the motorman will call the dispatcher and report train number and location. The dispatcher will then give such orders as are necessary, the conductor writing the order as given to the motorman and repeated by the motorman, plainly and without abbreviation, on the blank with carbon copies provided for that purpose. When the conductor has finished writing the order the motorman will repeat it to the dispatcher, who will O.K. the same if it is correct. The motorman will thereupon indicate such O.K. upon the order by signing his name to it. The conductor will then repeat the train order without abbreviation to the dispatcher, who will then complete it by giving the initials of the superintendent or other designated authority, and the time of completion, which initials and time shall be promptly written on the order. When the order has been properly completed, the conductor will sign his name to it, after which he will deliver one copy to the motorman, and the order will be in full force and effect. If for any reason the line should fail before the dispatcher completes the order, it is of no effect, and must then be treated as if it had not been given.

Revised Rule.

To obtain orders at telephone stations, the motorman will call the dispatcher and report train number and location. The dispatcher will then give such orders as are necessary to the motorman, who will write the same plainly and without unauthorized abbreviation on the blank provided for that purpose, with sufficient carbon copies for each member of the crew, and when he has finished writing the order he will read it to the train dispatcher, who will O.K. the same, if correct. The motorman will thereupon sign his name upon the order. The conductor will then read the order to the dispatcher and, if correct, the dispatcher will complete the order by giving the initials of the superintendent, or other designated authority, and the time of completion, which initials and time of completion, together with the signature of the conductor, shall be promptly written upon the order by the conductor, after which the order shall be in full force and effect. If, for any reason, the line should fail before the dispatcher completes the order, it is of no effect and must then be treated as if it had not been given.

Mr. Burke remarked that the rule did not take both members of the crew from the car at the same time. This was desirable. Mr. Nicholl doubted whether it was necessary to have two men take the order. Mr. Crafts suggested that the portion requiring the motorman to read the order back to the dispatcher be omitted. He suggested that the motorman take the order from the dispatcher, sign his name to it, after which the conductor would read the order back to the dispatcher and obtain it complete.

Mr. Emmons thought it advisable to have two voices over the telephone. He referred to a case where "7" in the repetition was mistaken for "11" until the second voice indicated the error. Now, as an additional precaution, the number "11" is referred to as "one-one."

The revised rule, as indicated in the right-hand parallel column, was then accepted.

Rule 257 was approved. Mr. Crafts called attention to the fact that Rule 258 did not provide for the agent receiving the order. He suggested the following clause, which was approved:

> When an order is given through an agent, he must read it back to the dispatcher and complete it in the same manner as a conductor. The conductor and motorman receiving such an order must each read it aloud back to the agent, and receipt for same by placing their initials upon it before detaching the copies intended for them.

Rules 261 and 262 were changed by the omission of the words enclosed in brackets.

Call Dispatcher if Opposing Train Has Not Arrived.

> When any train reaches a meeting point and finds that the train or trains to be met have not arrived, the motorman [or conductor] shall immediately call the dispatcher for orders, as provided in Rule No. 256.

Manifold Copies of Train Orders.

> The person receiving a train order must write it in manifold during transmission [and if they cannot at one writing make the requisite number of copies must trace others from one of the copies first made].

Rules 263 to 267 were approved. Rule 268 was referred to Mr. Nicholl for revision, as it was related to the rules previously assigned to him. No change was made in Rules 269 to 274.

FORM OF TRAIN ORDER BLANKS

There was a long discussion on Rule 275, *et seq.*, on train order blanks. After a discussion, it was decided to adopt the A.R.A. forms except as regards train orders and with such changes in verbiage as would be required by the different service.

DUTIES OF EMPLOYEES

The rules under this division from 300 to 352 were approved. In Rules 353 and 354 the words "general manager" were stricken out. As revised, the title of any officer can now be used as desired.

Mr. Crafts quoted his rule on "passing cars" in connection with Rule 356. It read:

> When passing standing trains on double track in cities and at stations train must come to a full stop before reaching rear end of standing train, proceeding cautiously only when the way is known to be clear, the gong to be rung until well clear of standing train.

After discussion it was decided to make no change in the rule. Rules 357 to 373 were unchanged.

There was some discussion on Rule 374, which provides:

Cars Blockaded.

> In the event of a blockade of cars from any cause, cars in such blockade must not all attempt to start at one time, but at such intervals as will not overload the power.

It was suggested that cars going in one direction should start first. No change was made in the rule. In Rule 399 the word "signals" was changed to "markers." No other change was made in Rules 375 to 412.

ACCIDENT AND PERSONAL INJURY CASES

Rule 430 was eliminated as it was identical with Rule 24. No other change was made in the accident and personal injury rules.

EJECTMENTS

Under ejectments Mr. Crafts thought the conditions under which ejectments are legal should be explicitly stated. His rule contained the statement that the ejectment "should not be in such a place, in such weather or at such unreasonable hours of the night as might easily endanger the life or safety of the person ejected. In no case shall an ejectment be made at a greater distance than one-half of a mile on a traveled highway from a dwelling known to be inhabited." Mr. Collins pointed out that the statutes on this subject varied in each State and it was decided to leave that matter to the local attorneys.

The meeting then adjourned.

COMMITTEE ON WELFARE OF EMPLOYEES

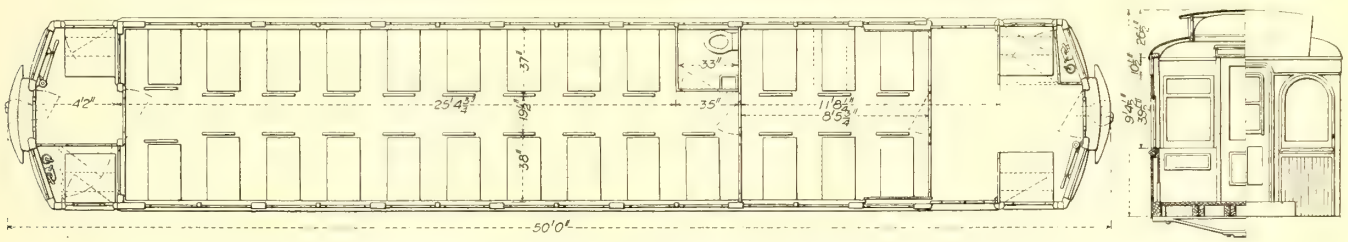
The committee on welfare of employees of the American Street & Interurban Railway Association, E. G. Connette, chairman, met May 8. Among the subjects which will receive attention by the committee is that of the fostering of club spirit. It is felt by the committee that where companies have facilities entertainments for employees and their families should prove profitable if combined with lectures presented in an attractive manner on topics of personal interest, which might embrace the expense and effect upon the health of the use of liquor, etc.

The committee will also discuss further the advisability of the merit system of discipline and will also consider plans for a savings association and pension systems.

WASHINGTON, BALTIMORE & ANNAPOLIS CARS

The Washington, Baltimore & Annapolis Electric Railway Company is making arrangements to operate its cars to the Treasury Building in Washington over the city tracks instead of stopping at the present terminal in the suburbs. The present cars are 62 ft. 2¾ in. long over the buffers, 9 ft. ¾ in. wide and weigh 58 tons complete without passengers. They are equipped with 500 hp in motors and geared for 70 m.p.h. To permit operation in the lower part of Washington the company will be obliged to use cars of 50 ft. extreme length, 8 ft. 9 in. extreme width and weighing 40 tons without passengers. It therefore placed an order on May 15 with the Niles Car & Manufacturing Company, Niles, Ohio, for 27 double-end combination passenger, smoking and baggage cars which will fulfil the new conditions. As shown on the accompanying plan, the new cars have a convertible motorman's cab in each vestibule to allow passengers to enter at each side of the rear and on the right-hand side of the front when running with either end of the car forward. The company has also purchased one 50-ft. express car body and 66 Baldwin Class 78-25 trucks for these 28 new car bodies, three of the present combination car bodies and two of the present express car bodies, which are shorter than the present passenger cars.

The new passenger cars will be fitted with four GE 75-hp motors geared for a maximum speed of 55 m.p.h. The car-body length will be 40 ft.; the length over buffers, 50 ft.; the width over all, 8 ft. 9 in.; the height under sills to the top of the roof, 9 ft. 4½ in.; the distance between truck centers, 27 ft. 6 in.; weight of car body, 27,000 lb., and seating capacity, 50. The bottom frame will have four 6-in. steel I-beams and two ⅝-in. x 7¾-in. steel plates, all filled with yellow pine on both sides. The four I-beams will extend under the vestibules from buffer to buffer.



Plan and End Elevation of New Car for Washington, Baltimore & Annapolis Railway

The vestibules are to have 27-in. swinging doors in the centers for train service and a 27-in. swinging door on each side with triple steps covered with Edwards automatic self-raising steel trap doors. Each end is to be fitted with Janney automatic M. C. B. radial drawbars and buffers and the Niles steel pick-up fender. The convertible motorman's cab is to be located at the left-hand side of the front end and the right-hand side of the rear end. It will be formed by a swinging door to isolate the motorman when longitudinal to the car and to inclose the controlling apparatus when it is transverse to the car.

Next to the vestibule at one end of the car there will be a small baggage compartment with a 34-in. baggage door on each side. The smoking compartment will have three windows on each side and be next to the baggage compartment. A dry-hopper toilet-room will be in the main passenger compartment against the smoking partition.

In external appearance the cars will be of the Niles twin-window or Pullman type with plate glass in all the lower side windows and doors and art glass in Gothic and deck sashes. The interior is to be of selected mahogany with natural-wood finish, full Empire ceiling. The floor in both passenger compartments is to be covered with inlaid linoleum. Hale & Kilburn leather seats will be used.

Each end of the car is to be fitted with Nichols-Lintern air sanders arranged to conduct the sand under the leading wheels by a flexible connection between the car body and iron pipes rigidly attached to the ends of the trucks. Lindstrom bronze levers and worms control the hand brakes at each end of the car. Electric heaters will be employed.

The trucks are to be of the Baldwin Class 78-25 of 6-ft 6-in. wheel base with Standard 36-in. forged rolled-steel wheels, 3-in. tread, flange 1⅛ in. wide and 15/16 in. deep with rims 2½ in. thick. The axles will be of hammered steel 5½ in. at motor bearings, 6 in. at gear seat and 5 15/16 in. at wheel seat. The journals will be 4¼ in. x 8 in. Symington ball center and side bearings and Symington semi-steel journal boxes will also be used.

A NEW SOLDER

A new kind of solder, called tinol, which was originated in Germany, has recently been put on the market by the American Tinol Company, of Philadelphia.

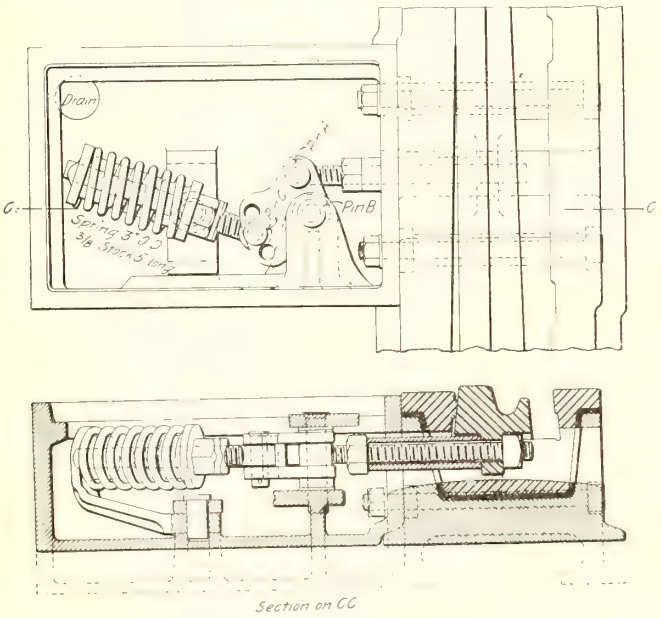
As is well known to every metal worker, all alloys of lead and tin on melting in contact with air form oxides or dross. The presence of such oxides prevents metallic union of the solder with the metal to be joined. The so-called fluxes, as acid or muriate of tin, rosin, etc., serve to protect the melting solder against direct contact with the air, and hence against such oxidation.

Tinol, the new soldering mixture, consists of finely granulated solder, each grain coated with a fatty organic substance which is neither acid or alkaline. This coating or "flux" begins to melt before the solder, but is not completely evaporated until the solder has set, thus protecting the solder fully against oxidation during the entire operation. The mixture of granulated solder and fatty flux forms a paste of a consistency that allows its easy application by knife blade, glazier's spatula, stiff bristle brush, or even with the fingers. As it is convenient for some work to use solder in stick and in wire form, tinol is also made up in rods and wires of different sizes, ranging from 8 mm (0.3150 in.) down to 1 mm (0.0393 in.). These rods and wires are all hollow and contain the same flux used in the tinol paste. Any source of heat may be utilized, as a gasoline or alcohol torch, hot poker or soldering iron. For light work, an ordinary wax match will answer. One advantage of the fine granulation of the solder is that much less heat is needed than with bar solder, since each grain melts much more readily.

Among the joints recently made with this solder are some with sheet lead of 0.018 in. thickness, with a joint of 7/16 in. x 3½ in., sheet lead of 0.018 in. thickness soldered to 0.022-in. sheet steel with a joint of ½ in. x 3½ in., two iron plates of 0.117 in. thickness soldered with a joint of 1¾ in. x 4¾ in., and for wires and cables.

A NEW DESIGN OF TONGUE SWITCH AND SPRING LOCKING DEVICE

The Lorain Steel Company, Johnstown, Pa., has recently begun the manufacture of a new design of tongue switch for electric or steam railway tracks in paved streets. The distinguishing feature of this new type of switch is the large bearing surface of the tongue at the heel. The heel is cylindrical in shape, 9½ in. in diameter, and is of the same thickness as the main body of the tongue. It is offset from the center line of the tongue, the center of the heel being on the gage line of the straight rail. This effectually prevents the tongue being shifted by the passage of a wheel over the heel. On the underside of the heel, and cast integrally with the tongue is a lug which projects downwardly through a hole about 3½ in. in diameter, cored in the main casting. This lug is not depended upon to center the heel of the tongue, as the sides of the offset cylinder are ground to a perfectly true circle and the hole in the main casting is also ground out perfectly true to receive the heel in a perfect mechanical fit. The heel has a total effective bearing area on the main casting of 60 sq. in., which is about five times the area provided in most designs of tongue switch fastenings.

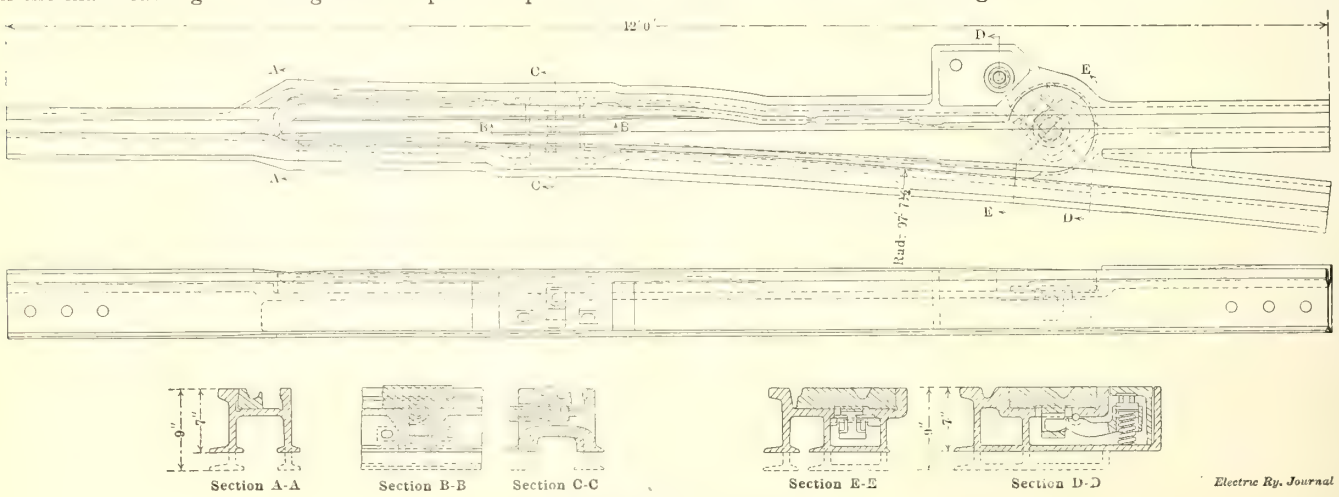


Spring Switch Locking Device

The lug on the under side of the heel is provided as a means of retaining the tongue to a perfect bearing on the main casting under any conditions of snow, ice or mud. The lug is formed with two projecting shoulders at the bottom. A short lever arm having a forked end engages with the lug and fulcrums against the top section of the main casting. At its outer end this lever is formed with a cup which encloses a small but stiff spiral spring. A bronze adjusting screw is provided for varying the upward pressure of this spring. The strength of the spring and the proportions of the short lever arm are such that a pressure of more than 2 tons downward on the heel of the tongue can be produced. This pressure is ample to retain the tongue at all times firmly on its bearing and yet is not too great to permit the tongue to be thrown with the ordinary switch iron. If it is desired to remove the tongue from the switch, the cover plate of the small box formed on one side of the main casting near the heel of the tongue can be taken off, and by loosening the adjusting nut the spring and lever can be quickly removed. The tongue is then free to be lifted out of the switch. This type of tongue fastening is used with solid manganese steel construction, and also for the company's well-known "Guarantee" construction, in which the main casting is of high-grade carbon steel and the tongue and inserted bed plate of special hard manganese steel.

All switches of this type have provision made for attaching a box to either side of the main casting containing a locking mechanism for holding the tongue in one position or the other, or mechanism for operating the switch from a distant point, either electrically or mechanically. The tongues of all switches are provided with a small lug on the under side near the point for attaching these locking or switch-throwing devices. In this connection the simple locking device which The Lorain Steel Company has perfected is of interest. The details are shown in one of the accompanying engravings.

A short bell crank is pivoted on lugs cast on the side wall of the switch-lock box. One arm of this bell crank is connected by an adjustable bolt to the lug cast on the bottom of the switch tongue. The other arm is drilled with three holes. A stiff spring 5 in. long and 3 in. in diameter is mounted on a swinging arm in the back of the box, and an adjustable stem inside the spring is connected by pin *C* to the ball crank through one of the three holes. The lengths of the bell-crank arms and the relative positions of the pins are such that when pin *C* is placed in the middle hole of the bell-crank arm the switch tongue will be held firmly by the pressure of the spring in either position to which it is thrown by a switch iron. By shifting

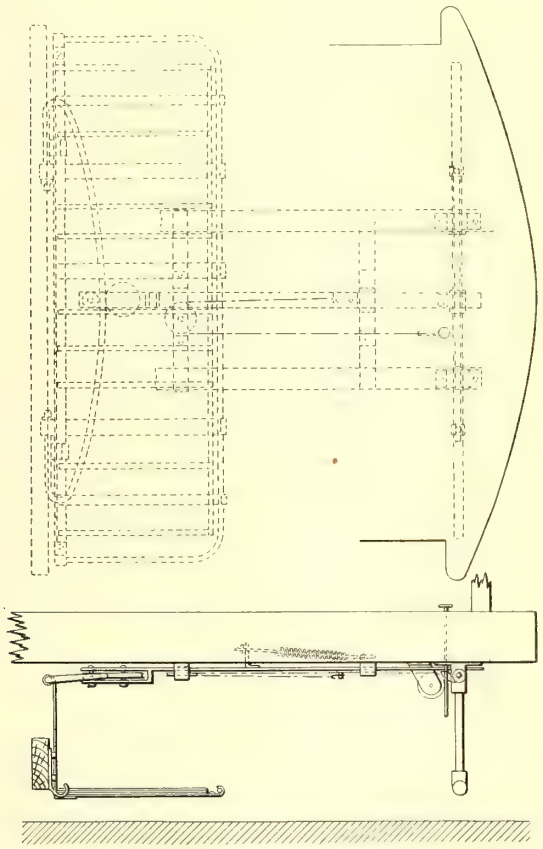


Tadpole Tongue Switch

the pin to one or the other of the outside holes the tongue can be held normally for either the straight track or the diverging track, at the same time permitting cars to run through as in the case of a spring switch. The spring-locking device is extremely simple and is not likely to get out of order. Ample provision is made for adjustment to take up any wear.

IMPROVED WHEEL GUARDS FOR THE METROPOLITAN STREET RAILWAY COMPANY, NEW YORK

As announced last week, the Metropolitan Street Railway, New York, has ordered 50 wheel guards of the latest type made by the Parmenter Fender & Wheel Guard Company, Boston, Mass. This requisition covers the 1909 model, which embodies many improvements over the earlier Parmenter guards, and is the result of 15 years' experience in the design and operation of car safety devices. The new guard can be reset from the platform if desired. It is always attached to the car trucks, and when applied to a double-truck car can be operated on curves as well as on tangents. It is said to be absolutely non-oscillating on single-truck cars, as the gate or apron is not suspended from the car body. The new anti-vibrating hanger is intended to overcome any rigid vibration from the truck and to carry the guard more flexibly than if the latter were attached to the car body. This elastic suspension should greatly decrease the maintenance cost of this design of wheel guard.

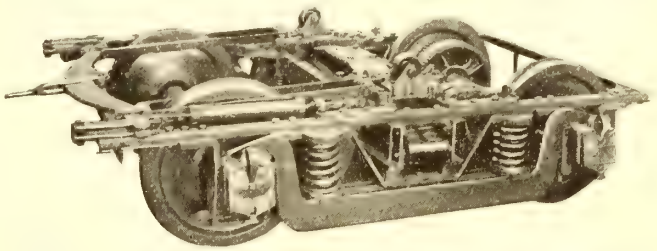


New Design of Wheel Guard for Metropolitan Street Railway, New York

The Parmenter fender, also manufactured by this company, made the highest number of points at the Schenectady tests of the Public Service Commission for projecting fenders with platform trip. The records show that it was successful in picking up both standing and prostrate dummies.

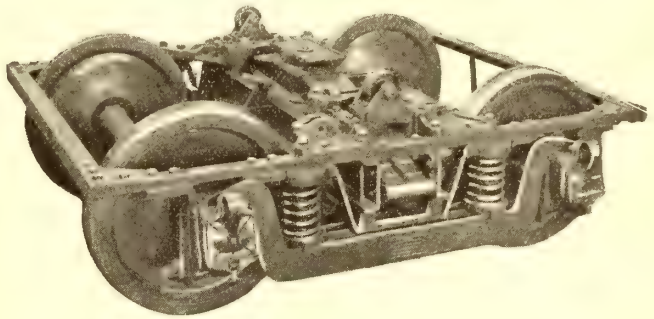
MOTOR AND TRAILER TRUCKS FOR THE SEATTLE, RENTON & SOUTHERN RAILWAY

The Baldwin Locomotive Works have recently built eight motor and an equal number of trailer trucks for the Seattle, Renton & Southern Railway. As shown in the accompanying illustrations, both trucks are of the M.C.B. equalized pedestal type, and are generally similar in design and construction. They are built for standard-gage track. The motor trucks are called by the builders Class 79-25, and will carry a centerpin load of 22,500 lb. They are arranged for West. 304 motors, inside hung, with bar suspension. The wheel base is 6 ft. 7 in.; the wheels are 34 in. in diameter and the journals are 5 in. x 9 in. In accordance with the most recent electric railway practice, these trucks are equipped with solid forged and rolled steel wheels, supplied in the present case by the Standard Steel Works.



Motor Truck for Seattle, Renton & Southern Railway

The side frames are of forged iron, measuring 1¾ in. x 3 in., while the end frames consist of 3-in. x 3-in. angles. The transoms consist of 9-in. channels secured to the end frames by cast-steel gussets. Double coil springs support the truck frame on the equalizers, and the bolster springs are double elliptic. The seats for these springs are of cast steel hung on the swing links and tied transversely by a pair of 2½-in. x 2½-in. angles. The bolsters are also of cast steel. The equipment includes inside-hung brakes and roller side-bearings.



Trailer Truck for Seattle, Renton & Southern Railway

The trailer trucks are designed for a centerpin load of 17,750 lb. They have a wheel base of 5 ft. 6 in., and are similar to the motor trucks in construction, except that most of the parts are lighter. The equipment includes Standard forged and rolled steel wheels, similar to those used under the motor trucks.

For the severe requirements of interurban work on electric railways, the M.C.B. type of truck, with rolled-steel wheels and parts machine fitted, has proved particularly suitable, and the designs above described embody the latest features of this style of truck as constructed by this builder.

The receipts from traffic on the London County Council Tramways for the year ending March 31, 1909, were $9,007,000, an increase over last year of $882,500.

News of Electric Railways

Cleveland Traction Situation

Judge Tayler's plan of settling the Cleveland traction problem by insuring a return of 6 per cent on the capital invested and the lowest fare consistent with good service was endorsed by the City Council of Cleveland sitting as a committee of the whole on May 21. At this meeting, Mayor Tom L. Johnson, however, did not insist upon the holding plan which he proposed some time ago, and this was considered a hopeful sign. City Solicitor Baker asked Horace E. Andrews, president of the Cleveland Railway, if he would consider dual management of the system, stripped of the holding-plan idea.

Mayor Johnson refused to concur in the proposition of Mr. Andrews, made some days before the meeting on May 21, to submit the whole matter to Judge Tayler and each side abide by his decision. Mr. Andrews said he had so much confidence in Judge Tayler that he would be willing to have him write a franchise under which the company would operate for the next 25 years. Mayor Johnson said that there were two reasons why this could not be done. One is that Judge Tayler had said he was not willing to undertake the task and another is that the administration is not willing that he should do it.

On the evening of May 22 Mayor Johnson and the City Council flatly refused the proposition of Mr. Andrews that Judge Tayler be requested to write a franchise. Mr. Andrews told the administration that the directors of his company had agreed to be bound by the terms of the franchise that Judge Tayler would write, in advance of it being written. On a resolution presented by Councilman Horner, embodying this proposition, the vote was 13 to 3 against it, some of the members not voting, evidently being loath to oppose the proposition. Mr. Horner explained that the members of Council would not be bound to accept the ordinance, as framed by Judge Tayler, but that they would have something before them, including the Tayler plan in detail, upon which they might work to advantage. Mr. Andrews reiterated that it would be useless for the Cleveland Railway to agree to be bound in advance if the City Council would not likewise agree to accept the terms in advance.

Mayor Johnson said that he admired and respected Judge Tayler, but that he could not permit him to assume the duties of Mayor or Councilman. He insisted that Judge Tayler take up nothing but the differences that exist between the company and the city, and said that upon many points Judge Tayler, because of lack of experience in street railway matters, would not be competent to pass judgment. Councilman Haserodt moved that a list of the points of difference be presented to Judge Tayler for advice. Mr. Andrews asked for time to consider this, and it is possible that his answer will depend upon whether the Council will agree to be bound by his finding on the points presented to him.

Mr. Andrews finally agreed to arbitrate the value of pavements involved, if the city would submit all other questions to Judge Tayler and abide by his decision. He said he had been holding up this matter until he learned what the city would do regarding the treatment of stockholders of the Cleveland Railway and the original holders of stock of the Forest City Railway.

The resolution adopted by the directors of the Cleveland Railway relative to submitting all matters to Judge Tayler says in part:

"Resolved, That it is the sense of this board 'that the street car question be settled upon the so-called Tayler plan.'

"Resolved, That we recognize that there probably exist honest differences of opinion as to certain details of the Tayler plan, and that we can think of no better or fairer way of bringing the long-continued discussions about such details to a conclusion than to offer to refer the interpretation and decision of all points in the Tayler plan to the author of that plan, namely, Judge Tayler himself.

"Resolved, That, desiring not to prolong the discussion of points of difference, we think it wise not to attempt any specific answer to Mr. Baker's questions, nor to lay down any ultimatums, believing that our offer to leave the decision of all such differences to Judge Tayler will furnish the speediest and most practical way, and the way most acceptable to the people of this community, for the final settlement of this much-vexed question."

At the meeting of the Council committee of the whole on the evening of May 17, Judge Tayler was invited to address the members. He said he regretted that a settlement had not been reached and that he would not have proposed a settlement on the plan he has suggested if he had supposed that the valuation fixed a year ago was to be changed. The task of a revaluation was too large to be repeated at this time, but with that out of the way, the Judge said he felt that means were provided to satisfy the needs of the people with a settlement that would give them the lowest fare at all times commensurate with good service. Judge Tayler stated that the maximum fare should be large enough to attract capital to rehabilitate the system and provide for extensions and that he thought six tickets for 25 cents would be sufficient for all purposes.

F. H. Goff, who served as arbitrator for the Cleveland Electric Railway in the negotiations a year ago, was requested to explain the so-called "gentlemen's agreement" which served as rules of procedure at that time. He said he believed the Cleveland Railway had conformed to the terms of the agreement.

Mayor Johnson has unfolded a holding company plan, the directors to be divided equally between appointments made by the city and by the company. Mr. Andrews said that he had stated at the outset he would never consider a plan of leasing the property to a holding company.

H. J. Schmidt submitted a bid at 3-cent fare for the franchise of Payne Avenue on May 18. Just why he did not bid for the other routes claimed to be open is not clear. The Cleveland Railway submitted bids on all routes open at the time for that purpose, the fare to be 5 cents cash, six tickets for 25 cents and transfers to all its lines. No cash deposit was made with the bids of the Cleveland Railway, as the company is operating lines. The city solicitor objected to this, however. The Cleveland Railway replied that the advertisement was not fair, as the company would be compelled to give transfers, while other bidders did not incorporate a transfer clause in their bids. It was requested that other bids be asked under conditions fairer to the old company. If this request be not allowed, the company stated that its bids are made under protest.

Arrangements for the Master Car Builders' and Master Mechanics' Convention

The Railway Supply Manufacturers' Association has issued a circular, outlining the arrangements which have been made for the coming conventions of the American Railway Master Mechanics' Association and the Master Car Builders' Association, to be held in Atlantic City June 16-23. The Master Mechanics' convention will be held on Wednesday, Thursday and Friday, June 16-18, and the Master Car Builders' convention will be held on Monday, Tuesday and Wednesday, June 21-23. The meetings of both associations will be held on Young's Million-Dollar Pier, as in the preceding year. The Marlborough-Blenheim Hotel has been selected as headquarters for both conventions, and the presidents, executive committees and secretary will have offices there. The registration booth will be in the entrance hall of the Million-Dollar Pier. In order that a correct record may be made of the members in attendance it will be necessary to register once for each convention.

The Manufacturers' Association has recently increased the available exhibit space on the Million-Dollar Pier to a total of about 65,000 sq. ft.; practically all of this space has been assigned. The arrangement of exhibits has been designed to be unusually attractive.

Yearly membership dues of the Railway Supply Manufacturers' Association are $25, and include one membership badge. Additional badges may be obtained by members for their representatives and ladies in attendance at the conventions for $5 per badge.

The Trunk Line Association this year offered a round trip rate on account of the conventions of a fare and three-fifths on the certificate plan, but owing to the difficulty experienced in previous years it was not thought advisable to accept this rate. Excursion rates of a fare and one-third for the round trip have been announced, however, as applying from Chicago and St. Louis and other points in that immediate territory. A special train will be run over the Pennsylvania Railroad, leaving Chicago at 5:30 p. m. June 14, on which the round trip rate will be $26 and the single fare rate $19.50.

The exhibit booths will be ready for the installation of exhibits on June 1, with the exception of booths on the west side of the main building and in the south half of Machinery Hall, which will not be ready until June 10. The

installation of exhibits may be begun on these dates and must be completed not later than the night of June 15. All freight shipments of apparatus to be exhibited should be plainly addressed to the company making the shipment, giving also the exhibit space number, and they should be marked "Million-Dollar Pier, care of Eldredge Express Company, Atlantic City, N. J." The usual arrangements have been made with the Eldredge Express Company and P. E. Lane for carting the shipments between the railroad station and the exhibit spaces on the pier, and for labor and material in erecting the exhibits. Furniture and rugs for the booths can be rented for the eight days of the convention from Joseph L. Shoemaker & Company, 926 Arch Street, Philadelphia, Pa.

On May 17 the secretary of the Railway Supply Manufacturers' Association, E. G. F. Smith, removed his offices temporarily to the Million-Dollar Pier, Atlantic City, N. J., where all communications relative to arrangements for exhibits should be sent.

Transit Affairs in New York

Corporation Counsel Pendleton, of New York, in answer to a statement made by Chairman Willcox of the Public Service Commission, says that it is within the province of the commission, as the successor of the old Rapid Transit Commission, to make an agreement with the New York Central & Hudson River Railroad for the removal of the tracks in Eleventh Avenue, as provided in the unrepealed Saxe law. The Saxe law provided that the city should have the power to condemn if the company and city did not come to an agreement about the removal of the tracks in a year, expiring March 26, 1907. No agreement was reached, and Mr. Willcox said that the period for agreement ended before the present commission was created. In his statement the Corporation Counsel said that the commission can proceed under the Saxe law.

The Brooklyn Rapid Transit Company is preparing to make service changes in the near future which will increase materially the facilities on its elevated lines and make it much easier for its patrons to travel in Brooklyn. Of its own initiative the company has had maps prepared showing the layout of all surface and elevated lines in the borough, with the stations on the elevated roads and the time of the departure of trains for the various points of destination.

The Public Service Commission has ordered the Brooklyn Rapid Transit Company to maintain in rush hours on week days, excepting Saturday afternoons, the maximum service on all its elevated lines that can be furnished with safe operation. At other times the company is required to offer facilities as follows: Where the headway is 5 minutes or less, sufficient cars must be operated past all stations to provide seats for at least as many passengers a there may be on four consecutive trains; where there is a headway of between 5 and 10 minutes, the order stipulates that three consecutive trains shall furnish the test; where the headway is between 10 and 20 minutes, it is two consecutive trains, and where the headway is 20 minutes or more there must be seats enough for every passenger in every train.

Time for the completion of two of the lower sections of the bridge loop line subway has been extended until Aug. 1 by an order of the Public Service Commission. Work on these sections has been held up by request of Mayor McClellan pending the construction of the foundations of the new Municipal Building. The loop subway will connect the Williamsburg, the Manhattan and the Brooklyn bridges.

The Public Service Commission has granted the New York City Interborough Railway permission to put into effect on May 29 a new tariff supplement, providing for a new routeing of the cars on the lines coincident with the opening of the new Sedgwick Avenue line. This will establish new transfer points, including the 8-cent transfer at the 238th Street station of the Broadway branch of the subway. The 8-cent transfer includes the ride on the surface car and on the subway.

The Public Service Commission has discontinued proceedings against the receivers of the Metropolitan Street Railway for the improvement of the service on the company's Fourteenth Street and Christopher Street lines as traffic has recently decreased and the service is now considered adequate.

Electrification of Canadian Lines Under Consideration.—The Dominion Government of Canada and the Provincial Government of New Brunswick have under joint consideration a plan to equip with electricity the eastern section of the National Transcontinental Railway from Quebec to Moncton.

Construction of Cambridge Subway Begun.—The Boston (Mass.) Elevated Railway has begun the construction of the Main Street subway in Cambridge, ground having been broken on Massachusetts Avenue in the Dana Hill section. A shaft is being sunk at the corner of Bay Street to afford soil tests and an exit for material excavated.

Electrification of Branch of Delaware & Hudson Company Possible.—The Rutland Railway, Light & Power Company, Rutland, Vt., is negotiating with the Delaware & Hudson Company with a view to electrifying that company's lines from Castleton to Eagle Bridge, N. Y., and from Fair Haven to Whitehall, N. Y., and operating them in connection with its present lines. If the negotiations now pending are not concluded, the Rutland Railway, Light & Power Company will probably build from Fair Haven to Castleton Corners or Hydeville to Poultney.

Report of Indiana Commission.—The annual report of the Indiana Railroad Commission, now in press, will contain 700 pages, 150 of which will be devoted to electric railways. The commission will recommend that several laws now in force be amended, and that a number of new measures be passed by the next Legislature. The commission desires especially the passage of laws to prevent trespassing and to provide a systematic plan for the elimination of grade crossings. The report will review the conferences that have been held between the commission and the managers of electric railways and cite the good results that have followed the observance of the uniform rules by the electric railways.

Chamber of Commerce of Cleveland Reports on Underground Rapid Transit Proposal.—The directors of the Chamber of Commerce, Cleveland, have made public their report on the proposal made to the city by the Cleveland Underground Rapid Transit Company for a franchise for an underground electric railway. The directors say that the term for which the grant is sought is too long, and that an ordinance containing the provisions asked by the company would work materially to the detriment of the city by preventing other companies from securing an entrance to the city. They say that in the main the proposal of the company is a good one, and would favor its passage if the changes are made which they have suggested.

Boston Matters Go to Joint Committee for Report.—Three important questions affecting the Boston Elevated Railway have been referred by Governor Draper to the Boston Transit Commission and Railroad Commission sitting jointly. The questions have to do: (1) with the proposed consolidation of the Boston Elevated Railway and the West End Street Railway, (2) authorizing the Boston Elevated Railway to invest in the stock and securities of other companies, and (3) the proposed elevated structure from Sullivan Square to Medford. In one way or another the three matters have been long before the Legislature. The Legislature now turns them over to the two commissions, for a report to the Legislature of 1910 before the second Saturday of January.

Program of Accounting Section, National Electric Light Association.—Separate meetings of the accounting section of the National Electric Light Association will be held during the convention at Atlantic City next week. The accounting section will have an all-day session on Thursday, June 3, and possibly a session on June 4 in addition. The following papers will be read before the accounting session: "Depreciation," by G. E. Claflin, United Electric Securities Company; "Payroll Problems," by W. E. Freeman, cashier, New York Edison Company; "Cost Accounting," by H. R. Kern, Philadelphia Electric Company; "Care and Handling of Supplies," by J. L. Bailey, treasurer, Consolidated Gas, Electric Light & Power Company, Baltimore; "Branch Office Accounting," by E. J. Allegaert, auditor, Public Service Corporation of New Jersey.

Convention of Pennsylvania Engineers.—A convention of the engineers of Pennsylvania will be held at Harrisburg, June 9-11, to organize an association to hold annual conventions in that State. The association will operate within the charter of the Engineers' Society of Pennsylvania, with 900 members and a club house at Harrisburg. The opening exercises will take place at the Industrial Exhibition, at Chestnut Street Hall. In the afternoon an organization will be effected and in the evening a reception will be given at the Board of Trade Auditorium. June 10 and 11 will be devoted to elections. Special trips are also proposed. The papers to be presented relate to sanitation, civil and mining engineering, forestry, mechanical engineering and electrical engineering. Among the papers is one on the Panama Canal, by Arthur P. Davis, of the Roosevelt board of consulting engineers, or by Lieut. W. H. Hodges, assistant engineer of the Isthmus Canal Commission. Those who desire to attend should communicate with Edw. R. Dasher, secretary convention committee, Engineers' Society of Pennsylvania, Harrisburg.

Estimate of Cost of Reconstructing San Francisco Railway as a Municipal Line.—Since the Aldermen of San

Francisco passed to print an ordinance to submit to the voters of the city a bond issue of $1,950,000 to cover the cost of reconstructing the Geary Street, Park & Ocean Railroad and extending the line to the Cliff, City Engineer Manson has submitted two estimates for the reconstruction of the property, one for an overhead electric railway from Geary Street and Kearny Street to the ocean, with a branch to the park, and the other for a conduit line with an overhead extension to the ocean and a branch along Tenth Avenue to the park. The cost of an overhead electric railway, as presented by Mr. Manson, is $1,994,232, and of a conduit line with a trolley extension, $2,258,000. The question of rebuilding the Geary Street, Park & Ocean Railroad as a municipal undertaking was originally considered in 1906, at which time it was estimated that the cost of reconstructing the property would be $710,000. This estimate was taken as the basis for the proposed issue of $1,950,000 of bonds by the city for reconstructing and extending the line.

Graduate Study at Massachusetts Institute of Technology.—In the recent report of Arthur A. Noyes, acting president of the Massachusetts Institute of Technology, particular emphasis is placed on the provision now made at the institute for advanced study leading to the higher degrees of Master of Science, Doctor of Philosophy and Doctor of Engineering. These courses are described in a bulletin entitled "Advanced Study and Research." Another important movement which also supports the cause of advanced study has been the establishment of the new research laboratory of applied chemistry. This laboratory co-operates with the research laboratory of physical chemistry. It is hoped that a research laboratory of applied electricity may soon be established. There now are 215 students at the Institute of Technology who are graduates of the courses of the institute or other institutions, many of whom are taking undergraduate engineering work. Others are pursuing the advanced or graduate instruction.

Terminal Plans Under Consideration in Baltimore.—The Pennsylvania Railroad has formally protested to the City Council of Baltimore against the passage by it of an ordinance requiring the company to use some motive power other than steam in the tunnels and open cuts in Baltimore through which all trains between Washington, Baltimore, Philadelphia and New York are run. Geo. Gibbs, chief engineer of electric traction of the Long Island Railroad, which is controlled by the Pennsylvania Railroad, presented an estimate of the cost of changing the motive power of the company's terminal line in Baltimore to electricity, which showed that the expense involved would total $6,000,000, a sum which is deemed prohibitive. The discussion of the terminal problem in Baltimore has resulted in a proposition being submitted to the city by Henry W. Williams, Baltimore, for a four-track railroad tunnel under Pratt Street. Mr. Williams has refused to discuss the plan in detail or to say who is associated with him, but has announced that the plan as proposed by him has been pronounced practical by his own engineers and consultants who were especially employed to consider the plan. He says that from the rough cursory plans that have thus far been developed it is estimated that the proposed line would cost $15,000,000.

Philadelphia Transit Situation.—Mayor Reyburn, of Philadelphia, has declined to arrange for a conference between himself and the other representatives of the city of Philadelphia on the board of directors of the Philadelphia Rapid Transit Company and the committee of 15, which was named at a recent meeting of the citizens of Philadelphia to take up with the company the question of fares and street railway conditions in general. The Mayor says that he does not propose to extend to the committee any courtesies that are not extended to private citizens and that he is always available to the public at his office in the City Hall. On May 20 the Pennsylvania Railroad Commission informed G. H. Burnham, Jr., president of the City Club of Philadelphia, that the members of the commission would confer with him informally on May 29, in Harrisburg, at which time Mr. Burnham will explain to the commission the desires of the club in connection with matters affecting street railway service in Philadelphia. John Y. Boyd, of the commission, has been in Philadelphia for several days, acquainting himself with local conditions, so as to be familiar with the situation in Philadelphia when it comes before the commission for consideration on May 29. It is expected now that the suit of Elmer E. Brode, attacking the validity of the contract between the city of Philadelphia and the Rapid Transit Company, will come up for a hearing in the Common Pleas Court within a few days. The case has been delayed for some time by legal technicalities. The employees of the Philadelphia Rapid Transit Company sent to John B. Parsons, president of the company, on May 24, a letter asking that concessions be made in their favor. The officials of the company point out that an increase of 1 cent an hour has been granted the employees, effective on July 1, and that the special committee of the board of directors of the company is studying the transfer system with a view to making concessions to the public and also has under consideration the previous communication of the men concerning the terms and conditions of their service with the company.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The Senate has concurred in the action of the House in passing a resolution for a joint select committee of nine members and two Senators, to consider the subject of public utility legislation and submit a bill not later than June 8. Senators Barnum and Middleton have been named as the representatives of the Senate on this committee. Closely following the action of the Senate in concurring with the House in the matter of public service legislation, a meeting of the new public utility committee was held, and Senator Barnum was chosen chairman. He subsequently announced that hearings will begin in a few days. The committee will have at its disposal the stenographic report of the previous hearings before the judiciary committee, so as to avoid going over the same ground again in oral hearings. Members who propose amendments to the bill will probably be asked to file them with the clerk of the committee as soon as possible, in order that they may receive consideration. The hearings before the judiciary committee on the question of public service legislation were reviewed in the issues of the Electric Railway Journal of April 3 and April 17, and in view of the testimony taken at that time it is probable that the committee which now has the matter in hand will devote such time as is at its disposal not to discussions about public sentiment, but to a detailed consideration of the practical features of the bill which it is to report. According to Senator Barnum it is more than likely that the committee will assign a day to a hearing on the financial control of public service corporations, another day to a hearing on the control of rates of public service corporations and another day to a hearing on the control of the management and operation of public service corporations.

Massachusetts.—The Senate has passed to be engrossed the bill to authorize street railways to issue securities for supplying working capital. The committee on railroads and the committee on street railways sitting jointly have been authorized to visit Berkshire County in connection with the bills before the Legislature to provide for the consolidation of the Bennington & North Adams Street Railway with the Berkshire Street Railway. The resolve to provide for an investigation and report relative to public improvements for the Boston metropolitan district has been ordered to a third reading by the House. Rapid transit projects fall within the scope of this bill, and it is planned to have these incorporated in suitable bills at different periods when a study of the metropolitan district is made. The Senate has passed to be engrossed the resolve to provide for an investigation of the advisability of allowing the Boston & Eastern Electric Railroad to build a tunnel and subway in Boston as previously described in these columns. The House has introduced an amendment to the franchise tax law, providing that the half of the corporation franchise tax which now goes to the cities and towns where the stockholders have residences shall go to the State. This is an extension of the McCarthy bill, which sought to have all the corporation tax go to the cities or towns where the company does business instead of dividing it with the municipalities in which the stockholders live. If the amendment should be adopted the State would receive an addition of $1,000,000 per year to its revenue through the redistribution effected. The Senate report of the committee on street railways, referring to the next Legislature the Smith bill to define further the purposes for which capital stock and bonds may be issued by street railways, has been amended on the motion of Senator Grimes by the substitution of the bill to permit stock and bond issues to provide working capital. Governor Draper has vetoed the bill which provides that eight hours shall constitute a day's work for public employees. The House has passed to be engrossed and sent to the Senate a resolve to provide for an investigation of the advisability of constructing additional rapid transit lines in Boston, as previously noted in these columns. The bill giving directors additional rights in voting and in accepting locations for street railways has passed both branches and will shortly be considered by the Governor. The Governor has signed the bill extending to Dec. 31, 1910, the limit in the act of 1908 authorizing the consolidation of the Boston Elevated Railway and the West End Street Railway.

Financial and Corporate

New York Stock and Money Market

May 24, 1909.

During the past week trading has been dull and prices strong on the New York stock market. Almost every net price change recorded has been an advance, but the transactions have been limited and generally professional. The outside public appears to be indifferent. The strongest interests are the steel shares, those of the Trust and of the leading independents as well having recorded advances. United States Steel common continues to be the favorite speculative issue of the market, and it has been pushed above 60. The traction issues are only fairly active and, as a rule, show fractional recessions on the week's trading.

The bond market continues strong and active and rates for money show no disposition to advance. Quotations today were: Call, 1½ to 2 per cent; 90 days, 2¼ to 2½ per cent.

Other Markets

Rapid Transit has continued to be the most active traction issue in the Philadelphia market. There has been a loss of about one point during the week, and the close today was at 33⅝. Union Traction has been moderately active at prices that were practically unchanged.

In the Boston market, traction issues were practically neglected. Occasional lots of Boston Elevated and of Massachusetts Electric find their way into the market, but prices are entirely nominal.

There is little interest in traction issues in Chicago, even Subway shares, which were active a week ago, having dropped out of trading within the last few days. Series 3 and 4 of the Chicago Railways issues have been offered in small lots, the former at 26 and the latter at 9⅞.

In Baltimore, United Railways bonds are the only traction securities in which there is any interest. These continue to be active in all the issues. The closing to-day was: Incomes, 58½; 4s, 87½, and funding 5s, 81.

Quotations of various traction securities as compared with last week follow:

	May. 18.	May 24.
American Railways Company	a46	45¾
Aurora, Elgin & Chicago Railroad (common)	*38½	a38
Aurora, Elgin & Chicago Railroad (preferred)	*89	a87½
Boston Elevated Railway	127	128½
Boston & Suburban Electric Companies (common)	*16	*15½
Boston & Suburban Electric Companies (preferred)	*72	71
Boston & Worcester Electric Companies (common)	12	11
Boston & Worcester Electric Companies (preferred)	a58	a56
Brooklyn Rapid Transit Company	79½	79
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	88¼	88⅝
Capital Traction Company, Washington	*133	*135¼
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	4	*4
Chicago & Oak Park Elevated Railroad (preferred)	*15	*15
Chicago Railways, ptcptg. ctf. 1	a110	a110
Chicago Railways, ptcptg. ctf. 2	a38½	a38
Chicago Railways, ptcptg. ctf. 3	a28	a28
Chicago Railways, ptcptg. ctf. 4s	a10	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	*78	a79
Consolidated Trac. Co. of N. J., 5 per cent bonds	a107½	a107
Detroit United Railway	*58	a58½
General Electric Company	160½	161
Georgia Railway & Electric Company (common)	a86	85½
Georgia Railway & Electric Company (preferred)	a85	*85
Interborough-Metropolitan Company (common)	16¼	16
Interborough-Metropolitna Company (preferred)	45⅜	44⅝
Interborough-Metropolitan Company (4½s)	79	78½
Kansas City Railway & Light Company (common)	a50	a49
Kansas City Railway & Light Company (preferred)	86	a86½
Manhattan Railway	*146	a148
Massachusetts Electric Companies (common)	a14	a14
Massachusetts Electric Companies (preferred)	70½	a71
Metropolitan West Side, Chicago (common)	a18	a18
Metropolitan West Side, Chicago (preferred)	a53	a53
Metropolitan Street Railway	27	a28
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	82¾	82½
Northwestern Elevated Railroad (common)	a24	a24
Northwestern Elevated Railroad (preferred)	a72½	a71
Philadelphia Company, Pittsburg (common)	43	42⅞
Philadelphia Company, Pittsburg (preferred)	a44¼	44
Philadelphia Rapid Transit Company	34⅞	33⅝
Philadelphia Traction Co.	92½	a93
Public Service Corporation, 5 per cent col. notes	a101	a100¾
Public Service Corporation, ctfs.	a89½	a89½
Seattle Electric Company (common)	97½	*97½
Seattle Electric Company (preferred)	99	99⅞
South Side Elevated Railroad, Chicago	a58	a60
Toledo Railways & Light Company	*10¼	11⅛
Third Avenue Railroad, New York	30¾	28½
Twin City Rapid Transit, Minneapolis (common)	*106½	a105⅛
Union Traction Company, Philadelphia	57	57
United Railways & Electric Company, Baltimore	a12½	*12¾
United Railways Inv. Co., San Francisco (com.)	*36⅜	a38½
United Railways Inv. Co., San Francisco (pfd)	54½	a55
Washington Railway & Electric Company (common)	*42⅞	*43
Washington Railway & Electric Company (preferred)	*92⅞	*90¾
West End Street Railway, Boston (common)	93½	92¼
West End Street Railway, Boston (preferred)	*110	*110
Westinghouse Electric & Manufacturing Company	84¼	84
Westinghouse Elec. & Mfg. Company (1st pref.)	120	121

aAsked. *Last sale.

Earnings of Greater New York Railways

A summary of the quarterly returns of street railways and railroads operating in New York City, covering the quarter ended Sept. 30, 1908, has been made public by the New York Public Service Commission, First District. The earnings from operation and the operating expenses as reported by the various companies are as follows:

QUARTER ENDED SEPT. 30, 1908.

	Gross earnings from operation.	Operating expenses.	Net earnings from operation.
Hudson & Manhattan R. R...	$121,373.05	$127,898.04	*$6,524.99
Interborough Rapid Transit Co.	5,328,887.63	2,675,709.70	2,653,177.93
Brooklyn Rapid Transit system	5,117,661.14	3,085,552.03	2,032,109.11
MANHATTAN AND BRONX.			
Dry Dock, East Broadway & Battery R. R. Receiver.....	$166,346.99	$120,241.35	$46,105.64
Forty-second St., Manhattanville & St. Nicholas Ave. Ry. Receiver	308,918.20	190,624.31	118,293.89
Third Avenue R. R. Receiver.	790,995.55	548,026.26	242,969.29
Southern Boulevard R. R.....	22,676.40	15,991.35	6,685.05
Union Railway of New York Receiver	468,872.81	343,403.40	125,469.41
Total—Third Avenue Railroad system.....	$1,757,809.95	$1,218,286.67	$539,523.28
Central Park, North & East River R. R (Aug. 6 to Sept. 30).....	89,197.22	79,754.59	9,442.63
Metropolitan Street Ry. Receivers (Aug. 1 to Sept. 30)	2,238,275.41	2,047,438.84	190,836.57
New York City Ry. Receiver..	1,205,663.38	1,360,660.28	*154,996.90
New York City Interboro. Ry.	35,528.79	37,430.01	*1,901.22
Westchester Electric R. R....	111,614.60	132,515.70	*20,901.10
Total—Manhattan and B'x	$5,438,089.35	$4,876,086.09	$562,003.26
BROOKLYN AND QUEENS.			
Bush Terminal R. R.....	$6,715.49	$4,369.21	$2,346.28
Coney Island & Brooklyn R. R.	480,856.11	331,317.89	149,538.22
Long Island Electric Ry.....	60,601.17	41,961.49	18,639.68
Marine Railway.....	3,853.50	3,701.33	152.17
New York & Long Island Traction Co.....	99,038.75	57,946.32	41,092.43
New York & Queens Co. Ry...	274,261.15	225,879.10	48,382.05
Ocean Electric Ry.....	54,414.37	20,486.80	33,927.57
Van Brunt St. & Erie Basin R. R.....	12,941.48	10,197.69	2,743.79
Total — Brooklyn and Queens (exclusive of B. R. T. system).....	$992,682.02	$695,859.83	$296,822.19
RICHMOND.			
Richmond Light & R. R. Co..	$103,498.30	$81,326.53	$22,171.77
Southfield Beach R. R.....	5,161.30	1,460.83	3,700.47
Staten Island Midland Ry....	91,669.76	67,922.77	23,746.99
Staten Island Ry. (steam railroad)	66,223.73	54,582.20	11,641.53
Staten Island Rapid Transit Ry. (steam railroad).....	159,928.07	134,652.54	25,275.53
Total—Richmond	$426,481.16	$339,944.87	$86,536.29
Grand total	$17,425,174.35	$11,801,050.56	$5,624,123.79

*Deficit.

Conneaut & Erie Traction Company, Girard, Pa.—The property of the Conneaut & Erie Traction Company was sold under foreclosure on May 12, at Erie, to John McDonald, acting for the bondholders' reorganization committee.

Denton Interurban Railway & Power Company, Denton, Tex.—The property of the Denton Interurban Railway & Power Company will be sold under foreclosure at Denton on July 6, 1909. The property has been inventoried at $51,651.73, and there are outstanding against it liens for $50,822. Those who desire to bid should address E. F. Bates, receiver, Denton, Tex.

Egerton Tramway Company, Ltd., Stellarton, N. S.—The purchase of the property of the New Glasgow Electric Light Company, New Glasgow, N. S., by the Egerton Tramway Company, Ltd., was noted in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, page 961. The New Glasgow Electric Light Company has been furnishing service in the towns in which the Egerton Tramway Company, Ltd., operates. The name of the Egerton Tramway Company, Ltd., has been changed to the Pictou County Electric Company, Ltd., and contracts have recently been placed for new power equipment, totaling about $35,000.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, signed an order on May 24 postponing the sale of the property of the Metropolitan Street Railway under the foreclosure of the Guaranty Trust Company's $12,500,000 mortgage, from June 29 to Nov. 18, or later. The reason assigned was the inability of the United States Circuit Court of Appeals to hear the appeal of the Guaranty Trust Company from certain features of the foreclosure decree until its October term. Judge Lacombe says in his order postponing the sale:

"Although the decree of foreclosure and sale in this suit was entered on March 18, the mortgagee has so delayed the prosecution of the appeal that the last day on which a motion could be made for a hearing has passed without bringing it to the attention of that court. The appeal cannot be heard until the next term, which opens Oct. 11. Under these circumstances sale cannot be had before Nov. 18. The special master will take the necessary steps to adjourn it accordingly."

Metropolitan West Side Elevated Railway, Chicago, Ill.—On page 924 of the Electric Railway Journal of May 15, 1909, the terms were outlined which the committee, composed of Ira M. Cobe, E. K. Boisot and Samuel Insull, proposed for leasing the Northwestern Elevated Railroad, the Chicago & Oak Park Elevated Railroad and the South Side Elevated Railroad. The plan of the committee is to lease all the elevated railways in Chicago on the basis of guaranteed yearly rentals, and the committee has since submitted its offer for leasing the Metropolitan West Side Elevated Railway. The Central Terminal Company, through which the separate lines will be leased, has agreed to guarantee dividends of 3 per cent annually on the outstanding preferred stock of the Metropolitan West Side Elevated Railroad from 1910 to 1912, inclusive. In 1913 and 1914 it agrees to pay 3½ per cent on the preferred and 1 per cent on the common stock each year; in 1915, 3½ per cent on the preferred and 1½ per cent on the common; in 1916, 4 per cent on the preferred and 1½ per cent on the common; in 1917 and 1918, 4 per cent and 2 per cent, respectively, each year; in 1919, 4½ per cent on the preferred and 2 per cent on the common, and in 1920 4½ per cent on the preferred and 2½ per cent on the common stock. The maximum rates of 5 per cent on the preferred stock and 2½ per cent on the common stock are to be paid in 1921 and thereafter during the term of the lease.

New Orleans Railway & Light Company, New Orleans, La.—The directors of the New Orleans Railway & Light Company have decided upon a financial plan which involves the creation of a $50,000,000 bond issue, of which $5,000,000, it is said, will be purchased at 85 by Bertron, Griscom & Jenks, New York, who recently bought $2,400,000 bonds of the company. The plan also provides that the preferred and common shareholders shall part with 25 per cent of their stock holdings at 40 and 15, respectively, and the New York banking firm will be given two members on the board of directors. The proposed $50,000,000 of bonds will bear interest at the rate of 5 per cent, and $30,000,000 will be held in the treasury against the $30,000,000 4½ per cent bonds now outstanding. The other $20,000,000 will be issued from time to time, and the proceeds will be devoted exclusively to extensions and betterments and for the purchase of new equipment, with the exception of a sufficient amount to take up $1,266,000 debenture notes outstanding. A circular will be sent out to stockholders asking their approval of the plan by June 28.

Philadelphia Company, Pittsburgh, Pa.—The directors of the Philadelphia Company have authorized an issue of $5,000,000 of 10-year 5 per cent debenture bonds convertible into common stock of the company on the basis of 20 shares of stock for each bond of a par value of $1,000. The company has sold $2,500,000 of the issue to Ladenburg, Thalmann & Company and Blair & Company, New York. A large part of the money secured from the sale of the bonds will be advanced by the Philadelphia Company to the Pittsburgh Railways and the Allegheny County Light Company for extensions and improvements. In order to provide for the conversion of these bonds, a special meeting of the stockholders of the Philadelphia Company has been called for July 22 to authorize an increase in the capital stock from $42,000,000 to $47,000,000, the additional $5,000,000 being in common shares.

Rockford & Interurban Railway, Rockford, Ill.—E. W. Clark & Company, Philadelphia, Pa., and Hodenpyl, Waldbridge & Company, New York, N. Y., have taken an option on the stock of the Rockford & Interurban Railway. The company operates 103 miles of line between Freeport, Ridott, Pecatonica, Winnebago, Rockford, Cherry Valley, Belvidere, Rockton, Beloit and Janesville.

Virginia Passenger & Power Company, Richmond, Va.—At a meeting of the reorganization committee of the Virginia Passenger & Power Company the following officials of the new company which is to take over the Richmond properties, which were purchased at public sale, were announced: Frank J. Gould, chairman of the board of directors; William Winthrop, president; Fritz Sitterding, vice-president; Henry W. Anderson, vice-president and general counsel, and the following directors: Frank J. Gould, Edwin Gould, William Winthrop, P. M. Chandler, Charles S. Whelen, Douglass Robinson, R. Lancaster Williams, Fritz Sitterding and Henry W. Anderson.

Traffic and Transportation

Accidents on Electric Railways of Indiana for Quarter

The Railroad Commission of Indiana has made public the following comparative summary of accidents on the interurban electric railways in the State for the three months ended March, 1908, and the three months ended March, 1909.

	1908. 3d Qr.	1909. 3d Qr.
WHERE—		
On passenger trains	57	22
On station grounds	0	3
CAUSES—		
Collisions	35	12
Derailments	17	0
Getting on and off moving trains	2	9
Getting on and off trains after stops are made	0	3
Miscellaneous	3	1
RESULTS—		
Deaths	1	1
Fractures or dislocations	4	1
Sprains	3	6
Cuts and bruises	45	14
Miscellaneous	4	3
TO TRAVELERS ON HIGHWAYS		
WHERE—		
Travelers on highways in vehicles	5	11
On foot	3	3
CAUSES—		
Struck on crossings	7	10
Teams frightened	1	4
RESULTS—		
Deaths	5	4
Sprains	2	2
Cuts and bruises	1	8
Miscellaneous	0	0
TO EMPLOYEES		
EMPLOYMENT—		
Conductors	1	2
Motormen	5	1
Laborers	0	3
CAUSES—		
Collisions	5	0
Miscellaneous	1	3
Fell from cars	0	3
RESULTS—		
Deaths	0	1
Fractures or dislocations	1	0
Sprains	0	0
Cuts and bruises	5	5
Miscellaneous	0	0
TO TRESPASSERS		
WHERE—		
Trespassers on tracks	3	11
Miscellaneous	0	2
RESULTS—		
Deaths	3	7
Fractures or dislocations	0	6

Collisions, 0; derailments, 2.

The following table shows the total casualties on the interurban railways:

	1908. 3d Qr.	1909. 3d Qr.
Deaths	9	13
Injured	71	45

The following table shows the total casualties on all the railroads:

DEATHS	1908. 3d Qr.	1909. 3d Qr.
Steam railroads	74	60
Electric railways	9	13
Total deaths	83	73
INJURED		
Steam railroads	298	284
Electric railways	71	46
Total injured	369	330

Wheel Guard Hearing in New York

On Thursday, May 20, Commissioner Maltbie presided at another hearing before the Public Service Commission of District No. 1, on the subject of wheel guards for the Metropolitan Street Railway, New York. James L. Quackenbush, of counsel for the railway, said that the equipment order issued by the commission on April 28 had taken his company quite unawares, as up to the actual issue of the order no intimation had been given as to whether fenders would be required in addition to wheel guards. Nevertheless, since March 1 the Metropolitan Street Railway had ordered three different types of approved wheel guards, and a number of each kind was now in service. There was still considerable doubt as to which of these was best adapted for the service, and the railway wished to give them more extended service tests before equipping the large number of cars which it operates. The wheel guards now on trial are the Parmenter, Hudson-Bowring and No. 7 Sterling-Meaker automatic guard. Bids for the installation of these guards had already been asked and received, although the company

reserved the right to ask for tenders on and to try other guards. Mr. Quackenbush said that blue prints and specifications of the types under consideration could be submitted to the commission within two weeks. As for completely equipping all cars by Aug. 1, 1909, the rate set by the commission, the company's inquiry of the wheel-guard makers had shown that it would be practically impossible to deliver and apply so many guards within such a brief period. Commissioner Maltbie asked whether the wheel guards already in service were being properly maintained and whether the elevation of the wheel guards had to be varied. H. H. Adams, superintendent of shops and equipment for the railway company, replied that both the automatic wheel guards and the old rigid, plow guards were being kept in good order. Should one of the trial wheel guards be removed for some reason, it is replaced for the time being by a plow guard rather than to have none at all. With the new wheel guards, great clearances are obtained—say 4 in. to 5 in.—so that trouble from striking paving blocks is less likely than with the rigid guards. The variations in height above the rail were due to differences in paving at various points on the routes.

The commission has not yet decided whether it will grant the desired extension to the Metropolitan Street Railway Company.

Finding in Boston & Worcester Street Railway Fare Case

The Railroad Commission of Massachusetts has issued the following decision in the case of the petition of the Mayor, the city solicitor and others of Marlborough and the Selectmen of Framingham regarding the increase of fare on the Boston & Worcester Street Railway:

"These petitions have been heard and considered together and by consent of all parties certain other municipalities have been heard. The petitioners contend that a recent increase of fare on this system is unreasonable.

"After the hearings were concluded the board requested and has received from the company comparative monthly statements of passenger receipts for January, February, March and April, 1908-1909, and has before it a comparative statement of earnings and expenses for the three months ending Dec. 31, 1907-1908, and a like statement from Jan. 1 to April 1, 1908-1909.

"A study of these statements and of the annual returns of the company, and our independent investigation of the property and the investment, convince us that the existing rate of fare is neither unreasonable nor excessive, and we therefore make no recommendation that the company decrease said rate. We reserve the right, however, either upon our initiative or upon complaint, to make recommendation to the company at the close of the financial year ending Sept. 30, 1909, or later, if occasion shall disclose.

"During the hearing certain recitals in the grants of location to some of the predecessors in title of the Boston & Worcester Street Railway were called to our attention. The legal effect of these recitals is not before us, and upon them we indicate no opinion. If they create enforcible obligations between the parties, appropriate remedy may be had in the courts of the Commonwealth."

Another Line in Washington Equipped with Pay-As-You-Enter Cars.—The Washington Railway & Electric Company, Washington, D. C., has placed pay-as-you-enter cars with longitudinal seats in operation on its Eleventh Street line.

Fare Reduction Asked in Massachusetts.—The selectmen of Westford have asked the Massachusetts Railroad Commission to reduce the fare on the Lowell & Fitchburg Street Railway between Westford Centre and Brookside from 10 cents to 5 cents. A hearing will be given by the commission.

Readjustment Asked by Employees at Evansville, Ind.—The agreement between the employees of the Evansville & Southern Indiana Traction Company, Evansville, and the company regarding wages and the terms of service entered into in 1907 expires in July and the employees have asked that the conditions of the agreement be modified. The men desire that the present rate of wages, 17, 18 and 19 cents, according to the term of service, be so changed that there shall be only two grades of employees, who shall receive 19 and 20 cents an hour. They also desire that the clause covering the employment of non-union men be changed. On May 17, F. M. Durbin, general manager of the company, had not replied to the communication of the employees in which their demands were stated.

New Schedule on Hartford-Rockville Line.—Having completed new turnouts at Cove Lane and Woodland, the Connecticut Company has readjusted the schedule of its line between Hartford and Rockville and has reduced the running time between the two cities from one hour and a half to one hour and a quarter. The first car leaves Rockville for Hartford at 6:22 a. m. and the second at 6.52 a. m. Thereafter cars leave hourly at 52 minutes past the hour until 10.52 p. m. On Sunday the first car leaves Rockville at 5.62 a. m. Thereafter the schedule is the same as on week days. The first car leaves Hartford for Rockville at 7.07 a. m. Thereafter cars leave hourly until 4.07 p. m., then 4.37 p. m., 5.07 p. m., 5.37 p. m. and then hourly at 7 minutes past the hour until 10.07 p. m. On Sunday the first car from Hartford leaves at 7.07 a. m. Thereafter cars leave at 7 minutes past the hour until 11.07 p. m.

Accident on Chicago Elevated Railroad.—More than 20 persons were injured in a collision on May 17 between a local Ravenswood and a Wilson Avenue express train of the Northwestern Elevated Railroad. The local train had stopped preliminary to approaching the Kinzie Street station and the express crashed into it from the rear. Mason B. Starring, president of the Northwestern Elevated Railroad, is reported by the Chicago *Record-Herald* to have said: "The collision was unfortunate, but in my opinion it was due to the carelessness of the motorman in charge of the express train. There is no safety device, automatic or otherwise, yet known that can overcome human carelessness. Our employees are under the strictest orders with regard to the operation of trains and our investigation has failed to disclose any reasonable excuse for the motorman not stopping his train. He was running in broad daylight and on a straight track."

Fast Service Between the Ohio River and Western Points.—The Youngstown & Ohio River Railroad, Youngstown, Ohio, has established an hourly service between Lisbon and East Liverpool, on the Ohio River. In connection with the lines of the Northern Ohio & Light Company between Cleveland and Canton and the lines of the Stark Electric Railroad, Alliance, Ohio, between Canton and Salem, good service is furnished between Cleveland and East Liverpool. Connections may also be made over the Lake Shore Electric Railway at Cleveland for Toledo and for points in Indiana. The Youngstown & Ohio River Railroad was described in the ELECTRIC RAILWAY JOURNAL of June 13, 1908. It connects Salem, Washington, Leetonia and East Liverpool and is built almost entirely on a private right of way. At East Liverpool a new Y has been built, which enables the operators to turn the cars. The absence of this improvement compelled the company to furnish only a temporary service for several months and materially increased the time over the road.

Providence Company Discontinues Park Band Contribution.—The Rhode Island Company, Providence, R. I., will not contribute to the fund for music at Roger Williams Park during the summer this year. The policy of the company in the past has been to contribute $2,000 each year toward defraying the expense of music at the park, the city expending about $2,500 for the same purpose. The company began the practice of contributing to the fund for bands at the park many years ago, but the territory in the vicinity of Providence has grown so rapidly that demands have been presented to it by other communities to which the company's lines extend for similar donations for parks located within their boundaries. The company feels that in view of these circumstances it must refuse hereafter to contribute to the fund for Roger Williams Park, as it cannot afford to contribute to the funds in all of the separate municipalities. It seems also that the concerts at Roger Williams Park are less popular than when first begun, and consequently the number of passengers carried by the company to the park has decreased materially.

Transfers in Buffalo.—Two resolutions have recently been introduced in the Council of Buffalo asking the International Traction Company to modify the transfer system adopted by it on March 21, 1909, and described briefly in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1909, page 391. A suit involving the legality of the new system is pending in the Municipal Court before Judge Hodson, and Thomas Penney, president of the International Traction Company, issued the following statement after the introduction of the resolutions in the Council: "Our intention is to abide by the decision of the courts whatever may be the outcome. If the system be declared illegal we will not attempt to enforce it, while if the courts declare in our favor there will be no use in bringing further suit against the company. As I have received no communication from the Board of Aldermen in regard to submitting a copy of the transfer plan to that body I have nothing to say on that matter. I desire to state again that the company is not holding up the transfer system as unassailable. It may have its faults, it may work for the inconvenience of some of the patrons of the road, but the plan is the very best that the company has been able to offer."

Personal Mention

Mr. M. L. Newton has been appointed consulting engineer of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., with headquarters at Waterloo.

Mr. T. E. Rust has been appointed chief engineer of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., with headquarters at Waterloo, vice Mr. M. L. Newton, transferred.

Mr. H. D. Perkins has resigned as superintendent of bridges and buildings of the Illinois Traction System to become connected with the Standard Contracting Company, Cleveland, Ohio.

Mr. Edward Bock, formerly train dispatcher on the Metropolitan West Side Elevated Railway, Chicago, Ill., has been appointed superintendent of the Chicago & Milwaukee Electric Railroad with headquarters at Highwood, Ill.

Mr. C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, has been elected a member of the newly-created board of regents of Marquette University, Milwaukee. This is a non-sectarian board of prominent residents of the city, established to further co-operation and closer union of interests between the city of Milwaukee and the University.

Mr. H. W. Weber, storekeeper of the Metropolitan West Side Elevated Railway, Chicago, Ill., for the last four years, has accepted a position as general storekeeper for the Hudson & Manhattan Railroad, New York, and will enter on his new duties on June 1. Mr. Weber entered the service of the Metropolitan West Side Elevated Railway in the capacity of a clerk in the store-room about six years ago.

Mr. E. M. Addis has been appointed general manager of the Tri State Gas & Electric Company, Brattleboro, Vt., operating the Brattleboro Street Railway and the Brattleboro Gas Light Companies, which control the electric railway, electric light and gas properties in Brattleboro, West Brattleboro, Dummerston, Vt., and Hinsdale, N. H. Mr. Addis succeeded Mr. F. P. Woy, who resigned some time ago to open an office in Madison, Wis., as a consulting engineer.

Mr. D. Pfeil, Mr. A. Hettler and **Mr. H. Meyer,** of the Siemens & Halske Company, Berlin, Germany, are visiting the United States and will spend three or four weeks in studying electrical and mechanical development here. Mr. Pfeil is a director of the railway signaling department. Mr. Hettler is works manager at Wernerwerke and Mr. Meyer is an engineer on the railway staff. Mr. Pfeil visited the United States in 1894, and is impressed very much with the progress made in the intervening 15 years. The itinerary of the party embraces Schenectady, Niagara, Chicago, Cincinnati, Pittsburg, Washington and Philadelphia.

Mr. De Witt C. McMonagle, general manager of the Wallkill Transit Company, Middletown, N. Y., has been elected president of the company, and will hereafter act as president and general manager. Mr. McMonagle has been a resident of Middletown for many years, and has been identified with various local enterprises in Middletown. For 20 years he was senior member of the wholesale drug firm of McMonagle & Rogers. When he retired from the company he became manager of the Consumer's Light & Power Company, Middletown, and remained with the company until its property was sold to the Orange County Lighting Company. Mr. McMonagle is vice-president of the First National Bank and is treasurer of the Orange County Telephone Company. He was appointed general manager of the Wallkill Transit Company in March, 1907.

Mr. Cecil G. Rice, manager of credits of the Colonial Trust Company, Pittsburgh, Pa., has been appointed superintendent of the claim department of the Pittsburgh Railways Company, to succeed Mr. John Francies, who was recently elected warden of the Western penitentiary. Mr. Rice went to Pittsburgh from Fairmont, W. Va., in 1899, and entered newspaper work, in which he remained until 1904, when he became a special investigator attached to the Pittsburgh detective bureau. Mr. Rice resigned from police service in January, 1907, to become private secretary to Mr. James D. Callery, president of the Pittsburgh Railways Company, and later was appointed general agent of the company in charge of the employment department. In March, 1908, he entered the operating department of the Pittsburgh Railways Company, but in August, 1908, he was appointed manager of credits and of the bond department of the Colonial Trust Company, being elected a member of the Pittsburg Stock Exchange to represent that institution.

OBITUARY.

Bradford Shinkle, formerly vice-president of the Hemingray Glass Company, Covington, Ky., died on May 7, 1909.

Hugh H. Hamill, president of the Trenton Trust & Safe Deposit Company and a trustee of Princeton Theological Seminary, died at his home in Trenton, N. J., recently. Mr. Hamill was born in Lawrenceville, N. J., in 1851, and after graduating from Princeton University, established an office as an attorney at Trenton. He was president of the Real Estate & Tile Company, Trenton, and a director of the Public Service Corporation of New Jersey, the Mercer Trust Company, the American Light & Traction Company, the National Carbon Company and the Schenectady Trust Company.

Henry H. Rogers, of the Standard Oil Company, who died on May 19, was interested in many railroads and electric railways, although not actively associated with the companies. After many years of independent operation in the early business, Mr. Rogers became connected with Charles Pratt, who with his associates largely controlled the oil trade in New York and vicinity, and in 1874 in connection with Mr. Pratt, Mr. John D. Rockefeller, Mr. William Rockefeller and others organized the Standard Oil Company, in the management of which he was active until his death. Mr. Rogers was president of the Richmond Light & Railroad Company, Staten Island, and was financially interested in the Atlantic Coast Electric Railway, Asbury Park, N. J., and the Staten Island Midland Railway, Staten Island, of which his son, Mr. H. H. Rogers, Jr., is an officer. Mr. Rogers was also a director of the United States Steel Corporation, the Atchison, Topeka & Santa Fe Railroad, the Chicago, Milwaukee & St. Paul Railroad, the Delaware, Lackawanna & Western Railroad, the Union Pacific Railroad, the National Transit Company and many other railroad and industrial corporations.

Ervin G. Long, who has been engaged in the electric railway equipment business in New York for more than 14 years, died very suddenly on May 18. Though he had previously an extensive experience in the railway and electrical field, Mr. Long first became known in the street railway business through his connection with the Peckham Truck Company. Afterwards he was vice-president and manager of sales of the Peckham Manufacturing Company, severing his connection with that concern about the time of the resignation of Mr. Edgar Peckham. He then engaged in a general supply business for his own account, giving particular attention to the export trade. In December, 1908, Mr. Long returned from a five months' trip to Japan, where he negotiated important special business for American manufacturers. Two years ago Mr. Long organized the E. G. Long Company, with himself as president and Mr. E. H. Mays as secretary and treasurer. The E. G. Long Company does a large domestic business throughout the country in addition to its export trade, and the business of the company will not be affected by Mr. Long's death, it being continued without interruption at the present address by his former associates, with Mr. E. H. Mays in charge.

NEW PUBLICATIONS

Trolley Trips Through New England and Hudson River Valley. Hartford, Conn.: The Trolley Press, 1909; 132 pages; illustrated. Price, 16 cents by mail.

The 1909 edition of this publication has been enlarged and its scope increased to include all New England and the Hudson River Valley. The information has been brought up to date and is official. Forty maps show the routes traveled by the different lines, and numerous half-tone engravings well printed convey an excellent idea of the territory through which some of the lines extend. In addition, there is a brief description of the principal routes, and the hotels and points of interest in the large cities are all given. The cities and the different routes are indexed separately. The routes of 11 main trips in New England, four main trips in the Hudson Valley and 35 side trips in New England are tabulated and indexed. There is also a complete itinerary of the trip between New York, Boston and Portland, Maine, and a map of the route and the connecting lines. There are innumerable trolley guides devoted to a limited territory or locality, and a number which have essayed to cover through trips, but none have, perhaps, succeeded better than "Trolley Trips Through New England and the Hudson River Valley" in presenting the matter in logical order and in bringing out forcibly the natural beauty and the historic and civic associations of the territory which they have taken for their special province.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Upper Broadway Railway, New York, N. Y.**—Incorporated to build a double-track street railway in Manhattan, 3½ miles long, from Twelfth Avenue along Manhattan Street to Broadway to St. Nicholas Avenue to Fort George Avenue. Capital stock, $750,000. Directors: M. D. Wilson, A. F. Wainwright and Chas. F. Hedden, New York.

***Troy Mercantile Milling & Power Company, Troy, Ore.**—Incorporated to construct an electric railway from Troy to Hurricane Creek, a distance of about 12 miles. Capital stock, $20,000. Incorporators: R. W. Barkham and H. E. Merryman. Principal office, Enterprise.

California & Centerville Street Railway Company, Harrisburg, Pa.—Incorporated to construct a 5-mile street railway in Washington County. Capital stock, $30,000. Incorporators: M. H. Francies, president; W. J. Weaver, H. C. Dunn, Jos. McLain and Harris Booker, California. [E. R. J., April 24, '09.]

***Westmoreland & Red Boiling Springs Railroad, Nashville, Tenn.**—Application has been made by this company for a charter to build a railway from Westmoreland to Red Boiling Springs. Capital stock, $5,000. Incorporators: A. R. Dean, H. C. Smith, E. K. Lamb, W. A. Smith and J. B. Kemp.

***Metropolitan Steam & Electric Railway, San Antonio, Tex.**—Chartered in Delaware to build electric railways in Texas. Capital stock, $100,000. Incorporators: J. W. Marmion, San Antonio; M. Kaufman and E. L. Squires, Wilmington, Del.

FRANCHISES

Mesa, Ariz.—A franchise has been granted to Dr. A. J. Chandler, president of the Consolidated Canal Company, for a double-track electric street railway on Main, Macdonald and Center Streets. [E. R. J., Feb. 13, '09.]

***Los Angeles, Cal.**—The Board of Supervisors has granted to P. Janss a franchise to build a single or double-track railway along Stephenson Avenue and Whittier Road.

***Monterey, Cal.**—H. R. O'Bryan has applied to the Board of Supervisors for a franchise to build a street railway over certain streets in Monterey County.

Hartford, Conn.—The Legislature has extended the franchise of the East Hartford & Windsorville Street Railway to Nov. 1, 1910, in which to build its railway from East Hartford to Windsorville. [E. R. J., Feb. 1, '08.]

Rantoul, Ill.—The City Council has granted the Chicago, Kankakee & Champaign Electric Railroad, Kankakee, a franchise for an electric railway on Church Street in Rantoul. [E. R. J., Feb. 20, '09.]

North Manchester, Ind.—The City Council has granted a franchise to J. A. Barry representing the Wabash & Northern Traction Company for an interurban railway from Wabash to Warsaw. This grant completes the last link in the chain of franchises required.

New Orleans, La.—An ordinance providing for the sale of a street railway franchise was introduced recently in the City Council by Mr. Virgin, by request. The franchise is to be sold by the Comptroller at public auction in block, the bidder offering to pay no less than one-half of 1 per cent of the gross annual income, less taxes, to be awarded the franchise for a period of 50 years, from June 30, 1910.

Worcester, Mass.—The Board of Aldermen has given the Worcester & Providence Street Railway an extension of time until Dec. 1 in which to lay its tracks in Worcester. [E. R. J., May 15, '09.]

Dewitt, N. Y.—The Town Board has granted the Syracuse Rapid Transit Railway a franchise to cross the thoroughfares between Eastwood and East Syracuse. It is said to be the intention of the company in the near future to begin operations looking toward the double tracking of the line between Syracuse and East Syracuse by way of the Burnet Avenue route.

Port Jervis, N. Y.—The Common Council has granted an electric railway franchise to the Port Jervis & Delaware Valley Railroad in Port Jervis, from the Barrett Bridge, through Pike, King and Third Streets and under the Erie Railroad to the north side of Jersey Avenue. The franchise provides that construction must begin between Jan. 1 and July 1, 1910. F. A. Sawyer, president. [E. R. J., Dec. 19, '08.]

Cincinnati, Ohio.—The first public meeting before the Council committee on street railways on the franchise requested by the Southwestern Ohio Traction Company was held on May 21. William M. Ampt stated that the city is not properly safeguarded by the franchise. It developed that the Cincinnati, Wilmington & Xenia Traction Company, which will ask for a franchise similar to the one sought by the Southwestern Ohio Traction Company, proposes to build a line between Cincinnati and Columbus.

Marshfield, Ore.—J. F. Clark and J. H. Somers have been granted a franchise by the County Commissioners for an electric railway over the county road between Marshfield and Coquille. The holders of this franchise are said to be connected with the move of the Coquille Mill & Mercantile Company in recently securing a franchise for an electric railway and power plant in Coquille. [E. R. J., April 10, '09.]

Charleston, S. C.—The Charleston & Summerville Electric Railway has petitioned the Board of Aldermen asking for an extension of time on its franchise. The company is constructing an electric railway between Charleston and Summerville, 25 miles.

Chattanooga, Tenn.—An ordinance has been introduced in the Board of Aldermen granting to S. W. Devine, Chattanooga, a 40-year franchise for the construction and maintenance of a street railway in Chattanooga. [E. R. J., Feb. 13, '09.]

Lynchburg, Va.—The Board of Aldermen has granted a franchise to the People's Improvement Company for a street railway to Fairview Heights, about 1 mile from the city. [E. R. J., May 22, '09.]

Wheeling, W. Va.—The City Council has granted a franchise to the Rapid Transit Railway to construct an electric railway over certain streets of Wheeling. A. M. Shenk, Wheeling, president. [E. R. J., April 10, '09.]

Centralia, Wash.—The City Council has passed the franchise granting the Twin City Light & Power Company the right to build and operate an electric railway on the streets of Centralia. The franchise was vetoed by Mayor J. P. Guerrier. [E. R. J., April 17, '09.]

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—This company is reported being organized by residents of Birmingham to build a 3½-mile street railway from the end of the South Highlands line to Red Mountain. Among those interested are D. M. Drennen, A. G. Smith and G. T. Brazleton. [E. R. J., Oct. 17, '08.]

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—This company expects to build a 5-mile extension during the present year between Honolulu and Pearl Harbor.

Chicago (Ill.) Railways.—It is announced that this company will extend its line along Fullerton Avenue from Milwaukee Avenue west to Fortieth Avenue, a distance of 1¼ miles.

Danville, Kankakee & Crescent Traction Company, Crescent City, Ill.—It is stated that this company has begun surveying the route for its proposed electric railway between Kankakee and Danville. J. P. Sterrenberg, Crescent City, is one of the incorporators. [E. R. J., April 24, '09.]

***Mascoutah, Ill.**—A meeting of citizens of Mascoutah was held there recently, at which Edward L. Thomas and David O. Thomas, of Belleville, presented a proposition for the construction of an electric railroad between Mascoutah and Belleville, which was accepted. A subscription list was put into circulation for the purpose of raising $30,000 for the right-of-way and construction and $10,000 was raised before adjournment.

Springfield & Jacksonville Electric Railway, Springfield, Ill.—This company has filed a deed making the St. Louis Trust & Savings Bank trustee in an authorized bond issue of $800,000. The company expects to begin work about June 1 on its projected electric railway between Springfield and Jacksonville. The greater portion of the right-of-way between the two cities has been secured and negotiations are in progress for the purchase of the remainder. The work of grading has been awarded the Franklin Construction Company, St. Louis, Mo. The Springfield City Council will be petitioned for a franchise within a few weeks. Headquarters, 500 Myer Building, Springfield. [E. R. J., April 10, '09.]

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company has let a contract for the construction of its proposed railway from Sterling to Rock Island to the Burns Construction Company, Anderson, Ind. About 5 miles of track in the vicinity of Tampico was laid last fall. The contract calls for completion of the line into Rock Island by 1911, and the plan is to finance the railway by issuing bonds for construction of the line

in sections as the work progresses. Work will be started at Sterling and it is proposed to extend south to Rock Falls, thence to Tampico, Hooppole, Geneseo and Rock Island.

Ft. Wayne, Ind.—It is reported that the plan of building an electric railway from Ft. Wayne to Chicago via Goshen has been revived by Henry W. Williams, Ft. Wayne.

Sioux City, Ia.—The interests back of the proposed Sioux City, Climbing Hill & Ida Grove Electric Railroad have secured the services of R. H. Baldwin, Chicago, Ill., to examine and prepare a preliminary report upon this project, which is a 60-mile freight proposition serving a heavy stock shipping district without adequate railroad facilities. [E. R. J., March 12, '09.]

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company expects to let contracts within the next few weeks for the construction of two concrete culverts.

Manhattan City & Interurban Railway, Manhattan, Kan.—Joseph T. West, secretary of this company, which is building a street railway in Manhattan, advises that 2 miles of track are completed, together with the car house and power station. It is expected that the line will be in operation on June 1.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company has awarded a contract to McLane & Company, Detroit, for the grading of a 10-mile extension from Benton Harbor to Colonia. Contracts for material for this new line were awarded as follows: Rails from the Carnegie Steel Company; overhead material from the Electric Service Supplies Company; poles from F. Cartwright, South Bend, Ind.; ties from Lombard & Rittenhouse, Hastings, Mich.

Marquette County Gas & Electric Company, Ishpeming, Mich.—This company advises that it is rebuilding its line between Ishpeming and Negaunee.

Anoka-Minneapolis Suburban Railway Promotion Company, Minneapolis, Minn.—Announcement is made that this company will have surveyors in the field within the next week on the preliminary survey. The railway will extend from Anoka to Minneapolis. [E. R. J., April 10, '09.]

Kansas City & Olathe Electric Railroad, Kansas City, Mo.—This company has begun the work of extending its line from Shawnee to Greenwood, a distance of 3 miles. It is the plan to extend the railway to Lawrence.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company has placed an order for 800 tons of 9-in. girder rail with the Lorain Steel Company for its Buffalo terminal construction. The company has also placed an order with the Pennsylvania Steel Company for about $20,000 of special work to be installed in Buffalo.

Hudson & Manhattan Railroad, New York, N. Y.—This company announces that it will construct 12 miles of single track during the present year.

***Ardmore, Okla.**—It is reported that a deal is under way to build an electric railway from Ardmore to Springer, Okla., and that the Lorena Park Amusement Company is interested. Among those interested are: W. C. De Witt and Burt A. Simpson, Ardmore, and James C. Mort.

Columbus, Plain City & Urbana Traction Company, Columbus, Ohio.—Charles A. Heath writes that this company has been incorporated for the purpose of building a railway to connect Columbus, Plain City and Urbana. Contracts have not yet been awarded nor any other preliminary work taken up beyond filing the articles of incorporation. Headquarters, 711 Harrison Building, Columbus. [E. R. J., May 15, '09.]

Portland Railway, Light & Power Company, Portland, Ore.—This company advises that it expects to build 7 miles of new track during the present year.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company expects to begin soon the construction of about 1½ miles of new track in Harrisburg. Material for this work has been purchased.

Pittsburgh (Pa.) Railways.—This company is said to be completing plans for extending its lines from West Washington into the industrial section of Washington, connecting with the Canonsburg line at Tylerdale and forming a loop around the west and north sides of town.

Waynesburg & Monongahela Street Railway, Waynesburg, Pa.—It is stated that this company, which will build an electric railway line from Waynesburg to the Monongahela River this year, has practically completed negotiations for the taking over of the Brownsville, Masontown & Smithfield Street Railway, which already has a section of its railway built. The plans of the latter concern call for the construction of an electric railway from Masontown across the Monongahela River to Carmichaels to connect with the Waynesburg & Monongahela Street Railway and also connecting with the West Penn Railways at Masontown. W. J. Sheldon, vice-president and general manager. [E. R. J., March 27, '09.]

Montreal & Southern Counties Railway, Montreal, Que.—Contracts have been awarded by this company as follows: Orders for special steel rails and steel tubular poles have been placed, and special brackets for the Victoria Bridge ordered from the Monarch Electric Company, Montreal; trolley poles to A. H. Cummings, Coaticook; special switch ties to Rixon-Ainslie-Stoddard Company, Owen Sound; special track work to the Montreal Steel Works and the Canadian Ramapoo Iron Works, Niagara Falls; spikes to the Nova Scotia Steel Company. [E. R. J., Jan. 9, '09.]

Chicago, Burlington & Quincy Railway, Deadwood, S. D.—This company, which operates an electric railway between Deadwood and Lead, is considering the extension of this line to Spearfish Gulch.

***Watertown, S. D.**—It is stated that E. Stanley, E. E. Simpson and C. E. Edwards and capitalists from Des Moines, Ia., have let to the Chicago Engineering Construction & Security Company a contract to build an electric railway between Watertown and Lake Kampeska, 6 miles.

Johnson City (Tenn.) Traction Company.—This company expects to award contracts during the next two weeks for the building of a 1½-mile extension.

Wheeling (W. Va.) Traction Company.—G. O. Nagle, general manager of this company, states that the improvements to be made to the lines of the company during the present year consist of the rebuilding of 3 miles of track, purchase of eight new cars and various other changes in connection with permanent betterments. Orders were placed last week for 112,000 lb. of copper, feeder and trolley. There is no increase in the capacity of the power stations contemplated for the present year.

Rapid Transit Railway, Wheeling, W. Va.—This company, recently incorporated under the laws of West Virginia with $1,000,000 capital stock, has organized by electing A. M. Shenk, president; Edward Steiffel, vice-president, and J. D. Merriman, secretary and treasurer. This company proposes to build an electric railway connecting Pittsburgh and Wheeling. [E. R. J., April 10, '09.]

Sparta-Melrose Electric Railway & Power Company, Sparta, Wis.—J. N. Braun, president of this company, advises that the right of way for this railway has been purchased. The proposed line will connect Sparta and Melrose, 28 miles. The company intends to operate a McKeen motor car and a General Electric gasoline-electric car. Several bridges will be built, but contracts have not yet been let for them, or for the repair shops and a car house, which will be erected at Sparta. Capital stock authorized, $300,000, of which $200,000 has been issued. On May 1 the company placed on the market an issue of $300,000 in 5 per cent, 40-year first mortgage bonds to be secured by a sinking fund. The Western Transportation Company, American National Bank Building, St. Paul, Minn., has taken over the holdings of the Sparta-Melrose Electric Railway & Power Company and will construct the line. Officers: J. N. Braun, St. Paul, Minn., president and general manager; H. O. Sargeant, vice-president; Asa B. Karns, secretary; E. A. Schwedler, Lacrosse, Wis., treasurer; Bert Cummings, superintendent; Clayton Oehler, Sparta, chief engineer. [E. R. J., July 4, '08.]

SHOPS AND BUILDINGS

Public Service Corporation, Newark, N. J.—This company has awarded to the F. D. Hyde Company, New York, N. Y., the contract for the general work involved in the construction of its proposed Hoboken terminal station.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company is building a new concrete car house in Harrisburg. Material has been purchased.

POWER HOUSES AND SUBSTATIONS

Frederick & Middleton Railroad, Frederick, Md.—This company has placed a contract with the Erie City Iron Works for 1 165-hp, high-pressure stationary boiler to be in place about June 15.

Pictou County Electric Company, Ltd., Stellarton, N. S.—This company, formerly the Egerton Tramway Company, Ltd., which has recently taken over the New Glasgow, Ltd., Company, advises that contracts have been placed for engines, generators, condensers, poles, etc., during the past month to the amount of about $35,000.

Johnson City (Tenn.) Traction Company.—This company has purchased recently 2 120-kw G. E. 500-volt motor generator sets.

Manufactures & Supplies

ROLLING STOCK

Interstate Railways, Philadelphia, Pa., will purchase a number of new cars for service on its various lines.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., is in the market for five single-truck 30-ft. city cars for September delivery.

El Paso (Tex.) Electric Railway lost one locomotive and three cars in a fire which destroyed several of the company's buildings.

Columbus Railway, Light & Power Company, Columbus, Miss., will purchase within the next two months three sets of double trucks with 4-ft. 6-in. centers and 33-in. wheels.

Pacific Electric Railway, Los Angeles, Cal., it is reported, will purchase the 50 cars which it was reported in the ELECTRIC RAILWAY JOURNAL of May 15, 1909, it contemplated constructing.

Wheeling (W. Va.) Traction Company, reported in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1908, as contemplating the purchase of several double-truck cars, will order eight new cars this week.

Lowell & Fitchburg Street Railway, Ayer, Mass., mentioned in the ELECTRIC RAILWAY JOURNAL of April 3, 1909, as having lost some rolling stock by fire, has ordered two cars from the Wason Manufacturing Company.

Philadelphia (Pa.) Rapid Transit Company has just purchased 10 more all-steel elevated cars, complete, from the Pressed Steel Car Company, Pittsburg. They will be built and equipped practically the same as the cars mentioned in the ELECTRIC RAILWAY JOURNAL of March 20, 1909.

Manhattan City & Interurban Railway, Manhattan Kan., has purchased four trailers from the Baldwin Equipment & Supply Company, Chicago, and four single-truck motor cars from MacGovern, Archer & Company, New York.

West Jersey & Seashore Railroad (Elec. branch of Penn. R. R.), Camden, N. J., has purchased several express cars from the American Car & Foundry Company, and three sets of motor and trailer trucks from the Baldwin Locomotive Works, Philadelphia.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md., has ordered 27 interurban combination cars 50 ft. long and one express car of the same length from the Niles Car & Manufacturing Company, Niles, Ohio. It has also purchased 66 type 78-25 Baldwin trucks for use on these cars.

Wilkes-Barre & Wyoming Valley Traction Company, Wilkes-Barre, Pa., has purchased 10 semi-convertible compartment cars from The J. G. Brill Company. The cars will be 42 ft. over vestibule, 8 ft. 6 in. wide over sills, have wooden bodies and composite underframes and will be finished in cherry. Each car will be equipped with Allis-Chalmers air brakes and two Westinghouse 101-B motors.

New York & North Shore Traction Company, Roslyn, N. Y., has drawn the following specifications for the three semi-convertible cars reported in the ELECTRIC RAILWAY JOURNAL of April 17, 1909, as having been ordered from the G. C. Kuhlman Car Company:

Seating capacity.....48	Headlights .....Imperial
Length of body..33 ft. 4 in.	Motors.....West. 101-B
Over vestibule...43 ft. 4 in.	Registers .....Ohmer
Width over sills.. 8 ft. 3¼ in.	Sanders .....Lintern
Over posts at belt. 8 ft. 6 in.	Seats.....Hale & Kilburn
Bumpers .....Brill	Step treads,
Destination signs.....Wason	Universal or Mason
Gongs .....Dedenda	Trucks.....Brill No. 27-F1
Hand brakes.....Peacock	

Sacramento Electric Gas & Railway Company, San Francisco, Cal., is constructing 10 new cars in its own shops with the following details:

Type of car.....California	Curtain material..Leatheroid
Seating capacity.....48	Fenders .....Clark
Weight, total.....13¼ tons	Gears and pinions .....GE
Length of body..20 ft.	Headlights .....Boesch
Width over sills..7 ft. 8 in.	Motors GE-54
Over posts at belt. 8 ft. 2 in.	Paint .....Valentine
Height from top of	Registers .....Ohmer
rail to sills..... 2 ft. 6 in.	Sash fixtures.....Greenburg
Sill to trolley base. 9 ft. 4¾ in.	Seats .....Walkover
Body .....Wood	Seating material.....Ash
Interior trim.....Ash	Springs..Detroit Spring Co.
Underframe.....Ore. pine	Trolley poles.....Shelby
Brakes.....Rope and lever	Trolley base.....GE
Car trimmings,	Trucks .....Company's
Greenburg & Sons	Varnish .....Valentine
Control system.....K-10	Wheels .....Griffin

Cedar Rapids & Iowa City Railway, Cedar Rapids, Ia., has specified the one motor and one trail car, mentioned in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, as being built by the Niles Car & Manufacturing Company, Niles, Ohio, to be 58 ft. long. The motor car will be single end, with passenger, smoking and baggage compartments, and the trailer will be double end, with but one compartment. Both cars will be mounted on Baldwin 84-30 trucks, and will be run in a train. The body length will be 47 ft. 4 in., over buffers 57 ft. 8 in., width over panels at sills 9 ft. 7½ in., over all 9 ft. 10 in., and height under sills to top of roof 9 ft. 6¾ in. The car bodies will weigh 36,000 lb., and the motor car will seat 54, while the trailer will seat 60. Other details of interest are: Janney M. C. B. drawbars, Standard forged-rolled steel wheels, four Westinghouse 75-hp motors, Nichols-Lintern air sanders, H. & K. No. 99-EE seats, Peter Smith No. 1 hot water heaters, and Edwards sash locks.

Southern Cambria Railway, Johnstown, Pa., has just ordered four interurban cars of the Pullman type from the Niles Car & Manufacturing Company, Niles, Ohio. The specifications follow:

Seating capacity.....50	Gongs .....Niles
Weight.....27,000 lb.	Hand brakes.....Lindstrom
Length over all...48 ft.	Heating system...Hot water
Width over all... 8 ft. 10 in.	Journal boxes....Symington
Sill to trolley base.. 9 ft. 5 in.	Motors GE-205
Body .....Wood	Roofs.....Steam coach
Interior trim.....Mahogany	Sanders .....Nichols-Lintern
Underframe .....Semi-steel	Sash fixtures.....Edwards
Brakeshoes .....Standard	Seats.....H. & K. 99-EE
Car trimmings.....Niles	Seating material,
Center bearings..Symington	Plush and leather
Control system.....GE	Trolley retrievers...Knutson
Couplers .....Niles	Trucks, type..Baldwin 78-25
Curtain material...Pantasote	Ventilators..... Niles
Pilots .....Niles	Wheels .....Standard
Gears and pinions.....GE	

Blue Hill Street Railway, Canton, Mass., has drawn the following specifications to be followed in the construction of its seven semi-convertible cars ordered from the Wason Manufacturing Company, besides those mentioned in the ELECTRIC RAILWAY JOURNAL of May 22, 1909:

Seating capacity.....32	Hand brakes.....Peacock
Length over vest...31 ft.	Heating system.Consolidated
Width over sills.... 8 ft. 6 in.	Headlights ...Crouse-Hinds
Over posts at belt.. 8 ft. 9 in.	Journal boxes....Symington
Height from top of rails	Registers .....International
to trolley base...12 ft. 6 in.	Seating material..Red plush
Body .....Wood	Trolley retrievers....Wilson
Interior trim.....Mahogany	Trolley base.Sterling-Meaker
Underframe .....Composite	Door fix.....Wallace S. Co.
Couplers.....Van Dorn	Safety tread.....Mason
Curtain fixtures....National	Track scrapers.....Root
Curtain material...Pantasote	Curtain rollers....Hartshorn
Fenders .....Pfingst	Signal lights.....Dietz
Gongs.....P. Wall Mfg. Co.	Trolley wheels and harps,
	Bayonet

The five 10-bench open motor cars are similar in all respects to the semi-convertible cars except that they will have a seating capacity of 50.

TRADE NOTES

Walter A. Zelnicker Supply Company, St. Louis, Mo., advises that Edward Elson, its general representative, now has his headquarters at Hotel Denechaud, New Orleans, La.

J. J. Nielsen, who has been associated with the engineering department of A. L. Drum & Company, Chicago, Ill., has resigned to accept a position with the Sanitary District of Chicago, where he will have charge of the drafting-room on electrical work. Mr. Nielsen is a graduate of Purdue University, class of 1905.

Root Spring Scraper Company, Kalamazoo, Mich., advises that the Root spring scraper (formerly manufactured by the Kalamazoo Railway Supply Company) will be more reliable than ever before on account of a new spring device which has recently been patented and which will prevent the scraper from dropping.

Castolin Company of America, St. Louis, Mo., announces that it has secured the sole agency in the United States for the Castolin process for brazing cast-iron. Results of this method in practice are shown in a recent publication issued through the office of this company, Wright Building, St. Louis, Mo.

Baldwin Locomotive Works, Philadelphia, Pa., has received an order for 18 interurban and four city short wheelbase trucks from the Michigan United Railways; six sets of trucks from the Buffalo, Lockport & Rochester Ranlway, and five sets of interurban trucks from the Conneaut & Erie Traction Company.

Slack Manufacturing Company, Springfield, Vt., is a partnership formed by W. W. Slack, president of, and H. K. Parkman, secretary of Gilman & Son, Inc., Springfield, Vt., and G. C. Parker, sales manager of Wm. J. Smith Company, New Haven, Conn., for the purpose of manufacturing and selling abrasive metal cutters. Messrs. Slack, Parkman and Parker will continue to hold their present positions with their respective companies.

Dorner Railway Equipment Company, Chicago, Ill., has sold the Chicago, Lake Shore & Northern Indiana Railway, South Bend, Ind., 30 Westinghouse No. 49 motors; the Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., three GE-1000 motors; the Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., one 18-ft. Brownell car, rebuilt and equipped with Westinghouse 12-A motors; the Albia Interurban Railway, Albia, Ia., one 18-ft. car fitted with GE-52 motors; and the Parsons Electric Railway & Light Company, Parsons, Kan., three 10-bench open cars, equipped with Brill trucks, GE-800 motors.

J. G. Brill Company, Philadelphia, Pa., has appointed Robert H. Thompson representative of The J. G. Brill Company and of its constituent, the American Car Company, in Colorado, South Dakota, North Dakota, Montana, Utah, Wyoming, New Mexico and Western Texas. Mr. Thompson's headquarters will be at Denver, Col. Mr. Thompson, who is a son of George Thompson, superintendent of motive power of the Denver, Northwestern & Pacific Railroad, is a graduate in mechanical engineering of the University of Nebraska, and for the past three years has been with the Buda Foundry & Manufacturing Company, Chicago, and the Engineering & Equipment Company, Denver.

Crocker-Wheeler Company, Ampere, N. J., reports the following recent orders: Two 1999-kva, 6600-volt, 3-phase, 25-cycle alternating-current generators for the Nordberg Manufacturing Company, Milwaukee, Wis.; an 800-kw, 575-volt, direct-current generator for the Houston (Tex.) Electric Company; two 3-phase, 2300-volt, 50-cycle alternators, having a combined capacity of 550 kva, for the municipal plant at Pasadena, Cal.; a motor-generator set consisting of a 3-phase, 60-cycle, 2300-volt, synchronous motor and a 575-volt, direct-current dynamo, having a capacity of 300 kw, for the Boise Valley Railway Company, Boise, Idaho; a 100-kw generator with a range in potential of from 125 to 250 volts, for Charles Wouter, Chicago, and a similar order from the Timken Detroit Axle Company, Detroit, Mich., for a 100-kw, 250-volt, direct-current generator; a Crocker-Wheeler form W motor, having a capacity of 200 hp built for 230 volts, for the Hunt Engineering Company, Des Moines, Ia.; two 100-hp, 3-phase, 60-cycle induction motors of the wound-rotor type, rated at 100 hp each, for the Boston & Corbin Copper & Silver Mining Company, Boston.

Allis-Chalmers Company, Milwaukee, Wis., during March and April received a large number of contracts for plants averaging 400 hp, the aggregate of apparatus representing the large capacity of 61,985 hp, in the power and electrical field. One of the orders which the company received was from the Milwaukee Electric Railway & Light Company for two 1500-kw motor generator sets, one 500-kw balancer, six 2000-kw transformers, two 300-kw transformers, two 300-kw motor generator sets and a 300-kw generator of the water-wheel type, much of this apparatus constituting a "repeat" order. Other purchasers are: Utah Light & Railway Company, Salt Lake, Utah; Detroit United Railways, Detroit, Mich.; Intercolonial Railway of Canada, Moncton, N. B.; Milwaukee & Fox River Valley Railway, Elkhart Lake, Wis.; Pacific Gas & Electric Company, San Francisco, Cal.; Northern Idaho & Montana Power Company, Sand Point, Idaho; Michigan Power Company, Lansing, Mich.; La Porte Electric Company, La Porte, Ind.; Oak Park Power Company, Flint, Mich.; Maumee Electric Company, Maumee, Ohio, and Murphysboro Water Works, Electric & Gas Light Company, Murphysboro, Ill. During the past 90 days this company has also taken contracts for more than 30 steam turbines and generators, aggregating in capacity nearly 50,000 kw and is negotiating for the sale of more than double that number of units. Among the orders recently placed is one for a unit of 2000 kw for the Public Service Corporation of New Jersey, to be installed at Camden, another of 2000 kw purchased by the Stone & Webster Engineering Corporation for the El Paso (Tex.) Electric Company and a 2000-kw machine to be placed on a "repeat" order in the public service station of the city of Columbus, Ohio.

Pullman Company, Pullman, Ill., has awarded contracts for the construction of new buildings at its plant at Pullman, which will increase the capacity of the shops to 30,000 cars a year, or about one-third, and which will involve an expenditure, including the equipment for the shops, of about $3,000,000. The new plant will be devoted to the construction of all-steel freight and passenger cars, and will have a capacity of three all-steel passenger cars a day, increasing the passenger capacity to 175 a month, and 1500 steel freight cars a month. In a general way, the plans for new shops were outlined about two years ago, but were abandoned temporarily on account of the business depression, and the almost total cessation of car building which followed. Work has already been started on two erecting shops for passengers cars, each 420 ft. x 220 ft., with a transfer table between them for handling the car bodies. These are located to the east of the present buildings and are of steel construction. They will cost $400,000 and will be completed in 90 days. All of the new buildings planned are expected to be finished by Sept. 1, 1909. Next to the passenger shops will be an 8000-hp electric plant 200 ft. x 150 ft. which will furnish power for the passenger shops. The steel cabinet shop for finishing the interiors of the steel passenger cars will be connected with the present wood-finishing shop. It will be of the same dimensions as the power house. North of the cabinet shop will be the new brass foundry and finishing shop, 160 ft. x 80 ft.

ADVERTISING LITERATURE

Crocker-Wheeler Company, Ampere, N. J., announces bulletin No. 114 on coupled type a.c. generators.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has mailed its Bulletin No. 84 listing the electric railway material it has for sale.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., is sending out folders describing a new compact magneto wall telephone and its oak, locust and "Krecose" (preserved hard maple) pins.

Okonite Company, New York, N. Y., has issued a folder explaining its use of the inspection stamp of the National Board of Fire Underwriters. Insulated wires which do not bear this official stamp are subject to rejection by the underwriters having jurisdiction.

J. G. Brill Company, Philadelphia, Pa., has issued the May number of *Brill's Magazine.* The principal features are descriptions of Baltimore traffic conditions, the convertible pay-as-you-enter cars for the Third Avenue Railroad, New York, N. Y., and the rolling stock for La Paz, Bolivia.

H. W. Johns-Manville Company, New York, N. Y., has issued a booklet on "Permanite" sheet packing for steam machinery and a pamphlet on its combination asbestos-asphalt J.-M. roofing. This publication includes an illustrated description of a successful blow-torch test on this roofing.

Buckeye Jack Manufacturing Company, Louisville, Ohio, has printed a catalog describing "Buckeye" compound lever track and automatic lowering jacks. The 10-ton automatic lowering jack has found particular favor with electric railways. Each type is illustrated and described in detail.

Western Electric Company, New York, N. Y., has issued a detailed description of the first Rateau regenerator installed in America. This regenerator is used with Western Electric equipment at the Chicago works of the International Harvester Company. The present bulletin is a reprint of a description originally published in *Power.*

Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., has just issued Circular 1502, entitled Westinghouse Distributing Transformers, 5 to 50 Kw. In discussing this subject the circular contains much valuable information on alternating-current distribution, covering transformers, lightning arresters, insulators, cross-arms, etc. Considerable space is also devoted to underground and overhead construction applicable to congested and scattered districts. Information on potential regulating systems is also given. The circular contains 52 pages.

Lord Electric Company, New York, N. Y., announces the following bulletins: "F," the Con-Tro-La-Tor, which is a controller regulator with or without the reverse feature; "I," Garton's Multi-Vapo-Gap Lightning Arrester for line and car service; "J," Garton's Multi-Vapo-Gap Signal Lightning Arrester for the protection of all signal circuits. It has also issued Bulletin D, relating to laminated soldered rail bonds. The last publication contains 24 pages, and is profusely illustrated with views of the different types of soldered bonds manufactured by the company, of the methods of applying the bonds and of the apparatus required. There is also a price list of the materials and tools used in the work.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JUNE 5, 1909 No. 23

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9500 copies are printed.*

The Accounting Department

Mr. Wright's paper on "The Accounting Department," published elsewhere in this issue, is an admirable discussion of the value of system in office work. Even if it be assumed that a force of employees is composed of those coveted characters who want to give their time wisely for the best interests of the company which employs them, it is often the fact that some have not learned the importance of making good use of the minutes. While men may try to be economical in the use of their time, and to make their results excellent in quality and satisfactory as to quantity, many have not had the benefit of a training sufficiently good to enable them to appreciate the importance of these matters. Since the system described by Mr. Wright is applicable to other departments than that which accounts for the receipts and expenditures, it will be of interest to railway officials and employees generally.

Standardizing Car Painting

The responsibility for poor results in car painting rests between the painter and the paint manufacturer. Good paint improperly applied will give no better results than poor paint, and even the most skilled painter cannot get long life from cheap and inferior mixtures. The proper painting of a car from the wood up requires a number of distinct operations and materials, each successive step depending on the thoroughness and skill with which the previous stage of the work has been done. Paints are complex compounds of liquids and solids having chemical and physical properties widely different. Between the filler coat and the surface varnish there are probably no less than 20 elements intimately in contact with each other. Chemically, some of these elements may have an affinity for each other, while others may tend to dissociate. The importance of selecting the right combination of paints for the successive coats, therefore, is self-evident. All paint manufacturers do not use the same vehicle or liquid nor the same pigments in grinding paints of the same color for the same purpose. The first and second color coats of two paint manufacturers, for example, may be of equally good quality. If the second coat of one make follows the first coat of the same make the result will be good, but if the first coat is of one make and the second coat of another, the mixture may have little or no stability.

Too many of the smaller electric railway companies buy their painting supplies piecemeal; a few pounds of filler from one maker, color coats from another, and a gallon or two of varnish from a third. Some cars are painted with one kind of paint and a different combination is used on other cars. Usually no record is kept of the kind of paint used for each coat, the weather conditions, time allowed for drying and the condition of the woodwork at the time the car was put through the shop. How is it possible, under these circumstances, to place the responsibility for poor results on either the painter or any one of the several manufacturers from whom the company buys its supplies?

Standardization is the tendency of the day in all the other shop departments. There is a big field for standardizing the methods and materials used in the paint shop. Buy all the paint and varnish from some one manufacturer, apply it strictly in accordance with the directions of the manu-

facturer's experts, who can devise a system to meet almost any condition of cost, time and climate, and then hold the single manufacturer responsible for the results.

Pneumonia Overcoats

An editorial in a New York paper of May 28 refers with some irony to the appearance of "the pneumonia cars" on "almanac time." As this is a sample of the character of editorial material which is found in many newspapers of leading cities at this season of the year, it may be remarked that the regulation of cars according to the weather is one of the most trying problems of the street railway manager, and of a nature kindred to that which, with most people, is insistent and incessant, especially in the late Spring. Unfortunately, when one wakes up in the morning and looks at his thermometer he cannot always be sure whether it is wise to don his winter flannels or not. Nor are the government weather predictions an unfailing guide as to whether to carry an umbrella—whichever course he decides to follow may be a cause of regret before night. When one endeavors to reconcile the views of several persons, however, on this subject of personal comfort, the problem grows. The frequent controversies between the traveler who must have the window open and the one who will die of chill and exposure if it is not closed, are testimony to the strangely conflicting desires of humanity. Yet it is the responsible and undenied duty of the traction manager to provide some closed cars when a sudden cold change takes place in warm weather, and to regulate the equipment, so far as it is possible, with the vagaries of the climate. It is still more the duty, however, of every individual to carry an overcoat or protect himself otherwise against the sudden changes which seem to be inevitable during the spring and the autumn.

Operating Rules for Interurban Railways

The conference called in Washington last week to discuss the subject of rules for the government of employees of interurban railways resulted in the adoption of numerous tentative amendments to the code presented to the Transportation & Traffic Association last year at Atlantic City. Underlying nearly all of the proposed changes was the desire manifested by most of the railway managers present at the conference to draft the new rules as nearly as possible in accordance with the standard code of the American Railway Association. There are differences in the methods of operating steam railways and most electric interurban railways which make the adoption of the American Railway Association standard code as a whole undesirable. The purpose of the interurban code is to provide a set of rules which can be used in their entirety by all electric interurban railways, omitting special rules covering local conditions, which can always be added by the managment. The American Railway Association code does not meet this requirement, but it does form a sound basis for the development of a satisfactory set of rules which if lived up to will permit safe and efficient operation of cars.

There are two reasons why the American Railway Association code is a good one to copy. First, because it is the result of many years of experience and is a consensus of the best ideas of two generations of practical railroad men. Second, because large numbers of former steam road employees who are thoroughly familiar with its provisions are now in the train service of interurban lines and the fewer differences there are between the old and the new rules under which they work the less chance for confusion, mistakes and accidents. Codes of rules are not easily changed from year to year to meet new conditions and in adopting a set of rules as the standard the Transportation & Traffic Association must look ahead to the traffic developments of the future. The time will inevitably come when interchange of traffic, through routing of trains and joint operation of tracks by steam and electric railways will be an accomplished fact. Uniformity of operating rules will then be imperative. The plan of following as closely as possible the American Railway Association code is to be commended.

Some of the rules included in the American Railway Association code have been wisely omitted from the interurban code. We refer particularly to those relating to superiority of direction, use of time orders and supersedure of time-tables. Employees of interurban railways as a whole do not have the benefit of a long apprenticeship and years of experience in subordinate positions in the train service as do the employees of steam roads. It is safer therefore to eliminate long and puzzling definitions or outlines of procedure to cover every contingency and to restrict the responsibility and rights of train crews when thrown on their own resources. Doing away with superiority of direction may delay trains under some circumstances, but the possibility of error in assuming rights to the track is overcome and safety in this respect is assured. The same argument applies to the abandonment of the time-order form which on more than one occasion has resulted in an accident due to its misunderstanding or disobedience. With this exception, however, all of the train-order forms in the American Railway Association code were tentatively adopted, after the necessary slight changes in verbiage were made to adapt them to electric railway service.

The protection of trains when stopped for any cause on the main track is one of the most important points covered by the rules. Rule No. 219 in the interurban code is framed in the same language as Rule No. 99 of the American Railway Association code with the addition that 1000 ft. is specified as the minimum distance which the conductor or flagman must go back. No rule in the American Railway Association code has been more consistently violated or slurred and it is questionable whether the introduction of a specific minimum distance for the flagman to go back will altogether correct the fault. It will be hard to enforce such a rule strictly, but its efficiency depends on its enforcement. The rule suggested by Mr. Crafts, patterned after that of the Chicago & Northwestern Railway, is an excellent one, but is open to several objections. One of these is that it is too long and complicated and therefore difficult to understand and to enforce rigidly. In this connection it might be suggested that the railway companies provide each train crew with a standard signal tube containing flags, torpedoes and fuses such as are supplied to the steam roads and require the conductor to carry it with him on each trip. Means for protecting the car would then be available quickly in case of any emergency.

Distant Railway Investments

For many years Philadelphia was the most important center of street railway investment in this country. Individuals in that city owned large portions of the capital stock of the principal street railway systems in New York, Baltimore, Chicago, Pittsburgh and in other important cities, and the securities of these traction companies were active on the Philadelphia stock exchange. During recent years, as street railway systems have increased in number and importance, the position of Philadelphia as the most important center of this class of investment has been largely wrested from it by New York, although many important railway enterprises are still controlled by Philadelphia capitalists.

In Europe, outside of the British Empire, Brussels occupies the place corresponding to that formerly possessed by Philadelphia here. This may be due to the fact that the neutral position of Belgium between the larger European states permits continental capitalists to unite more easily to control foreign enterprises under its laws than under those of any other country, or it may be because such investments have always been popular in Belgium, and particularly in Brussels. Whatever the reason, Brussels has long been and still is the headquarters from which the affairs of tramway companies in many of the leading cities in Asia Minor, Russia, Turkey, Greece and other countries of eastern continental Europe, as well as in South America and Central Asia, are directed. Next to Brussels, London and Berlin rank high as centers of tramway control. The capitalists in both cities have not only promoted many tramway enterprises wherever the flags of their respective countries have flown, but have not hesitated to invest heavily in similar enterprises elsewhere.

These facts are cited because but few American capitalists up to this time have yet attempted much in the way of electric railway promotion outside of this country and its possessions. This seems somewhat of an anomaly at first thought, when one considers the extent of electric railway development here and the very wide use of American apparatus in all electric tramway work. If we attempt to seek a reason for this condition several explanations can be given. One has undoubtedly been the seeming opportunities here for investment. Another reason is undoubtedly the "insularity" of the average American so far as his investments are concerned. Although residents of this country have the reputation of being extensive travelers, their trips abroad are usually for pleasure and do not include much more than a quick tour of some of the largest European capitals and watering places with perhaps a few weeks in Switzerland or a trip up the Nile. The investing public in America as a whole does not travel. At all events, the average American investor has very little real knowledge of foreign methods, languages and laws and consequently has little faith in the security of investments located abroad. This is shown by the almost complete absence of trading on the New York stock exchange in any foreign securities except a few issues of Japanese and Mexican national securities. With the opportunities for profitable investment in this country, however, becoming, as they are, more restricted, partly by the occupation of the best territory and partly by adverse legislation, the attraction for electric railway investment outside of this country is becoming much greater. As Americans have for years taken a pessimistic view of this class of investments, it is worth while to consider certain conspicuous advantages in their favor.

In the first place, as a rule, the transportation facilities in foreign cities are very much under-developed, judged even according to local standards of travel. Again, the laws in most of the countries outside of those in Western Europe, are on the whole very favorable to freedom of operation and amount of the return permitted on the investment, compared with similar laws of this country. Finally, while the fares which can be charged are low, the expenses for labor are also low and the net return is not greatly affected.

Of course, the railway owner and manager should not expect to find that the same operating conditions will prevail as exist in America. If they do, they will be disappointed. Some of these differences will appear strange at first, such as the provision of two classes of cars, the use of graded fares, the necessity of employing a different language and currency and of conforming to alien customs. But after one becomes habituated to these features of foreign life they will no longer seem peculiar. Business can be done where they prevail often as well, sometimes better, than under the conditions that exist at home. After all, one is dealing with individuals, and human nature does not differ greatly, whether observed in New York, Cairo, Mexico or Calcutta. The foundations for successful electric railway management are nearly identical in each place. Traffic in every country can be increased by attractive and clean cars, by polite service and by convenient schedules, and it is equally easy to drive it away by a neglect of all these features. The success of a tramway enterprise or of a tramway manager abroad can best be predicated from the results which would follow corresponding efforts of the same persons or companies at home.

The Mexican Tramways

There have been a few marked exceptions to the general practice of American capitalists in keeping their electric railway investments in this country. One of them is in the case of the group of capitalists who control the Mexican tramways and other important electrical enterprises in countries in America south of the United States. Readers of this paper will find in this issue a continuation of the account of the Mexican system, printed in the issue of May 1. The article in that number was devoted largely to an account of the conditions of electric railway operation in Mexico City. In the present article the subjects treated are the constructional and operating features of the system.

The great distance which separates Mexico from the base of all electric railway supplies has necessitated the adoption by the company in that city of many features which, as a rule, are omitted from the systems here. The company is obliged to do a large part of its own manufacturing and necessarily has to have extensive facilities for repair work. It has also put in service special designs of cars to suit the conditions found in Mexico. Fortunately, however, the experience acquired by those in charge of the property in the direction of their other for-

eign enterprises has undoubtedly been of assistance in solving this particular problem. Through their European and American connections also they are able to keep in touch with the development of the industry in Europe and here. This, in fact, is a condition upon which the greatest degree of success in foreign tramway enterprise is contingent. The management of an American road, however small, can usually keep pretty closely informed about modern improvements, but if the enterprise is abroad it is much more difficult to do this. The management of a company may go on in a narrow groove, making few changes in apparatus or methods and satisfying the local conditions fairly well, but by no means living up to its greatest opportunities. Indeed it may be the case in America if the officers of the road do not know what the others operating similar properties are doing. But for this there is far less excuse.

Accident Releases

In these days of ambulance chasers, competition is so keen for the opportunity to prosecute accident cases against railroads that attempts are occasionally made to get clients among those who have signed releases of claims for accidents. It is not unusual, nor perhaps unnatural, for a person who has been injured and has made a settlement promptly to come to the conclusion afterward that he might have demanded and obtained better terms if his case had been presented differently. Frequently his friends tell him that if he had stood out for a larger sum he could have obtained three or four times as much money, and an unscrupulous lawyer would have no hesitation in trying to make a man believe this if he thought that he could secure a fee for bringing suit against the company again. Fortunately, it is a maxim of the law to encourage settlements and discourage unnecessary litigation. Consequently the law can be relied upon to sustain settlements made out of court, unless there is some special reason for setting them aside. Several cases of this kind have occurred recently, and as each was appealed until it reached the highest court in the State, they throw interesting light upon the importance of being able to substantiate by outside evidence that the injured person was competent to sign the release at the time he did, and that he fully understood its import.

In the first case, which occurred in Maine, the plaintiff's leg was fractured so that it became necessary to amputate it above the ankle, and, later, above the knee. The liability of the company for damages was not denied, and 25 days before the first amputation it settled with the plaintiff for $500 and the payment of medical expenses. Later, the settlement was repudiated by the plaintiff on the ground that, owing to his feeble condition of body and mind at the time, he had not the power of connected thought nor the will to make a legal contract. The jury before whom the case was tried accepted this plea and awarded additional damages of $1,612,50. The evidence showed, however, that at the time the payment was made the plaintiff had expressed a desire to settle with the company without the intervention of a lawyer, and had said that he was satisfied with the amount. It was also proved that on the day of signing the release there was nothing in his physical condition that would indicate any impairment of his mental processes. The question turned upon this point, because the plaintiff did not claim that the release was obtained by fraudulent methods, and under these circumstances the court refused to set the verdict aside.

Another decision bearing somewhat along the same lines was rendered in Maryland some time ago. An employee who could not read English and who was also a member of an employees' relief association, from which he received money after an accident, signed a release, and afterward claimed that he thought he was signing receipts for the money received from the relief association. The injured man did not ask to have the papers read to him, and it was held that there was no evidence to show the releases were obtained by fraud.

In another Eastern State, however, a release was disregarded under the following conditions: The plaintiff proved that in an accident he had received a shock which later resulted in serious injury; that an hour and a half after the accident, in the superintendent's office, while still "dazed and rattled," the railroad agent had prepared for his signature two papers, one a release, which he told the injured man was merely a form, the other a receipt, which was stated to be for the injuries to plaintiff's clothes. The release was, in fact, a comprehensive document, while the receipt included "also, injury to person." The plaintiff signed the papers without reading them or knowing their contents. The agent swore that nothing was claimed or allowed for personal injuries, and it was held that the jury was justified in disregarding the papers as relating to personal injuries.

Central Rating Organization for Electrical Risks

The question of fire insurance ratings on electrical risks has become quite acute during the past few months. As most of our readers know, these rates are established, for the most part, by different rating organizations, each of which has jurisdiction over a particular territory. Practically the only properties exempt from the control of these rating organizations are those belonging to the large steam railroads and to a few of the very large manufacturing companies. These latter risks, though scattered throughout the country, are covered by blanket policies issued through the main offices of the insurance companies in New York, Chicago or elsewhere. The result of this condition has been that with the exception of the comparatively small amount of property already described as not being subject to the rating organizations, the fire insurance rate on the same kind of risk has varied greatly, depending upon where it is located. Thus, an insurance company may charge 1 per cent for insuring a car house in the New England district, 1½ per cent for an exactly similar car house which is no greater risk in Pennsylvania, and 2 per cent for a precisely similar building in Texas, and there has been no redress.

Rating organizations had their origin in a desire on the part of the different insurance companies to prevent the disastrous cutting of rates which would follow unrestrained competition, and have been in existence so long that they now constitute an integral part of the business of fire insurance as conducted by the old line companies. But each rating organization is independent of every other in the matter of making rates, rules and schedules, so that a great many inconsistencies will be found in their methods, if the

practices in different parts of the country are compared.

These variations, of course, are not particularly apparent to a person whose property is all in one place. He has to pay the rate demanded, or else seek some mutual company or Lloyds, or else carries his own insurance. But if an individual or company has property in different parts of the country, the widely divergent rulings and rates often come as a disagreeable surprise. It does not seem reasonable to him to have to pay the same fire insurance company twice as much, or even five times as much, as has been the case, for insurance on the same class of property and subject to the same hazard, simply because the two pieces of property are on opposite sides of an imaginary line drawn through the country, and because the rates on each side of this line are fixed by different organizations. The owner may be able to prove absolutely that the cost of the insurance is the same in one case as in the other, but if he takes the matter up with the insurance company which writes both policies it is powerless to help him. Its rates in each territory are fixed, not by itself, but by an association in which it has but one vote, and it must be governed as to its charges in each district by the vote of the majority of the representatives of the insurance companies who are members of the rating organization of that particular district. As has been explained, the steam railroads and some of the larger industrial corporations which have widely scattered risks are exempt from this condition, and are permitted to deal directly with the insurance companies, through a central rating organization. It has been the proposal to follow a similar plan in the case of electrical risks during the last few months which has brought matters to the crisis already mentioned.

Those in favor of the change include the large insurance companies, which realize the necessity of some reform. With their co-operation, identical resolutions have been presented before all of the rating organizations which have met since April 1. The text to these resolutions was published in our issue of May 1. Up to the present time about an equal number of rating organizations have accepted and have rejected the plan. Among the former are the Middle Department, which operates in the Middle States; the New York State Association, which operates in New York State, and the Newark Board. Among the latter are the New York Fire Insurance Exchange, the Boston Board and the Philadelphia Board.

The opposition has come largely from the local insurance brokers, most of whom act as agents on a percentage basis for several insurance companies, and are consequently independent of any one company. The advocates of the central rating bureau deny that the plan includes the discontinuance of the services of the local agents, but the latter seem to see in it some plan by which their influence and receipts will diminish. As opposed to this, the advocates of the change claim that the plan constitutes the only salvation of all interested, because unless business is done in a sensible and economical way, the owners of the electrical properties will leave the stock companies altogether and seek some other means of fire protection, and that it is time that the present chaotic condition is discontinued. The next few weeks will undoubtedly see some important developments in this situation.

The Maintenance Department and Accident Prevention

It goes without saying that unless the work of the maintenance department is well done, the tendency toward accidents to rolling stock and passengers on the road is increased. On the other hand, the present necessity on most roads of looking at both sides of a cent before spending it requires the most careful administration to secure proper repairs without undue expenditure. It is not so much a matter of doing the physical work as of accomplishing it at minimum cost. In considering the relation between maintenance and accidents, however, it is desirable to realize that sometimes very small oversights in the shops lead to serious conditions on the road. Thus, in one case, the failure of the car cleaner to remove the dirt from beneath a trap ring in the floor caused trouble through the tripping of a passenger over the projecting metal, since the ring did not lie flat and flush with the floor level. In this particular instance the company was obliged to pay the claim, which amounted to several thousand dollars. If the car had been properly inspected after cleaning, it is probable that the defect would have been discovered. Nothing can be done carelessly without opening the way to a future penalty.

Too much care cannot be given by the mechanical department to the construction and location of fuses and circuit-breakers on cars. Long experience has shown that the cost of a suitable fuse, which will not create a panic among the passengers when it blows, is as nothing to the damage claims that often result from a harmless but startling flash when a poorly built or badly located fuse goes out. In this connection the proper maintenance and inspection of the overhead switches in cars is of the utmost importance. Grab-handles and steps also need frequent consideration.

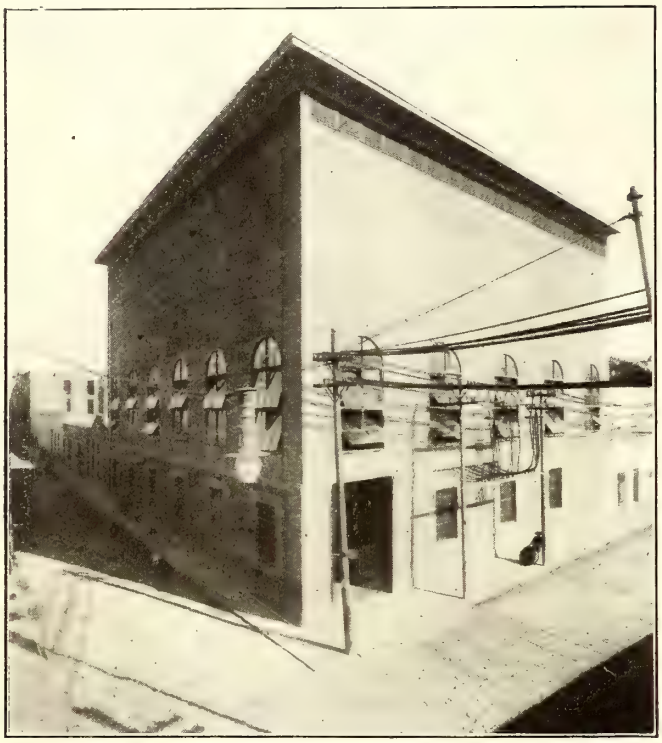
A point of some concern to large city companies on whose tracks the rolling stock of foreign cars is run in interurban or other service is the responsibility for accidents due to defective equipment. This must be provided for in the operating agreement if trouble is to be avoided, and even then it is sometimes difficult to place the responsibility. It is therefore desirable that, when a foreign car comes into the shop of a local company after an accident, that a thorough inspection of it should be made, with a full report of all abnormal conditions upon which the proper responsibility can be assigned. In some cases where an accident of slight nature has occurred, say with the cut-out switch in one of the vestibules, the local company's maintenance force has gone over the car so far as the immediate location of the trouble is concerned, and has testified that the whole car, with the possible exception of the circuit-breaker, was in good condition when it pulled into the house. Unless the whole car has been gone over it is undesirable to thus give it a clean bill of health, since such a course makes it harder to fix the responsibility for the final settlement, and also tends to discredit the local company's shop force in case the plaintiff introduces evidence to show that the car was not in the best of condition at the time of the accident. The conduct of an electric railway is, after all, a business of well-nigh infinite detail, and experience shows that there is nothing too small to create trouble if not properly taken in hand.

CONSTRUCTIONAL AND OPERATING FEATURES OF THE MEXICO CITY TRAMWAYS

A previous article in the Electric Railway Journal of May 1, 1909, described the organization and traffic of the Mexico City tramway system. The details of construction and methods of operation which form the subject of this article present many features of interest.

TRACK

A number of types of construction have been tried in Mexico City in an endeavor to build track which will remain in good surface and alignment under the very trying conditions which exist. The soil underlying the entire city is unstable and is constantly settling owing to the weight on the surface of the large buildings, street paving and heavy traffic. The Government has recently completed extensive works for draining the valley in which the city is built and this has also contributed to the settling of the soil. The type of track construction which is now used for all new work in paved city streets consists of a solid mattress of reinforced concrete under each track in which steel channel ties spaced 10 ft. apart, center to center, are partially embedded. The rails are 7-in. girder section, cross-connected with tie rods and joined with ordinary angle bars or Continuous rail joints. The space between tracks is paved with sheet asphalt or stone blocks, but owing to the continuous and irregular settling of the underlying soil much repaving is constantly being done.

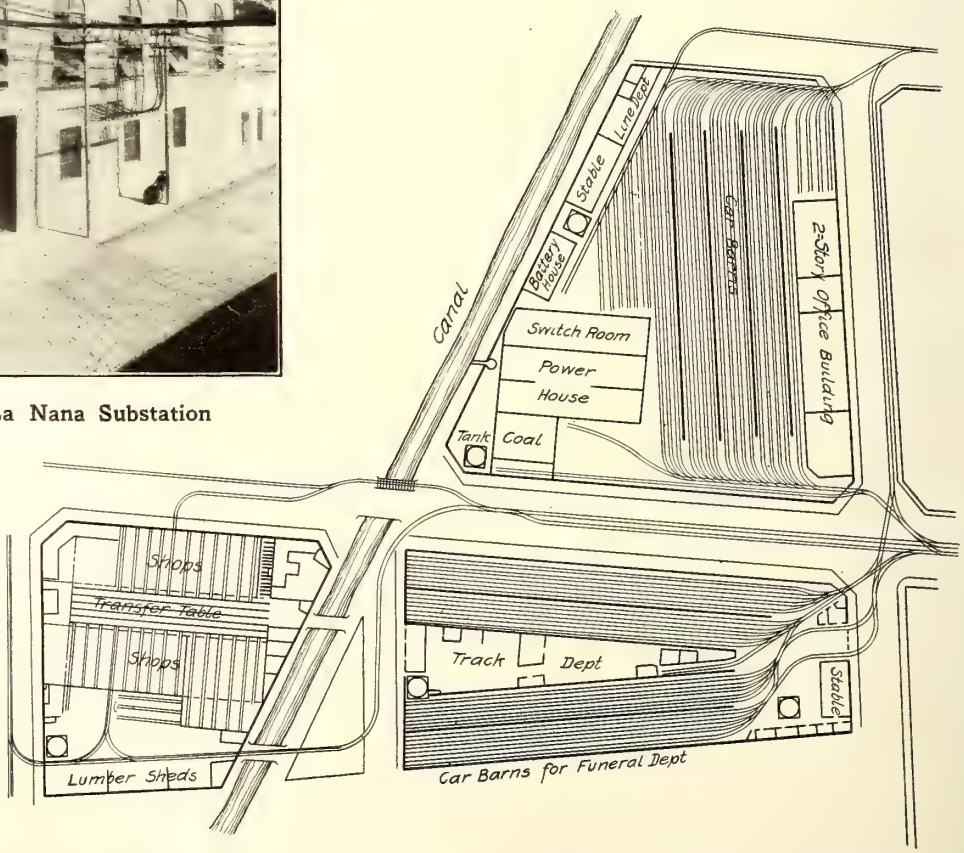


Mexico City Tramways—La Nana Substation

On the lines running through reservations or parked streets and on the suburban lines running out from the city 70-lb., 4⅝-in. T-rails are used. Part of the ties are of wood treated with creosote, but steel ties have also been put down in considerable numbers. Creosoted ties are obtained at the present time mostly from Galveston and New Orleans in the United States, but the company is conducting some experiments in treating native woods with the idea in view of doing its own creosoting of ties at some future time. Girder rails are fastened to steel ties with rail brace plates. Part of the rails have welded joints, but Continuous joints are used for most of the lines. For bolting the joints Harvey grip bolts and Ideal recessed nuts are standard. All rails are bonded at the joints with an electric bond-welding machine. Most of the suburban and interurban lines are well ballasted with



Mexico City Tramways—Mule and Automobile Tower Wagons



Mexico City Tramways—Plan of the General Headquarters at Indianilla

broken stone. Manganese hard-center type frogs, mates, switches and crossings, mostly of American manufacture, are used and the rails also are the product of American mills.

Ballast is obtained from extensive quarries of lava and other volcanic rock owned by the tramway company on the outskirts of the city. A stone crusher has been installed here and good ballast ready to put down in the track is obtained at moderate cost. The track department has extensive rail storage yards and a well-equipped shop for the manufacture and repair of special work and other material. The experimental creosoting plant already mentioned is also under the charge of the head of this department.

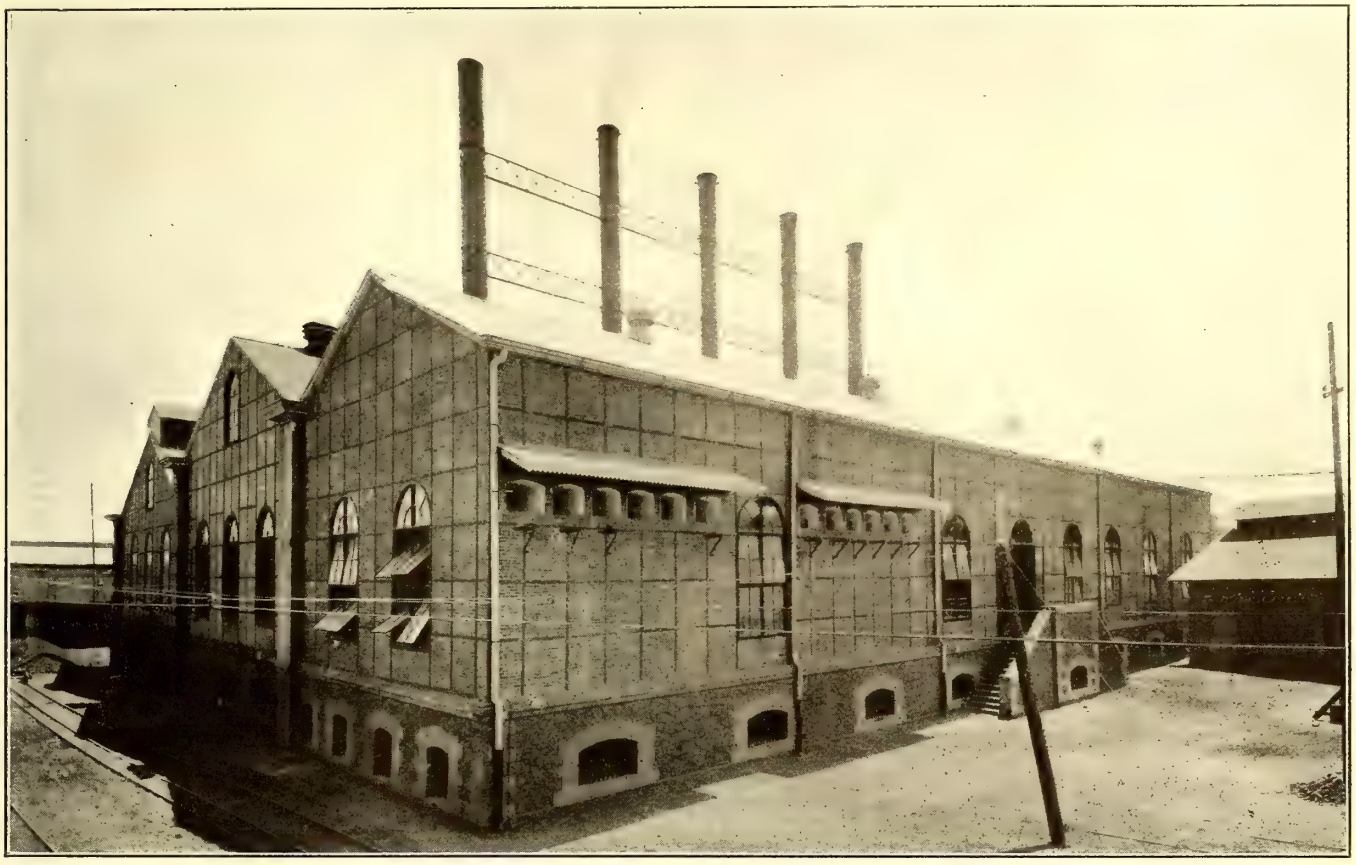
OVERHEAD TROLLEY

The overhead trolley is used throughout the system. Center pole construction is common on both city and interurban lines. On the broad avenues in the city the ornamental iron center poles have a much better appearance than the span-wire construction with poles set next to the curb, which is so generally used in the United States. All poles are of steel tubing, as wood poles, unless thoroughly treated with creosote or some other efficient preservative, suffer dry rot very rapidly. Even treated wooden poles have a very short life in exposed locations. Wood poles of suitable size and quality also are not to be found in Mexico in any quantities and have to be imported at high cost from the United States. The company maintains an efficient corps of linemen, who are supplied with mule-drawn and automobile tower wagons.

POWER SUPPLY

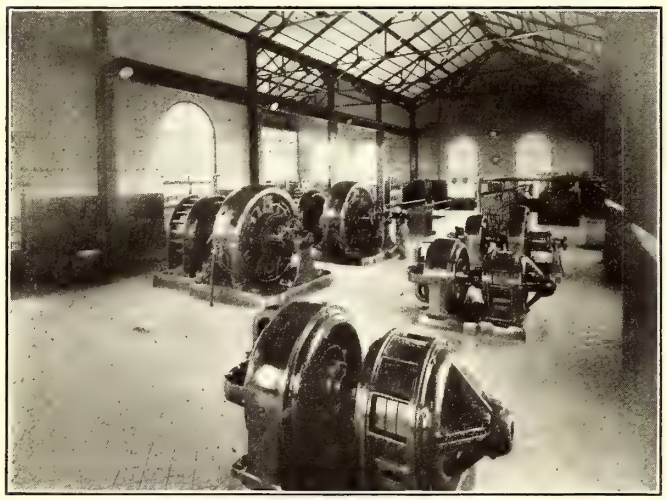
Most of the power for operating the tramway system is obtained from the hydro-electric generating station located at Necaxa, 100 miles away. The company maintains, however, a large steam-power station adjoining the shops and car barns at Indianilla, about 1¼ miles from the Plaza. This station, which is used only in emergencies and to assist in carrying the peak load at seasons of heavy traffic, contains 11 250-hp Babcock & Wilcox water-tube boilers and five McIntosh & Seymour engines direct connected to three 850-kw and two 400-kw generators.

Current from the hydro-electric generating station at Necaxa is brought into the city at a potential of 60,000 volts by an overhead transmission line carried on steel towers. It enters the main substation at Nonoalco, and from here it is distributed to four substations, called respectively La Nana, near the Alameda; Indianilla, adjoining the steam power station; Tlaxpana, in the northwestern district, and Churubusco, in the southeastern part of the city, all receiving the current at 20,000 volts and distributing it at 600. Another substation is to be built at Mixcoac, a suburb southwest of the city, which is the center of a large population. Two of these substations contain two 500-kw motor-generator sets each and the other two each contain two 1000-kw units with the necessary transformers, switchboards and other auxiliary apparatus. In addition to these permanent substations the tramway company has built a portable substation of 500-kw capacity. The electrical apparatus, which consists of a 500-kw motor-generator set taking 3300-volt three-phase alternating current at one end direct from low-tension distribution circuits within the city and delivering 600-volt direct current at the other end, together with incoming and outgoing switches, lightning arresters, etc., is mounted on a car of special design which is shown in one of the accompanying engravings. The motor-generator is placed at one end of the car and the



Mexico City Tramways—Indianilla Reserve Steam Plant, Substation and Storage Battery House, Showing Incoming 20,000-Volt Power Lines

a.c. and d.c. switchboard at the other end. This portable substation is moved from place to place as required at times of heavy traffic, such as special days at Chapultepec Park or when extraordinary crowds are to be handled to and from the bull ring.



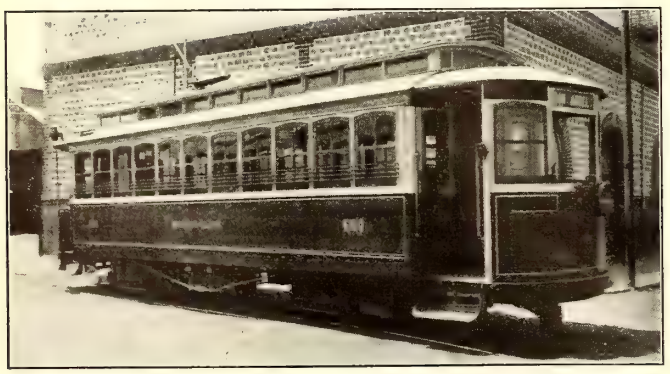
Mexico City Tramways—Churubusco Substation, Illustrating the Use of Motor-Generator Sets

The permanent substation buildings and the steam power station building at Indianilla are constructed in a manner not common in the United States, but often employed in Europe, especially in Germany. The foundations are of



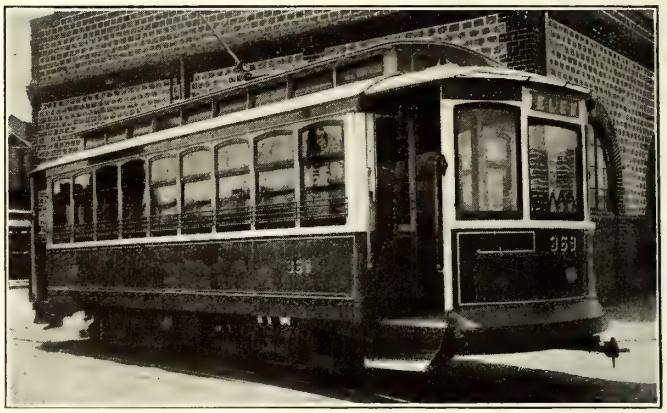
Mexico City Tramways—Exterior of Second-Class Trail Car with Package Compartment

concrete and the side framing, columns, crane girders and roof trusses are of structural steel. The walls, however, are made up of a grill work of light steel sections which



Mexico City Tramways—Second-Class Motor Car

divide the surface into a series of rectangles as can be seen in the accompanying engravings from photographs. In this network of steel paneling a brick wall having the thickness of only one brick, or 4-in., is laid. This construction has several advantages, chief of which is the great saving in weight of the walls. As mentioned previously the City of Mexico is built on a thin crust of firm soil underlying which is an unmeasured depth of soft and unstable mud and the weight of all large buildings causes them to settle to a marked degree after erection. Even with this construction of walls of light weight all of the tramway company's buildings have settled somewhat since they were put up.



Mexico City Tramways—Standard City Line Car

The roofs of the substations and power station are of corrugated iron laid on the steel roof trusses.

At the Indianilla power station a large storage battery has been installed. The battery floats on the d.c. feeder network and has a capacity for carrying the entire tram-



Mexico City Tramways—Latest Type Second-Class Car, Built by the Company

way load for short periods when for any reason the hydroelectric transmission line fails or any of the substations shut down. It frequently happens during the rainy season that lightning strokes temporarily disable the transmission lines, and at such times the battery automatically picks up the load.



Mexico City Tramways—Second-Class Trail Car

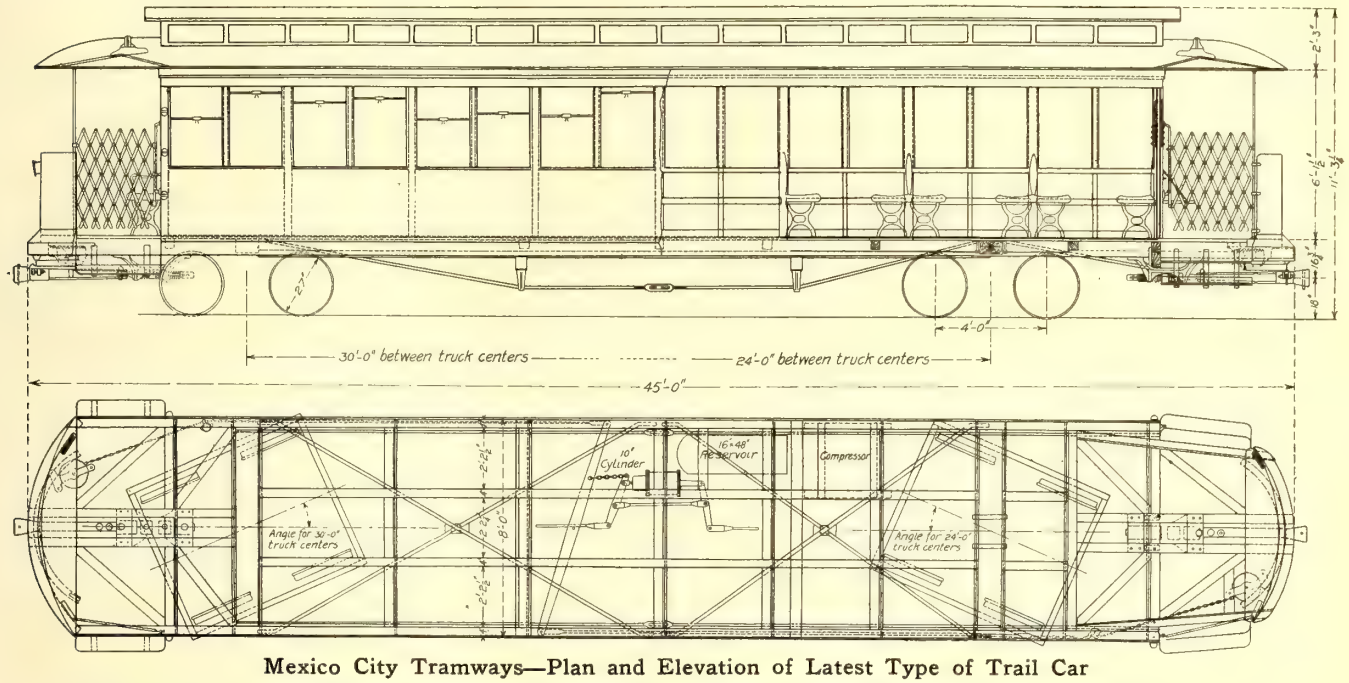
The d.c. feeder lines and tie lines between substations are all carried overhead on steel poles with metal cross-arms.

OPERATION OF CARS

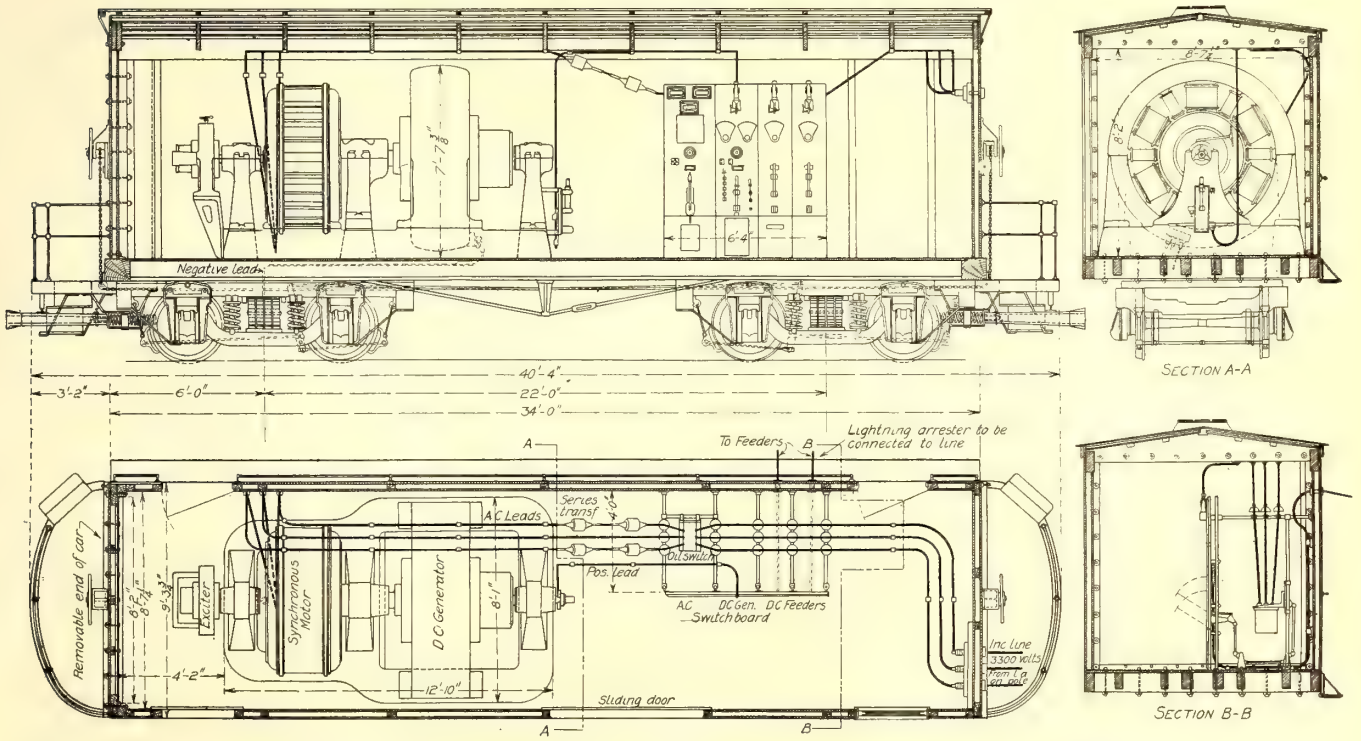
The ignorance and stupidity of the average Mexican peon

conductor, who is held in contempt by the upper classes, has made it necessary to adopt many peculiar practices in the operation of the tramway cars. Some of these methods would not appeal to managers of street railway systems in the United States, but they are successful in Mexico and are worthy of mention. The responsibility for the safe operation of the cars is delegated almost entirely to the motormen, who are a superior class of employees, and the duties of the conductors are limited to collecting what fares they can and attending to the trolley pole. The conductors for most part know little about the location of streets and buildings and care little about the safety of passengers getting on and off, the proper ventilation of the cars or their own personal appearance. They are afraid to insist on the payment of fare by passengers who deliberately refuse to pay and frequently have to call on the motormen or uniformed inspectors to collect the amount due. The fact that they are in uniform gives them some little authority over the lower-class passengers. As mentioned in the previous article, no fare registers are used, but graded fare receipts are issued instead to each passenger. These receipts are subject to frequent scrutiny by inspectors who board the cars and check up the loads.

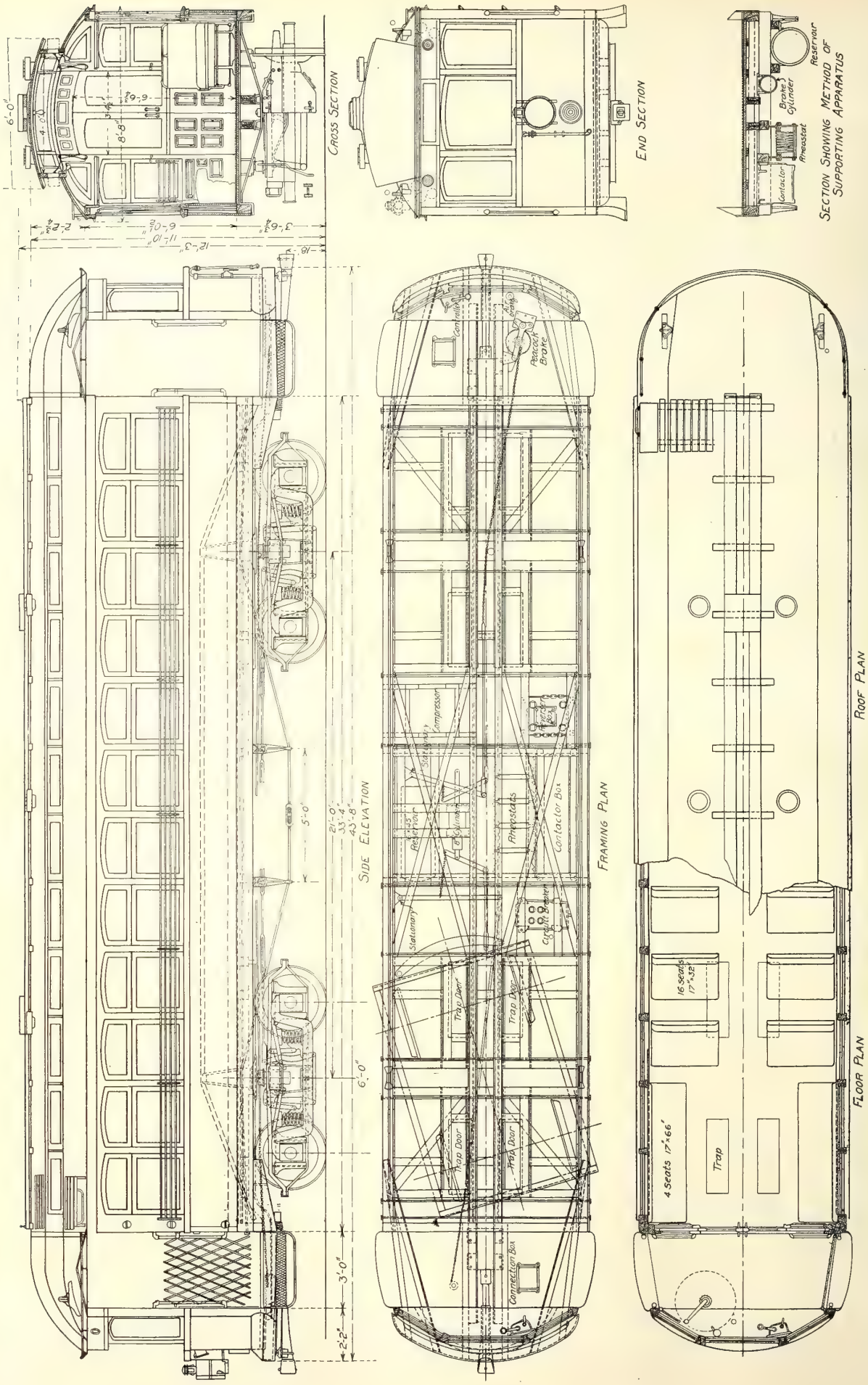
Not only is the fare-register bell silenced, but the usual signal bell for the motorman is dispensed with also. A city ordinance requires passengers to board cars at the rear end only and leave by the front end. Mirrors are mounted at an angle on each corner of the motorman's vestibule so that he can see the rear step on each side without moving from his position in front of the controller.



Mexico City Tramways—Plan and Elevation of Latest Type of Trail Car



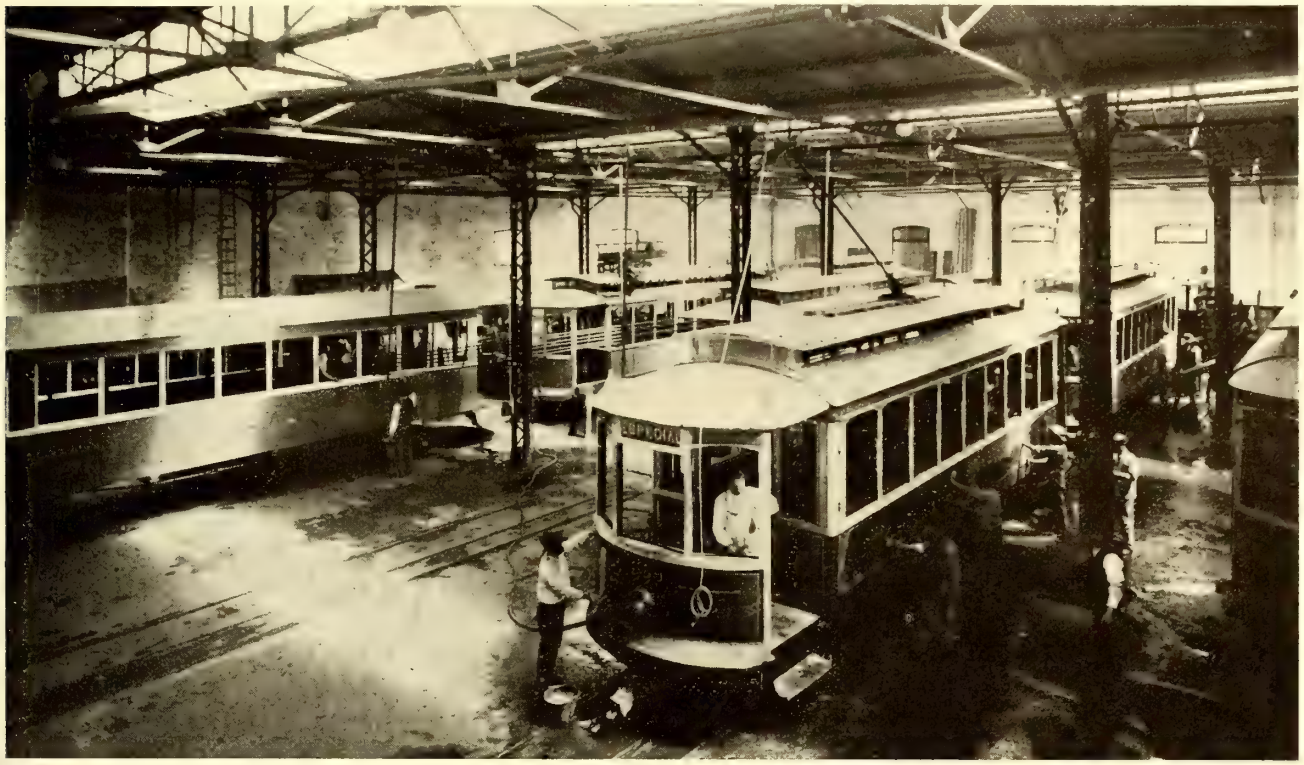
Mexico City Tramways—Plan, Elevation and Sections of the Portable Substation, with Motor-Generator Equipment



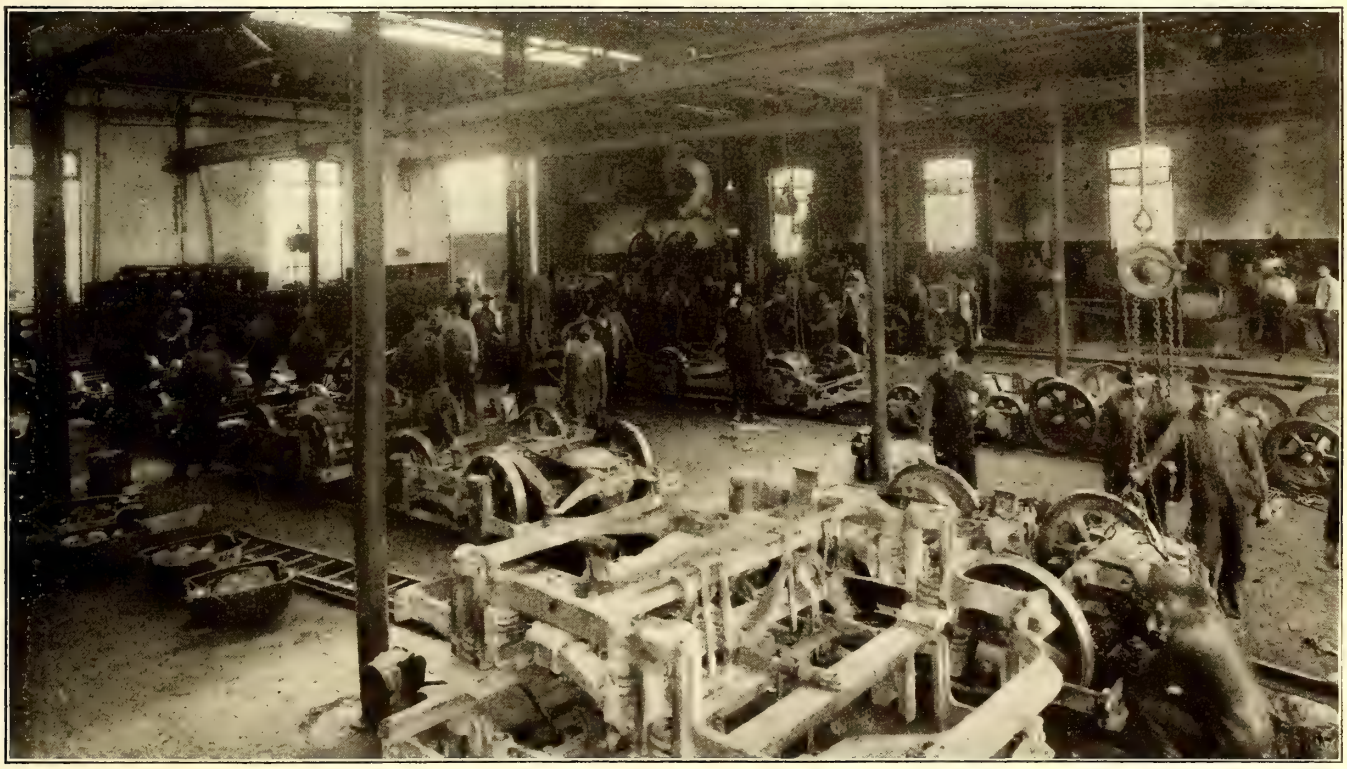
Mexico City Tramways—Plans, Elevations and Sections of the Standard Closed Motor Car for Suburban Service

He does not start the car until he sees that all passengers are safely on board and, as all passengers leave from the front end, he also has control of alighting as well. Under extraordinary conditions, of course, such as when large crowds are handled at the plaza or the bull rings, these strict rules are relaxed to some extent. Arrests for breaking the rules regarding boarding and alighting and keeping the front platform clear are made whenever it is necessary, and as confinement in Mexican jails is dreaded by foreigners and natives alike, little difficulty is experienced in enforcing the regulations.

The motormen in general are very careful in the operation of the cars, but all of them enjoy the sensation of running fast. In the central zone it is necessary on account of the congested streets to limit the speed of cars. To control the maximum speed absolutely special controller handles are used having a lug cast on them which prevents turning the controller beyond the notch designed to give



Mexico City Tramways—Paint Shop



Mexico City Tramways—Motor and Truck Assembly Shop

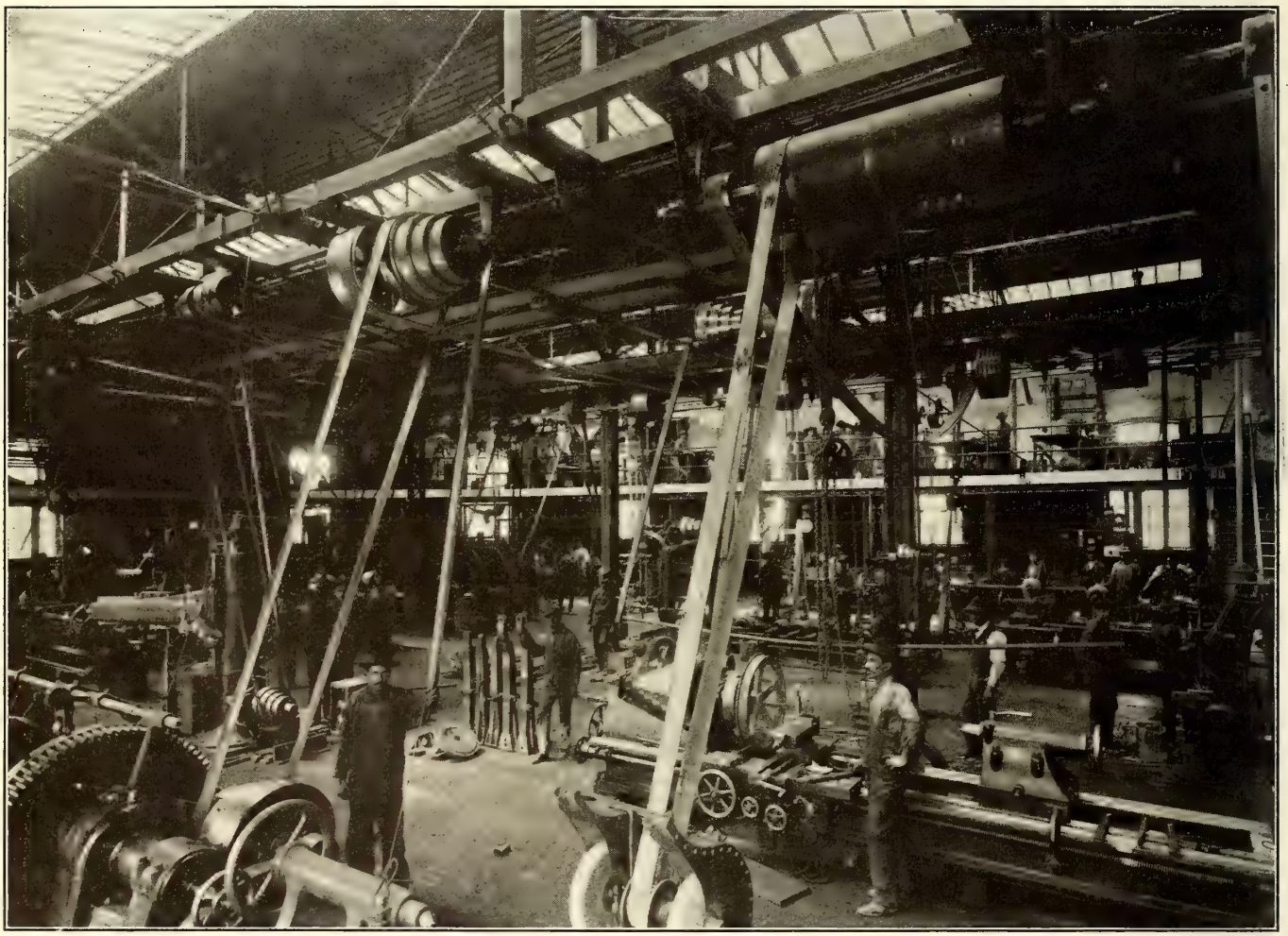
the maximum reduced speed. These handles are kept in booths located on all lines at the limits of the congested zone and attendants on duty exchange handles with motormen as cars enter the congested zone and again as they leave.

Cars stop on the near side of all intersecting streets except at points on the reservations or parked streets where shelter sheds have been erected; stops are made directly opposite these shelters. Accidents to passengers and pedestrians occur quite as frequently as in large cities in the United States, but they are caused in the main not by careless operation of the cars, but through the ignorance, stupidity or indifference to possible danger of the lower classes of natives. Many accidents are due to the injured person being drunk, a vice which has a strong hold on the peons. The trainmen have a strong incentive to avoid causing accidents because if a person is injured on or by a car the motorman and conductor are immediately arrested and confined in jail until a magistrate has made a thorough investigation. Witnesses are also clapped in jail and held for examination. If in the judgment of the examining magistrate a motorman is to blame for causing an accident he is criminally prosecuted as a responsible agent of the tramway company.

Smoking is permitted on all cars both inside and on the rear platform. Owing to the extreme heat in the middle of the day it is customary to operate trains of one closed motor car and an open trail car. Both cars are reserved for passengers paying first-class fare, but there are no compulsory distinctions of caste or color. While both first and second-class cars or trains are run independently on most of the lines, in some instances the desire to obtain a seat overcomes all class distinctions. All first-class cars are painted an orange color, while second-class cars are painted green.

SUBURBAN SERVICE

The service given on the suburban lines in the Federal district depends on the population of the towns reached and the amount of travel. On some lines cars run on a five-minute headway while on other lines cars run only once an hour. The suburban territory has been built up rapidly since the inauguration of mid-day express or "rapido" service in addition to that given in the morning and evening. Men who live in the suburbs and work in the city are enabled to go home for luncheon and the noon siesta. Two-car multiple-unit trains are used in this express service. The longest run is 11 miles, which is made in 30 minutes from the plaza in the center of the city. All other cars yield the right of way for these express trains.



Mexico City Tramways—Machine Shop

FREIGHT AND EXPRESS TRAFFIC

The tramway company conducts a large freight and package express business over its city and suburban lines. Bulk freight is shipped in open gondola cars of a capacity of from 5 to 22 tons. Closed motor express cars are used for hauling package freight, milk in cans and other similar commodities. The freight charges are based on suitable classifications and vary according to the distance hauled. In addition to this service a compartment is provided in the second-class motor cars in which small packages, bags and crates of produce, fruit and flowers and even small live

stock, such as pigs and goats, are carried. Parcels shipped in this way must be accompanied by a passenger, who alone is responsible for the loading and unloading. Charges are made for this accommodation, but the tramway company assumes no liability. This service is very popular with the suburban farmers and the city merchants. It is locally known as "Furgon" service.

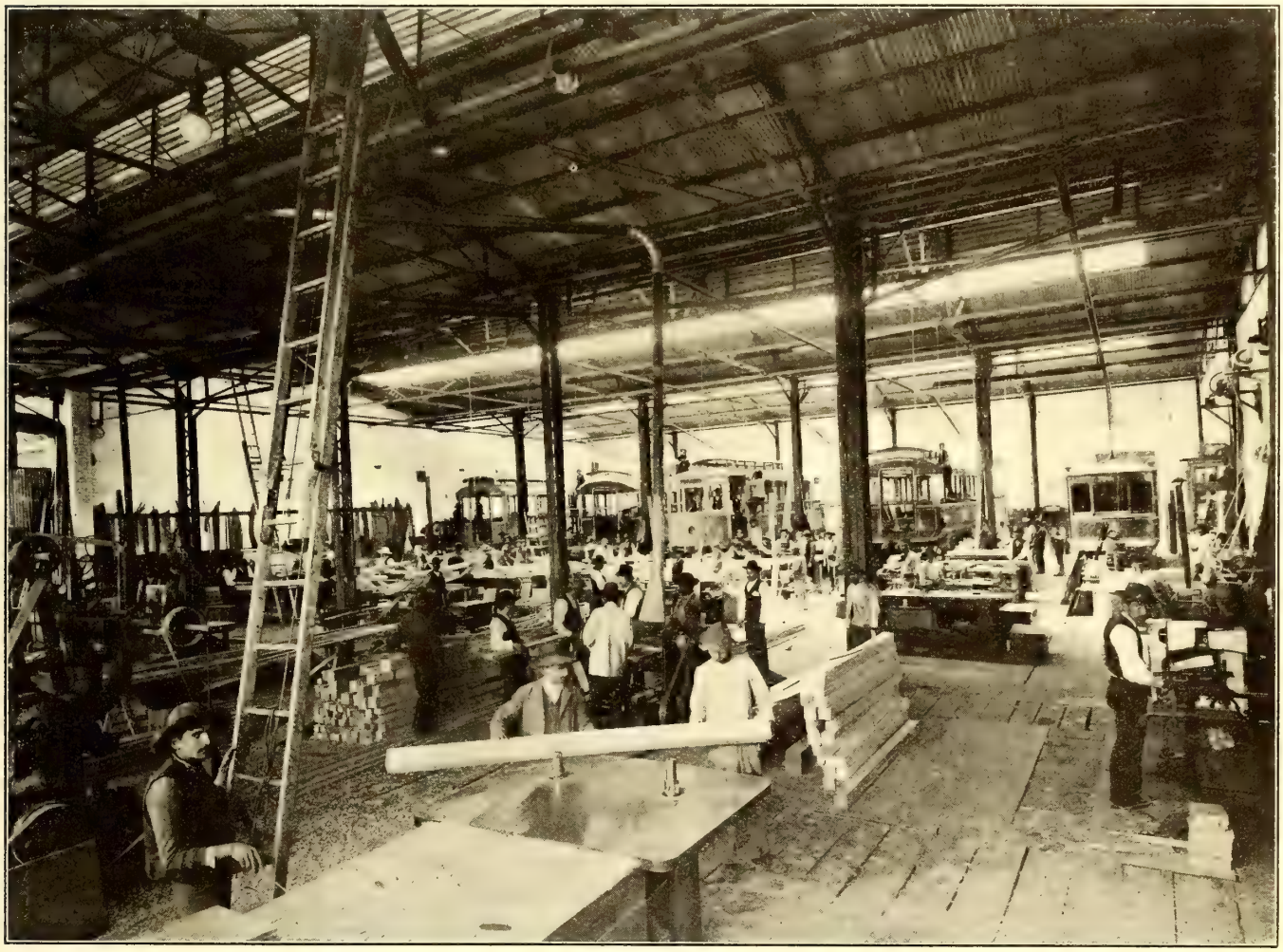
The company is not permitted to haul more than two trailer freight cars behind a motor car through the city streets. All freight trains are under the jurisdiction of a freight train dispatcher to whom the train crews report at certain points as ordered.

ROLLING STOCK

Although the City of Mexico is situated in a tropical latitude its elevation of 7500 ft. above sea level gives it a mild equable climate throughout the day. After sundown, however, there is sudden fall of temperature and the nights are quite cool. For this reason closed motor cars are used in preference to open cars. A few first-class open trailer cars are used during the rush hours, but not at night, when the travel is light. All passenger cars, both of the open and closed types, are wide enough to permit the use of a center aisle. Transverse seats are used on all but a few second-class cars. Both platforms of the closed cars are vestibuled and the steps are guarded by folding gates.

Of the 325 electric motor and trailer passenger cars owned by the company 49 are mounted on single trucks and the remaining 276 are mounted mostly on short wheel-base double trucks with outside-hung motors, but the newest interurban cars are mounted on two M. C. B. type trucks having a 6-ft. wheel base and are equipped with four GE-87 60-hp motors and Type M multiple-unit control for interurban use, but on the city cars GE-70 motors are used. Wrought-iron or cast-steel center steel-tired wheels 34 in. in diameter are the standard for all motor cars. Most of these wheels are imported from England and are made by Baker or Hadfield. All motor gears are of the keyed-on solid type. The trolley stock is well suited to the service which it has to perform, and but little trouble is experienced in keeping it in good and serviceable condition. Frequently every car which the company owns is pressed into use on holidays.

Owing to the indifference of trainmen to proper ventilation of the cars and the general preference of the passengers to have the windows closed in order to avoid drafts, automatic roof ventilators have been installed on nearly all cars. Revolving illuminated destination signs and colored lamp route markers are used on motor cars. On the city cars incandescent lamp headlights are employed, but the suburban and interurban cars are also fitted with arc headlights. All cars have oil-burning tail lamps mounted on the roofs to warn following cars in case of breakdown in poorly lighted suburban districts. Most of the motor and trail cars are equipped with air brakes and also geared hand brakes. Long-nose fenders of an English pattern were adopted some time ago as a result of tests by Government officials. No heaters are required in the cars at any time during the year and there is no snow to contend with.



Mexico City Tramways—Carpenter Shop

The tramway company maintains a special private car for the exclusive use of the President of Mexico and his family and has built a track into the grounds of Chapultepec Castle, the summer home of the President, over which the car can be run. There is frequent demand for chartered private cars to make short runs between the city and the outlying towns, where many of the Government officials and foreigners have summer homes. The company makes a special effort to provide good cars and in every way encourage this source of traffic. The last 25 motor cars purchased were built by the St. Louis Car Company from designs made by the engineers of the tramway company. In the future all new cars will be built in the company's own shops from native woods. The electrical and miscellaneous equipment will be purchased in the United States. The company has had considerable experience in car building, having built at its shops a large number of first-class trailer cars, second-class motor cars, all of its freight equipment and its funeral cars. The present car equipment of the tramway system consists of the following:

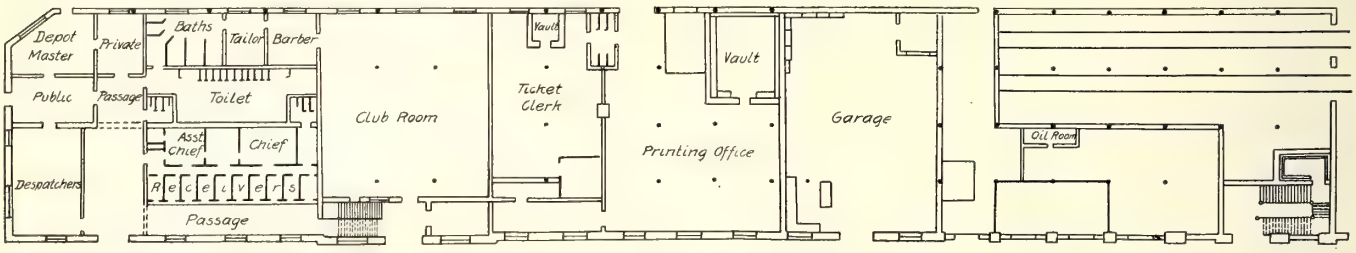
255 first-class motor and trailer cars.
8 second-class motor combination passenger and freight cars.
45 second-class trailer cars.
5 special first-class motor cars.
28 freight motor cars.
40 freight trailer cars.
75 flat cars.
3 steam locomotives for narrow-gage steam line.
70 passenger mule cars for narrow-gage steam line.
21 electric funeral cars.
8 horse or mule funeral cars.
1 pay car.

559 total.

SHOPS

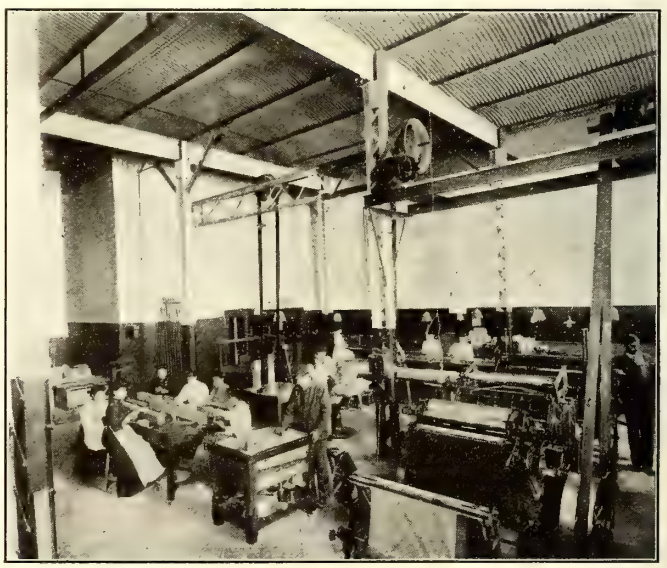
The Mexican Government has endeavored to encourage the construction of public utility projects in many ways, believing that they aid in the development of the country. To this end import duties on material and apparatus intended for new construction or extensions of existing systems are frequently waived or greatly reduced. High duties, however, are charged on all materials imported for repairs and maintenance and these duties, combined with the very high freight rates from the United States and England make it almost imperative for a system of the size of the Mexico City Tramways Company to manufacture most of the material needed for the up-keep of the property. The tramways company now manufactures most of its overhead line material, trolley wheels, car bodies and trucks, and has facilities for repairing special track work. The shops are comparatively new and are equipped with all of the necessary machinery. They are located in the suburb of Indianilla, adjoining the steam power station. The shops, power station, car barns, storage tracks, offices and stables occupy a large irregular area which is divided into three sections, each enclosed by a high masonry wall. A general plan of the buildings is shown in one of the engravings.

All of the buildings are constructed with steel framing and masonry walls with corrugated iron roofs laid on steel roof trusses. The car repair shop buildings are divided into two groups separated by a transfer table pit. One group contains 11 transverse tracks and the other group 14 tracks. In the wood-working shop an exhaust system for disposing of dust and shavings from all of the wood-working machinery has been installed. The refuse collected is burned in a furnace which supplies heat for the brass foundry crucibles and for the armature drying ovens. Compressed air is piped throughout all of the shops; the supply is taken from a tank and compressor interconnected with a duplicate in the steam-power station near by. All tools in the machine shop are group-driven by electric motors mounted under the roof, and in the wood-working shop most of the tools are separately driven by individual electric motors. Pneumatic and chain hoists have been installed at convenient points in the truck shop and machine shop.



Mexico City Tramways—Utilities Building Alongside the Main Car House

The car barns and shops at Indianilla have recently been equipped with a complete system of wet-pipe aisle and roof sprinklers. The sprinkler system is supplied by five 30,000-gal. overhead pressure tanks which are interconnected. The system is also connected to a motor-driven high-pressure fire pump which can be started in case of fire. The motor-driven fire pump also supplies numerous stand-pipe connections throughout the shop buildings, to which hose and nozzles are attached. Every precaution is taken to ensure a supply of water and electric current for operating the fire pump at all times. The company has a number of artesian wells on the shop tract and an intake has been built to one of the city canals which crosses the property.



Mexico City Tramways—Printing Department

The engineering department employs only Mexican draftsmen in charge of a chief draftsmen who is an American. Construction drawings are made in either the metric or English system of measurement and all notes and lettering are printed in either Spanish or English, depending on the destination or purpose of the drawings. In the shops all work is done to English measurements. The entire shop force, numbering several hundred men, has been trained by an American master mechanic. On the whole, the Mexicans are skilful and proficient workmen and the company is able to carry on the manufacture of nearly all of its supplies.

CAR HOUSES

The main car house of the system adjoins the steam power station at Indianilla. A few small car houses have been built in the outlying districts, but these are used chiefly for storing passenger cars in the daytime and for temporary storage of freight and work cars. All car houses are built with open ends, as the climate is so mild that closed buildings are not required. Division walls separate the main car house into three bays, each containing four tracks. The walls of the car houses are brick and the roofs are corrugated iron. All of the car barns are equipped with inspection pits, but it is the practice to have all car repairs made at the main shops. The centralization of all repairs, inspection and cleaning at one point results in economy and efficiency in the maintenance of the rolling stock.

In the morning all cars pull out from the Indianilla barns and run to the Plaza in the center of the city, from which point the regular trips begin. In the Plaza the company has erected a building locally called the "Kiosko," which is used as an office for the superintendent of the central division and for the chief train dispatcher. Conductors



Mexico City Tramways—Employees Making Returns to Receivers

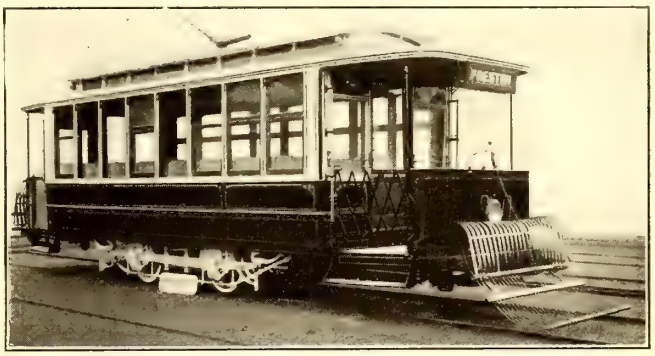
obtain supplies of change and fare receipts at this point and the building serves as a general headquarters for the company in the center of the city.

OFFICES

The main offices of the tramway company are located in a large two-story building adjoining the car barns at Indianilla. The first floor of this building is given over largely to accommodations for the employees. Here are located the offices of the chief train dispatcher, the receiver's cages, barber shop and bathroom, employees' clubroom, the printing office, where all fare receipts are printed, and the company garage. On the second floor of the building are the offices of the manager, the auditor and of the engineering and purchasing departments. The company has a private telephone system connecting all offices, dispatching booths, car houses and substations and at the switchboard this private system is also connected to the public telephone system. Operators who speak both Spanish and English are on duty day and night.

ENGLISH SEMI-CONVERTIBLE CAR WITH HIGH WINDOWS

The accompanying illustration shows one of the new semi-convertible cars built by the United Electric Car Company, Ltd., Preston, Lancaster, England. A large number of these cars have been shipped to South America, and 20 are now on order for the Bahia Blanca section of the



Semi-Convertible Car for Buenos Ayres

Buenos Ayres & Pacific Railway. This design was prepared chiefly for foreign countries where the extremes of climate are greater than in England, and its construction also embodies features which enable it to be shipped with boxed sash and without removing the inside finish.

One of the special features of the car body is the high window opening of 3 ft. 9⅜ in. secured by the use of wall pockets. Both the upper and lower sections of the sash may be dropped by the passenger without leaving his seat. This feature has been attained by a special window post construction, which allows the upper sash to be lowered on the inside of the bottom sash and to stay on the arm rest if desired. When both parts are in the pocket they are covered by the arm rest which locks into the lower sash.

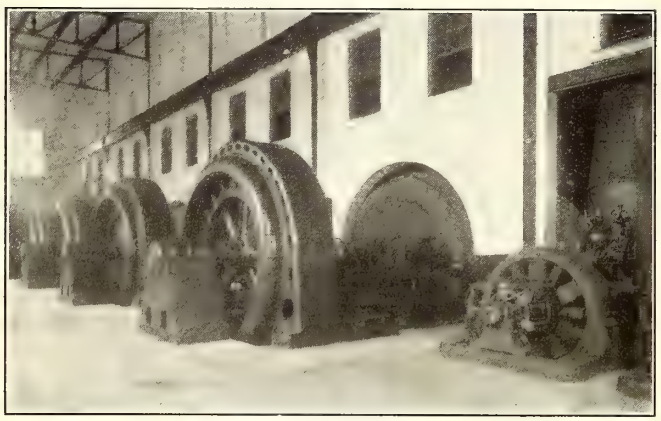
It is asserted that no rattling takes place, as there is nothing to guide the sash but the post. The use of drop sash, of course, allows a much lighter roof construction. The extra width gained across the car between the lower sashes gives the maximum shoulder room possible.

The truck used under these cars is of the Preston compensating type illustrated and described in the STREET RAILWAY JOURNAL of Jan. 4, 1908. In addition to the usual spiral side and semi-elliptic journal springs, this truck has special leaf springs at the ends. The forward end is under ordinary compression when the car is light and the rear end becomes compressed only when the load increases beyond a predetermined point.

The principal dimensions of these cars are as follows: Length of body over corner posts, 20 ft. 11 in.; length over platforms, 30 ft. 1 in.; total length over all, 31 ft. 9 in.; width over body, 8 ft. ½ in.; width over roof, 8 ft. 3½ in.; clear height inside at center, 7 ft. 10 in.; over-all height from rail to trolley board, 11 ft. 2 in.; width between side posts, 2 ft. 2⅜ in.; clear opening when side lights are lowered, 3 ft. 9⅜ in.; clear opening when top light only is lowered, 1 ft. 6¾ in. The seating capacity is 32.

POWER GENERATING SYSTEM AND RECORDS OF THE TWIN CITY RAPID TRANSIT COMPANY

Several articles have been published within the past year in the Electric Railway Journal upon improvements made during the past three or four years by the Twin City Rapid Transit Company, particularly in the construction of its Snelling Avenue repair shops, at which all of the repair work on the system is done, and in the erection of extensive car houses at the same point. In the power department changes of almost equal importance have been made. They



Twin City System—Interior View of Hennepin Island Station

include additions to the substations, which are now 10 in number, and the completion of arrangements for the receipt of current from a new water-power station at St. Anthony Falls.

Power for the operation of the company's system is now obtained from the original St. Anthony Falls station, the property of the St. Anthony Falls Water Power Company, from the steam-power station of the Twin City Rapid Transit Company and from the new Hennepin Island power station. From the first the company secures power on a 24-hour basis. The greater part of the remaining power is taken from the steam-power plant of the company on the east bank of the Mississippi River just below the Tenth Avenue bridge in Minneapolis. This station operates for about 20 hours a day and has a capacity of about 30,000 hp supplied by four vertical-compound reciprocating engines of 5000 hp each and two Curtis turbines of 5000 kw each. In addition, power is also taken from the Hennepin Island water-power station, which utilizes the overflow from the St. Anthony Falls. This station has been in use only since last summer. Through the courtesy of E. H. Scofield, engineer of power and equipment of the Twin City Rapid Transit Company, and of R. D. Thomas, assistant engineer of the St. Anthony Falls Water Power Company, this paper is enabled to publish an account of the new Hennepin Island power station and the accompanying diagrams, showing the power output of the different stations and other interesting data.

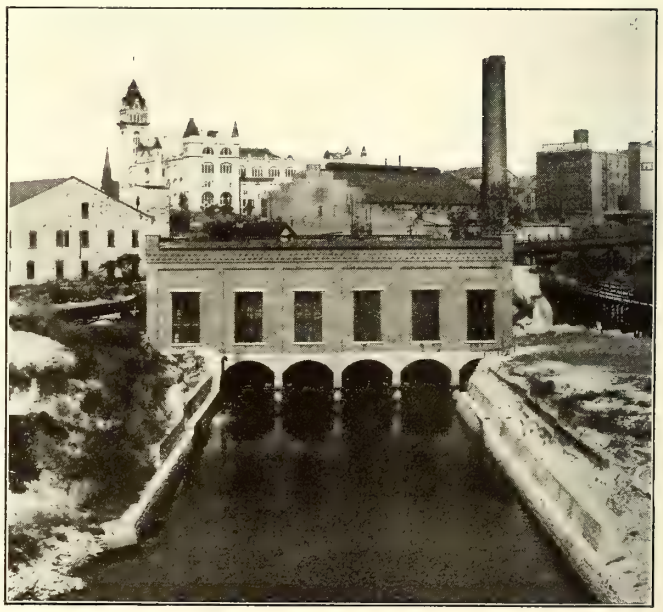
THE HENNEPIN ISLAND POWER STATION

With the recent completion of a new hydro-electric station at the Falls of St. Anthony, Minneapolis, Minn., the St. Anthony Falls Water Power Company has entered a field which is somewhat novel in the exploitation of hydraulic power development.

This plant is located at what is known as the Upper Falls, which have for many years furnished power to the Minneapolis flouring mills and to other minor industries, and is intended to utilize water for power only at such times as the supply may exceed the demands of all earlier lessees. In other words, it is purely a surplus power development, utilizing the flood waters of the river up to the maximum capacity of the hydraulic installation. Furthermore, the plant is ready at all times to use water when the other lessees shut down their wheels, as they do on Sundays and holidays.

In order to sell power of this nature, with its uncertain availability, it was necessary to find a market where its withdrawal at any time would not seriously affect the user, and, at the same time, the price must be low enough to make its use economical even under these conditions. A favorable location provided for a relatively cheap development, and, upon the assurance of a probable market, construction was begun in the spring of 1906.

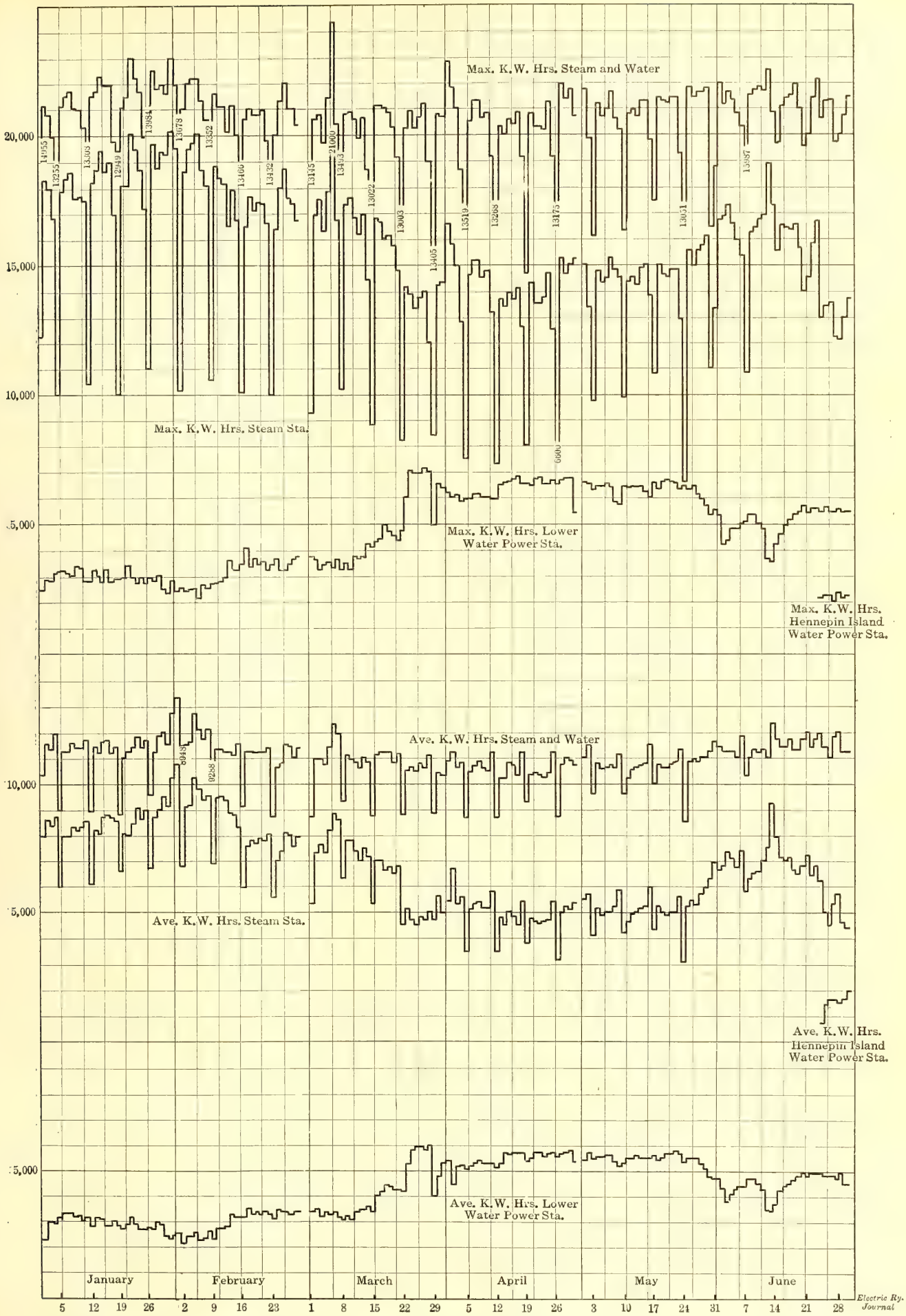
The wheelpit division walls rest upon a heavy steel reinforced concrete mattress, which also serves as a protection for the soft underlying sandrock. This sandrock forms the foundation of the entire structure from the forebay wall to the wheelpits. When properly protected, it makes a perfectly safe and solid foundation, and in its virgin state is so hard that a pick will make scarcely any impression upon it, but when subjected to the action of the weather or to the erosive effect of water it rapidly disintegrates and washes away. As the tail race was through this sandrock for its entire length, it was deemed advisable to protect it both on the bottom and on the sides. The bottom was paved with limestone blocks, and then covered with a cement grouting. The sides were protected by means of rubble masonry walls laid nearly to the top of the excavation.



Twin City System—Hennepin Island Power House from Lower End of Tail Race

The generating installation consists of four main units, each of 2250-kw capacity, and two exciter units, each of 150-kw capacity. Each main unit consists of a pair of 48-in. wheels set horizontally in a ⅜-in. steel plate casting, and direct-connected to a 2250-kw, three-phase, 35-cycle generator running at 210 r.p.m. The exciter units are each connected to a 24-in. horizontal McCormick wheel running at 225 r.p.m. The generator room is provided with a 50,000-lb. Pawling & Harnischfeger hand-operated traveling crane.

Water is taken from the canal through a trash rack ex-



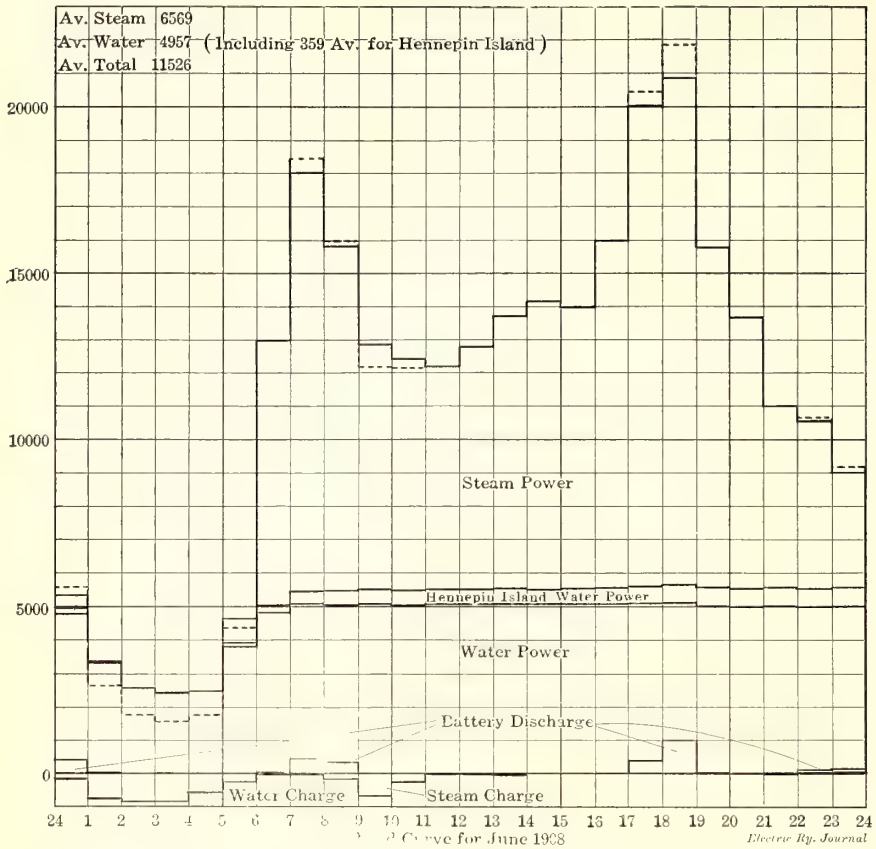
Twin City System—Graphical Record of Output of Different Stations by Weeks, from January to June, 1908

tending the entire length of the power house. This rack is built of 3½-in. x 5/16-in. flat steel bars, securely bolted together with ¾-in. round bolts and spaced with extra heavy 1-in. pipe thimbles. A structural steel frame provides support for the rack and also for a traveling carriage used for operating the penstock gates.

The large penstock gates, of which there is one for each unit, are each 14 ft. wide x 13 ft. 3 in. high, and are built of pine timbers securely bolted together and provided with steel bearing plates. These gates are operated by means of a motor-driven hoist, which is mounted on a carriage traveling over the head gates on two parallel 55-lb. T-rails. The hoisting mechanism consists of a series of gearing belted to a 5-hp motor and drives two ball-bearing bronze nuts engaging two long screws which serve as gate stems. In moving from one gate to another, these screws are disconnected from the gates and travel with the carriage. Each gate is provided with a small hand-operated filler gate which is used for filling the penstocks before raising the gates, thus relieving the hydrostatic pressure on them.

For the exciter penstocks two small hand-operated gates are provided. These gate hoists are of a standard pinion and rack pattern, made by the Dayton Globe Iron Works, of Dayton, Ohio.

The penstocks all pass through a heavy forebay wall and end with a 90-deg. elbow entering the wheel-cases at the top.



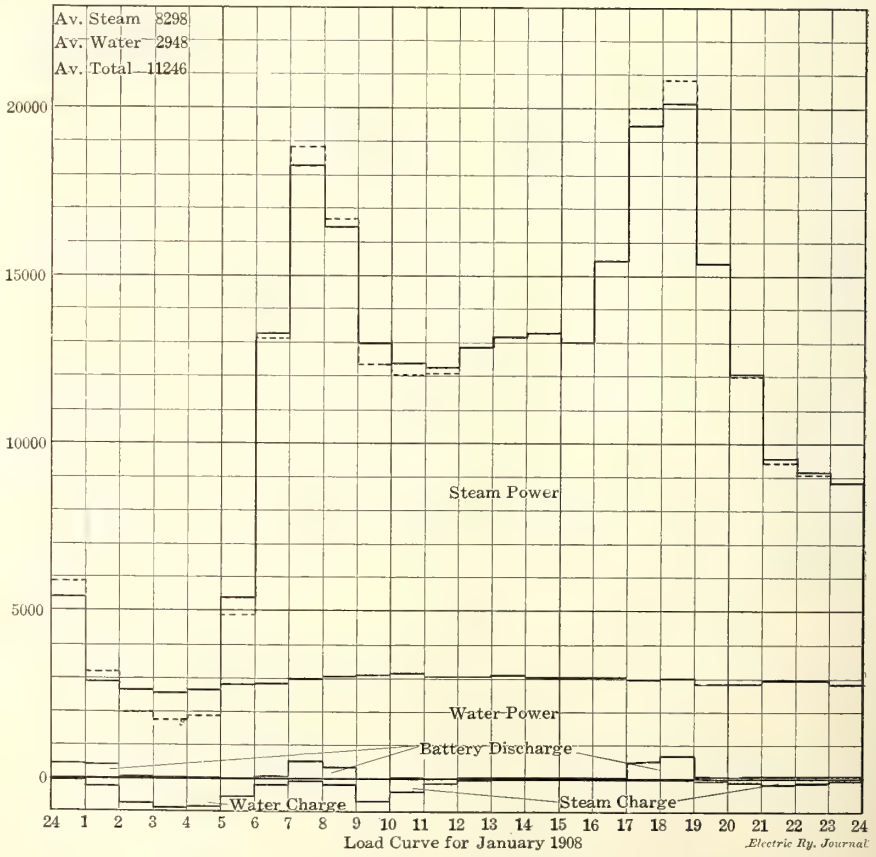
Twin City System—Load Curves for Different Stations, Summer Month

The plant is situated on the east shore of the Mississippi River, taking its water from the original mill pond through a canal 350 ft. in length. The water is discharged below the power house into a tail race 280 ft. in length, returning again to the river just above the lower development, known as the Lower Dam.

The canal stands upon a solid limestone ledge, with heavy masonry walls of the same material. It has a clear width of 55 ft. and an average depth of 17 ft. At the upper end there are provided three Stoney type headgates, each gate being 16 ft. 4 in. wide by 18 ft. high. The gate hoist is so arranged as to be operated either by hand or by motor, and the gates may be handled singly or all together. The gates are built with steel frames of 15-in. I-beams decked with 6-in. pine planks, having steel gate-stems which are seated upon roller nests peculiar to the Stoney gate.

The power house is a brick structure 84 ft. x 136 ft. x 42 ft. high, with a steel skeleton frame supporting the traveling crane and roof trusses. A brick partition wall divides the building longitudinally, with the water wheels and penstocks on the upstream side and generator room and switchboard gallery on the downstream side. A series of heavy concrete arches resting on the wheelpit walls provides suitable support for the machinery and superstructure of the building.

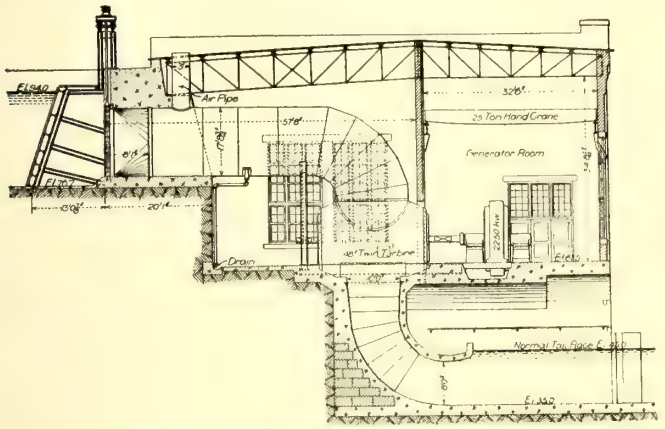
The water wheels are of the "Smith" type, manufactured



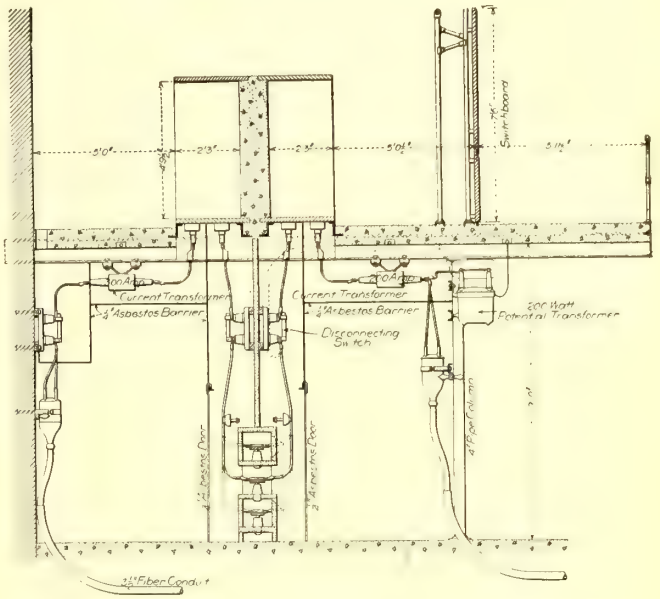
Twin City System—Load Curves for Different Stations, Winter Month

by the S. Morgan Smith Company, of York, Pa. They are set in pairs, horizontally, with center-discharge draft chests. Each unit is provided with a lignum vitæ center bearing suspended from the top of the draft chest by means of heavy steel rods. The entire turbine setting is supported upon steel I-beams securely embedded in the concrete floor.

The draft tubes are of the elbow type, making a right-angle turn at the bottom, thus discharging the water horizontally into the wheelpit. The top diameter at the exit of the draft chest is 10 ft., and from this point to the lower end it gradually enlarges in area and changes in shape until at the mouth it is oblong, being 8 ft. high x 19 ft. wide. The total draft-tube length is about 26 ft., and the normal draft head is about 21 ft.



Twin City System—Cross Section Through Hennepin Island Station



Twin City System—Cross Section Through High-Tension Compartment, Hennepin Island Station

The draft tubes are built of concrete, with a steel-plate lining for about two-thirds of the length. This steel lining was used as a substitute for wooden forms, and also to provide a wearing surface. Although the design of these draft tubes was somewhat novel at the time they were built, tests have proved them to have an efficiency of over 99 per cent.

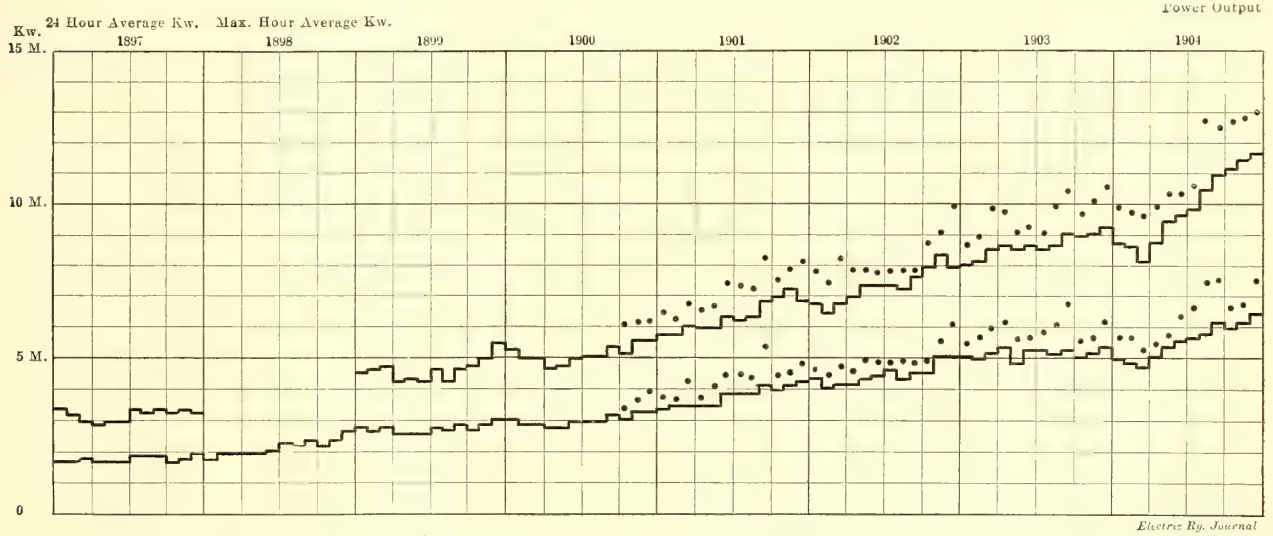
Each main turbine unit is provided with a Type N Lombard governor and each exciter unit is provided with a Type D Woodward governor. Both of these governor types are too well known to require any detailed description.

The main generators are of the revolving field type, and are designed to deliver three-phase alternating current at 35 cycles and 13,200 volts when running at 210 r.p.m. Each machine has a rated capacity of 2250 kw at 100 per cent power factor. The generators are separately excited by a 150-kw, 110-volt water-wheel-driven exciter. The exciter installation is in duplicate.

A small motor-driven air compressor is provided for cleaning the electrical machinery.

The switchboard is located on the gallery floor at one end of the generator room, and is made up of 14 panels of blue vermont marble, of which there are four generator panels, four line panels, one exciter panel, one station lighting panel, one storage battery panel and three spare panels for future extensions. Each generator panel is equipped with three ammeters, one power-factor indicator, one voltmeter and one field ammeter on the front of the board, and a polyphase recording meter on the back. The outgoing line panels are each equipped with three ammeters, one remote control oil switch and one triple-pole, time-limit overload relay similar to those on the generator panels.

The oil switches and generator field rheostats are all operated from the generator panels by means of control switches. In addition to the equipment previously men-

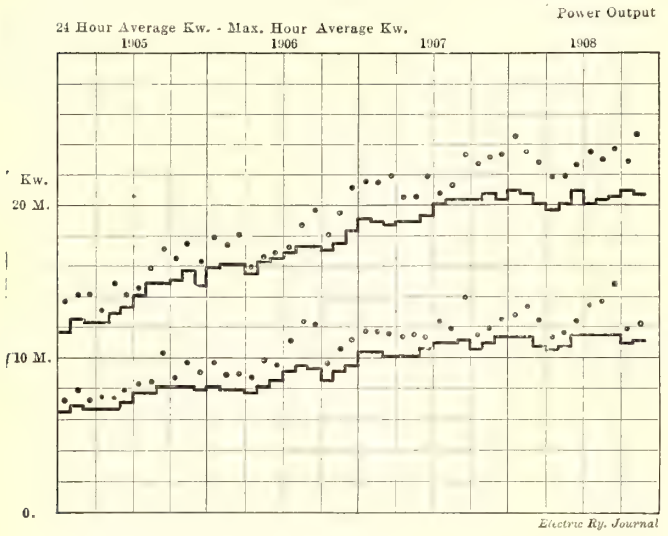


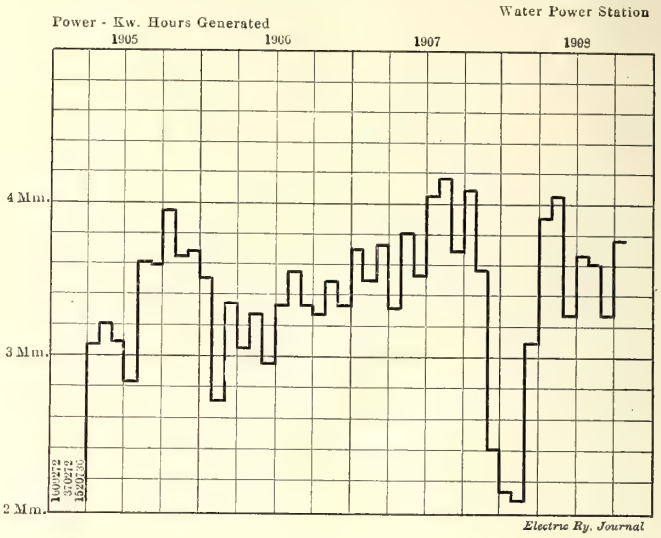
Twin City System—Output of Power Stations from 1897 to 1904, Showing Average for 24 Hours for Entire Period, and Maximum Hour Average Since October, 1901

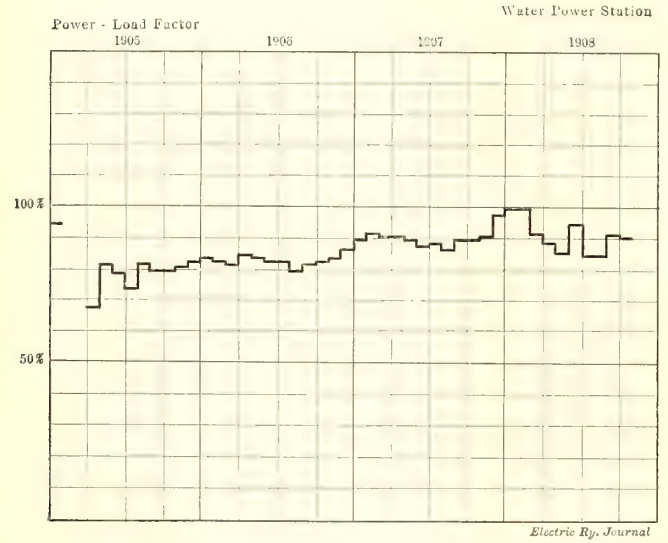
tioned, each generator panel is provided with a field switch, potential and synchronizing receptacles and a time relay connected with the automatic high-potential oil switches.

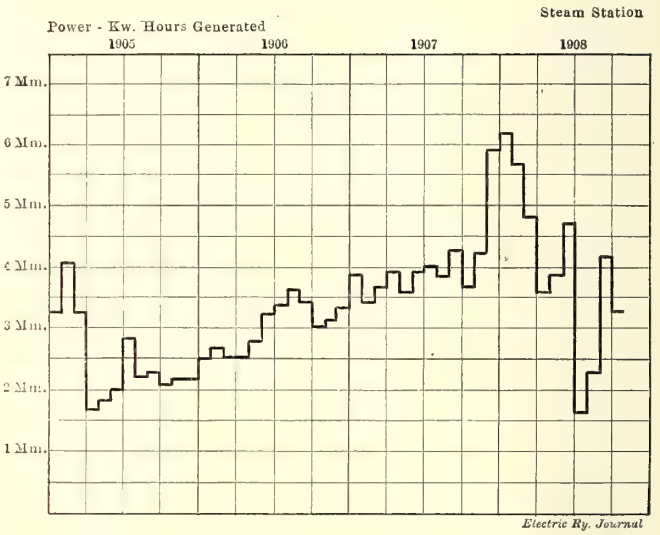
Both exciters are connected to a single panel, upon which the generator and line panels. These switches are triple-pole, single-throw, 15,000-volt, 300-amp form H3 and are motor-operated.

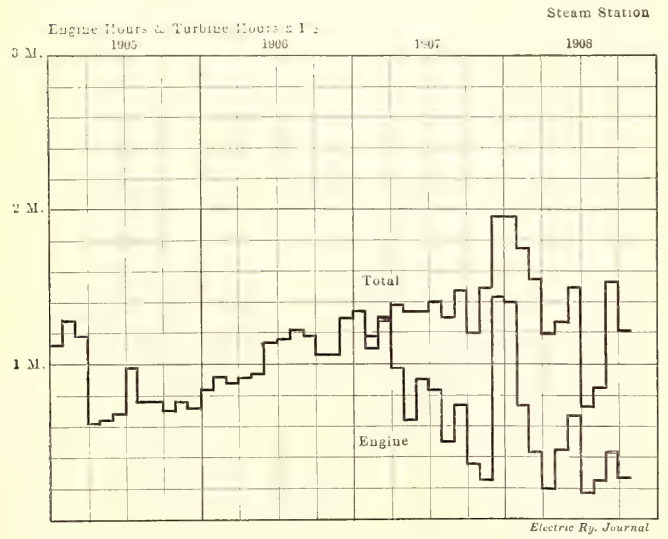
Directly under the oil switches and resting on the main

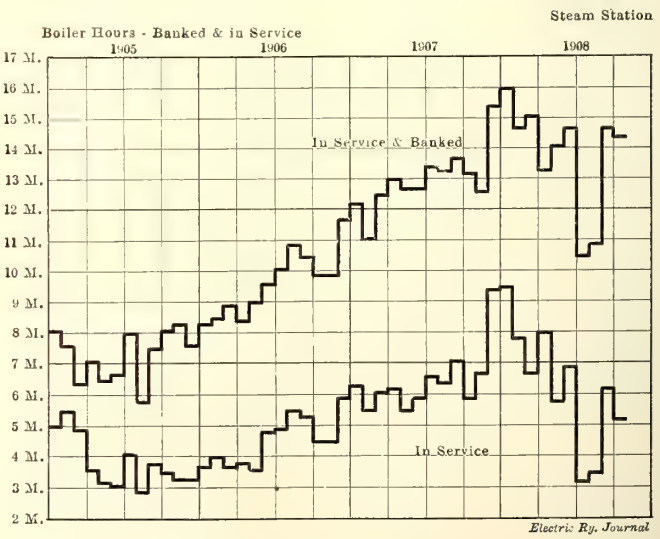












Twin City System—Graphical Records of Power Station Statistics

is mounted a Tirrill regulator, together with necessary indicating meters and switches.

On the switchboard gallery directly back of the switchboard are placed the high-potential oil switches for both floor are the busbar compartments. The partition walls of these compartments, and also of the oil-switch cells, are built of concrete in which is embedded expanded metal lath for reinforcement. Asbestos board doors are

provided for the stalls in this structure. There are three buses, each of ¼ in. x 2 in., copper supported longitudinally in position by heavy insulators. The busbar compartments and general arrangements of switches and connection are shown in the cross-section through the switchboard gallery.

All wires and cables are concealed by the use of metal and fiber conduits wherever possible. The gallery floor is constructed of concrete in which are placed iron-pipe conduits sufficient in number to provide for all necessary wiring for the present plant and possible future extensions. For the generator cables and outgoing line cables 3½-in. bituminized fiber conduits were placed in the main power house floor, the cables being pulled in after the completion of the plant. All cables are lead covered and all other wiring is heavily insulated.

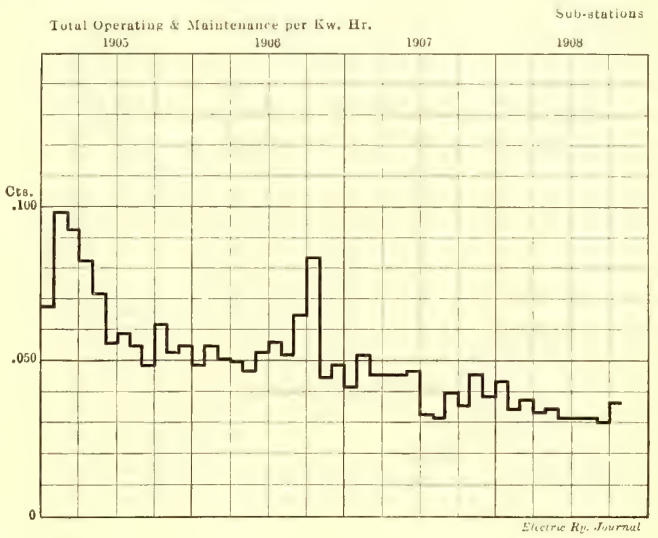
The power generated at this station is sold entirely to the Twin City Rapid Transit Company for the operation of its street railway service in Minneapolis and St. Paul. The station is operated in parallel with another hydro-electric station of 7000-kw capacity located at what is known as the "Lower Dam," about ½ mile below on the river; and also with a steam station of 24,000-kw nominal capacity. The power from these three generating stations is distributed to the various substations in the two cities and there converted into direct current for street railway service.

It is interesting to note the very low cost of this development, which, including all electrical and hydraulic machinery, was about $26 per horse-power. This cost was subdivided as follows:

Head race and tail race excavation and construction, complete	$6.00
Power house, complete	6.50
Head gates, cofferdams and miscellaneous structures	1.50
Electrical machinery	8.00
Hydraulic machinery	4.00
Total cost	$26.00

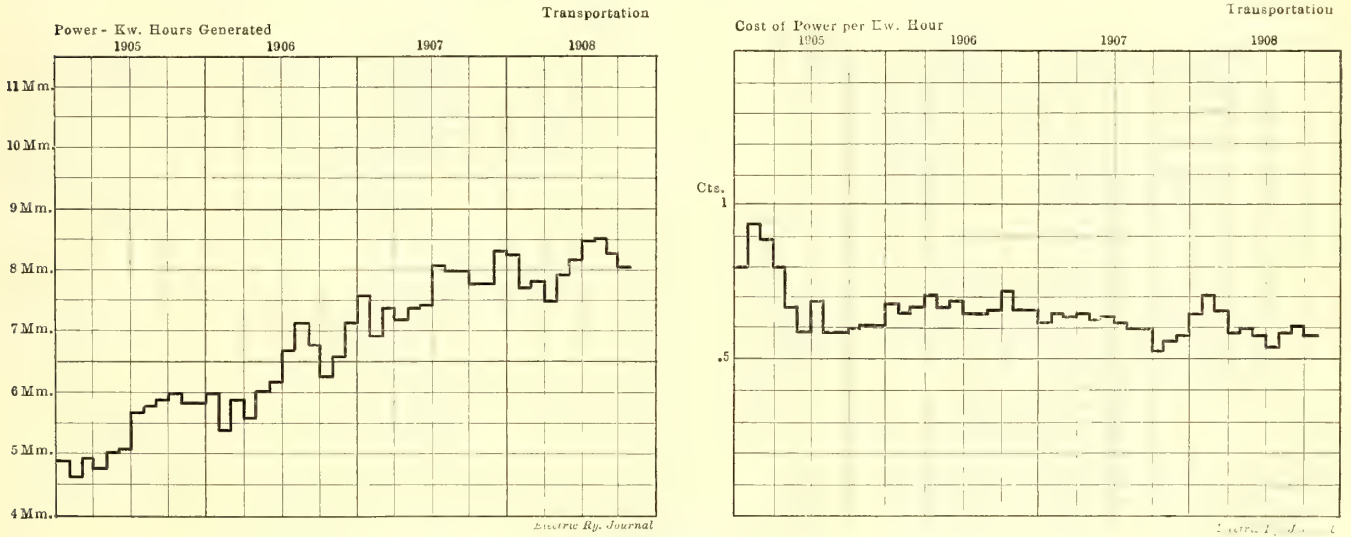
In this connection it should be stated that no dams were built, the water being used from the existing pond already created by the dam of the water-power company. Another factor aiding materially in this low cost was the presence upon the site of all stone required for masonry and concrete work.

The excavation for the power house necessitated the removal of several thousand yards of a limestone well suited for building purposes. The construction plant was so arranged that, as this stone was removed from the quarry by derricks, it was set upon flat cars and thus hauled directly to the point where it was to be used. The larger stones were used in laying up the masonry canal and forebay walls, whereas the smaller pieces and spalls were all hauled to the crusher and subsequently used in the concrete work.



Twin City System—Substation Operating Cost per Kw-Hour

The complete electrical equipment was furnished by the General Electric Company, of Schenectady. The electrical design and installation were made under the direction of E. H. Scofield, M. Am. Inst. E.E., engineer of power and equipment of the Twin City company. The entire plant, exclusive of the electrical equipment, was designed and built by the water power company's forces under the direction of its chief engineer, Wm. de la Barre, M. Am. Soc. C.E. The first unit was completed and put in operation in June, 1908, and the entire plant was running by July 20.



Twin City System—Records of Total Kw-Hours Generated and Their Operating Cost

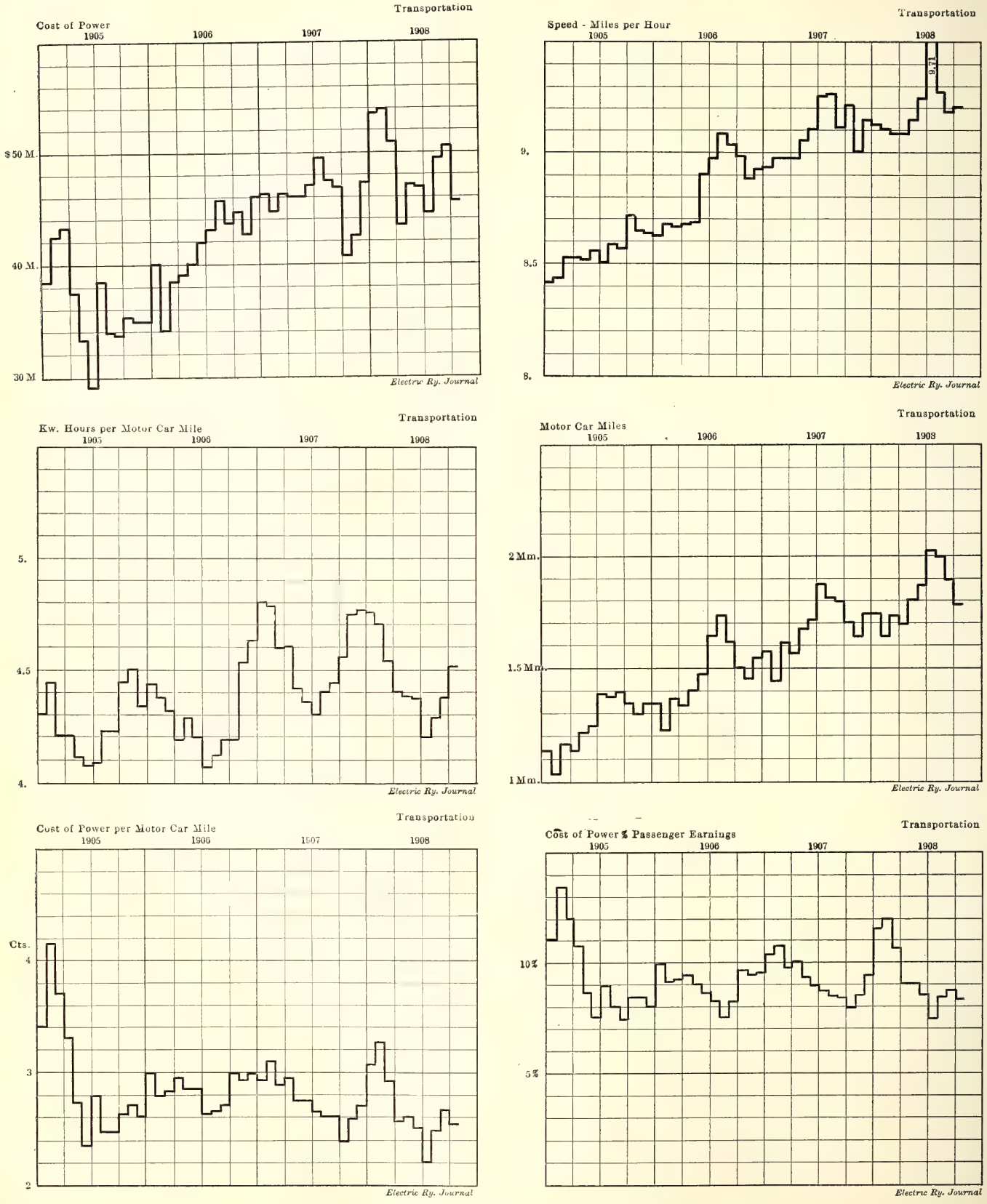
STEAM POWER STATION

The steam-power station of the Twin City Rapid Transit Company was described in the STREET RAILWAY JOURNAL for July 27, 1907. Since that time additions have been made to the power equipment, and the station now contains two 5000-kw Curtis five-stage turbines, as well as

the initial equipment of four vertical cross-compound Allis-Chalmers engines, whose cylinder dimensions are 46 in. and 94 in. x 60 in. The guaranteed steam consumption of the turbines per kw-hour at 175-lb. pressure, 2 in. back pressure, 100 deg. Fahr. superheat is: At half-load, 18.3 lb.; at full load, 17 lb.; at one and a half load, 17.5 lb.; variable between one-half load and one and one-half load, 17.8 lb. The speed variation between no load and full load is guaranteed not to exceed 2 per cent, except in the case of momentary variations, which may be as high as 4 per cent.

The turbines are connected to independent Worthington surface condensers, each with 20,000 sq. ft. of surface and a capacity for condensing 130,000 lb. of steam per hour with condensing water at 70 deg. Fahr.

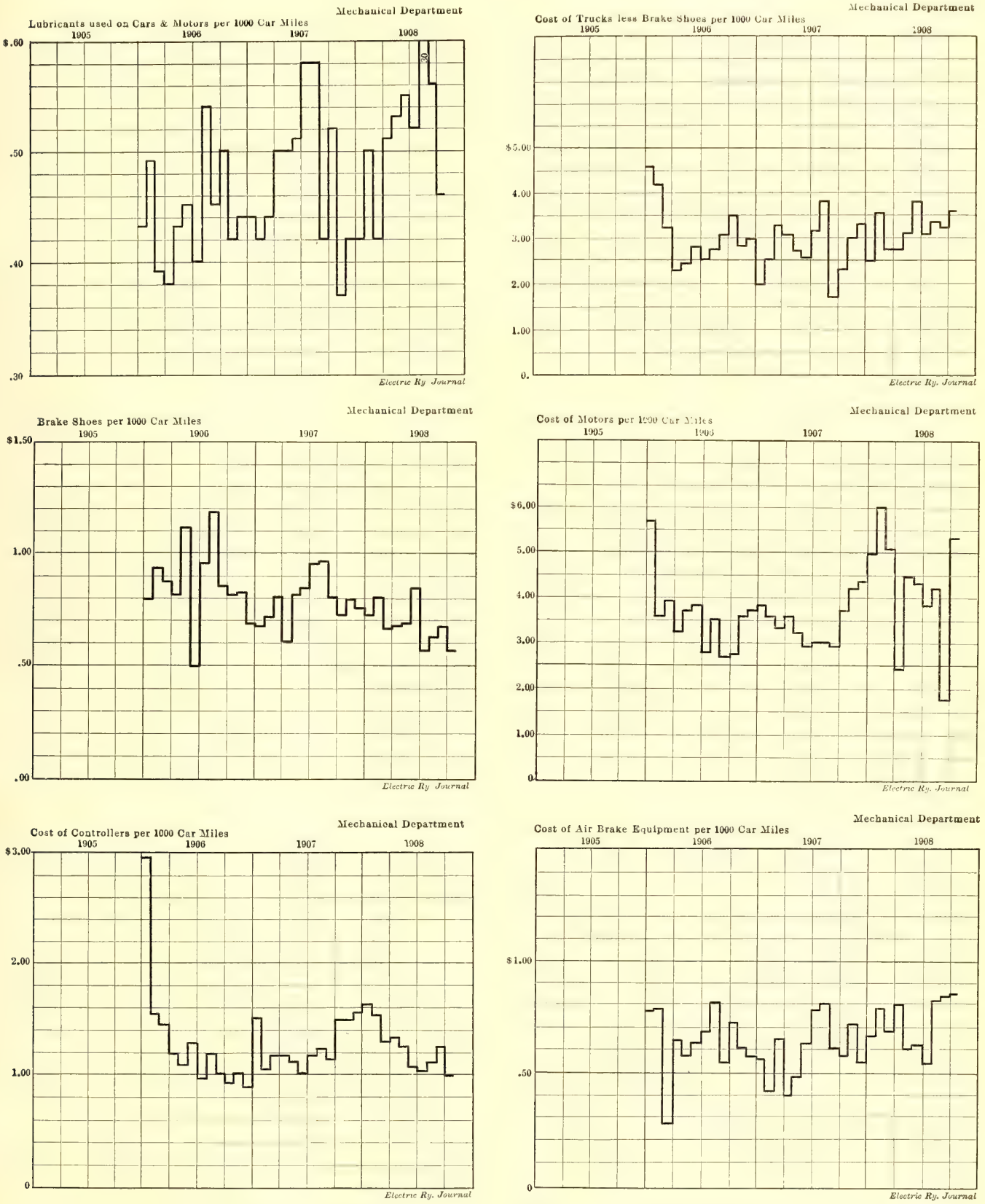
The step bearings are lubricated by oil supplied at a



Twin City System—Graphical Records of Transportation Statistics

pressure of 550 lb. per square inch from a Wood accumulator and two Worthington twin pumps with steam cylinder 7½ in. x 6 in. and oil cylinder 2 in. x 6 in. These pumps are connected in relay, so that if one fails to maintain the required pressure the second will start. There is also one electric triplex pump connected to the step-bearing oiling system for emergency use and arranged to start automatically if the accumulator falls below a predetermined height. The discharge from the step bearing and governors flows into closed settling tanks, from which the oil is drawn by the pumps. A bleeder removes water and sediment from the bottom of the tanks to the filter.

The low-pressure oil supply for general lubrication is under 80-lb. pressure.

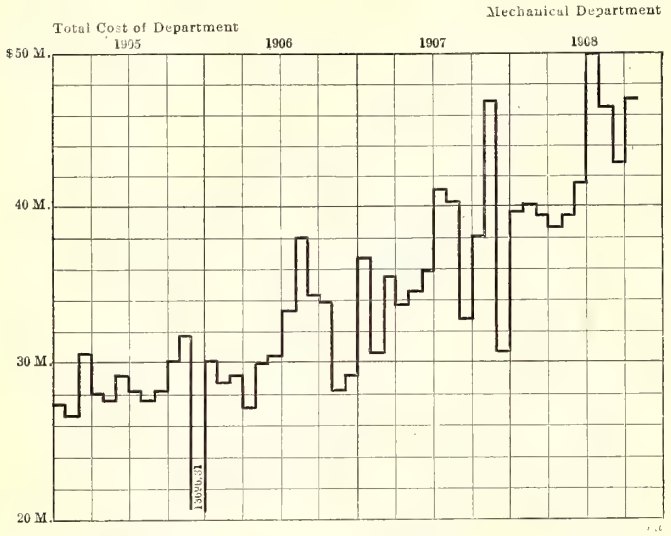


Twin City System—Graphical Records of Statistics from Mechanical Department

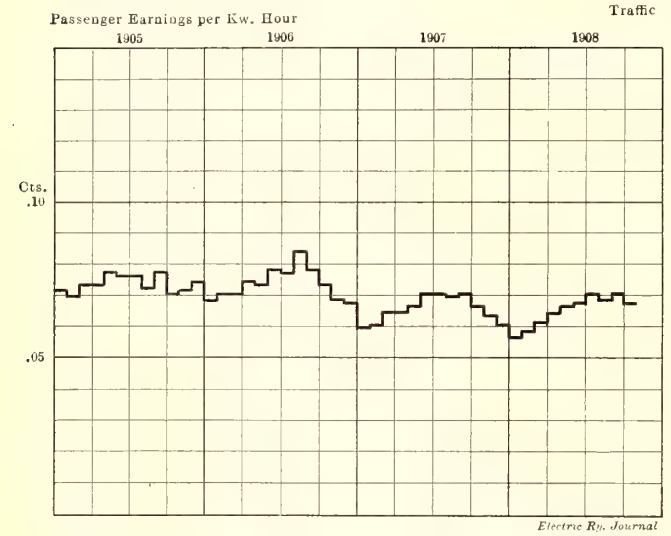
GRAPHICAL RECORDS

The diagrams on pages 1025 and 1026 show the output of

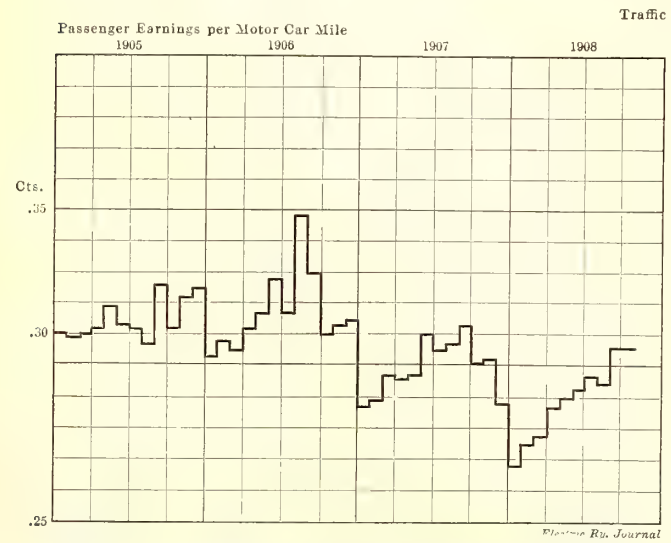
the steam-power station and of the St. Anthony Falls station for railway purposes for the months in 1908 indicated. The other diagrams are part of the graphical



Twin City System—Cost of Mechanical Department



Twin City System—Passenger Earnings Per Kw-Hour



Twin City System—Passenger Earnings Per Motor Car-Mile

records of the Twin City Rapid Transit Company, and are made public through the courtesy of the engineering department and management. In the case of power output they go back as far as 1897, and in the case of maximum demand, are shown on the power chart as black dots, to 1900.

The statistics in other charts are plotted as far back in most cases as 1905. This method is used, in conjunction with the compilation of the actual figures, as a continuous record, the data for each month being added as it becomes available. As the charts carry their own story, no especial comment upon them is necessary, except to point out the evidence of increasing load and traffic and decreased maintenance cost per unit in most of the cases in point.

TRANSMISSION SYSTEM OF BOSTON & NORTHERN AND OLD COLONY STREET RAILWAY COMPANIES

The last regular meeting of the New England Street Railway Club for the season was held at the American House, Boston, on May 27, with President Wright in the chair. George W. Palmer, Jr., electrical engineer of the Boston & Northern and Old Colony Street Railway companies, read a paper on the "Construction and Operation of the Transmission System of the Old Colony Street Railway Company." On this system are 380 miles of track, extending from Boston southerly to Newport, R. I., 54 miles, and westward from Hull to Needham 24 miles. Forty-two municipalities, with a population of 658,000 persons, are served. The company is the result of the consolidation of 22 smaller roads. At present about 320 cars are operated. The power supply for the component roads was drawn from about a dozen plants of moderate size and relatively antiquated equipment. As a result of the combination of the roads and the growth of business it became necessary to centralize the power generating equipment in a main plant which was located by the engineering department at Quincy Point, Mass., with substation installations for local distribution to the trolley lines. At Newport, R. I., a new turbine station of 2000 kw capacity was erected.

Mr. Palmer fully described the Quincy Point station, which was built about six years ago, and which has since been the mainstay of the system south of Boston. This is a plant of 10,000 kw capacity, in five units, Curtis turbines being in service. There is a coal-storage capacity of 18,000 tons at the plant, and an automatic coal-handling plant which operates at a cost of not over 6 cents per ton from the coal barge to the bunkers above the boilers. This station has been described in the Electric Railway Journal, and has many interesting features, one of the most prominent being the extensive use of electrically driven auxiliaries. The operation of the plant has been especially smooth, flexible and particularly pleasing to the company, amply fulfilling its expectations.

Substations are located at Milton, Rockland, Brockton, Bridgewater, Taunton, Lakeville, Portsmouth, R. I., Quincy Point, Fall River and Newport. These substations are connected with the main stations by a 13,200-volt transmission line. Rockland, Milton, Brockton and Bridgewater are normally operated from the Quincy Point plant, and Lakeville, Taunton and Portsmouth from the Fall River station. The system as planned included a second generating station at Fall River, which is not yet necessary. A tie line was erected between Bridgewater and Taunton, so that in case of trouble with either main station the other could operate the entire chain of substations; or if any section of the through transmission line had to be taken out of service, all the substations of the main line could still be operated. This feature gives in itself the same re-

sult as duplicate lines from one station, entirely isolated from each other. Further, the entire through line is in duplicate, enabling operation by either line singly or by a line made up of selected links of each main line. The underground cables from the power stations to the points where aerial service begins are also multiplied in several cases.

The line was built of stranded aluminum cables on wooden poles. The underground construction aggregates about 1 mile of conduit in Quincy, ¼ mile in Brockton and 2½ miles in Fall River. A right of way was secured, except for ¼ mile in Brockton, for the entire length of the pole line, with an easement in some cases to keep clear a strip 50 ft. in width, in most instances to keep a path clear 8 ft. wide, and to cut whatever trees, in the company's opinion, were a menace to the line, and all other rights incident to the construction and maintenance of the lines. The right-of-way man had a strenuous time bargaining with the farmers, and in some cases the route had to be altered thousands of feet on account of the prohibitive prices asked.

The line consists mainly of three-phase stranded aluminum circuits of from 262,000 to 502,000 circ. mil, carried on 35-ft. poles, chestnut being used. On straight line the cross-arms are 3¾ in. x 4¾ in., and on curves or angles, 4-in. x 6-in. yellow pine arms. The wires are spaced on 36-in. measurements, with reversed double delta construction. The insulators are brown glazed porcelain, built to stand a 70,000-volt dry test and a 40,000-volt rain test. Angle insulators are of a special original design, with pin hole entirely through the center, the angle pins being 2 in. in diameter, of sound selected hickory boiled in paraffin, and supported at the upper and lower ends by separate cross-arms. All angle poles are double armed, and line angles are turned on from one to four poles, depending on the degree. Where foreign wires were crossed the line wire was suspended from messenger cables.

The line has given extremely reliable service. It went into use without any preliminary weeding out of troubles before the final connection for continuous work. When the current went on, it covered 195 miles of regular line wire, and it went on to stay without a single bad insulator or leak. On the Fall River-Taunton section one insulator was overlooked. To date, there have been six stoppages of the system due to line trouble. Two cases were caused by trees blowing across the line; in another a Blue Hill Observatory kite broke away, and its piano-wire string short-circuited two circuits. In another case the line grounded on account of a broken insulator, believed to have been "shot up," and in the last two a wire got down upon the cross-arm and lightning struck a pole.

Terminal houses are in service where the underground cables join the overhead lines. A four-wire telephone line is in use on the transmission system only, extending the entire length of the line. Emergency boxes are located on the poles about 1 mile apart, and they contain tools and telephone sets. The entire line is patrolled every day, and every foot of it is sighted. Many incipient faults are thus picked off. The patrolmen carry portable telephones. The underground conduits are of the built-up type, the manholes being of brick, with brick shelves. The cables are three-phase, paper-covered, lead-insulated, from No. 0 to No. 000 in size, with ¼-in. paper around the bunch and a 5/32-in. lead sheath. In manholes the cables are further protected by a double thickness of asbestos, to protect each one from possible short-circuits or burn-outs on an adjacent cable. The cables were built to stand a 40,000-volt test after installation. No troubles have occurred which have shut down the installation. The condition of the cable sheaths is regularly examined and recorded, in order that it may always be kept electrically negative to other structures and the ground, to avoid electrolysis, and all sheaths are solidly connected to the d.c. 600-volt bus.

The new system is much more flexible than the old one, and the voltage has been much improved by the redistribution of the feeder copper. This, with the capacity of the substations to respond to all demands for power, together with their quiet and reliable operation, has totally changed the character and quality of the power supply to the cars.

DISCUSSION

In the discussion which followed the paper, Mr. Palmer stated that no trouble had been experienced from locomotive stack discharges where the line insulators are located above railroad tracks. The line repairs are made, so far as possible, in the early morning, and the most stringent precautions are taken to red-tag all switches and open and close them only under orders from the proper authorities. The tag has a space on which the name of the man ordering a switch manipulated is inscribed, with the reason for the action. The operation of the entire system is directed from Quincy, the chief engineer of the station at that point having full charge of all lines and substations, as well as the local station. The line is built to withstand operation at 22,000 volts if the load requirements become such as to call for an increased potential.

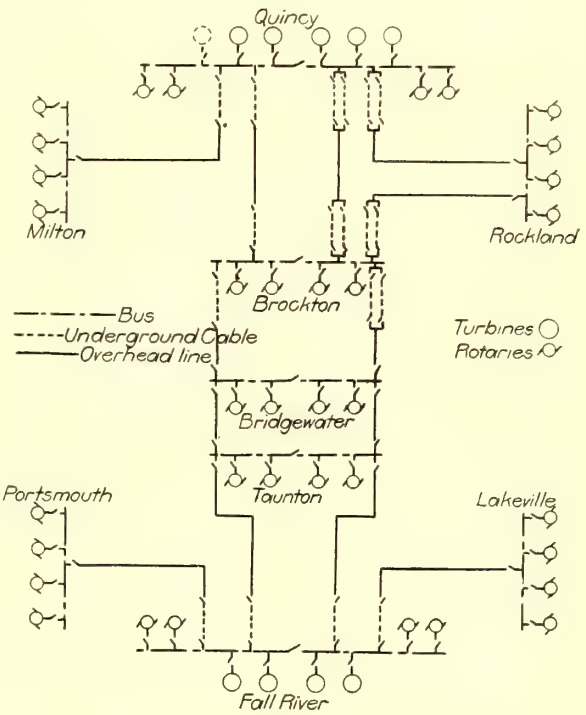


Diagram of Transmission System of Old Colony Street Railway

M. V. Ayres, electrical engineer of the Boston & Worcester Street Railway, stated that his company has recently adopted a special clip on the disconnecting knife switches of its 13,200-volt circuits, so that when the switch is opened the phases are grounded at the station or substation. This prevents current from coming back from any possible source.

Mr. Palmer said in conclusion that his linemen ground the phases on which they are working to prevent any possibility of shock.

ORGANIZATION AND OPERATION OF A CLAIM DEPARTMENT *

BY W. C. FORBESS, GENERAL CLAIM AGENT, NORTHERN TEXAS TRACTION COMPANY, FT. WORTH, TEX.

As to the best manner of organizing and conducting a claim department, this must largely be governed by the amount of money allotted to the department and by the ability of its head to adopt effective methods to accomplish desired results.

In one company with which I am familiar, the organization consists of a clerk whose duty it is to keep all the records and to make out from the accident reports a daily report of all accidents, which consists of a statement sufficient to show their nature and extent. This report is in triplicate and reaches the manager, general superintendent and claim agent, and upon examination of the report the claim agent indicates whether or not the accident shall be investigated or the accident report merely filed. In addition to this report, these officials have monthly reports showing in detail the number of accidents during the previous month, number and amount of claims made and how settled, number of suits filed and amount of each suit and its disposition; and, further, a yearly recapitulation report. This clerk also does the claim agent's stenographic work and takes written statements of such witnesses as come to the office. The card system is employed.

For the investigation of accidents the claim agent has one regular assistant, whose duty it is to secure written statements of witnesses. These statements reach the claim agent's desk each morning, and after examination by him, are stamped with his initials and sent to the files, or in the event of a serious accident are discussed with the investigator for the purpose of indicating to him other points to be developed. From time to time such extra help in this line as the needs require is employed.

A claim agent should reserve to himself the settlement of all claims and the handling of all court cases. There should rarely ever be a case tried when he is not present and actively assisting the attorneys both as to having the witnesses present, and especially in calling the attention of the attorneys to salient points which can and should be developed from the witness while on the stand. I believe it to be an important part of the claim agent's duties to assist his attorneys in the trial of cases, for the reason that he is in closer touch with the witness and the facts of the case than the attorney, who frequently meets the witness for the first time at the court house when the case is called for trial.

The operation of a claim department brings it in touch not only with the public, but with every other department of the corporation, and to make it successful it must have the active co-operation of all. It should have the co-operation of the rank and file of the employees, in order that it may not in any wise become embarrassed in obtaining the facts surrounding each and every accident, which often are peculiarly within the knowledge of the employee who was operating the car or machine. To obtain this co-operation the claim agent should occasionally meet the men in a body at their quarters and discuss with them the accident problem in its various phases, going into detail as to cause and how accidents could have possibly been avoided, and the amount of money expended in adjustment, inviting the men to express their ideas on the subject.

The investigation of accidents brings the claim department into active touch with the public, and experience has taught me that the investigation should be made as soon as possible after the accident, while the facts are yet fresh in the minds of the witnesses, thus forestalling any effort on the part of would-be unscrupulous friends or representatives to pervert the facts. The investigation takes both tact and knowledge on the part of the investigator. It should be the policy where liability is apparent to settle the claim, if it can be settled on a reasonable basis, and thus keep the matter out of court. The company of which I have spoken has been very successful in this direction.

When we conclude that a claim is fraudulent, we should exert all our energies to uncover it, and decline a compromise for any amount, preferring to expend the money in exposing the fraud. We believe it the duty of the claim department to discourage by every means possible the filing of claims and suits with the mere hope of extorting a sum of money by compromise.

From personal observation I know that a large percentage of the money paid by the street car companies in Texas is to satisfy judgments founded upon fraudulent claims in the entirety, or with elements of sham so prominent that the claim agent often wonders if there is any justice in our system of jurisprudence for the corporation. Especially do I call attention to this matter for two reasons: First, to arouse to more effective methods and co-operation than at present prevail among the various companies for the combating of this growing evil; second, that the managing officers of the various companies may more fully appreciate the work of their claim departments in exposing some of these frauds and not pull the purse strings too tightly when necessary to spend money to accomplish results.

*Abstract of paper read before Southwestern Electrical & Gas Association, Dallas, Tex., May 20 to 22, 1909.

SCOPE OF LEGAL AND CLAIM DEPARTMENTS AND THEIR RELATION TO EACH OTHER*

BY H. S. COOPER, MANAGER, GALVESTON ELECTRIC COMPANY, GALVESTON, TEX.

In this paper when speaking of "accidents" and the damage—and injury—claims that arise from them, it is not intended to limit the meaning of the word "accidents" to the actual bodily accidents arising from the operation of the cars or other portions of the active property, but the word will include, as it should in its broadest sense, any and every occurrence connected directly or indirectly with the operation of the property and from which can arise any claim for compensation for damage or injury.

Any department to which is given the duty of minimizing the losses arising from these "accidents" is the "claim department." The purpose of this paper is to show that such a department should not be a portion of the "legal" department or under its authority or in any way dominated by it, but that the claim department should be an independent one, separate and distinct from all other departments and having full autonomy, authority and power with regard to its specialty—the lessening, to as near the vanishing point as is humanly possible, of the losses arising, directly or indirectly, from accidents.

While it must have the same co-relation with, and must co-operate with, the legal department and all the other departments in the same manner as they do with it and with one another, it must, from the very nature of its specialty, have more authority, more power and more independence than any other. You will easily see the correctness of this claim if you will consider that its specialty covers a phase of the company's business which, if not properly and adequately handled, may eat up—and often does eat up—anywhere from 3 per cent to 25 per cent of the company's gross receipts—which may mean anywhere from 10 per cent to 100+ per cent of the net receipts. Its specialty covers every portion of the property of the company, the intangible as well as the tangible; it covers every department, for in every department—in the legal department and even in the claim department itself—lurks the possibility of damage claims. Every bit of the property of the company, from the bottom of its pole-holes to the top of its smokestack, and every employee, official and officer is a potential agent in the causing of accident-damage losses. In its preventive capacity the claim department must have full authority over all the property and all the personnel of the company in order to prevent "accidents," and in its curative capacity it must have full authority over all the employees, officials and officers of the company, whether as individuals or departments; to call on them for active and passive aid, advice, work or assistance, to help it in the minimizing of the effects of those accidents.

Please realize this point fully: Neither accidents nor their financial and other results are within the power of the company to absolutely prevent or control.

*Abstract of paper read before Southwestern Electrical & Gas Association, Dallas, Tex., May 20 to 22, 1909.

The accident-damage business is, at the present time, an unknown and seemingly uncontrollable portion of the company's losses; it is an "X"—the unknown quantity of the company's business that, improperly handled, may result in deficits and receiverships. Its effects are more apparent and are generally greater in that portion of the company's operation which brings it directly in contact with its patrons and the general public, but the potentiality of immense accident losses is latent in every piece of the company's property and in every person connected with it, and the department to which is given the responsibility of controlling these losses must have entire, full and complete jurisdiction and authority over all these possible causes if it is expected to produce the results desired.

The jurisdiction and authority mean that so far as the minimizing of accidents and their results are concerned, the claim department must have complete charge of and full responsibility for this purpose and that, if to this end it appears to encroach on the prestige or authority of any other department, it must, to an extent commensurate with the importance of its specialty, be allowed to do so. It is better to err a shade on the side of caution and of the lessening of accidents and their results than to have them and their results not lessened, simply to save the absolute authority of a department or an official.

While the legal department is interested in the lessening of accident losses, as is every other department of the company, and while it is directly interested in that end to a greater degree than many of the other departments, on account of its personal partaking of some of the active portions of that lessening, it is not as interested in the prevention of accidents as are any and all of the other departments, its main interest and action being in the lessening of losses from the legal results of accidents which have happened. As a "legal department"—outside of the actual conduct of trials—its connection with the matter of accident losses is entirely advisory, and advisory only in regard to purely legal points. Even as regards the trials, it is only directly concerned with the purely legal conduct of the case, for all other matters in regard to and all other aspects of the case have been and will be the proper and exclusive work of the claim department. The legal department is, from the peculiarities of its specialty, engaged in its portion of share of diminishing the accident losses in a totally different manner and from a totally different viewpoint than the claim department, and, indeed, any other department of the company.

In very large corporations the accident-loss business is of such magnitude that the "legal department" attached to, or including, or included in their "claim department" is engaged absolutely and entirely in this one specialty, and is therefore a part and parcel of the whole claim department. In the smaller corporations their accident loss is so actually small in dollars and cents as compared to any of their larger brethren that it can be, and is, handled without any claim department.

Between these, and large in numbers—and in accident losses—lie those corporations which maintain a "legal department" for general legal advice, opinion and action, and, at the same time, maintain an actual "claim agent" who, either by himself or with assistants, constitutes a "claim department." In this class the claim department has only one thing to do, and that is to endeavor to lessen accidents and the losses resulting from them.

On the other hand, the legal department has many other things to do for the company. It has to advise the company on other matters, on franchises, rights of way, ordinances, legislation, and many other matters requiring legal advice. It has to draw up papers on subjects entirely foreign to the accident business, and it sometimes has to try cases or causes having nothing to do with accident losses.

There is another important phase of the subject that militates against the legal department as being or dominating the claim department. This lies in the fact that the claim department is dependent for its existence, and for the continued employment of the persons comprising it, on its success in and with the one thing—the diminishing of accidents and the losses resulting.

In the legal department, while its employment by the company may depend entirely on its results or its portion of the results obtained in the lessening of accident losses, it is a fact that this is seldom the case.

There is one further and most important difference between the two departments that cannot be passed by, as its influence in damage-suit litigation is one that not only can be, but is, inimical to the interests of the company. The claim department is never hampered in its duty by a departmental code of "ethics" and "courtesy" between it and any of its opponents in the damage-suit industry. Its "ethics" are that its first and only duty is to its sole employer and that "courtesy" to a person who—in 99 cases out of 100—is trying to rob the company, is a little bit far-fetched.

On the other hand, there is scarcely one of us who, in our various experiences with legal departments, has not had to deplore the effects of legal "ethics" and "courtesy" as they are generally practiced. At the most they are relics of medieval days when the profession was—or was believed to be—a profession of honor—at any rate before the day of the damage-suit lawyer and the ambulance chaser.

This sharp line of demarcation between the two departments does not prevent their perfect co-operation in a common cause or does it engender antagonisms between them or make opportunities for misunderstandings or ill-feeling, all of which operate to the disadvantage of the company.

Both sides must see to it that not only must the integrity of their own department be preserved, but also that they are not the first to make a precedent in the destruction of the integrity of the other. This can only be done by the fullest co-operation between them, by placing personal feelings, beliefs and biases entirely to one side and looking only to the best interests of the one whom both serve—the company. The claim department must be extraordinarily careful not to trespass on any legal territory; in anything that is purely legal, or that has a semblance of so being, it is its duty to bring the matter to the attention of the legal department, to settle jointly its status and, if it is a purely legal matter, to leave its decision to the legal department and accept that decision as one final and without appeal for the moment. At the same time, it is the strict duty of the claim department, if it does not concur in the decision, to enter protest, give its reasons therefor and make a record of the whole matter. This is to be done, not that it may at some future time "throw it up" to the legal department as an "I told you so," but strictly for the reason that, if the decision or action of the legal department has been a mistake, a record may be at hand to prevent its repetition.

On the other hand, the legal department must keep "hands off" the claim department in all matters not having a legal bearing. No matter what the temptation to settle, compromise, appeal or take any action—even a legal one—that will have an important bearing on the case, that temptation must be combatted and the matter fully and freely discussed with the claim department and, in all matters not legal, the decision of the claim department must be respected and the responsibility left to it.

If this cannot be done in any case; if both sides are fixed in their belief, and there is a "dead-lock," the claim department must do nothing that the other side can take exception to, and especially must the legal department refrain from using the prestige of its power and influence in other directions to override the rights of the claim department. This should be particularly the case in any action tending toward the settlement, compromise or other ending of a claim. Very few, if any, damage-claims are settled on points of law, and very few damage-suits are won, lost, settled, compromised or dismissed on purely legal grounds. In nearly every case, settlement or compromise of either claim or suit is more a question of unlegal facts, opinions and judgment than it is of law; and, from its more intimate acquaintance with all the facts in the case, and its fuller knowledge of the results of making such a settlement, the opinion and judgment of the claim department will be more accurate and should be relied upon and deferred to.

When it comes to any question of the final lessening of accident losses, the opinion and judgment of the claim department are those of an expert specialist, and when we desire specific results in regard to any certain important matter we take as final the opinion and work of an expert specialist.

LOW PRESSURE TURBINES*

BY FRED M. LEGE, JR., MANAGER, BRUSH ELECTRIC LIGHT & POWER COMPANY, GALVESTON, TEX.

The excessive demand on central stations during the hour or hours of peak load has developed a problem to be decided from both a financial and an engineering standpoint. From a financial standpoint most of these properties cannot afford to discard existing reciprocating engines that are in good working order, yet of low efficiency, for new and more efficient units, and to install more units of the same class involves too great an outlay when compared with the increase in revenue from such short periods as the peak load covers.

The engineer's problem must be considered from both a financial and engineering standpoint. What can be done to increase the output by expending the least amount of money, at the same time keeping the operating expense as low as possible? He will realize what a sacrifice it would be to discard existing engines, as well as the fact that he can well afford to use less efficient units for the sharp peak than he can during the flat loads.

The object of this paper is to call attention to the possibilities of the low-pressure steam turbine when operated by the exhaust steam of an existing reciprocating steam-engine plant. The high-pressure turbine will more economically utilize the steam energy, both above and below the atmospheric line, than the reciprocating engine, and therefore is entitled to first consideration in a new installation or the remodeling of an old one, but when an increase is necessary to an existing reciprocating plant, where good engines are in use, the low-pressure turbine can oftentimes be used to better advantage than any other piece of apparatus without entailing an increase in the boiler plant or buildings proportionate to the increase in capacity, and in many cases without any increase of the items above mentioned.

The low-pressure turbine affords a means of increasing the capacity of an existing central station equipped with reciprocating steam engines without a material increase of fuel used or additional boiler capacity. The steam engine is an efficient piece of apparatus for utilizing the available energy of steam between the boiler and atmospheric pressure and the low-pressure steam turbine is very efficient when worked on pressure ranges below atmospheric. Combining or adding a low-pressure steam turbine to an existing reciprocating plant, exhausting the high-pressure engines into a suitable receiver and then into a properly proportioned turbine and the latter exhausting into a good condenser, affords as efficient a means of utilizing the available energy of steam as can be designed where engines are in operation.

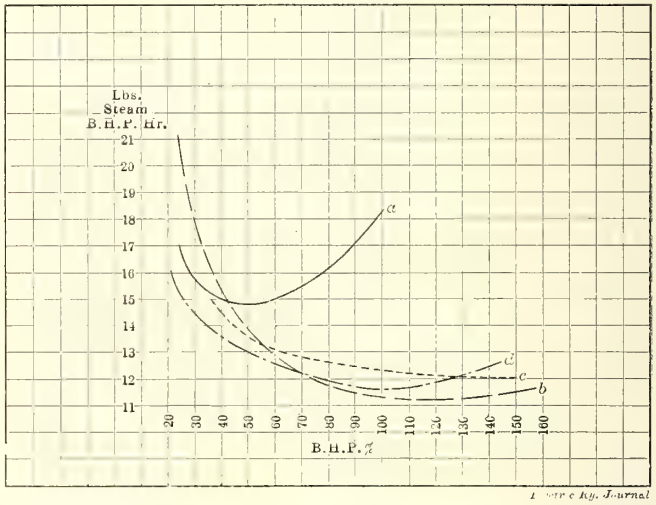
The low-pressure turbine requires about 34 lb. of steam per kw-hour with a vacuum of 28 in. referred to 30 in. barometer. Assume an existing central station operating compound and simple engines at 120-lb. gage pressure and exhausting to the atmosphere through a common exhaust header with a back pressure of 1.5 lb. and requiring 35 lb. of steam per kw-hour. By comparing the above approximate pounds of steam required by the steam turbine it will be found that an increase of approximately 100 per cent capacity is available without any increased cost of fuel other than that necessary for the auxiliaries (which would not exceed 15 per cent) necessary to operate the condenser and possibly the cooling tower.

If, however, more economical engines were considered, such as compound-condensing units, under a 26-in. vacuum, requiring approximately 22 lb. of steam per kw-hour when operating at full load condensing and approximately 28 lb. of steam per kw-hour when operating non-condensing, the capacity could be increased approximately 70 per cent as compared with the unit operating condensing and no more fuel would be consumed than was originally used, owing to the fact that the combination would develop a kw-hour on approximately 15.5 lb. of steam.

When compared with the same units operating non-condensing and consuming 28 lb. of steam per kw-hour, the combination would develop 80 per cent more power and the steam per kw-hour would remain approximately 15.5 lb., whereas the first-mentioned equipment would require approximately 17.5 lb. of steam per kw-hour.

The efficiency of a well-designed low-pressure turbine is remarkably uniform over a large range of load, making the combination a very attractive proposition during the lighter loads, due to the very flat economy curve. In a well-designed low-pressure turbine and engine plant, where the units are split up, it is a very easy matter to operate the flat loads of the day very economically and at the same time take care of the peak loads without losing the general economy of the plant.

The possibilities of low-pressure steam will be more readily understood if we consider the available work through all the ranges. In 1 lb. of saturated steam operating from a pressure of 150-lb. gage to a pressure of 1 lb. above atmosphere, the available energy is approximately 132,000 ft.-lb., and if saturated steam operates from a pressure of 1 lb. above atmosphere to a vacuum of 28 in., the available energy is approximately 132,000 ft-lb. per pound of steam. Thus we find that there is approximately as much power available below atmospheric pressure as there is above, and owing to the fact that a properly constructed low-pressure steam turbine will work more economically on the low-pressure ranges than the reciprocating



Steam Consumption of Reciprocating Engine, Low Pressure Turbine Combination and High Pressure Turbine

engine on the high-pressure range, we have an ideal condition. The gain over non-condensing engines by condensing is only approximately 30 per cent. However, if it were practicable to utilize cylinders of the necessary diameter, a much higher economy could be secured, but owing to the fact that to work steam down to its seventh expansion (28.1-in. vacuum) it would require a piston with 128 times the area of the first expansion this would require a diameter that would be prohibitive.

The low-pressure turbine is being operated in quite a number of stations to-day and is giving remarkable results, both from an increased capacity standpoint, as well as developing power at a lower cost.

The following is a list of a few installations which prove the practicability of the combination:

The Philadelphia Rapid Transit Company has in operation two 800-kw low-pressure turbines, and by installing these units have reduced the cost to approximately 80 per cent of what it was prior to this installation, as well as increasing the capacity 1600 kw at a cost of 50 per cent less than would have been required to install an engine equipment similar to those in operation.

The Scranton (Pa.) Street Railway Company has a 500-kw low-pressure turbine operating on a 28-in. vacuum.

An 800-kw low-pressure turbine has been installed in East St. Louis which is equipped with a 500-volt direct-current generator and also a 1000-kw low-pressure turbine equipped with an alternating-current generator, both of which take steam from the same exhaust header and deliver their output for entirely different purposes.

In South Chicago one of the first low-pressure turbines

*Abstract of a paper read before the Southwestern Electrical & Gas Association, Dallas, Tex., May 20-22, 1909.

was installed on a reversible engine which drives a blooming mill in one of the steel works.

A 1000-kw low-pressure turbine was installed on a mining property in Gary, W. Va., for the United States Coal & Coke Company, which was then operating compound engines and complete expansion steam turbines. This unit was very satisfactory and had as low a water rate as 18.5 lb. per kw-hour for the combined units.

The primary question of whether or not the installation of a low-pressure turbine is warranted in any plant can be answered only after a careful analysis of the character and conditions of the operation of that particular plant. There can be no question about the increased efficiency obtainable and the consequent increase of capacity or decrease of power cost. In plants, such as rolling mills, where the engines are intermittent in their operation and conditions are such that but little economy can be effected by operating them condensing, there is no doubt that the low-pressure steam turbine has found a very valuable field. In power plants, however, where the engines may be operated condensing, while the low-pressure turbine will undoubtedly show added efficiency, the probable remaining useful life of the engine to which it is to be tied, as also the future increased demand for power and the value of a spare unit must all be weighed.

In general, it is safe to say that in large plants, comprising two or more modern engines, the low-pressure steam turbine has a proper place, whereas in small plants having only one engine, and this, perhaps, in the last stages of decrepitude, it would generally be better policy to install a complete high-pressure condensing turbine of the full power required, and to hold the engine solely as a spare.

Unless a vacuum at least equivalent to 26 in. referred to a 30-in. barometer can be economically maintained, the installation of an exhaust turbine can scarcely be justified. Nor is it fair to compare what can be done by installing a low-pressure turbine to operate with very good vacuum with what is being done by an engine with a very poor vacuum. To obtain the same degree of vacuum when condensing a given weight of steam under the similar conditions will cost just the same, whether such steam be exhausted directly from a reciprocating engine or a high-pressure turbine, or passed through a low-pressure turbine.

The acompanying diagram shows four curves giving the steam consumption per brake hp-hour for four combinations of units. The load is expressed in percentages of the maximum capacity of a compound Corliss engine having a cylinder ratio of 4 to 1 and operating condensing with 190 lb. absolute steam pressure and 28-in. vacuum referred to 30-in. barometer. The maximum capacity of the assumed engine under these conditions is 4250 hp. Curve *a* shows the steam consumption of this engine under various loads from 25 per cent up to its maximum capacity of 100 per cent.

Curve *b* refers to the combination of this engine, operating with a constant back pressure of 18 lb. absolute and a low-pressure steam turbine. Curve *c* refers to the combination of this engine, operating with varying back pressure and a low-pressure turbine. Curve *d* refers to a high-pressure condensing steam turbine of a capacity approximately equivalent to the combined engine and low-pressure turbine, and operated with dry saturated steam at 190 lb. absolute, and a 28-in. vacuum referred to a 30-in. barometer.

The diagram does not indicate the efficiency obtainable by the addition to the steam-engine plant of a high-pressure condensing turbine having a capacity equivalent to the low-pressure turbine, which might be installed in connection with the engines. Such combination of condensing engine and high-pressure condensing turbine would naturally be considerably lower in efficiency than either the combination of engine with low-pressure turbine or of the larger high-pressure condensing turbine, and unless plant conditions warrant the installation of the large high-pressure condensing turbine, or are such that consideration other than efficiency make it preferable to install a small high-pressure condensing turbine as a separate unit from the engine, there is no question but that in first cost, as well as efficiency, the low-pressure steam turbine to run in combination with the engine would offer, by far, the most attractive proposition.

ABSTRACT OF QUESTION BOX OF SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION

CAR SHEDS

What are the most necessary tools and apparatus for the maintenance of equipment (electrical and mechanical) of street railways operating from 30 to 100 cars on regular schedule?

We find that the following tools are all that are absolutely necessary in our shops, operating between 50 and 100 cars: 1 lathe, 1 emery wheel, 1 radial drill press, 1 large grindstone, 1 100-ton wheel press, 1 electric blower for forges, the necessary hand tools. In our carpenter shop we have 1 rip saw, 1 band saw, 1 planer. All these tools are run with two 10-hp, one 7-hp and one 2-hp motors connected to the trolley circuit. T. C. BROWN.

One lathe, one wheel boring machine, one wheel press, one planer, one or two chain hoists, one good blacksmith equipment, one power emery wheel and one drill.

W. L. WESTON.

The most necessary tools are 20-in. x 10-in. lathe, 20-in. drill press, wheel boring mill, grinder and compressed air apparatus; also chain hoists of sufficient capacity to handle the loads. J. E. GALLAHER.

One medium size lathe, one large lathe or wheel boring mill, one hydraulic wheel press, one medium size drill press, one small planer, one power emery stand with coarse and fine stone. T. N. HARTIN.

ROLLING STOCK

In a street railway having very few spare cars, which is best and in the end most economical, night or day inspection? "Inspection" to mean also a certain small amount of maintenance, renewals and repairs.

Day inspection gives the best results from every standpoint, where you have sufficient cars for leave-ins. In addition to this, of course, cars should be given all possible inspection at night. T. C. BROWN.

Night inspection is preferable because with few cars you cannot spare a sufficient number to make day inspection complete. THEO. TAYLOR.

Car inspection of system having very few spare cars should always be made at night, as in the end it is the most economical and avoids unnecessary labor in switching regulars cars to the barn in daytime and substituting spare cars in their place. T. N. HARTIN.

I would consider night inspection satisfactory in this case if followed up closely with a thorough day inspection at 30-day intervals at least. J. E. GALLAHER.

Night inspection is the only practicable scheme, for you have too few extra cars for day inspection, and in order to make day inspection complete cars will have to be pulled in and others sent out continually, which results in extra labor and a great deal of "dead" mileage.

W. L. WESTON.

Is it good practice to depend on car circuit-breakers, doing away wholly with the fuses?

Yes, if you keep your circuit-breakers properly adjusted. T. C. BROWN.

Is satisfactory if breakers are kept in good repair and set properly for amperage. H. L. HARDING.

Circuit-breakers properly adjusted and maintained should obviate the necessity of a fuse. J. E. GALLAHER.

Fuse boxes have been found to be more or less dangerous, and should be wholly done away with on small cars. The automatic circuit-breaker will work very satisfactorily alone. T. N. HARTIN.

Fuses are of value in addition to circuit-breakers in case the latter stick or are otherwise in bad order.

THEO. TAYLOR.

Which are preferable, solid rolled steel or steel-tired car wheels?

Solid rolled steel wheel. H. L. HARDING.

Solid rolled steel wheels are best. The first cost is less, the maintenance is less. They are safer than the steel-tired wheels, for in the latter the spokes are very likely to break. THEO. TAYLOR.

Solid rolled steel wheels are the most economical and are safer. T. N. HARTIN.

On roads of high speed, heavy service and frequent stops I would consider the solid rolled steel wheel preferable, on

account of low maintenance cost and a higher factor of safety. J. E. Gallaher.

Solid rolled wheels are preferable because the first cost is less and maintenance is less. In small companies it is not an easy job to shrink the new tires on in your own shop, and in many places it is difficult to have it done in a regular machine shop. W. L. Weston.

Have never used steel-tired wheels, but solid rolled steel wheels are satisfactory in every way. G. H. Clifford.

Should circuit-breakers on double-end cars be connected in series or multiple, and why?

Circuit-breakers on double-end cars should be connected in multiple. In other words, no current should go through the circuit-breaker on rear end. T. C. Brown.

Should be in multiple; if connected in series, rear breaker could open on overload and would be dangerous in case of an accident. H. L. Harding.

Automatic circuit-breakers should be wired in multiple, as this places the circuit-breaker and the controller on the same end with the motorman. T. N. Hartin.

Circuit-breakers should be connected in multiple, thus avoiding rear breaker going out, causing trouble and delay if connected in series. J. E. Gallaher.

Circuit-breakers on double-end cars are safer if connected in multiple, because the circuit-breaker and controller are then on the same end with the motorman, which gives him absolute control over the car.

Theo. Taylor.

Does it pay to refill old-style ribbon rheostat boxes after they have become burnt out or short-circuited?

Yes. T. C. Brown.

Yes, as often only one section burns out.

H. L. Harding.

It is cheaper to refill the old-style ribbon rheostats than to buy new ones, as the refilled ones are practically as good as new and the cost is much less. Theo. Taylor.

Cannot see any economy in refilling old-style ribbon rheostats. J. E. Gallaher.

We refill old-style ribbon rheostats and think it economical. T. N. Hartin.

What results have you obtained with ball-bearing trolley bases? Does the saving in trolley-wheel wear justify equipping all cars with ball-bearing bases?

We have obtained very poor results so far with the ball-bearing trolley bases. We are now testing two different makes of recent design, but so far we do not think anything better than the U. S. No. 6 on slow-speed city cars.

T. C. Brown.

Have never used the ball-bearing trolley stand.

J. E. Gallaher.

Ball-bearing trolley bases are a great saving on the interurban high-speed cars. On the slow-speed city cars they do not save the trolley wheel a great deal.

Theo. Taylor.

Have air brakes ever been applied to single-truck cars?

While I do not know whether air brakes have ever been successfully applied to single-truck cars, I do know that several cities have equipped a single car as an experiment, and all were found to be very unsuccessful, and the air was replaced by the hand brakes. In fact, considering the weight of single-truck cars and the comparatively small power required on a hand brake to secure the maximum braking effect on the car, there could hardly be any substantial argument for equipping a single-truck car with air. I think a very important fact in connection with the stopping of a car, and one which is frequently overlooked, is the question of how well the braking effect is applied by the operator, rather than how quickly or how powerfully applied, in order to obtain the best resultant braking effect to the car. T. C. Randall.

Yes. H. L. Harding.

Is there any benefit to be obtained by slotting commutators? If so, what?

Stops flat spots on commutator. Prevents flashing of motor. H. L. Harding.

Yes, because the copper softens with the continual heating and cooling and wears faster than the mica. This causes the mica to protrude above the commutator bars, and the brushes on that account do not get a good contact. It is not necessary, however, to slot new commutators, but it will prove very beneficial, as stated above, after commutators have been in use about three years. Theo. Taylor.

We have obtained good results from slotting commutators after the copper has become worn, for the mica protrudes above the commutator bars. T. N. Hartin.

For all motors showing excessive brush and commutator wear I would unhesitatingly advise the slotting of commutators, giving brushes an all copper contact, thus reducing sparking and short-circuiting to a minimum, and increasing the life of brush and commutator and lessening the number of controller burnouts, all for the good of a low maintenance and a decided benefit to the claim department.

J. E. Gallaher.

What should be the power consumption in watt-hours per ton-mile for city and interurban cars?

The power consumption of cars in watt-hours per ton-mile depends upon the schedule speed and the number of stops made per mile. For interurban cars, making a schedule speed of 35 m.p.h. and making stops every 2½ miles, it would take about 90 watts per ton-mile. For the average city cars it would take about 125 watts per ton-mile.

E. E. Nelson.

Roadbed, Overhead and Maintenance of Way

What has been the experience, if any, in wheel flanges getting chipped in going through hardened center special work?

We have a great many chipped flanges, but have no positive evidence as to the amount caused by special work.

J. J. King.

More than 50 per cent of our car wheels are removed on account of chipped flanges. The writer thinks that this is caused by hard stones, pieces of iron, etc., getting in the grooves of the grooved rail. Where cars run at the proper speed through hard center special work, don't think it will chip flanges to any great extent. T. C. Brown.

In any special work where the "floor" of the special work is raised, so that the wheel crosses or runs on the special work on its flange, there will always be chipping of wheel flanges, even when a car is run at very slow speed across the special work, this being especially the case on new wheels or where the flange is sharp and thin and the "floor" of the special work is of hardened material. From a long experience in matters of this kind, the writer would suggest that in all cases the special work be so arranged that the wheel, in crossing, rides on its tread, for, after the special work has been in use for some time and the floor has been gradually worn away by the cutting of the flange of the wheel, any wheel with the flange a little worn will have to cross it on its tread, and the slight advantage thought to be gained when the special work is new and the floor uncut does not compensate for the chipping of the flanges of the wheels. H. S. Cooper.

There has been a tendency of late for makers of special work to leave a square shoulder on the hard center plate, which results in the flange striking abruptly against it, where, if the hard center was tapered on a gradual slope to bottom of flangeway in the special work, the flange would ride on the center without chipping, but with present construction we are having some trouble.

G. H. Clifford.

We are having some trouble with wheel flanges on hardened center special work, brought about, I think, on account of flangeway or groove not being deep enough to give the necessary clearance for the flange, causing the flange to take all of the load of the car, producing chipping.

J. E. Gallaher.

Which is the most desirable construction for a diamond point turnout, and why—an open point switch or the reverse? That is, in entering the turnout, should the switch tongue be on the right or left-hand rail?

Practically no difference if spring is used. If motorman is to throw tongue, whichever side is most convenient to him, taking into consideration car construction.

J. J. King.

Have switch tongue on right-hand rail in order that the force which changes the direction of the car comes on the inside of flange, rather than on the tread side. The inside contour of the flange is more uniform for all wheels after they have been in service than that of the tread side, and as the diameter of the tread of the wheel is less on the outside than at the gage line and the right-hand wheel riding

on the smaller diameter, there will be less liability of broken flanges or riding of switch point.

T. C. RANDALL.

Does it pay to use treated ties in street railway construction? Should untreated ties be put into track before they have been thoroughly seasoned?

Treatment of ties has been found a profitable investment by most all users. Experience has taught many that ties, whether treated or untreated, should not be put into the track before seasoning. H. H. GERHARD.

It does pay to use properly treated ties. Untreated ties should not be used till thoroughly seasoned. J. J. KING.

If properly treated, yes. In regard to the second question the answer is, in all cases, decidedly no.

H. S. COOPER.

It pays to use treated ties for street railway construction, as they last three to four times as long as untreated timber of the same species, with an additional cost not exceeding from 20 to 25 cents per tie. J. C. MILLER.

Treated ties undoubtedly last much longer than untreated ones, and I believe the increased cost is more than made up for in the lengthened life of the tie.

Unseasoned untreated ties should never be put in track.

W. L. WESTON.

Of the two ties do you prefer a post oak or all-heart pine tie?

Many railway engineers throughout the United States have stated that heart timber is superior to other kinds.

H. H. GERHARD.

All heart in this climate, though there is not much difference. J. J. KING.

At the same price I prefer the heart pine tie, and believe that if of first-class long-leaf timber it will last much longer than the post oak. The heart pine, if sawed, will give a better rest for the rail, and being more uniform in size than the hewn tie, can be more easily put into the roadbed. W. L. WESTON.

What type of trolley wire hanger (the bell or cap and cone) is the most economical?

Either bell or round top is more economical in maintenance than cap and cone.

The writer is not in favor of using any type of self-insulated trolley wire hanger, either as a matter of economy, insulation or maintenance. He has devised a trolley wire suspension that obviates the defects of both the bell and cap and cone hanger. H. S. COOPER.

The bell, or what is known as the type N hanger, is more desirable and economical. G. H. CLIFFORD.

Is it advisable to use an iron protector at the ground line in connection with iron poles, this protector consisting of an iron tube or pipe slipped over the pole and extending about 6 in. above and 2 ft. below the ground line?

It is, if it is hot-swedged onto pole and sealed to prevent water entering joint. J. J. KING.

TRANSPORTATION

Outside of large cities, in towns of, say, 25,000 to 100,000 population, operating from 30 to 100 cars on regular schedule, is it wise to employ experienced trainmen from other roads?

It is just as wise to employ experienced trainmen, especially motormen, to operate your cars as it is to employ experienced engineers to operate your power plant. The San Antonio Traction Company pays a premium on experienced men. T. C. BROWN.

We do not consider it wise for the small lines to employ experienced trainmen from other roads, and in Houston we deviate from the policy after considerable consideration, as we discovered that the experienced men were teaching our local and "raw" men many old "tricks of the trade," which they had picked up during their previous experience. We also found it harder to change the habits of the experienced man and teach him the operation as we desired it than it was to teach an entirely "green" man according to our own ideas. H. L. HARDING.

Would by all means prefer an experienced man, particularly on the front end, to an inexperienced man, assuming, of course, that he has satisfactory references from past employers. The value lies right in the word "experience," for however complete may be instruction and competent the man may be, nothing but continuous operation can give a man knowledge of the thousand and one situations that arise in the operation of a car, and the ability to handle same coolly, quickly and successfully. As a new man works the extra list he is getting this experience slowly, as he probably does not work every day, or as much as a regular man. While it is true that an experienced man may have learned certain habits that are not as you desire, and which to remedy or break may cause the instructing and inspecting force some trouble, nevertheless the real magnitude of these habits are infinitesimal as compared with the gain in the ability of the man to keep out of the way of vehicles, pedestrians and other cars, and the ability to get fares and handle a crowd safely on the rear end, all of which are practically the same proposition in any city, as a single slip upon any of the above may mean a serious accident and consequent expense.

Take the experienced man if you can get him, and if he has a good record. T. C. RANDALL.

I usually employ inexperienced trainmen, for the reason that acceptable experienced men are hard to obtain. When the latter are available they are given the preference.

C. H. BOWEN.

I prefer experienced trainmen if satisfied as to their habits, etc., for the reason that it costs the company money in many ways to break in new men. G. H. CLIFFORD.

Can trailers be operated more satisfactorily than single units to take care of rush hour business?

This is altogether controlled by local conditions. On cars that pass the barn, or near the barn, probably so. Where trailers have to be taken a long distance to attach to regular cars and only run one or more trips, it will cost more to put them on and pull them off than to run trippers. T. C. BROWN.

Single units are more satisfactory in handling crowds during the rush hours than the trailer equipment used in this country. The expense is somewhat greater, but considering the increased liability of accident and the slower time made by trailer equipment, the small additional expense is not objectionable. C. H. BOWEN.

Trailers for city service can only be used satisfactorily during rush hours on a double track, as on the single track they drag too much and good meetings at turnouts are impossible. W. L. WESTON.

What progress have you made during the past year in reducing the number of car failures or "pull-ins"?

We have almost eliminated pull-ins during the past year by better inspection in the barn and having a good trouble man out with the cars from the time they leave the barn till they go in. T. C. BROWN.

A thorough inspection of cars and minor repairs such as can be made at night. This inspection to cover particularly brakes, trucks, cables and motors. By adopting this plan and carrying it out carefully, trouble can be avoided by repairing immediately before any particular part of the equipment gets badly run down. T. N. HARTIN.

The number of pull-ins or car failures has been reduced about 50 per cent in the last 12 months.

J. E. GALLAHER.

AMUSEMENT PARKS

What is the best way to handle an amusement park—to lease it or run it yourself?

I think, in general, the most successful method of handling a street railway park, particularly in towns having a population of less than about 150,000, is for the railway company to handle it itself and to operate it with a view of stimulating traffic on the cars, rather than making a large profit from the park itself.

The real value of a park to a street railway company is to educate the public to ride, not particularly on holidays or other big days, when it becomes a burden and sometimes impossible to perfectly and efficiently handle the crowd, but to build up the riding on the ordinary weekday, and to make this increased business somewhat uniform, so that the extra service required to handle it can be more nearly foretold in advance, and consequently operated more efficiently, straight through from car to power station.

The objection to leasing a park to outside parties to run is that the lessee is looking for a profit for himself, as is the owner of each concession. The result is that the park is filled up with frivolous and fake forms of concessions,

most of which cost 10 cents or more each admission, and the attraction or show is all over in a minute. The average person consequently gets very little amusement for an afternoon or evening without an expenditure of about 75 cents or $1 in addition to his car fare, and rarely a single one of these concessions tends to make "repeaters" of the public.

In towns of up to at least 150,000 population, unless they have a very large and daily changing population, if the public is not educated to "repeat" the population of the town is not sufficient to support the ordinary so-called "White City" or "Electric Park," with its large investment, and from the viewpoint of the street railway company, the volume of the park traffic is irregular, uncertain and frequently amounts to nothing during the ordinary weekday (the day on which a company is best able to handle the business advantageously), and the business runs out early in the season, all of which tends to give the park a black eye for future years.

My experience and observations of the park business in the various cities of the country have been that the best results are obtained by the railway company running the park itself, starting the park off right at the beginning and giving the public a good, clean amusement with variations that will entertain them while they are at the park, with good street car service to and from the park. All of which, outside of the car fare, will cost them practically nothing. The company should figure the real profit from the increased number of passengers carried.

T. C. Randall.

MANAGEMENT, AUDITING

What results have come from selling six street car tickets for 25 cents? Have the Texas companies that have tried this plan been satisfied with the results?

So far as the experience of the writer is concerned, the selling of any street car tickets for a cut rate is very seldom remunerative to the street car company. In the first place, it opens up another chance for the conductor to steal from the company, in that it allows him to buy six tickets for 25 cents and turn in tickets for 5-cent cash fares, thus making 20 per cent profit on his investment and robbing the company of that much money. In the second place, it must be remembered that in nearly all street railway companies the margin of profit lies between the fourth and fifth cent, and that any cut in the price of tickets, reducing them below 5 cents, cuts not only the gross receipts, but makes a direct cut into the net. The use of any ticket involves the expense of the ticket itself, counting and accounting for the tickets, and, on account of the tickets lost, mislaid or held, leaves a constant and constantly increasing liability, the uncertainty of which becomes quite annoying to the accounting department after a while. In a town of about 30,000 people with which the writer is acquainted, the debit side of the ticket account showed in five years nearly $2,800, and in his present property, at Galveston, tickets were offered and compelled to be accepted five years after their issue and purchase. On the whole, unless there are very urgent reasons for so doing, in fact, unless it is impossible to get out of it, the writer would certainly advise that no tickets, and especially no cut-rate tickets, be issued by a street railway company as long as the straight 5-cent fare, or, at any rate, as long as a straight cash fare can be maintained. H. S. Cooper.

Do you require conductors to register transfers collected? If so, do you require conductors to pay for transfers short or defective?

Yes. No. T. C. Brown.

We require conductors to register cash on one side of double register and on the other side to register transfers and tickets, but do not require conductors to pay for transfers short or defective, but do keep an account of each conductor to ascertain the number of errors made, so that he may be disciplined accordingly. G. H. Clifford.

Do you consider it good policy to have transfers registered if conductors are not accountable for the number registered?

Yes. T. C. Brown.

Yes, for the reason that trainmen could not be checked successfully without the use of the double register.

C. H. Bowen.

Yes. G. H. Clifford.

THE ACCOUNTING DEPARTMENT*

BY W. B. WRIGHT, AUDITOR, INDIANAPOLIS & CINCINNATI TRACTION COMPANY

In reviewing the subject it seems to the writer that it cannot be suitably handled as a whole in one paper, but that it should be presented in a series of possibly three studies something as follows:

The accounting department. Its organization and routine.

The accounting department. Its relation to other departments—especially discussing the methods of quick and accurate interchange of information and data covering both current business and periodical report work.

The accounting department. Its chief—his status in the general organization, his authority, and its limitations.

The first two subjects suggest in themselves a style of treatment, but the last one brings before us a phase of the matter which is seldom handled in a concrete way outside the gatherings of accounting men. I believe it one of the very important subjects for the consideration of the general body; this on account of the increased responsibility imposed upon the chief accounting officer by the laws empowering control through national and State commissions; also on account of the tendency to add to his duties as a reviewing authority duties which partake largely of the nature of those of the operating official, notably his participation in the work of the traffic department, and his control of the receipt, care and issue of supplies and stores. On some lines this latter duty includes the employment and discipline of employees engaged in handling this class of property.

I will attempt to discuss briefly the first proposition and to describe the schedule of duties as made in the accounting department of the company with which I am connected. I shall hope to hear the other propositions presented at later meetings.

ORGANIZATION OF ACCOUNTING DEPARTMENT

The organization of our accounting departments cannot be based on the required duties alone, nor can it be based entirely on the force of people who are to perform them, but will follow a line, the resultant of a combination of these elements. Ordinarily the required duties will indicate an outline for the organization of the working force, but the "personal equation"—the aptitude, education and experience of the individual workers—will vary this widely from time to time as the working force changes, even where the list of duties remains practically constant.

The changing conditions of our individual properties incident to growth, consolidation, etc., adds to our problem another element which must by no means be overlooked, since the relatively small property of to-day, with few accounting people, each performing many duties, is likely to become the large system of to-morrow, where single duties are performed by many people.

The solution of our problem, then, calls for a grouping of duties, so correlated with the individualism of our working force that we can increase or diminish our list of duties both as to number and volume, and augment or diminish our working force—either or all—without serious friction, loss of the effective working time of our employees or the impairment of our records.

Webster quotes Coleridge as defining "organization" in the following question, "What is organization but the connection of parts in and for a whole so that each part is, at once, end and means?" or, to drop the interrogative style and state the proposition positively, organization is the combining of parts in and for a whole, so that each part is both end and means.

Following this line of thought, but keeping always in mind the quality of the human material with which we are to work (and this quality is usually limited by the element of salary appropriation), the work and the workers should be so progressively grouped that the finished product of one group becomes the raw material of the next. As an example take the trip reports, the conductors' finished product. These, forwarded to the accounting department,

*Abstract of paper read before Central Electric Railway Association, Ft. Wayne, Ind., June 3, 1909.

become the raw material for the checking force; the trip report abstracts, properly footed, balanced and proved, the finished product of the checking force, together with reports of other earnings from their various sources, become the raw material for the chief clerk or other employee charged with compiling and refining the earnings statistics; and the earnings report, the finished product of the chief clerk, becomes the raw material for the clerks in charge of the general books of account. The balance sheets and comparative statements, the finished product

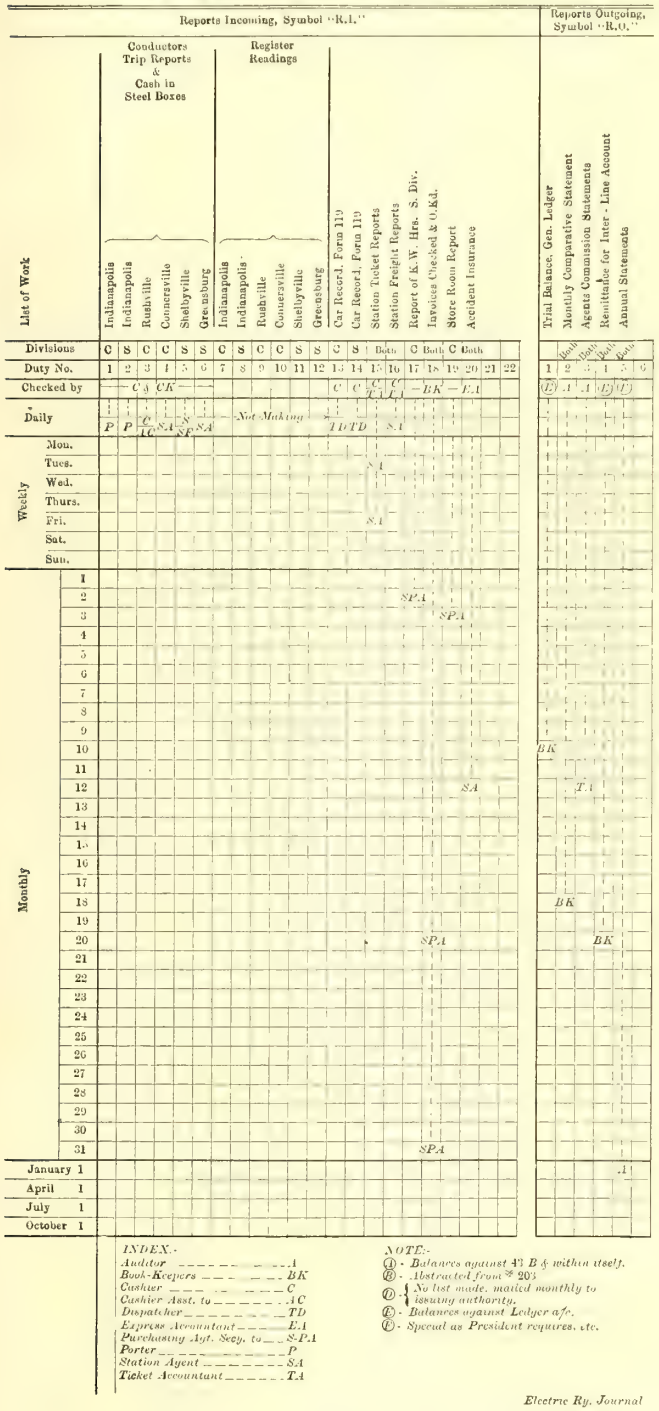


Chart of Duties of Employees in Auditor's Office, Indianapolis & Cincinnati Traction Company

of the latter, become again in part the raw material for the executive, whose finished product is a system with each department attuned to a high degree of productive efficiency, and each grand division of his forces properly aligned under the general scheme with every other grand division, the net result being an easily handled, well-balanced, forceful, result-producing organization.

To produce in the accounting department definite results at definite periods (daily, weekly, monthly or yearly), some sort of a graphic schedule must be used, and this schedule must, in conforming with the above deductions, possess the following characteristics:

Comprehensiveness. It must show the list of duties, by whom performed, time of performance, by whom checked, what proofs of corrections, if any; and if the road is operated by divisions it should show to what divisions the duties apply.

Flexibility. As regards grouping of duties and changes in individuals assigned thereto.

Legibility. It must be in such shape that it is readily scanned and quickly understood, even by one not conversant with it.

It is the opinion of the writer that neither the ordinary tabulated list, the bracketed table nor the chart based on rectangles or circles showing duties and individuals, with converging or diverging lines showing direction of movement, meets the requirements mentioned. Instead, we have adopted and are using a chart after the style of the sketch shown herewith. A similar chart was published some years ago by a prominent Chicago business magazine, but it did not show the amount of detail that we require.

The chart, for convenience, should be sectionalized, preferably by combining in each section reports and duties incoming, outgoing, etc. Our division is: "Reports incoming, symbol R. I.;" "reports outgoing, symbol R. C.;" "miscellaneous, symbol M.;" and "pay rolls, symbol P. R."

On the chart, as shown, we have first the list of work; below it is lettering indicating the operating divisions; below these, numbers indicating the duties; below this again, symbol indicating by whom each duty is checked or proved, and below, in serial order, sections indicating times of performance—daily, weekly, monthly and quarterly; the last section also provides for duties recurring at annual intervals only. Each class of employees is indicated by a letter symbol, as A, auditor; C K, checking clerk; S A, station agent, etc. These are alphabetically indexed, as shown at bottom of chart.

The chart is completed by drawing with a hard pencil, in the vertical column representing the required duty, a line from the top of the column to the time of performance, and at the latter place writing, also with hard pencil, the symbol representing the class of employee (and this usually indicates the individual) of whom the duty is required. On the "checked by" line is indicated, also with hard pencil, the symbol for class of employee checking or proving the work. These items are inserted with hard pencil so that they may be readily erased and changed with the changing necessities of the department work.

After the chart is completed as above, a schedule or table of individual work is prepared, grouping under the title of each individual or class of employees all the duties required of that individual or class. This is in effect a classified list, typewritten, with sufficient carbon duplicates to meet the requirements of the case, and shows, in addition to individual or class as above, the symbol for the duty, as "R I—1," the name of duty, as "forwarding conductors' trip reports and cash," and the time, as "daily-train No. 38." A complete list is kept by the chief accounting officer, and copies are sent his superiors. The carbon copies are cut in sections, giving each affected employee the section indicating his duties, this completing the scheme, except that at the foot of the chart should be made a list of notations showing how each duty or report capable of proof is verified, as, for instance, annual statement proves against ledger account.

This type of chart may be known to many of you, but I have never found it in use in any of the offices whose accounts and systems I have been called to handle. This may be because the chart looks somewhat intricate and would appear to be difficult to construct, but it is not.

ADVANTAGES OF GRAPHIC CHART

There are three things that strike the writer as of great importance in the charting of any office routine, and especially that of the accounting department.

First.—The individual schedules made up from the chart detailing the work of each member of the force and giving definite times for the completion of each duty, largely prevent the attempt so commonly made by clerical people to shift their burden in part to other shoulders, especially if the owners of those other shoulders be willing, and the

localizing of responsibility in this manner is usually followed by a very decided increase in output per clerical unit.

Second.—In case of long absence or disability of the department head, there is at hand a means of ready reference and positive information for the guidance of the official detailed to supply his place. If the sections of the chart are covered with a thin sheet of glass the duties may be checked off as completed by dotting the glass lightly with ink over the indicated squares, thus giving a correct and complete record of the work day by day—a record quickly available for the acting department head, the executive, or other interested parties whose work may depend in a greater or less degree on the completion of the work of the department under consideration.

Third (and not of least importance).—The executive whose chief accounting officer has successfully charted his office routine, proving his work by actual results, may rest assured that that accounting officer knows thoroughly the work of his department, where and by whom it is being done, for a very perfect knowledge of the work in complete detail is necessary to the successful construction of a working chart of this kind.

This method of recording routine is adapted not only to the accounting department, but lends itself readily as well to any place where like duties re-occur at approximately fixed intervals of time, and it was this feature, coupled with the thought that it might possibly be applied in other branches of our work, and thus be of some general interest, that first prompted its presentation.

In conclusion, it may be taken without question that the larger properties are provided with carefully planned schedules, the proposition with them being how best to prepare and present these schedules to those members of their forces affected.

The smaller properties are frequently without these helps, but the writer believes that no property is too small to use some plan for outlining definitely the routine of its accounting force, to bring clearly and at fixed times before the mind of the employee charged with many and frequently differing lines of work the thing which at that fixed time requires immediate attention, and which in the stress of the day's routine and under the distracting influence of widely dissimilar duties, unless so reminded, is certain at some time to be forgotten, with results sometimes disastrous to himself and always annoying to his superiors.

It would seem, therefore, that a closely organized working force, with a definite schedule of duties, the latter so built as to admit of quick and easy change, is a desideratum, even a necessity, to economical and effective accounting work.

THE PIECE WORK SYSTEM*

BY J. A. GOHEN

Piece work if properly conducted makes better and more diligent workmen than day work. All the average day worker seems to consider is that the company has agreed to pay him so much per hour for so many hours per day whether he does or does not give them a commensurate return for the money they pay him. It is no concern of his if the company has lost by such an agreement. He has no incentive to work harder for the company or to increase his efficiency, for he believes, and often rightly, that extra effort will bring him no additional recompense. There are, of course, exceptions. Some men are honest, careful of the company's material and tools, ever watchful of its interests and put in all their time in an earnest endeavor to help the company, but being classed the same in mechanical ability, they receive the same rate of pay as the other men under the day-work system. The diligent, capable man after a time observes that he is doing more work, or better work, than his fellow-workman, and not getting one penny more. The result is that there being no incentive to continue to work for the company's interest, he becomes careless and improvident and is sooner or later dragged down to the level of his inferior companions.

*Abstract of a paper read before the Central Electric Railway Association, Ft. Wayne, Ind., June 3, 1909.

Under the piece-work system he becomes a copartner of his employer and is remunerated for any or all increased efforts on his part. There is an incentive to make more money by diligence and increased effort. By so doing the workman makes more money for his employer, and, therefore, is more valuable. The careless, indifferent workman on the day-work plan, if placed on piece work, soon finds the diligent, energetic man distancing him in earnings and realizing the situation, immediately tries to be his equal; the result is that two indifferent workmen under the day-work plan have been converted into two capable and valuable men under piece work.

About a year ago the Cleveland, Cincinnati, Chicago & St. Louis Railroad instituted piece work at its Cincinnati terminal for cleaning, icing and watering coaches. The writer happened to be there one morning talking to the foreman. Directly opposite his office was a storeroom for the commissary department of the dining-car service, with a driveway just about wide enough to admit a horse and wagon backed up to the storeroom. A man who iced the coaches had passed through this driveway to the ice house with a wheelbarrow for ice. While getting his supply a wagon backed in to the storeroom with supplies. When the man came back he found his way blocked. He quickly gathered two boards which he had placed conveniently for the purpose, and passing around the storeroom, used the boards for inclines to cross a number of intervening tracks to get to the coaches. If he had worked on a day rate he would probably have waited at that passageway until the wagon was unloaded if it took half an hour and let the ice melt in the sun, claiming it would be impossible to cross the tracks with a load of ice. But he was not getting pay for loafing under the piece-work system. Can any deduction be drawn from this incident? The saving of the ice from melting is but illustrative of greater savings under a piece-work system.

B. D. Lockwood, mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis Railroad, when asked how piece work affected the output of the company's shops, replied:

"Under day work we did not get more than 35 per cent of the efficiency of all machines and we now get 65 per cent under piece work. Allowing for increased repairs incidental to piece work, we think it will net us 60 per cent of the possible maximum efficiency. It does not require any more fuel to develop power to operate machinery at a maximum than a minimum efficiency, for provision must be made for the maximum output at all times. Therefore there is a saving in fuel when 60 per cent or 65 per cent efficiency is obtained from machinery instead of 35 per cent. A large plant will not require so many duplicate lathes and planers when the output of each one is nearly doubled. Under piece work fixed charges, such as interest on investment, taxes and insurance are the same as under day work. Doubling the efficiency of the machinery with little, if any, increase in expense will certainly help to pay your fixed charges. A peculiar feature developed at the Beech Grove shops of the Big Four after the introduction of piece work. Previous to this time no complaint was ever registered by any of the machine hands in regard to a surplus of material in either iron or brass castings that had to be turned, slotted or planed, but it was only a short time until the lathe men complained of this excess in packing-ring cylinders, driving boxes and all other castings, both iron and brass. Now the pattern shop is unusually busy in reducing the superficial area of all such patterns. This will result in quite a saving in the cost of rough castings; also a reduction in the amount of scrap borings and turnings."

Should any electric railway company determine to introduce piece work it should be fair and just with the employees. Try to divide the additional profit which must surely ensue from a practical and well defined system of co-partnership of capital and labor. Do not be precipitate in formulating a schedule of prices. Do not get them so high that they will have to be generally reduced nor so low that the workman will not be amply repaid for any increase in his diligence and ingenuity. Above all things after a schedule of prices that is fair to both sides has been established do not place any limit on the earnings of any workman. Let him earn all he can if there is work to keep him busy. The more he earns, the more

the company will make from his efforts. It may develop that some of the workmen could earn nearly twice as much as others if allowed to do so. Do not jump to the conclusion that such men are making too much money. They have more brain and more muscle than the other men. Remember that the company's savings are in direct proportion to the increased earnings of the men.

If the introduction of piece work is contemplated quietly and without the knowledge of the workman, who is on day work, keep a correct record of the time it takes him to do a specified job. Do this a number of times, then strike a general average and find what this particular job is costing. If a number of men are on the same kind of work, find the average cost of all the output.

After the average cost under day work has been ascertained deduct 40 per cent of the time required under day work and add 40 per cent to the price per hour paid for the labor. For example, if it has taken 10 hours to do a specified job at 25 cents per hour, that job costs $2.50. Deducting 40 per cent of the time required under day work gives six hours as the time required under piece work. Add 40 per cent to the rate of 25 cents per hour, making the rate 35 cents per hour.

Six hours at 35 cents equals $2.15, and 10 hours at 35 cents equals $3.50. The result is that the job is done for $2.15 which formerly cost on day work $2.50, and the workman gets $3.50 for 10 hours instead of $2.50. These prices are so nearly just that as good work can be expected and exacted under a piece-work system as under day work, and the workmen will soon appreciate it. If they are made to work unnecessarily hard to earn such an increase they will soon learn to slight the work, and trouble will follow.

Start right with the confidence of the men as to the company's honesty of purpose in improving their interests, as well as the company's, and piece work will undoubtedly prove practical and profitable. It will build up a force of intelligent, diligent and independent workmen.

MUNICIPAL ELECTRIC RAILWAY SYSTEM OF DURBAN, SOUTH AFRICA

Some interesting facts concerning the municipal electric railway at Durban, Natal, South Africa, are contained in a recent report to the Department of Labor and Commerce at Washington, D. C., by Edwin S. Cunningham, Consul at Durban. The municipality of Durban acquired the street railway system in 1901 and immediately extended it to 30 miles of track and converted the horse-car system to an electric railway. No power station was built, however, current being supplied by the municipal electric lighting plant, which represents a total investment of $1,356,626. The street railway operates 64 cars, mostly double deck, six of which were bought in the United States. All except 11 of the cars are equipped with motors purchased from the General Electric Company, Schenectady, N. Y. The total investment in the railway system is $1,996,369.

The cars are operated from a common center and the lines are divided into 2-mile fare zones, the first zone being 2 miles from the common center. The second zone usually is somewhat short of 2 miles, but the fare is the same for each zone; that is, 4 cents cash or 3 cents by ticket. During the year ended June 30, 1908, 12,688,800 passengers were carried, or 9.77 per car-mile, and they paid an average fare of 3.42 cents each. The gross receipts of the company for the year ended June 30, 1908, were $437,369, of which $256,682, or 58.68 per cent, was paid for operating expenses; $80,686 for interest on bonded debt; $12,847 was added to the sinking fund; $53,344 was charged to the depreciation account and $2,710 to accident insurance and other funds, leaving a balance of $31,127. Motormen and conductors are paid a flat wage of $17.50 per week.

ORGANIZATION OF THE PACIFIC CLAIM AGENTS' ASSOCIATION

A large and enthusiastic meeting of the claim agents of the electric and steam railroad companies of the Pacific Coast States was held at the Oregon Hotel, Portland, Ore., May 22, and resulted in the organization of the Pacific Claim Agents' Association. The representatives of electric railway companies in attendance included Thomas A. Cole, Los Angeles Railway and Los Angeles & Redondo Railway Company, Los Angeles, Cal.; E. H. Odell, Tacoma Railway & Power Company, Tacoma, Wash.; Geo. Carson, Seattle Electric Company, Seattle, Wash.; H. L. Bleecker, Washington Water Power Company, Spokane, Wash.; J. H. Handlon, United Railroads of San Francisco, Cal.; Geo. D. O'Conner, Walla Walla Valley Traction Company, Walla Walla, Wash.; H. G. Fleischhauer, Vancouver Traction Company, Vancouver, Wash.; A. E. Beck, British Columbia Electric Railway Company, Vancouver, B. C.; T. G. Newman, Bellingham, Wash.; J. L. Lambirth, Portland & Eugene Electric Company, Portland, Ore.; F. I. Buller, C. J. Franklin, O. B. Coldwell, F. F. Barbour, R. E. Edwards and B. F. Boynton, Portland Railway, Light & Power Company, Portland, Ore. In addition, the Northern Pacific, Southern Pacific, Oregon Railway & Navigation Company and other steam railroad companies were represented. Letters expressing interest in the meeting were received from most of the other principal roads on the Pacific Coast.

The officers elected for the ensuing year are as follows: President, B. F. Boynton, Portland Railway, Light & Power Company, Portland, Ore.; first vice-president, A. M. Lee, Northern Pacific Railway, Seattle, Wash.; second vice-president, J. N. Hone, Spokane Inland Empire Company, Spokane, Wash.; third vice-president, T. A. Cole, Los Angeles Railway and Los Angeles & Redondo Railway Company, Los Angeles, Cal.; secretary and treasurer, Mrs. I. P. Newel, Portland Railway, Light & Power Company, Portland, Ore. The executive committee consists of Chairman G. N. Smith, O., R. & N. and S. P. Co., Portland, Ore.; J. H. Handlon, United Railroads of San Francisco, Cal.; John Ferrin, Oakland Traction Company, Oakland, Cal.; A. E. Beck, British Columbia Electric Railway Company, Ltd., Vancouver, B. C.; Geo. Carson, Seattle Electric Company, Seattle, Wash., and H. L. Bleecker, Washington Water Power Company, Spokane, Wash.

On the arrival of the delegates at the Oregon Hotel they were given an informal address of welcome by F. I. Fuller, vice-president of the Portland Railway, Light & Power Company. They then proceeded to the convention hall, where they were formally welcomed by F. F. Barbour, assistant to the president. The organization went into session at 10 a. m., and completed its labors at about 10 p. m. of the same day.

The following morning, Sunday, the visitors were taken in the observation car of the Portland Railway, Light & Power Company, and were shown the city, including the famous Portland Heights trip. Through the kindness of Mr Hutchings, who is building the floats for the Rose Festival, the visitors were permitted to enter the buildings and the floats were lighted up for their entertainment. In the afternoon the visitors inspected the Cazadero power plant, and had dinner at the Hotel Estacata.

There are 54,540 stockholders of the Pennsylvania Railroad Company, of whom 47.96 per cent are women. Nearly 20 per cent of the stock is held abroad.

CHICAGO TRACTION DEVELOPMENT

At a joint meeting of the electrical section of the Western Society of Engineers and the Chicago section of the American Institute of Electrical Engineers, held on May 28, B. J. Arnold, Harvey B. Fleming and George Weston, of the Board of Supervising Engineers of Chicago Traction, presented the latest developments in the great work of rehabilitating the surface railways of Chicago. W. L. Abbott, chief engineer of the Commonwealth Edison Company, and W. B. Jackson, consulting engineer, presided jointly.

Mr. Arnold first outlined the steps that led to the ordinances of 1907, by which the roads are being rebuilt under the guidance of the Board of Supervising Engineers. Previous to the ratification of the ordinances by the voters of Chicago a valuation board under Mr. Arnold had appraised the physical properties of the Chicago City Railway Company and the Chicago Union Traction Company at $52,000,000, with pavement, and $47,000,000 without pavement. As a result of a controversy between the two railways on one side and the city on the other as to the propriety of including the value of the pavement, the total value of the two properties later was assumed as $50,000,000, and on this basis the ordinance provisions were founded.

By the acceptance of the ordinances of 1907 the two railroad companies agreed to rehabilitate their properties and to furnish the money therefor. To date the rehabilitation work for the two properties has cost about $30,000,000, and the final amount probably will total $40,000,000, but this figure cannot definitely be stated until a decision is made as to whether large new generating stations shall be built.

According to the ordinances, the city may, on six months' notice, purchase the properties at the valuation, plus the rehabilitation costs as certified to by the Board of Supervising Engineers. A renewal and depreciation fund of 8 per cent of the gross receipts of each month is set aside to guarantee the up-keep of the property to 85 per cent condition. The ordinance provides that out of gross receipts shall come the operating expenses, the renewal fund of 8 per cent and 5 per cent interest on the capital invested at the time of signing the ordinance, and then the balance shall be divided, 55 per cent to the city and 45 per cent to the company. This feature of dividing the profits required that some one should assume the supervision of the rehabilitation work and the books of the railways, and therefor the Board of Supervising Engineers was created. This board has a staff of auditors who have laid down a system of bookkeeping for the roads and a staff of engineers and inspectors who carefully supervise the construction work as carried on. Through these two independent organizations the city is assured of accuracy in the performance of the work.

Harvey B. Fleming, chief engineer, Chicago City Railway Company, presented a paper on "Street Railway Car House Design," which will be found elsewhere. Mr. Fleming is the member of the Board of Supervising Engineers representing the Chicago City Railway. John Z. Murphy, chief engineer, Chicago Railways Company, and member of the Board of Supervising Engineers, was not present, but Mr. Abbott spoke in tribute to the excellent record which Mr. Murphy had made in handling the present reconstruction, and also complimented him for his resourcefulness in keeping the equipment of the underlying companies in good condition prior to the acceptance of the ordinance, when financial affairs were very unsettled and when, as Mr. Abbott stated, any other man would have called upon the receivers for considerable more help.

George Weston, assistant chief engineer, Board of Supervising Engineers, presented a brief outline of the rehabilitation ordinance requirements and outlined the organization of the Board of Supervising Engineers. Among other things, Mr. Weston stated that there were 137 employees on the staff of the board, which had in charge work distributed over 651 miles of city track in Chicago, 213 miles of which were being rehabilitated. Sixty-five miles of new extensions are being constructed, and to date 132 special track work layouts have been installed at different locations, not including nearly 100 crossovers. All curves are built for complete clearance of the large pay-as-you-enter cars.

The discussion of the subject of the evening was opened by B. I. Budd, general manager, Metropolitan West Side Elevated Railroad, who, when called upon, asked whether the forthcoming large increase in the number of cars operated would not bring about additional congestion in the loop district. He had noted that as more cars were added to the various routes, additional time was lost at the downtown terminals, and therefore he inquired whether the track capacity downtown had not nearly been reached, and what plans had been made to relieve the congestion caused by the operation of the large amount of new equipment prior to the building of subways.

Mr. Arnold replied that, according to the plans of the board, when all the tracks in the downtown district were reconstructed the congestion would be relieved by through routing a large number of the cars that now turn on loops. downtown. The board held that an equal number of cars from each company should be shuttled from one end of the city to the other, and thus the carrying capacity of the tracks increased. Single cars were now operated in place of two-car trains. This relieved congestion. Also the improvement in the motor equipment of the cars and the power distribution had brought about an increase of 11 per cent in the speed. When political and financial affairs were adjusted it was hoped that subways would be built, and even then the transportation companies of the city would need all the space below, on and above the downtown streets.

When questioned, Mr. Arnold stated that during the past two years the partnership ordinances had resulted in the companies paying the city about $3,000,000. This was approximately 8 per cent of the gross receipts. Before the ordinances were passed representatives of the city argued that the ordinances should require that the companies pay 10 per cent of their gross receipts to the city, but Mr. Arnold had maintained that under such conditions the railroads would not be able to give the best service, and so the ordinance provided that 55 per cent of the net receipts should go to the city and 45 per cent to the companies. Mr. Arnold also stated that in valuation work there was an undecided question of what should be done with promotion and development expenses. While not making a definite statement, he held the opinion tentatively that such expenses which had to do with the creation of the property should be put into a special account and charged off within a fixed period of years, so that the capital would not have to carry the load. This was a question, however, that must be settled shortly, because of the valuation work at hand in New York, Detroit, San Francisco and elsewhere.

STREET RAILWAY CAR HOUSE DESIGN AND OPERATION*

BY H. B. FLEMING, CHIEF ENGINEER, CHICAGO CITY RAILWAY

I only hope at the present time to call your attention to certain phases of the subject of street railway car house design and operation which are new, and which I think will be of interest to you. In case any of you desire to read up on this question, I would call your attention to the report of the committee on operating and storage car house design, published in the ELECTRIC RAILWAY JOURNAL Oct. 17, 1908, which report very fully covers the principal problems entering into the design of car houses.

LOCATION

In selecting a location for a car house the points to be considered are:

(1) Provision for future requirements.
(2) Convenience and economy of operation; i.e., minimizing of dead mileage and maintenance.
(3) Fire risk—location with reference to other buildings.
(4) Economy of construction.
(5) Facilities for drainage and sewerage, especially if pits are used.
(6) Room for proper layout of tracks and extensions.

DESIGN

The Board of Supervising Engineers in considering the question of car house design reached the following conclusions:

(1) All car houses that are to be permanent should be divided into bays or sections so as to reduce the loss in case of fire to a minimum.

(2) New car houses to be built should also be divided into bays or sections and should be of fireproof construction.

(3) Where any old car houses are to be remodeled in such a manner as to become permanent structures, involving the expenditure of considerable money, that such buildings should be fireproof.

(4) Where it is necessary to remodel old car houses in order to accommodate the large modern cars temporarily, and which would probably be abandoned in the near future, that such modifications should be made with as little expense as would make them reasonably safe for the storage of property contained in them, and that they should be abandoned and new fireproof car houses built at the proper time at the same or more desirable locations.

(5) Wherever conditions will permit, the car houses to be of the double-ended type.

The latest approved design of car houses conforms with the above general requirements, and I wish to call your attention to their various features.

ACCOMMODATIONS FOR MEN

Ample accommodations have been provided for the office of the division superintendents, clerks and trainmen, and in addition, a club room, coat room and reading room is furnished for the use of the employees assigned to duty at the division of which the car house in question is the headquarters. The club room is furnished with pool and billiard tables, chess and card tables, and a small amount of gymnasium apparatus and a stage. These rooms are open to employees at all times, and they are given the privilege of holding various entertainments in them. A small library is kept in sectional book cases along the walls of the reading room, and on the tables are current issues of daily papers and some of the technical journals.

Special attention has been paid to providing toilet facilities for all of the car house employees, and in addition, the repairmen are provided with locker rooms and lunch rooms.

CAR STORAGE SECTIONS

Each bay or section is independent of all the others, and all openings between sections are provided with double automatic steel fire doors. Each bay is approximately 490 ft. long and 38 ft. wide, and contains three tracks, with a capacity of 30 standard double-truck cars.

*Abstract of paper presented at a joint meeting of Western Society of Engineers and the Chicago Section A. I. E. E., Chicago, May 28, 1908.

Each track is divided into three sections; the middle section having a pit to permit of ready inspection and repair of the trucks, motors and car equipment suspended underneath the body.

The fire-walls of each bay are of brick, 12 in. thick, spanned by reinforced-concrete girders spaced 16 ft. centers and 18 ft. in the clear, and covered with a reinforced-concrete slab 4½ in. thick, cast in one piece over the entire roof. The middle 8-ft. section of the roof of each bay, except at the end panels, is covered with fireproof skylights for lighting and ventilation. The ends of each bay are provided with galvanized steel rolling doors.

The tracks in the bays are connected with the main line in the street by curves at each end, or, in other words, the car house is of the double-ended type, so that the cars can come in at one end, be washed and fumigated, passed over the pits, inspected and repaired, and thence moved on to the other end of the car house ready to go in service again, without any switching or reverse movement after the process is once started.

REPAIR SECTION

Every car house is provided with one section which is known as the repair section, where special provisions have been made and special machinery installed for the economical handling and repairing of cars.

By the use of overhead traveling cranes we are enabled to shift our standard double-truck car bodies from one pair of trucks to another pair in less than three minutes. These cranes are also very useful in the truck repair section. In addition to the above, each repair section is provided with the following tools:

1 motor-driven lathe.
1 motor-driven drill.
1 motor-driven emery stone with 48-in. grindstone.
1 portable beam for swinging armatures into lathe with triplex chain block.
Assortment of drills.
Assortment of wrenches.
1 mandrel and 40-in. forge.
2 vises.
1 carpenter bench.
1 pipefitter's bench.
1 6-ft. face plate.
Assortment of sledgehammers and hand hammers, cutting chisels, drifts and jacks.

Only certain classes of work are handled in the car houses. Whenever cars require general overhauling or repairing they are sent to the main shops.

LIGHTING AND WIRING

All light and power wires are installed in conduit and according to the requirements of the National Board of Fire Underwriters. The general lighting is accomplished by means of arc lamps, five in series on a 500-volt circuit. The lights are staggered in the various bays so as to provide general lighting between the rows of cars. Lighting in the pits is obtained by the use of incandescent lamps on the 500-volt circuit, special arrangements having been made for pit lighting in order to reduce the load to a minimum and yet provide the lights needed by the inspectors and repairmen.

The power supply for the building is controlled from what is known as the switch room. The power supplies for each bay and for the trolley wire leading from the bay to the street are also controlled from this switch room so that in case of fire in any one section the power can be cut off without interfering with the supply in the other sections, which would prevent the removal of cars from the danger zone.

This switch room has direct connection with the street so that it would not be necessary for the operator to go through a burning section to pull the desired switch.

The buildings are heated by direct radiation and in most of the buildings the vacuum system has been installed. In the original installation it was considered necessary to provide overhead coils in the vicinity of the skylights, but experience has proved that the bays can be properly heated by locating the coils only in the pits and on the sidewalls in the immediate vicinity of the end doors. The stacks in connection with the heating plants are of the reinforced concrete type.

Each division car house is provided with quarters for the following utilities:

Wreck and trouble wagons.
Track department section house and tool room.
Dry sand storage.
Salt storage.
Storage of summer and winter equipment, such as storm windows, screens, etc.
Stock room containing material and supplies required for the car-house maintenance work.
Advertising room.

INSURANCE

In the design briefly described above special attention has been given to protection against loss by fire and the results obtained have been very satisfactory, as you will note from the following:

COMPARISON STATEMENT—FIRE INSURANCE

		Premium	Rate
Total insurance	(1906)	$6,441,869	$64,418.60	$1.00
Total insurance	(1906)	7,432,413	61,024.40	.82
Total insurance	(1907)	9,660,000	65,688.00	.68
Total insurance	(1908)	9,775,000	58,650.00	.60
Total insurance	(1909)	10,300,000	51,500.00	.50

Increased insurance (1909), $525,000; decreased premium, $7,150.

CAMPAIGN AGAINST ACCIDENTS IN CHICAGO

Under the personal direction of its president, John M. Roach, the Chicago Railways Company has started an educational campaign for the purpose of decreasing accidents on its lines. The campaign will be carried on principally by means of a series of "caution bulletins" which are to be posted conspicuously in each end of all of the cars operated by the company. These bulletins will be directed to the public and will state briefly how dangerous accidents may occur and how they may be avoided. Several of the bulletins will be illustrated by large drawings calling attention to the accidents that are most common to passengers in getting on and off cars. The first bulletin posted was devoted to a few of the many "don'ts" with which it is especially desired that the patrons of the railway should become familiar. The text of this bulletin was as follows:

HELP US TO AVOID ACCIDENTS

Don't cross tracks without looking both ways for approaching cars.

Don't get caught in the narrow space between two tracks when cars are passing.

Don't fail when leaving a car to look up and down the street for an approaching automobile or other vehicle which may run you down.

Don't jump on or off a car while it is in motion.

Don't ride on car steps.

Don't get off facing rear of car.

Don't cross opposite track after leaving a car without looking for a car or vehicle which may be approaching from another direction.

Don't run after a car and jump on it while it is going at full speed.

Don't let your children play near street-car tracks.

The second bulletin is reproduced in the accompanying engraving.

The educational campaign will also reach the operating department of the company. It is proposed to educate the employees who have charge of the operation of cars so that at all times they will carefully look after the interests of passengers boarding or alighting from cars. This campaign will include lectures by the representatives of the various departments into which the railway organization is divided. As soon as the company's new car barn and depot at the "Limits" on the north side is completed, lectures on accidents will be given periodically for the benefit of the motormen and the conductors.

The campaign as outlined by the company is similar to that begun by some of the large city railway systems in the East, but the plan will be enlarged upon and it is expected later to use large display advertisements in the daily papers to keep the subject of accidents and the way to prevent them constantly before the public. On May 26, 1909, the following bulletin on accidents was sent to every motorman and conductor in the company's employ:

ACCIDENTS

A vigorous campaign against accidents has been started by the Chicago Railways Company. One feature will be the education of the public—men and women who ride on cars, who cross the streets without keeping a sharp lookout, and parents who carelessly permit their children to make a playground of the streets. But while many accidents are unquestionably due to the carelessness of the public, trainmen also must do their part in the campaign. Theirs is a great responsibility.

Constant care, concentration of your mind on your work, a sense of your responsibility to the company and, above all, a high regard for human life and limb and a strong feeling of humanity are essential on your part. We believe unquestionably our trainmen are humane men. They are undoubtedly deeply distressed whenever they are responsible for a dangerous accident. But being sorry is useless when it is all over. It will not restore a human life or mend broken bones.

TO MOTORMEN

The motorman's mind must be constantly concentrated on the movement of his car and his surroundings. You perhaps are a motorman on one of the big cars on Madison Street or Clark, or Van Buren, or Blue Island Avenue or some other line, or you may be taking the car through the down-town district. Don't let the monotony of the position



Caution Bulletin Placed in All Cars

make your mind a semi-blank. Keep your wits about you. Think of nothing but your car, the team on the track ahead of you or the one about to pull in at the next street crossing. Watch out for that woman who apparently is about to run across the track, or that little boy who is playing heedlessly in the street. You may have a wife or children of your own and they may be exposed some day to the same danger. Above all, strictly obey the rule against talking to passengers. You can't talk and keep your mind on your work at the same time. That's one of the frequent causes of accidents.

Ring your gong when passing a standing car or one that is slowing up to make a stop for the discharge of passengers. Ring the gong at all street intersections and keep a sharp lookout for pedestrians and vehicles. Run slowly in dangerous places.

Reduce your speed in time to prevent a rear-end collision with a wagon or another car on the track ahead. Never move your car without a signal from your conductor.

Don't run your cars at too great speed past vehicles which are in motion and which may deviate in their course when the car is about to pass just enough to catch a passenger who may be standing on the footboard.

TO CONDUCTORS

People have no business jumping on or leaving a car while it is in motion, but you must make every effort to prevent their doing so before you give the signal to go ahead. It takes but an instant to look along the side of the car just before you give the go-ahead signal to see if some belated woman with parcels, or perhaps a cripple, is hurrying to the entrance. Never let a passenger jump from the rear end of the car while it is in motion if you possibly can avoid it. Don't be too quick with your bell. It is desirable to expedite the business of the company, but not to the danger of passengers entrusted to your charge.

On the other hand, it may be that you don't always give the signal to stop quick enough. As a result the motorman may run past the stopping place. In this case don't let the passenger jump off until the next corner is reached. Impress upon him that it is dangerous. With the new pay-as-you-enter cars the rear-end or platform accidents should be entirely eliminated. Children never should be permitted to ride on the rear platform; neither should a person under the influence of liquor.

With the new, up-to-date equipment on most of the lines of the Chicago Railways Company there is no reason why the accident percentage should be greatly reduced. On a system with the finest cars that can be obtained, the best motors, controllers, air-brakes, sanders, etc., all of which are kept in first-class condition, with good power, good roadbed and track and splendid overhead construction which does away with practically all the petty annoyances that the trainmen at one time had to put up with, our conductors and motormen should be in a frame of mind that calls for the steadfast application of their work that ought to insure the operation of cars with but few accidents. Avoid any appearance even of carelessness, recklessness or inattention to your duty.

It has been announced that hereafter all trainmen shall be at least 30 years old before they are placed in charge of a car on this company's lines.

Edward Hungerford has contributed to the June *Outing* an article entitled "The Fellows Out Upon the Line," which has for its subject trainmen, engineers, firemen, track walkers and others who are directly concerned with the operation of trains. While it is distinctly a popular story, the article contains a number of features of general interest, and is remarkably well illustrated, the photographs having been taken by D. F. Urquhart, Jr. Mr. Hungerford says that one man in every 12 is on the payroll of a railroad, and that 96 per cent of these men are engaged in maintaining and operating the lines. He has divided his article under the following heads: "What is Required of Railroad Men?" "How Promotion Comes," "The Brakeman and the Trainman," "The Conductor," "Other Men of the Passenger Crew," "Service in the Railroad Outposts and the Station Agent," and has told under each of these headings what the duties of the men holding the posts are, and how the maintenance of schedules and avoidance of accidents are dependent upon the care which they exercise in performing their various functions.

The libel suit brought by John E. Carroll, of Philadelphia, against F. R. Low, senior editor of *Power*, was tried before a Philadelphia grand jury on May 13 and the editor was acquitted, the judge instructing the jury to find for the defendant. Carroll, it will be remembered, is the inventor of the CO_2 motor, which was described in *Power* for September, 1907, as being a "mechanical fake." Carroll himself is to be tried on several counts for obtaining money under false pretenses.

BOSTON ELEVATED RAILWAY COMPANY TRACK MAINTENANCE

Track maintenance of the surface lines of the Boston Elevated Railway Company is carried on by the road department under the general direction of a superintendent of tracks reporting to the vice-president. Plans for other than routine work in the department are prepared under the direction of the civil engineer, bureau of surface lines, and executed under the supervision of the superintendent of tracks. The number of men employed from time to time in the track department varies greatly. On large construction jobs it is sometimes necessary to employ 1000 to 1500 men. The nucleus of the track maintenance work, however, is a force of regular men attached to each of the company's surface line divisions, with the exception of the district in the business center of Boston. This district, officially known as Division 8, is maintained by the force with headquarters at the track department yards at Dorchester Avenue, South Boston. The size of the track maintenance forces varies according to the mileage and conditions in the different divisions, a fair average being 30 men per division, each division crew being under the immediate direction of a division track master responsible to the superintendent of the division, who is, in turn, responsible to the superintendent of tracks.

The work of the track department is confined mainly to the open season between April and December, only the most urgent repairs being made during the winter. The tracks in each division are subject to frequent inspection by the track master, and, at least once each month, the division superintendent, accompanied by the track master, makes an inspection of all track under his supervision and makes written report to the superintendent of tracks.



Case and Roller for Holding Blue Prints

At the Dorchester Avenue headquarters a large storage space is maintained by the company for rails, ties, plates, sand and other supplies, and a number of the company's stables are also located here. The machine work of the track department is handled by a shop in this yard. The tools are group driven by a 50-hp, 500-volt direct-current motor through line shafting. The principal tools of the shop are a Loring rail bender, separately driven by a 50-hp, 500-volt direct-current motor; a saw sharpener; Newton self-feeding rail saw; two grinder saws; emery wheel and two drill presses. The motors are boxed in to protect them against dust and metal particles, and the wiring is run in iron conduit. The saw sharpener is illustrated in the accompanying photograph. This consists of an emery wheel mounted in bearings on a shelf and belt-driven by the main motor countershaft. The saws used are 32 in. in diameter, and in the sharpener there is room

to place the saw close to the bench and out of the way when operating the emery wheel. A special arm and set screw are provided to keep the alignment correct, and at the side of the machine is a hand lever which advances the saw forward one tooth at a time when moved. A pawl is provided to keep the saw from slipping backward. At the side of the tool a pail is set up with a small faucet outlet, from which water is dropped upon the teeth of the saw to maintain the temper of the steel, which otherwise would be lost, due to the heating caused by the process of sharpening.

The rail bender consists of a table across which the rail to be curved is fed by hand, there being two posts against which the rail is set while it receives the thrust of a head driven by gearing from the motor. The travel of the head is regulated and adjusted by a hand wheel and screw mounted centrally in the machine at its end. Rollers are provided on each side of the table to facilitate moving the rail across the face of the machine. From the bender each rail is fed out on a pair of wooden horses fitted with rollers on their tops. After the rails have been formed they are hauled away by horses to the yard storage, or else transported directly by teams or service cars to the point where they are to be used.

In connection with the rail bending a template rack has been provided in the shop. This rack or cabinet is 30 ft. long, 8 ft. high and 2 ft. deep. It is equipped with sliding doors and ¾-in. pine pins 12 in. long and located 2½ in. apart vertically. The templates used are each 15 ft. long, and are made of white pine varnished. They are carried in the rack on five pins each. At the end of the rack is a list of curve radii corresponding to the templates stored in the rack, and in addition each template is marked with its radius, one curve being formed on each side of the template. The templates range in radius from 25 ft. to 1200 ft., larger or intermediate curves being measured by chords struck on the rail as it goes through the bender. The sizes are more numerous and closer together in the smaller ranges. The accuracy of the bending and speed of production have been increased by the use of the templates.

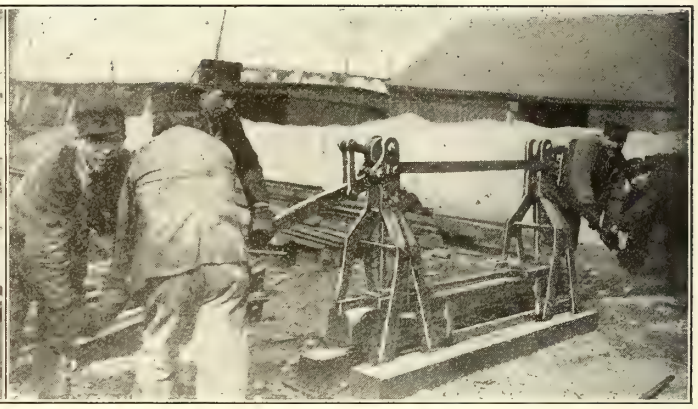
Another convenience at the shop is a blue print roller rack. This is about 4 ft. long, 2 ft. high and 6 in. deep, with a glass front and hinged door. Inside are two 2-in. rollers held 14 in. apart on centers. One roller is held by a spring and finger from slipping when set in any position, and the case is used for the display of the transition curve prints made by the engineering department which are used in the regular practice of the shop. By means of a handle at the side the rollers may be turned to bring any print desired in front of the observer, and a 32-cp incandescent lamp hung in front of the glass facilitates reading the drawings. By this means the standard drawings are consulted quickly, and at the same time are maintained in first-class condition.

The principal work done in the Dorchester Avenue shops consists of bending rails for new and old track, sawing rails for all purposes, repairing frogs and switches by utilizing short sections of old rail when possible, drilling for bonding, and maintaining ties and bonds. The tie treating plant is located at East Cambridge power station yard.

One of the most convenient tools at the Dorchester Avenue shops is a tie plater, shown in the accompanying photograph. This has a capacity for applying plates to about 220 ties per day, including handling. It consists of a pair of A-frames located above a level bed on which the tie is placed to receive the two plates. A gage of wrought iron is set upon each tie, and the tie is carried on the table, while the tie plates are slipped into position in exactly the right place through a rectangular enclosure at each end of the template. Pressure is then applied through a plate and lever rod at each end of the tie by the use of two levers about 6 ft. long, which are hand operated and which give the necessary pressure by a combined link and eccentric motion. The tie plates are firmly forced into the tie by this means, without hammering. The machine is operated by five men, one setting the gage on the tie and placing the tie plate in the gage, making the connections fast, etc., and the others working in pairs on the lever arms at the end of the machine. Two rollers are provided on the machine to facilitate moving the ties in and out of position, and these rollers are each equipped with a spring to force them upward when the pressure on the plates has been taken off.



Rail Saw Grinding Machine



Tie Plating Device in Storage Yard

The work at the Dorchester Avenue yard is under the supervision of a yard master, the force consisting of nine men in the shop and about eight men handling material in the yard. In general, in the track shop one man is assigned to the rail bender, one to the drill, one to the rail saw, and the others are employed as helpers. Two Wellington sand driers are in operation on the premises.

Bond maintenance is handled by the track force in each division under the instructions of the company's electrical engineer. When a track is repaired this force rebonds if a joint is broken, and on all new work follow the special instructions of the engineers.

The company has done a small amount of thermit joint welding during the past year, and an experimental wagon has been fitted up with motor-driven compressor, torch

and standard welding supplies required. By another year the company will have had a wider experience with this method of putting in joints.

THE PHILADELPHIA STRIKE

On Saturday, May 29, 2100 of the 6500 surface car men of the Philadelphia Rapid Transit Company went on strike in an attempt to force the acceptance of the following demands: Grievances to be adjusted between company officials and its employees, or by arbitration in important cases; privilege of purchasing uniforms anywhere; not less than nine hours or more than 10 hours within 12 consecutive hours to constitute a day's work, with time and a half for periods of more than 10 hours; regular wages, 25 cents an hour.

In reply to these demands the company stated that it could not afford to submit the management of its affairs to committees of employees, or, rather, of the union, and stated that it would treat with its employees only as individuals. The rule with regard to purchasing uniforms was necessary for the protection of the men themselves, as inferior goods were furnished by outside clothiers selling on credit at extortionate prices. The conditions involved in the practical operation of street railways in Philadelphia made it impossible to arrange the working time as desired by the carmen. As to the demand for 25 cents an hour, the management pointed out that the directors had voluntarily arranged to increase wages from 21 cents an hour to 22 cents an hour, beginning July 1. It could not go beyond this figure in view of financial conditions.

Of the 2100 men who went out on Saturday not more than one-third were members of the union. Many of the others who joined them were intimidated or feared violence and abuse. A great many of the older employees remained loyal to the company. Although the demands of the platform men were voiced as early as last December, the Philadelphia Rapid Transit Company did not anticipate that the threatened strike would assume serious proportions. No special efforts, therefore, were made to secure the services of strike breakers in advance. When the strike was declared, however, the employment bureau in Philadelphia was immediately thrown open and another bureau established in New York City. In Philadelphia ex-employees and other men are also being engaged at the rate of 180 to 200 a day, and several hundred experienced men from New York and vicinity have also been hired. The employees thus secured are not professional strike breakers, but are chiefly unemployed men who have applied for permanent positions with the company. That the great majority of them are experienced in the operation of cars is very evident to observers.

Several hundred men are quartered at the Lancaster Avenue and Forty-third Street car house, where a complete commissariat has been provided. The company has agreed to care for any man who is injured in the performance of his duty by strikers or others.

Owing to the ease in getting new men so rapidly and the number of loyal men, it was possible to operate 50 per cent of all cars on Saturday, 40 per cent on Sunday, 40 per cent on Monday and 60 per cent on Tuesday. It will be understood, of course, that the schedule demands for Saturday, Sunday and Monday were extraordinarily heavy on account of holiday business; in fact, the strike had been timed to come at the period most embarrassing to the railway management. Nevertheless, fully 516 cars were in service on Tuesday at 8:30 a. m. By 12:30 p. m. of the same day 615 cars were on the lines, and in the evening a total of 707. As on the previous nights, no attempt was made to operate cars after 8 p. m.

Despite the fact that the people of Philadelphia and the railway company are engaged in a controversy about the abolition of the six-for-a-quarter fare tickets, the strikers did not meet with much material encouragement from the public. It was apparent that the people were willing to ride wherever cars were placed in service. About the only visual evidence of a strike was an occasional "I walk" sign carried in the caps of boys or by striking employees in uniform. Many of the latter are selling newspapers and others are collecting money by playing street organs. During the first three days of the strike a large number of trucks were impressed to carry people for 5 or 10 cents each, but by Tuesday they were doing very little business. Most of the suburban traffic temporarily lost by the electric railway is being diverted to the steam railway lines, especially in the travel to Willow Grove.

The strikers have been cautioned by their leaders not to



Phila. Rapid Transit Co.

2d Vice President & General Manager's Office,
8th & Dauphin Streets.
Philadelphia, May 31st, 1909.

SPECIAL NOTICE TO MOTORMEN AND CONDUCTORS.

Any Motorman or Conductor in the employment of this Company who has been or may be injured as the result of any violence attendant upon the present strike, and who has notified the Company within 24 hours after being injured, will be cared for by the Company as long as he remains incapacitated.

CHAS. O. KRUGER,
2d Vice Pres't & General Manager.

Poster Placed in the Car Houses of the Philadelphia Rapid Transit Company

participate in any form of disorder. There have been a few slight disturbances here and there, incited by strike sympathizers, but in general the city is remarkably quiet. This must be ascribed largely to the prompt action of Mayor Reyburn in furnishing policemen for all cars and ordering that all saloons should be closed between the hours of 6 p. m. and 6 a. m. It has not been necessary to swear in any railway employees as deputies. By Tuesday conditions had become so much better that the saloons were permitted to remain open until 8 p. m.

Despite the most strenuous efforts on the part of the strikers, not a single employee of any other department of the railway company has left the service. Leaders of other unions have arranged for a parade on Thursday, June 4, mass meetings and the like, but there is little prospect that these will have any effect, as the company is securing all the men it wants, is enjoying sufficient police protection and is getting all the traffic it can handle. The leader of the strikers is C. O. Pratt, who in the past has incited strikes in Knoxville, Chicago, Dayton, San Francisco and other cities.

REPORT OF PENNSYLVANIA RAILROAD COMMISSION

The Pennsylvania State Railroad Commission has issued its annual report for the year ended Dec. 31, 1908. The commission states that it is co-operating with the Interstate Commerce Commission in an endeavor to secure the adoption of forms of accounts and reports for carriers subject to the jurisdiction of the commission which can be readily adapted to the needs of both commissions. The Pennsylvania commission expresses the opinion that the adoption of the uniform system of accounts would carry with it great benefits to the public, whose money is invested in the securities of these corporations. It is expected that the Interstate system can be used by the Pennsylvania commission "without substantial change, and with only such modifications as may be found necessary to confine the reports to the actual mileage and operations of common carriers in this State."

The street railway situation in Philadelphia and Pittsburg received considerable attention from the commission.

The number and variety of complaints as to the sanitary condition of the street railway cars, especially those used in interurban service, have induced the commission to propose joint consideration and action with the State Department of Health.

The commission adds that such orders and recommendations as it has already made affecting the operation of street railways have been complied with promptly, and have seemed to meet the approval of the public.

A number of recommendations are made by the commission. Among them is one that, in the interest of public policy, a law be enacted providing punishment for all who trespass upon the private right-of-way of any steam or electric railway in the State. The commission recommends that it be given additional power over the issue of securities by corporations under its jurisdiction. The report says on this subject: "How best to regulate this without appearing to place unnecessary obstacles in the way of new undertakings for the development of our rich resources and at the same time furnishing a reasonable measure of protection to the public against such increases of capital of our public service corporations as are improperly conceived has been carefully considered by this commission."

During the year 203 persons were killed on street railways, of whom 32 were trespassers. The number of injured was 4907, of whom 105 were trespassers.

FRENCH TRAMWAY STATISTICS

The report of the Minister of Public Works of France, covering the statistics of French railways for the calendar year of 1905, has just been published. In this report the tramways are divided into two classes, namely, Class I, which included those conducting a passenger, baggage and package business, and Class II, those which conduct a passenger business only.

The following statistics are presented:

	Class I	Class II
Number of lines	33	76
Length of line in operation in km	803	1,844
Number of passengers	214,587,056	657,117,421
Receipts, in francs	28,735,816	78,498,611
Number of employees	6,240	23,348
Number of cars	1,885	4,865

As regards motive power, 19 roads in Class I are equipped with electric power, 10 use steam locomotives, 2 employ horses, 1 is equipped with compressed air and storage battery cars, and one with steam and electricity.

CLOSED TYPE FEED-WATER HEATER

The Goubert Manufacturing Company, New York, has recently introduced its "Multipass" closed type feed-water heater made in sizes from 50 hp to 5000 hp. This apparatus is guaranteed to heat feed water from ordinary temperature to within 10 deg. of the temperature of the exhaust steam. As shown in the illustration, the heater consists essentially of two cast-iron water chambers connected by a cluster of small straight brass tubes, which in turn are inclosed within a cylindrical cast-iron shell extending from one water chamber to the other. The ends of the tubes are rolled into steel tube plates in the same manner as boiler tubes are rolled into the manifold. The cast-iron shell surrounding the tubes merely provides an envelope for the exhaust steam and is of larger diameter than the water chambers, to form an annular belt from which the steam may enter among the tubes from all directions.



Closed Feed-Water Heater

The exhaust steam enters the shell by the upper opening shown at the right, and what does not condense passes out the lower opening. That which is condensed on the tubes flows to the bottom of the shell and passes out through a drip pipe. It is a peculiarity of this construction that oil or grease in the steam is removed as in an oil separator and passes off with the drip, leaving the remainder of the exhaust steam in the best possible condition for heating systems and other purposes where live steam is sometimes used. In some closed heaters the steam is made to circulate inside the tubes, while the water is in the shell. In either case the water is forced by the pump through the apparatus as though it were but a part of the feed pipe. In the steam tube type, however, the mud and sediment tend to settle at the bottom among the tubes where they are difficult to remove, while scale that may form on the tubes is also difficult to get at. One great advantage of having the water within the tubes, as in this heater, is that the scale may be removed without taking down the heater, for by removing the top chamber the tube interiors can be examined and cleaned out with little difficulty. Any sediment which falls, either during cleaning or operation, goes down into the bottom of the lower water chamber from which it may be drawn out through the bottom blow-off openings. The greatest advantage claimed for the water-tube construction, however, is the multipass feature. There

are baffles so placed in the upper and lower chambers that the feed water entering at the bottom must travel back and forth through several sets of tubes and be subjected to the heat of the steam several times before it can reach the outlet at the top. In a 700-hp heater, for instance (handling 21,000 gal. of water an hour), there are 100 tubes each 1 in. in diameter and over 7 ft. long. The feed water must travel five times the length of these tubes in the path of the steam, which gives opportunity for absorbing the largest practicable amount of heat.

It is evident that the shell and brass tubes of a feed-water heater will expand to different lengths under the possible difference of about 150 deg. in temperature, and if the construction between the shell and upper water chambers were rigid the tubes would start from their fastenings, leak and render the apparatus useless. For this reason the Goubert heater is provided with an expansion joint between the upper chamber and the shell. The upper chamber is supported entirely by the tubes and left free to move up and down. The expansion joint is fitted with a flexible ring gasket composed of layers of soft copper and special packing with wire interwoven. The inner edge is clamped between the shell and an annular ring. The only purpose of this gasket is to prevent steam from escaping into the room, and as it is subjected to no other pressure than atmospheric, the gasket will last for years. Its renewal amounts to nothing more than the replacing of a cylinder-head or steam-pipe gasket. The vertical heater construction described is preferable, but for installations where there is not sufficient head room, as in the cellars of city buildings, a horizontal heater can be used.

A NEW ADJUSTABLE BRAKE

The accompanying illustrations show additional details of the Ackley adjustable brake which was briefly described in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1909. This brake is the invention of G. S. Ackley, president of the National Brake Company, of Buffalo, N. Y., and is of particular advantage for use on cars where, owing to the limited space, it is difficult or almost impossible to install any other gear brake. In the Ackley brake the drum is supported by a yoke which is bolted to a separate casting under the platform. Fig. 1 shows the top part of the brake as it fits under the floor, the brake staff being inserted in the hollow pinion at the right. A 3¼-in. hole is bored in the platform allowing the sleeve, which is a part of the frame base, to extend through the platform so that its top is almost flush with the surface of the floor. The pinion is journaled on this part of the frame. The bottom of the brake staff can be squared to fit the pinion without lathework or milling.

Fig. 2 illustrates the base and yoke. As this yoke can be attached at different angles the brake may be installed under the platform in any position desired or that the peculiar construction of the car demands. The entire brake can be dismantled by removing the two yoke bolts. Fig. 3 shows the shape of the winding drum with its roller bearing in position. The large part of this drum is designed to gather up the slack brake chain quickly and the smaller part to give power when applying the brake shoes. A variation of 2½ in. in the amount of slack chain wound on the large part of the drum can be obtained by removing one of the two bolts by which the chain is secured to the drum. Fig. 4 shows the pinion with its roller bearing which turns in the sleeve of the frame base, as mentioned before, thus leaving no chance for binding in the gears. This brake is made in three different gear ratios. The 18 x 30 and 14 x 34 are designed for single-truck and medium-weight double-truck cars, and the 12 x 36 for heavy double-truck cars. These different gear combinations are all interchangeable in the same frame.

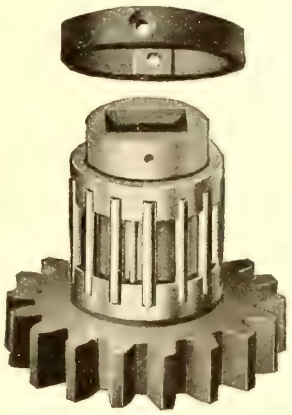


Fig. 4—Roller Bearing and Pinion

WEARING PLATES FOR TROLLEY FROGS

The Electric Service Supplies Company, Philadelphia and Chicago, has recently patented and is now manufacturing a form of wearing plate designed to be used in connection with overhead trolley wire frogs and crossings for the purpose of increasing the life of frogs. These plates are made of sheet steel and in various shapes to fit the pans of different designs of frogs and crossings. They are provided with lips which are turned over the edges of the pan so as to hold them in place. They protect and save the trolley frogs at those points which are subject to the greatest wear, due either to the pressure of the trolley wheel or to arcing. They do not affect the trolley wheel guides in any way, so that the efficiency of the frog is not impaired. They are readily attached, and can be easily replaced when worn out, giving the frog a much longer life.

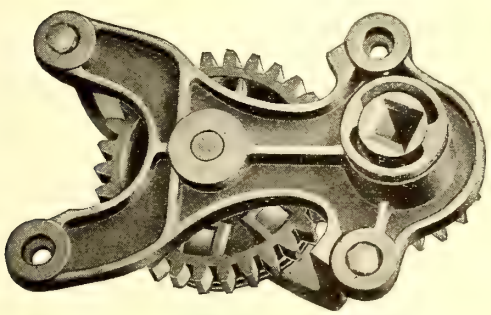


Fig. 1—Main Base Casting

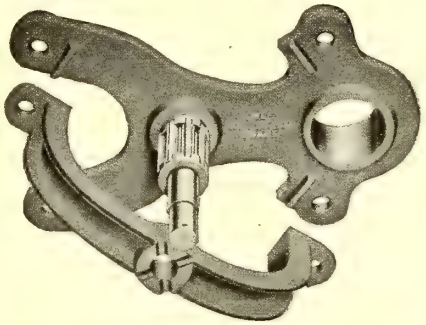


Fig. 2—Base and Yoke

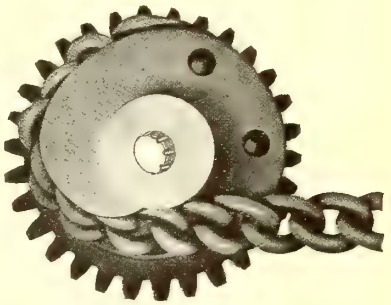


Fig. 3—Winding Drum

Work on the Pennsylvania Railroad tunnels and terminal station in New York City is progressing so rapidly that it is said trains will be running under Manhattan Island early in 1910. The area of the new terminal station is 28 acres, and it will contain 21,500 linear ft. of platforms between the 21 tracks.

LONDON LETTER

(From Our Regular Correspondent.)

The annual Budget presented by Lloyd George, Chancellor of the Exchequer, seems to have had a rather depressing influence upon the motor omnibus enterprise, as it proposes a very substantial tariff on petrol and to tax vehicles, though large rebates will be given to wagons used for commercial purposes. On the other hand, the underground railways conclude that with greater expenses before the motor buses a larger portion of the traffic will be secured by them. The underground railways of London, especially the lines of the Underground Electric Railways, are enjoying increased traffic, and the debenture stocks and preference shares of the company are almost unprocurable at anything like remunerative prices. Even the receipts of the lines of the Metropolitan District Railway, which has been part of the Underground Electric Railways since the property was electrified, are increasing week by week, and the ordinary shares of the company, which have not paid dividends for years, are being purchased by the public for investment. This progress is attributed to the methods of A. H. Stanley, general manager of the company. Trains are run more frequently and much more quickly, and an express service has been established, a thing that has been considered impossible heretofore. One has only to go into a tube to note the improvements that have been made. The dismal dark stations of the past are giving place to airy, well-lighted stations and convenient connections have been arranged where changes have to be made. The District Railway has the distinction of running trains of 10 50-ft. coaches, the longest electric train in the world. Now that steam and smoke have been eliminated advantage is being taken of the valuable sites which the company owns at Cannon Street and the Mansion House stations and at St. James's Park. At the last place an extension is being built to the general offices of the company.

So successful has the Bakerloo tube railway been that determined efforts are being made to pass the North West London Railway bill, which is a modification of a bill already granted. If enacted the measure will result in the construction of an extension of the Bakerloo tube from Edgware Road to Cricklewood and the northwestern suburbs. This extension is being promoted by the British Electric Traction Company, which owns the existing North West London Railway bill, though the railway would be operated by arrangement by the Bakerloo Railway. It would also involve the abandonment of the North West London Railway from Edgware Road southward to Victoria and also the abandonment of the small stretch of line from Edgware Road to Paddington, for which the Bakerloo Railway owns rights. Paddington was the original destination of this railway. Curiously enough, there is opposition to the construction of the new portion northward and to the abandonment of the portion to Paddington, as the Great Western Railway would undoubtedly have liked to see the Bakerloo tube extended to underneath its station.

John A. F. Aspinwall, the new president of the Institution of Mechanical Engineers, read at his inaugural address a paper on the electrification of railways in May. This paper was abstracted in a recent issue. It is gratifying to hear Mr. Aspinwall state that the electric line opened by his company from Liverpool to Southport has been an undoubted commercial success. The company has saved the immense amount of money which it would have had to expend on the enlargement of its station and has gained considerable new traffic. Generally his paper read to the effect that the "battle of the systems" had been responsible for a great deal of the delay, that at present no great benefit would be derived from the general electrification of main railways, but that many of the suburban railways in the vicinity of large cities might undoubtedly be electrified to great advantage.

The City of York has not yet settled its tramway problem, though in a recent poll there was a majority in favor of municipalization. More recently the tramways committee decided to recommend the City Council to accept the tender of Dick, Kerr & Company for the reconstruction of the permanent way and equipment, including cars, but at the meeting of the City Council to consider this recommendation action was postponed until the June meeting of the Council, as labor representatives have objected to the work being done by an outside contractor. It is to be hoped that the Council will carry the recommendation of the committee, as experience has shown that cities cannot do their own construction work as economically and expeditiously as private contractors who are specialists in their respective lines.

An effort was made recently in Manchester to secure halfpenny tram fares, but the tramway committee has decided against any such innovation, Mr. McElroy, the general manager of the tramways, stating that any attempt to introduce halfpenny passengers at the expense of the penny passengers would end in financial disaster, and that the risk of turning the surplus into a deficit by any such means is too great. It is suggested that letter boxes should be put on the last cars to Manchester from outlying districts where there is no late postal collection, but no action has yet been taken. A car thus equipped runs every night from Fleetwood to Blackpool, the letter box being fastened on the back of the car. The postman meets the car at Blackpool and collects the letters and they are distributed in Manchester and elsewhere the following morning. In the ordinary course letters posted at night in the districts served by the postal car would not be collected for distribution until the following morning.

The formal inauguration of the new electric tramway service at Rawtenstall took place during May. The construction cost was more than £120,000. The line will shortly be extended to Bacup at an additional cost of about £25,000.

The King and Queen are to visit Lancashire in July, and as a review is to be held at Worsley on that occasion, the possibility of utilizing tramcars for mobilization of the territorial troops has been the subject of a conference in Manchester between officers of the territorial force and representatives of the tramway undertakings in the district. Between 12,000 and 13,000 troops will assemble, and of these about 3000 will be transported by tramcar from the various East Lancashire towns.

The London County Council has issued about £2,250,000 of new 3½ per cent stock at 102, the issue being greatly oversubscribed. The money will be used for extending the electric tramways, work on which is steadily proceeding.

"Studs" is a familiar term to the Londoner and the word has really become a political war cry between the Moderates and the Progressives and will undoubtedly be used a great deal in the next London County Council election. The work of pulling up the studs of the surface contact system, the abandonment of which was noted in my last letter, has begun and it will not be long before all tangible reminders of the unfortunate experiment will no longer be visible. The London County Council is being savagely attacked for its action in connection with this matter, it being pointed out that Mr. Mordey, the electrical expert retained to report on the system, reported in favor of certain modifications.

Mr. A. L. C. Fell, of the County Tramways, recently gave evidence before a select committee investigating the Daylight Saving bill. Mr. Fell's contention is that the bill would increase the number of passengers because people would have longer evenings to spend in recreation. He contended that 25 per cent of the total number of cars lying idle in the depots would be employed for 123 hours and that this would mean from £6,000 to £7,000 per annum. The bill would also tend to decrease working expenses by reducing the charges for light in cars and workshops.

The work of adapting cars for use in connection with the proposed through service between Leeds and Bradford is approaching completion. It will be remembered that in order to overcome the difficulty presented by different gages of the Leeds and Bradford lines a movable axle was invented, and it was recently stated at a meeting of the tramways and electricity committee of the Leeds Corporation that the two corporations now own a sufficient number of cars fitted with these movable axles to provide for a 10-minute service.

At a recent meeting of the Birmingham Tramways committee a deputation from the Trades Council urged the advisability of the committee building its own car bodies, as is done in other large towns instanced by the deputation. The matter was referred to the consideration of a subcommittee. As a result of the report the committee decided that it could not adopt the suggestion.

The Halifax Corporation Tramways committee has decided to try for three months the system of issuing return tickets for short-distance journeys on the tramways. By this system a passenger will be able to make a short journey of about half a mile, and the purchase of a penny ticket will also cover the return journey.

The Chorley & District Tramways, Ltd., is being formed to construct and equip tramways connecting Chorley with Preston, Bolton, and Horwich, thus serving a population of over 490,000 people. The share capital is £300,000, divided into 50,000 7 per cent cumulative preference shares of £4 each at par, 3000 preferred ordinary shares of £10 each, 7000 ordinary shares of £10 each and first-mortgage 5 per cent debenture stock £160,000.

As the result of prolonged discussion on the electrification of the existing horse tramways the corporation of Oxford has resolved to adopt instead of an underground system of electric traction, as provided by the Act of 1907, a combined system of conduit and overhead traction.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

Public sentiment in Cleveland has crystallized into an intense desire to have the traction muddle settled. People understand that they are gaining nothing by a continuation of the eight years' controversy over rates, franchise features and city control. Tracks have become dangerous on many lines, cars are worn and rickety, and so few are they in number that the schedules are nothing like sufficient to give the service that is needed by the city. Consequently, the business men, the industrial workers and the people at large have united in a demand that an end be put to further parley and a settlement be reached at once. This demand took the shape of a request that Judge Robert W. Tayler of the United States District Court formulate his ideas of a settlement for the guidance of the negotiators in terminating the series of public meetings in which they have engaged and making an agreement. Judge Tayler, realizing that the people of the city are in earnest in demanding that something be done, yielded, and on May 27 issued a statement of his ideas, in which he said:

"I am of the opinion that every necessary requirement of the situation can be met with a maximum rate of fare of seven tickets for 25 cents, 1 cent for transfer with no rebate and 5 cents for single cash fare, the 5-cent single fare to cover also the cost of transfer. I do not think this rate of fare will ever be put into effect under the present or any conditions now foreseeable. If, in order to finance the necessities of the company it should become necessary to raise the maximum rate of fare, I am sure the Council, in the interest of the community, will very promptly pass an ordinance, which, while not giving an additional cent to the stockholders of the company, would minister to the advantage of the community.

"With the provisions of the Baker draft of ordinance providing for a dividend fund, the initial rate of fare ought to be 3 cents single fare and 1 cent for transfer with no rebate.

"The valuation of the property ought to be determined in one of two ways: either (1) by taking the Johnson-Goff valuation of last year; or (2) by an expert impartial arbitration.

"I am not, however, the advocate of any unjust or burdensome valuation. If it clearly appears that the valuation put upon the property by Mr. Johnson and Mr. Goff is excessive, then there ought to be a revaluation by impartial arbitrators, although I hesitate to take the chance of having the arbitration result in an increase of the valuation.

"If it be said that the valuation may be arrived at in some other way, I answer that that has been tried. Four months or more were devoted to it last year. It was agreed to then. What right have we to hope for a better fate as a result of new negotiations? The effect of fixing a valuation upon which an ordinance is passed is to substantially appropriate the property of the Cleveland Railway to a public use; that is, to permanently devote it to the use of the community at a fixed rental.

"The Baker ordinance provides that if the franchise is not renewed within 10 years after its date the company may charge the maximum rate of fare and distribute among its stockholders the surplus thus produced. It also relieves the company from special supervision by the Council. I disagree with both Mr. Johnson and Mr. Andrews on this point. In my opinion, when, after 10 years, a new franchise not having been granted, the company charges the maximum rate of fare, the surplus that would thus certainly be created ought to be used to wipe out capital value; so that, when the Council does renew the franchise, as it doubtless would before the expiration of the final 15 years, the cost of service will be then reduced according as the interest charge is reduced by the reduction of capital value. I think, also, that there ought to be, during the entire life of the franchise, a supervision by the city of accounting and operation.

"The right of Council to nominate a purchaser is one of the most valuable provisions to be incorporated in the franchise, since it gives opportunity to the city, without jeopardizing the investment, to obtain better terms if they can be obtained. The right ought not to be exercised earlier than 10 years from the granting of the franchise. Whatever ordinance is passed must be submitted to the people at a referendum election."

President Andrews of the Cleveland Railway was in New York at the time Judge Tayler's statement was issued. Although expressing the fear that the initial fare is too low and that the maximum is not high enough to attract the money that will be needed to rehabilitate the system, he said that he is willing to accept Judge Tayler's suggestions without qualifications of any kind. Mayor Johnson, also in New York, received the text of the statement in full by wire, but refused to commit himself, stating that he would not talk except in a public meeting before the City Council. In almost all respects except as to the time suggested for the city or its nominee to exercise the option of taking over the property, and perhaps limitations in the manner of control the city shall exercise over the operation, the terms suggested coincide with the views the Mayor has been expressing all along.

At a meeting of the Council committee of the whole on May 24 the subject of placing certain points before Judge Tayler for decision was discussed. President Andrews of the Cleveland Railway presented another resolution of the board of directors, proposing that all disputed points be laid before Judge Tayler and that both sides agree in advance to abide by his decision. The points regarded as open by the company were as follows: Form of ordinance, valuation, miximum rate of fare, initial rate of fare, right of the city to name a purchaser, and when; liability of the city for bonds, if the city purchases the property; allowance for operating expense, including maintenance and renewal reserve and accident reserve; character and extent of the city's supervision and regulation. A resolution was adopted by Council that the initial and maximum fares should not be presented to Judge Tayler for consideration. President Andrews said he did not see how any headway could be gained by presenting questions to Judge Tayler if the main contention was omitted.

At the regular meeting of the City Council on the same evening a franchise providing for a grant to Herman J. Schmidt on Payne Avenue was presented. The bids of the Cleveland Railway were referred to the street railway committee. Although Schmidt made a bid for Clark Avenue, also, only Payne Avenue was included in the ordinance. This indicates that all the rights that Schmidt will need for some time to come will be treated as extensions from Payne Avenue. Such extensions do not require consents of owners of abutting property. However, all franchise grants must be submitted to a referendum vote, and this is the great stumbling block in the way of further experiment. The Schmidt ordinance contains no safeguards, such as were included in the original 3-cent grants. It merely gives him the right to build and operate a line on Payne Avenue, without requirements for transfers and practically without other restrictions. Mayor Johnson explained that this was done to avoid legal entanglements, and that all conditions would be entered in the final contract or whatever arrangement he sees fit to make with Mr. Schmidt. The question of Schmidt's ability financially did not enter into the matter.

On the evening of May 29 the Cleveland Chamber of Commerce, with one dissenting vote (that of City Solicitor Baker), adopted a resolution requesting Judge R. W. Tayler to write a complete franchise ordinance, embodying his views both as to the main points and the details.

Judge Tayler's statement was introduced at the meeting of the Council on June 1. Mayor Johnson insisted that it might be easy to settle the street railway matter under the plan proposed by the judge, if only disputed points are submitted to arbitration. Mr. Andrews asked that all points in the valuation be taken up by the arbitrators if anything is submitted to arbitration. Judge Tayler indicated that he meant that the valuations made by Mr. Goff and Mayor Johnson a year ago be accepted or that the whole matter be reconsidered. He favors a settlement on the basis of the valuations already made, however.

On the evening of June 1 the Council refused to accept Judge Tayler's maximum fare plan. Judge Tayler then said he would assume no further responsibility in the matter.

Transit Affairs in New York

As soon as it had been informed that Governor Hughes had affixed his signature to the Travis-Robinson bill, designed to amend the Rapid Transit law so as to permit of the construction of rapid transit lines by private capital, the Public Service Commission sent letters to the Interborough Rapid Transit Company, the Brooklyn Union Elevated Railroad, the Amsterdam Corporation, the Bradley-Gaffney-Steers Company and the Continuous Transit Company, all of which have recently made propositions to the commission for consideration. The communication to the Interborough Rapid Transit Company explained in detail

the reason the recent propositions submitted by the company could not be accepted by the commission, with the exception of the plan to lengthen the platforms of the present subway stations, which is now being gone over by the chief engineer of the commission. It further called the attention of the company to the action of the Governor and asked that any propositions that the company may have to offer and that the commission can consider under the amended law be submitted immediately. It also invited a proposition for the utilization of the Steinway tunnel to Long Island City. The letter to the Brooklyn Union Elevated Railroad asked that company to submit any plans it may have in mind, including those relating to Manhattan. The Amsterdam Corporation was asked to submit any plans for the interterminal belt line that may be considered under the law. The Bradley-Gaffney-Steers Company was asked to submit a formal bid in accordance with its recent communication. The Continuous Transit Securities Company was asked to forward any proposals it wished to have the commission consider that will come under the amended law.

All of the companies to which the Public Service Commission addressed communications replied to the commission within a few days of the receipt of the letter. The Interborough Rapid Transit Company proposed a modified plan calling for the construction of a $100,000,000 subway to connect Brooklyn, Manhattan and the Bronx. E. W. Winter, president of the Brooklyn Rapid Transit Company, which controls the Brooklyn Union Elevated Railroad, called on Chairman Willcox, of the commission, in person and discussed transit development in Brooklyn. While nothing official has been announced regarding this conference, it is understood that Mr. Winter for his company will submit plans calling for the expenditure of $20,000,000, especially as Mr. Winter outlined improvements recently in Brooklyn which his company contemplates, as noted in the Electric Railway Journal of May 8, 1909, page 885. The Bradley-Gaffney-Steers Company asked that it be permitted to delay for a few days in order that some changes in its plans might be perfected. The company at first intended to build a subway in Lexington Avenue which would connect with the Brooklyn loop subway and go south only as far as the Brooklyn Bridge. The commission has asked the company informally, however, that it conform as closely as possible to the route laid down by the commission in the Broadway-Lexington Avenue subway. In accordance with this request, the company has decided to make its southern terminus the Battery. William J. Wilgus, president of the Amsterdam Corporation, which planned both freight and passenger elevated and subway lines, said that his company had already anticipated the signing of the bill, and that Edward M. Shepard, counsel for the company, had written to Chairman Willcox, stating that the company was anxious to proceed and suggesting several points for mutual discussion. Max E. Schmidt, president of the Continuous Transit Securities Company, said that his company would renew its proposition for a moving platform under Broadway from Fourteenth Street to Forty-second Street within a few days.

The special committee of the Board of Estimate appointed to consider the proposed extension of the Hudson & Manhattan Railroad from Thirty-fourth Street and Sixth Avenue to the Grand Central Station, which has already been approved by the Public Service Commission, decided on May 27 to send the matter back to the commission for further consideration. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, said he desired to have the Hudson & Manhattan Railroad specify the exact location of its stations on Forty-second Street so there might be no possibility of interference with future extensions of the present subway.

The receivers of the Metropolitan Street Railway have been granted an extension of time by the Public Service Commission in which to equip their cars with fenders or wheel guards of approved design. The time originally set was Aug. 15. Now it has been made July 15 for 500 closed cars and Oct. 15 for all cars. The receivers desired the extension so that they might complete comparative tests of different types of wheel guards and fenders.

F. W. Whitridge, receiver of the Third Avenue Railroad, has sent letters to Comptroller Metz and to Corporation Counsel Pendleton protesting against the proposed sale of the properties of the Third Avenue Railroad on June 5 for non-payment of special franchise taxes. Mr. Whitridge rehearsed his negotiations with the city authorities, in the course of which he offered to settle the unpaid special franchise taxes for the lump sum of $1,000,000, the representative of the Corporation Counsel estimating the amount at $1,250,000. Just now negotiations are suspended pending the decision of the Court of Appeals on the Jamaica Water Company case, and Mr. Whitridge thinks it both improper and futile to attempt to hold the tax sale under the existing conditions.

Circular on Selection and Training of Employees

The committee on training of transportation employees of the American Street & Interurban Railway Transportation & Traffic Association has sent to the general managers of member companies Data Sheet No. 39 on the selection and training of employees. The committee's recommendations are given covering various points and the companies are asked to fill in the blanks giving their practice and to state in particular cases why they have adopted a standard which differs from that of the committee. The committee's recommendations follow:

SELECTION OF THE EMPLOYEE.

Age limit of conductors—21 to 40 years. Why different?

Age limit of motormen—21 to 40 years Why different?

Weight limit of conductors—minimum, 130 lb.; maximum, 200 lb. Why different?

Weight limit of motormen—minimum, 150 lb. Why different?

Height limit of conductors—minimum, 5 ft. 6 in. Why different?

Height limit of motormen—minimum, 5 ft. 6 in. Why different?

Do you prefer men having previous electric railway experience, or men without experience? Men with previous experience be employed, provided that such experience is in the same class of service as that applied for, and that previous record is entirely satisfactory. Why different?

Do you prefer country or city bred men? Country bred men, especially for interurban service. Why different?

On interurban service do you favor employing men of steam railroad experience? Men without steam railroad experience. Why different?

Do you employ other than Americans? If so, what nationalities? No distinction other than all employees be American citizens, excepting as to negroes, Chinese and Japanese, the employment of whom is not recommended. Why different?

What information required from applicant, and how verified? Use of standard forms as submitted in report, particular attention being called to the form of release and the furnishing of photographs. Why different?

Do you have vision, color, hearing and physical tests? Standard forms as submitted be used in these examinations. Why different?

TRAINING OF THE EMPLOYEE.

(*a*) After applicant has been accepted, what is the next step, if he is to be a motorman?

(*b*) If he is to be a conductor?

(*c*) Do you give motormen shop experience?

(*d*) If so, how much?

(*e*) Do you allow compensation while in shop?

(*f*) Do you have training school with dummy car?

The committee recommends that after acceptance the applicant be given a talk by the head of the transportation department or delegated official on the duties of the position that he is about to assume. It recommends that before permitting applicant to go out on the road it is advisable to give him a certain knowledge of the handling of control and other apparatus, either by means of a service car in the barn or shop, or on an instruction car fitted up for that purpose. Why different?

Do you require a certain length of time to be spent by the student on the car, or is it left to the discretion of the instructor? It is recommended that the length of time with the instructor should be left to the discretion of the instructor and the ability of the applicant to pass subsequent examination. Why different?

(*a*) Do you give new employees an examination? (*b*) Is it oral or written? The committee recommends examination to be both written and oral. The written to cover all essential points on rules of operation, and that this be retained as part of the employee's record. Why different?

Where joint city and interurban service is operated, do you work extra men on both city and interurban lines? Service should be separately operated. Why different?

In city service, after trainmen have been taught their duties and turned in, do you employ traveling instructors to follow up new men? It is recommended by the committee that traveling instructors be employed to follow up new men. Why different?

What educational work are you carrying on among men already in the service? The committee deems it advisable and to the interest of the companies' service to take up educational work for the men, through meetings with the men, conducted by the transportation department, at which talks should be given by the master mechanic, claim agent, auditor and others, on the different subjects pertaining to their respective departments, in which the transportation department has to co-operate or execute. The committee feels that one of the greatest means of reaching and maintaining high efficiency among employees is through "follow-up" work along educational lines, and that the mental and moral development of the man should go hand in hand with his training as a transportation employee. Why different?

What method of discipline do you recommend? The committee, after careful consideration of the various methods of discipline and with knowledge gained through actual operation of the merit and demerit system, recommends it as being the best form of administering discipline, on account of its taking notice of minor infractions of rules which otherwise would not be made subjects of discipline, and also because of the fact that it makes possible commendation of good work on the part of the employees; it affords as well a complete and accurate record of the employee's work in every particular and is of great value in determining standards of efficiency. Why different?

Niagara Gorge Railroad Resumes Service

The Niagara Gorge Railroad at Niagara Falls, which was submerged with ice to a depth varying from a few feet at the Whirlpool to 25 and 30 ft. at the lower end of the Gorge near Lewiston, the result of an unprecedented ice jam last month, was restored to a condition permitting service to be resumed on May 23 on the outer track. Work is rapidly progressing on the clearing and restoration of the inner track, but ice has still to be cleared from a section of the inner track about 2 miles long near "Giant Rock" in the central portion of the route. It is expected, however, that this section will be complete by June 15, and the full service will then be restored. Meantime sufficient space for passing sidings has been cleared in this portion.

Cars of the Niagara Gorge Railroad were forced to stop running at 4 o'clock p. m. on April 8, the day on which the

ice jam started, owing to the encroachments of the ice upon the tracks, and cars were not run from that time until May 23, except between Niagara Falls and the Whirlpool at the entrance to the lower gorge. The jam rose rapidly on April 8 and April 9, and remained practically stationary until April 16. Then it commenced to subside, and men were placed at work to restore the road. On April 18, however, a second rise in the ice jam commenced, which lasted a number of days, and reached a greater height than the first, 60 ft. being the height in some places below Lewiston Suspension Bridge and 30 ft. to 40 ft. on the roadbed near Lewiston. After the accumulated jam at the mouth of the Niagara had been dynamited by the New York State authorities the flood and ice began to recede again, and on April 22 a force of 100 men was set to work to clear the roadbed of the wall of ice piled upon it and the force was gradually increased by Bert T. Jones, general manager, until 315 men were employed, all that could be worked to advantage. Results were attained rapidly, considering the thousands of tons of ice upon the roadbed and the large quantities of loose rock and earth scoured out of the cliff back of and above the tracks by the movement of the ice and deposited on top of the ice wall and lodged over the roadbed and tracks.

When the ice had been removed it was found that comparatively little damage had been done to the tracks, guard rail and roadbed. As explained by George A. Ricker, chief engineer of the company, this was due to the fact that the road was built almost entirely upon solid rock, the rails being held in place by the weight of the ice wall packed over the roadbed and protected from the rush of the current. The track required only the lining up and reballasting of such portions as had not been seriously disturbed and the laying of new rail in the few places, mostly adjacent to culverts, where the roadbed had been twisted out of place by the action of the ice.

Precaution has been taken when the danger from overflow of ice seemed imminent to cut the feed cables into sections and haul them up on the bank out of reach of the jam, so that in the reconstruction of the line there was not a great deal of expense for material for overhead work except for poles. The principal portion of the expense of restoration was for labor in removing the ice. The management estimates the total expense at about $18,000. The road was able to take care of the large crowds at the Falls from Canada to celebrate the Queen's Birthday, or "Victoria Day," May 24, the day following the reopening, notwithstanding that only one track was in service. Herbert P. Bissell and Bert L. Jones celebrated a formal reopening of the line on May 27 by a trip of inspection over the road, accompanied by a party of newspaper men as invited guests in the company's private car "Ondiara."

Decision in Des Moines Franchise Case

The Supreme Court of the United States has handed down an important decision as the result of an injunction secured by the Des Moines (Ia.) City Railway to restrain the city from enforcing a resolution adopted by the Council of Des Moines, which directed the company to do certain work. Questions were raised by the City of Des Moines regarding the right of the Des Moines City Railway and the Inter-Urban Railway to maintain and operate their lines, and as it was deemed essential to determine the questions involved as speedily as possible, the City Council ordered the companies to remove certain specified tracks and to restore the street. The Circuit Court of Iowa granted an injunction to the company against the enforcement of the resolution, and the case was appealed to the United States Supreme Court. The opinion of that court as delivered by Justice Holmes, says in part:

"This is a bill brought in the Circuit Court by an Iowa corporation against a city of Iowa. The ground of jurisdiction is that a resolution of the City Council of that city is a law impairing the obligation of contracts within the meaning of the Constitution of the United States, and if carried out will take the property of the corporation without due process of law, contrary to the Fourteenth Amendment. The Circuit Court granted an injunction against the enforcement of the resolution, and the defendant appealed to this court.

"The plaintiff, the appellee, sets up, under a certain ordinance, a right unlimited as to time to construct, maintain and operate an electric street railway in and over the streets, alleys and bridges of Des Moines. The resolution of the city alleged to impair these rights.

"We are of opinion that this is not a law impairing the rights alleged by the appellee, and therefore that the jurisdiction of the Circuit Court cannot be maintained. Leaving on one side all questions as to what can be done by resolution as distinguished from ordinance under Iowa laws, we read this resolution as simply a denial of the appellee's claim and a direction to the city solicitor to resort to the Courts if the appellee shall not accept the city's views. The resolution begins with a recital that questions as to the railway company's rights have been raised, and ends with a direction to the city solicitor to take action to enforce the city's position. The only action to be expected from a city solicitor is a suit in court. We cannot take it to have been within the meaning of the direction to him that he should take a posse and begin to pull up the tracks. The order addressed to the companies to remove their tracks was simply to put them in the position of disobedience, as ground for a suit, if the city was right."

Program for Meeting of Central Electric Accounting Conference

The following call has been issued for the next meeting of the Central Electric Accounting Conference:

"The ninth meeting of the Central Electric Accounting Conference will be held in Columbus, Ohio, Saturday, June 19, 1909, at 12:30 p. m., in the general offices of the Scioto Valley Traction Company, corner of Third and Rich Streets.

"The following subjects have been listed for discussion and all members are requested to come to the meeting prepared to discuss them:

"1. Difficulties experienced in handling the classification of operating expenses prescribed by the Interstate Commerce Commission.

"2. Traffic statistics—their preparation and use.

"3. Pay rolls, time keeping, and the best methods of paying employees.

"An address will be delivered by P. V. Burington, secretary and auditor of the Columbus Railway & Light Company, on an appropriate subject.

"Robert N. Wallis, president of the American Street & Interurban Railway Accountants' Association, has signified his intention of attending this meeting, and all members are urged to be present in order to meet Mr. Wallis personally and to show their appreciation of the interest he has taken in the conference.

"It was found necessary to change the date of this meeting from June 12 to June 19 on account of the inability of a number of members to attend on June 12, the date originally set.

"All officials of electric railway lines, both city and interurban, are invited to be present at this meeting, as it is thought that the meeting will prove of interest to all present.

"Please notify the secretary of your intention to be present at this meeting, so that before the date of the meeting he will know how many members will be present.

"M. W. GLOVER, President.

"C. B. BAKER, Secretary."

Association Meetings

Pennsylvania Engineers, Harrisburg, Pa., June 9, 10 and 11.

Canadian Electrical Association, Quebec, Que., June 16, 17 and 18.

American Railway Master Mechanics' Association, Atlantic City, N. J., June 16, 17 and 18.

Master Car Builders' Association, Atlantic City, N. J., June 21, 22 and 23.

Street Railway Association, State of New York, Lake George, N. Y., June 29 and 30.

American Institute of Electrical Engineers, Thousand Islands, June 28, 29 and 30.

Colorado Light, Power & Railway Association, Denver, Col., during the week of Oct. 11-16.

American Street & Interurban Railway Association and affiliated associations, Denver, Col., week commencing Oct. 18.

Lunch Room for San Antonio Employees.—J. J. King, general superintendent of the San Antonio (Tex.) Traction Company, has fitted up a dining-room for employees by the company at its barn and has readjusted the shifts of the men so that they have an increase in time for meals.

Catalog of Wheeler Gift.—The illustrated two-volume catalog of the Wheeler Gift of books, etc., to the American Institute of Electrical Engineers, edited by William D. Weaver, which is the most complete list of electrical books ever prepared, is completed. Information of the method of securing copies can be obtained from the secretary of the Institute.

Special Train to Car Builders' and Master Mechanics' Convention.—To accommodate delegates to the annual

convention of the Master Car Builders' Association, and the American Master Mechanics' Association at Atlantic City, the Central Railroad of New Jersey will run a special train leaving New York (West Twenty-third Street) at 3.20 p. m., Tuesday, June 15. Those desiring to travel on this train should notify Wm. McIntosh, S. M. P., Central Railroad of New Jersey, at Jersey City.

New Line Opened Between Hartford and Middletown, Conn.—The Connecticut Company opened its line between Hartford and Middletown, Conn., on May 25. The road is 16 miles long and the running time between the two cities is 1 hr. 15 min. The fare between the cities is 25 cents, and the fare zones are as follows: Middletown to Cromwell, Cromwell to Rocky Hill, Rocky Hill to Griswoldville, Griswoldville to Wethersfield, and from Wethersfield to Hartford.

Street Railway Conditions Here and Abroad.—G. J. Clark, of the Toronto (Ont.) Railway, was the guest of the Progressive Club, of Toronto, on a recent occasion when it considered civic and political questions. Mr. Clark took for his subject "Public Franchises." He contrasted returns to the city of Toronto under the contract between it and the company with the results attained in England under municipal ownership, and showed clearly how Toronto benefited by its contract with the city without the risks which follow an adventure into municipal ownership. He said that serving the public is precarious at the best, so many variable factors enter into the problem, and that in order to secure capital for investment the guarantee is essential that the property after development will not be confiscated, either directly or indirectly.

Fire Insurance Rates Discussed in Boston.—After one of the most spirited meetings in its annals the New England Insurance Exchange recently declined to adopt by a tie vote, 64 to 64, the resolutions submitted requesting it to relinquish jurisdiction over the rates and rules governing electric traction, lighting and gas properties in favor of a central rating committee. The attendance was the largest on record. Every member present, including President Rice, voted. A copy of the resolutions being offered in this and other exchanges on the subject of fire-insurance rates was published on page 827 of the Electric Railway Journal for May 1. In the case of the New England exchange, the majority report was presented by George Neiley, of the Royal Insurance Company, and the minority by Frank H. Battilana, of the Pennsylvania Insurance Company.

Public Utilities Commission in Canada.—The Province of Quebec has passed an Act authorizing the appointment of a Public Utilities Commission to have a surveillance of all public utilities. The bill defines a "public utility company" as "persons or organizations whose business is subject to provisional authority, with their lessees, receivers, etc., who possess, exploit, administer or control a system, plant, or appliances for transmission of telegraphic or telephonic messages or for transport of passengers or freight on a railway or tramway, or for production, transmission, delivery or sale of heat, light, or motive power, directly or indirectly, to or for the public." In matters of fact the commission will be absolute, while on questions of law or of jurisdiction there may be an appeal to the Court of King's Bench. The commission will be composed of three members appointed for a term of 10 years. It will have power to regulate all questions relating to the expropriation of private property by public utilities companies, including the power to fix the compensation. It will have authority to grant a public utility company the right to build within a municipality and will control all matters relating to extensions by companies, and all questions arising between a public utility company and a municipality in regard to furnishing heat, light, etc., to the citizens, including the fixing of rates.

Hearing on Boston & Western Electric Railroad.—The Massachusetts Railroad Commission gave a hearing recently at Boston on the petition of the Boston & Western Electric Railroad for a certificate of exigency to build a high-speed double-track interurban electric railway between Waltham and Marlboro. Samuel L. Powers represented the company, and Henry Durkee, Springfield, testified as its engineer. The line will cost about $1,522,000, including a power plant investment of $116,110, the total single-track mileage being 40 miles. With the exception of three grade crossings located where a combined abolition of steam railroad, electric railway and highway crossings will be necessary, the line will cross no steam railroad at the same level. The main line will be almost entirely on a private right-of-way. W. N. Buffum, Boston, counsel for the opposing interests, requested the board to refuse to give the company a hearing at this time, arguing that the dismissal of two previous petitions within the past year constituted a refusal to grant the certificate of exigency. One petition was dismissed at the request of the company on account of a change in the directorate, the commission stating that this action was taken without prejudice in the case. The second petition was dismissed by the commission on account of an informality in the company's advertisement of its articles of association. Chairman Hall asked the counsel for the opposition if the spirit of the law forbidding a company to reappear within a year after the refusal of the board to grant a certificate did not require that the board should first investigate the whole proposition from the standpoint of whether additional transportation facilities are needed; and ruled that the commission had not refused to grant the certificate and that the company is properly before the commission. The next hearing will be held in June, unless the opposition stops the proceedings temporarily through the courts.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The House has passed the following bill: "Section 1. Whenever the Railroad Commissioners deem it necessary, in the interests of the public, that any or all of the cars operated by any street railway upon any highway in this State shall be equipped with air brakes or other sufficient brakes, said Railroad Commissioners may order the company operating such cars to equip such cars with brakes, operated by air or otherwise, of such kind and in such manner as said Railroad Commissioners may deem necessary and proper, first giving such company reasonable notice to appear and be heard, and may, after similar notice, alter, modify or revoke any such order. Sec. 2. Any company operating such car or cars which shall neglect or refuse to comply with any order relating to brakes made pursuant to the provisions of section 1 of this act shall forfeit to the State $25 for each day of such neglect or refusal." The House has reconsidered the bill providing for seats for motormen and has passed the measure and referred it to the Senate.

New York.—The Travis-Robinson rapid transit bill, which provides for the construction of subways in New York by private capital, public funds, or by assessment on the property benefited, was transmitted to Governor Hughes with the approval of Mayor McClellan of New York on May 11. The Governor immediately announced that a public hearing on the measure would be held by him at Albany on May 22. Many advocates of the bill appeared at the hearing to favor the measure, and on May 26 the Governor signed it. Governor Hughes vetoed the Stillwell bill designed to permit the Public Service Commission of the First District to make contracts for the construction, equipment, maintenance and operation of a subway extension. The bill conflicts with the Travis-Robinson bill which the Governor signed, as both measures provide for the amendment of the same section of the rapid transit law. In a memorandum filed with the Stillwell bill the Governor said: "The Travis-Robinson bill is a comprehensive measure designed to meet in a just way and with proper safeguards of the public interests the necessities of New York with regard to rapid transit development. Nothing should be done to introduce uncertainty or confusion. If the present bill were signed first the subsequent signing of the Travis-Robinson bill would supersede it. If the Travis-Robinson bill were signed first, the signing of this bill would override important provisions of the former. From any point of view this bill is inadvisable and cannot be approved." On May 27 Lieutenant-Governor Horace White and Speaker James W. Wadsworth, Jr., appointed the four joint legislative committees which are to investigate the question of direct primaries, the Ivins New York city charter, the capacity of the members of the Public Service Commissions and the question of employers' liability and the reasons for the condition of the unemployed in this State. The members of the committee to report on the advisability of extending the authority of the Public Service Commissions are Senators Meade, Rochester; Davenport, Oneida; McCarren, Brooklyn; Assemblymen Merritt, St. Lawrence; Yale, Putnam; Ward, New York; Walters, Onondaga, Caughlan, New York. Senator Meade has been made chairman of the committee. Despite the fact that Governor Hughes cut out of the legislative contingent fund the appropriation of $50,000 for the expenses of these committees, the Republican legislative leaders determined to go ahead to pay the money for the expenses of these committees, using an available $65,000 legislative contingent fund which the Governor did approve. During the first week of the legislative session next January the legislative leaders plan to pass a bill appropriating $50,000 to meet the expenses of these committees, and if Governor Hughes vetoes the bill again it is their purpose to pass it over the Governor's veto. To do this will require a two-thirds vote in each house. This means Democratic support will be necessary.

Financial and Corporate

New York Stock and Money Market

June 1, 1909.

The stock market opened up buoyant and more active to-day, after the three days of holiday. The most notable feature was the strength of the common and the preferred issues of the United States Steel Corporation, which made new high records. Traction stocks have not been active and their prices have shown only fractional gains.

The money market continues to be remarkably easy. The banks are overstocked with cash and rates remain extremely low. Quotations to-day were: Call, 1½ to 2 per cent; 90 days, 2½ to 2¾ per cent.

Other Markets

Both Philadelphia Rapid Transit and Philadelphia Union Traction stocks have sold off a few points and to-day were at the low points for the week. The former sold down to 30⅛ and the latter to 54. There was some recovery for each at the close.

In Boston, the only sales recorded were a few shares of Massachusetts Electric, both preferred and common, and some lots of Boston Elevated.

Kansas City Railway & Light has been the only traction issue that has been in evidence, to any extent, in the Chicago market during the past week. The issues of the Chicago Railways have been dull, only broken lots appearing.

United Railways bonds continue to be active in the Baltimore market. The "incomes" have been especially in demand. Prices remain about the same: "incomes" 57¼, funding 5s 80, and 4s 87½.

At the auction of securities in New York last week the following tractions were sold: $5,000 West Penn Railways Company first mortgage 5s, at 99⅛; $4,000 Third Avenue Railroad first mortgage 5s, at 109⅞, and 140 shares Orange County (N. Y.) Traction Company preferred, $25 par, at $1.50 per share.

Quotations of various traction securities as compared with last week follow:

	May 24.	June 1.
American Railways Company	45¾	45¾
Aurora, Elgin & Chicago Railroad (common)	a38	*38
Aurora, Elgin & Chicago Railroad (preferred)	a87½	*87½
Boston Elevated Railway	128½	130
Boston & Suburban Electric Companies	*15½	*15½
Boston & Suburban Electric Companies (preferred)	71	*71
Boston & Worcester Electric Companies (common)	11	*11
Boston & Wooster Electric Companies (preferred)	a56	*56
Brooklyn Rapid Transit Company	79	79⅛
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	88⅝	88
Capital Traction Company, Washington	*135¼	a135⅞
Chicago City Railway	a190	*190
Chicago & Oak Park Elevated Railroad (common)	*4	3
Chicago & Oak Park Elevated Railroad (preferred)	*15	*14
Chicago Railways, ptcptg. ctf. 1	a110	*110
Chicago Railways, ptcptg. ctf. 2	a38	38½
Chicago Railways, ptcptg. ctf. 3	a28	*28
Chicago Railways, ptcptg. ctf. 4s	a10	10¼
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a79	a79
Consolidated Trac. Co. of N. J., 5 per cent bonds	a107	a107
Detroit United Railway	a58½	a58
General Electric Company	161	161¼
Georgia Railway & Electric Company (common)	85½	86
Georgia Railway & Electric Company (preferred)	*85	*85
Interborough-Metropolitan Company (common)	16	16½
Interborough-Metropolitan Company (preferred)	44⅝	46
Interborough-Metropolitan Company (4½s)	78½	78⅝
Kansas City Railway & Light Company (common)	a49	50¼
Kansas City Railway & Light Company (preferred)	a86½	85¾
Manhattan Railway	a148	*147
Massachusetts Electric Companies (common)	a14	*12½
Massachusetts Electric Companies (preferred)	a71	*69½
Metropolitan West Side, Chicago (common)	a18	*18
Metropolitan West Side, Chicago (preferred)	a53	*53
Metropolitan Street Railway	a28	*28
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	82½	81⅞
Northwestern Elevated Railroad (common)	a24	*24
Northwestern Elevated Railroad (preferred)	a71	69½
Philadelphia Company, Pittsburg (common)	42⅞	41½
Philadelphia Company, Pittsburg (preferred)	44	43½
Philadelphia Rapid Transit Company	33⅝	32
Philadelphia Traction Co	a93	a93
Public Service Corporation, 5 per cent col. notes	a100¾	a100¾
Public Service Corporation, ctfs	a89½	a89
Seattle Electric Company (common)	*97½	108
Seattle Electric Company (preferred)	99⅞	100
South Side Elevated Railroad, Chicago	a60	*58
Toledo Railways & Light Company	11⅛	10
Third Avenue Railroad, New York	28½	30
Twin City Rapid Transit, Minneapolis (common)	a105⅛	*104½
Union Traction Company, Philadelphia	57	55¼
United Railways & Electric Company, Baltimore	*12¾	*12¾
United Railways Inv. Co., San Francisco (com.)	a38½	a38
United Railways Inv. Co., San Francisco (pfd.)	a55	a55
Washington Railway & Electric Company (common)	*43	a43
Washington Railway & Electric Company (preferred)	*90¾	a90⅝
West End Street Railway, Boston (common)	92¼	92
West End Street Railway, Boston (preferred)	*110	105½
Westinghouse Electric & Manufacturing Company	84	84
Westinghouse Elec. & Mfg. Company (1st pref.)	121	121

aAsked. *Last sale.

Quarterly Report of Subsidiary Lines in Brooklyn Rapid Transit System

A report of subsidiary companies of the Brooklyn Rapid Transit system for the quarter ended March 31, 1909, has been issued by the New York Public Service Commission, First District. The returns of all the companies combined show total gross earnings in the quarter of $4,451,869, an increase of $213,197 over the corresponding quarter of the previous year, and total operating expenses of $3,151,537, an increase of $68,133. The operating ratio, all companies, was 70.8 per cent. The returns of the principal companies in the system were as follows:

Quarter ending March 31, 1909.	Brooklyn Heights Railroad.	Brooklyn, Queens County & Suburban Railroad.	Brooklyn Union Elevated Railroad.	Nassau Electric Railroad.
Gross earnings from operation	$1,612,089.53	$279,916.20	$1,611,888.91	$887,307.10
Operating expenses (excluding all taxes)	1,106,583.93	221,578.99	1,052,294.39	695,454.32
Net earnings from operation	$505,505.60	$58,337.21	$559,594.52	$191,852.78
Income from other sources than operation	16,155.29	13,296.74	35,684.07	36,993.51
Gross income from all sources	$521,660.89	$71,633.95	$595,278.59	$228,846.29
Deductions from income as follows:				
Interest on funded and floating debt.	$144,662.62	$104,083.50	$425,824.68	$214,593.26
Taxes: On property used in operation of road	88,031.30	12,705.40	91,296.86	33,065.17
Taxes: On earnings and capital stock	21,682.46	2,932.13	16,475.73	14,493.00
Taxes: Other than above	3,804.99	990.00	.....	1,830.00
Rentals	387,125.00	.....	.....	.....
Special appropriations	9,344.16	.....	.....	10,078.74
Total deductions	$654,650.53	$120,711.03	$533,597.27	$274,060.17
Net income from all sources (surplus)	*$132,989.64	*$49,077.08	$61,681.32	*$45,213.88
Net income for previous quarters of fiscal year	90,118.45	21,177.55	424,138.33	154,139.61
Surplus for nine months ended March 31, 1909	*$42,871.19	*$27,899.53	$485,819.65	$108,925.73
Increases or decreases over the corresponding period of 1908:				
Gross earnings from operation	$26,738.45	*$119,233.65	$100,260.91	$199,783.10
Operating expenses (excluding all taxes)	12,482.86	*32,685.01	*51,244.32	163,897.87
Net earnings from operation	$14,255.59	*$86,548.64	$151,505.23	$35,885.23
Income from other sources than operation	*5,005.65	7,240.59	156.36	744.91
Gross income from all sources	$9,249.94	*$79,308.06	$151,661.59	$36,630.14
Deductions from income as follows:				
Interest on funded and floating debt.	$12,321.85	$6,555.90	$7,987.45	$3,034.16
Taxes: On property used in operation of road	26,306.76	1,599.55	51,556.89	3,655.34
Taxes: On earnings and capital stock	217.14	*1,119.93	1,004.17	2,005.47
Taxes: Other than above	39.99	115.02	.....	*4.98
Rentals	*750.66	.....	.....	.....
Special appropriations	9,960.69	*93.61	*6,922.69	8,482.39
Total	$48,095.77	$7,056.93	$53,625.82	$17,172.38
Net income from all sources (surplus)	*$38,845.83	*$86,364.98	$98,035.77	$19,457.76
Net income for previous quarters of fiscal year	3,900.04	107,433.81	*308,234.66	72,738.81
Surplus for nine months since July 1st	*$34,945.79	*$193,798.79	*$210,198.89	$92,196.57

* Indicates deficits, losses or decreases.

Quarterly Report of Interborough Rapid Transit Company

A report of the Interborough Rapid Transit Company of New York for the quarter ended March 31, 1909, has been made public by the Public Service Commission, First District. It shows that, as compared with the corresponding

quarter of the previous year earnings from operation of the subway division gained 16 per cent, while the Manhattan Railway (elevated) division gained but 0.8 per cent. The operating ratio on the subway division in the quarter ended March 31, 1909, was 35.7 per cent and on the elevated division 43.6 per cent. The comparative figures follow:

MANHATTAN RAILWAY DIVISION.

Item.	January–March, 1909.	January–March, 1908.	Increase over corresponding quarter in 1908.
Earnings from operation	$3,521,230.87	$3,492,308.11	$28,922.76
Operating expenses	1,536,728.94	1,579,435.82	*42,706.88
Net earnings	$1,984,501.93	$1,912,872.29	$71,629.64
Other income	139,663.34	118,210.13	21,453.21
Gross income	$2,124,165.27	$2,031,082.42	$93,082.85
Deduct—			
Taxes: On property used in operation	$36,000.00	$30,000.00	$6,000.00
Taxes: On earnings and capital stock	50,108.94	49,605.18	503.76
Taxes: Other than above	300,000.00	265,000.00	35,000.00
Rentals	1,455,293.02	1,500,833.37	*45,540.35
Net income	$282,763.31	$185,643.87	$97,119.44
SUBWAY DIVISION.			
Earnings from operation	$3,321,525.15	$2,862,124.16	$459,400.99
Operating expenses	1,186,884.98	1,126,495.03	60,389.95
Net earnings	$2,134,640.17	$1,735,629.13	$399,011.04
Other income	222,606.59	200,130.95	22,475.64
Gross income	$2,357,246.76	$1,935,760.08	$421,486.68
Deductions.			
Interest on funded debt	$498,812.50	$275,000.00	$223,812.50
Taxes on property used in operation	18,000.00	15,000.00	3,000.00
Rentals	†545,957.46	†502,769.74	43,187.72
Amortization of debt discount and expense	3,036.21	.....	3,036.21
Net income	$1,291,440.59	$1,142,990.34	$148,450.25

* Decrease.
† Rental due City of New York measured by interest and sinking fund on city bonds for construction of Rapid Transit Railway.

Annual Report of the Honolulu Rapid Transit & Land Company

Earnings of the Honolulu Rapid Transit & Land Company for the year ended Dec. 31, 1908, compare as follows with the previous year:

	1908.	1907.	Increase.
Gross earnings	$382,130	$367,134	$14,996
Operating expenses	211,976	201,228	10,748
Net earnings	$170,154	$165,906	$4,248
Other income	7,797	7,475	322
Balance	$177,951	$173,381	$4,570
Taxes, interest and sinking fund, etc.	72,727	78,161	*5,434
Balance	$105,224	$95,220	$10,004
Depreciation	22,731	22,807	*76
Net divisible income	$82,493	$72,413	$10,080

*Decrease.

Of the operating expenses in the last year $27,464 was expended for maintenance of equipment and ways and structures, as compared with $25,142 in 1907.

From the net divisible income of $82,493 shown as the result of the year's operations dividends of $21,000, or 6 per cent, were paid on the preferred stock and $32,000, or 4 per cent, on the common stock, a total of $53,000.

L. T. Peck, the president, states in his report to shareholders: "Deterioration is showing in our rails, especially on curves, and renewals in future will be an expense of some moment. The same may be said of our poles and wires."

Mention is made by C. G. Ballentyne, the manager, of the increasing requirements on account of depreciation, as follows: "On account of depreciation due to wear and tear and climatic effects, it will be necessary from year to year to increase our expenditure in regard to the maintenance and renewals of all parts of the plant, but with the favorable outlook for increased passenger and freight traffic, I have no hesitation in saying the percentage of increase in the earnings will be much greater than that of the expense account."

Boston & Northern Street Railway, Boston, Mass.—The Boston & Northern Street Railway has petitioned the Railroad Commissioners for authority to issue $536,000 additional bonds as voted by the directors of the company. The commission has previously approved an issue of $15,000,00 first mortgage refunding 50-year 4 per cent gold bonds dated July 1, 1904, to be issued from time to time, of which the present issue is a part. Of the $15,000,000 bonds, $10,770,000 have already been issued.

Chattanooga (Tenn.) Railways Company.—The Chattanooga Railways Company and the Chattanooga Electric Company have applied to the City Council of Chattanooga for permission to consolidate. The Chattanooga Railways Company is capitalized at $3,000,000, $1,000,000 of which is 5 per cent preferred stock and the remainder common stock. The Chattanooga Electric Company is capitalized at $1,500,000, of which $500,000 is preferred stock. It is said that the proposed new company will be capitalized at $5,000,000, of which $2,000,000 will be preferred stock and the remainder common stock. The consolidation will be financed through E. W. Clark & Company, Philadelphia, Pa., and Hodenpyl, Walbridge & Company, New York, N. Y.

Columbia Power, Light & Railways Company, Bloomsburg, Pa.—The Columbia Power, Light & Railways Company, which has taken over the railway, lighting and gas properties in Danville, Bloomsburg and Berwick, organized on May 25 at Bloomsburg, as follows: E. R. Sponsler, Harrisburg, president; Myron I. Low, Bloomsburg, vice-president; A. W. Duy, Bloomsburg, secretary; M. Milleisen, Bloomsburg, treasurer. The directors of the company are: E. R. Sponsler, M. I. Low, A. W. Duy, W. C. Billman, Reading; William M. Pyle, Wilmington, Del.; W. F. Lowry, Berwick; C. M. Creveling, B. F. Myers, Harrisburg; R. H. Koch, Pottsville; R. S. Ammerman, Danville; M. F. D. Scanlon, Philadelphia, and P. R. Bevan, Wilkes-Barre.

Lehigh Valley Transit Company, Allentown, Pa.—At a special meeting on May 26 the directors of the Lehigh Valley Traction Company voted to increase the bonded indebtedness of the company from $7,600,000 to $9,000,000. Brown Brothers & Company, New York, and E. B. Smith & Company, Philadelphia, have agreed to take the new bond issue of $1,400,000. After utilizing about $400,000 to cancel outstanding notes $1,000,000 will go into physical betterments, chief of which is a belt line for Allentown.

Lexington & Interurban Railway, Lexington, Ky.—The Lexington & Interurban Railway has sold part of an authorized issue of $750,000 of two-year 6 per cent notes, the proceeds of which will be used to finance an extension from Lexington to Nicholasville.

Metropolitan Street Railway, New York, N. Y.—The United States Circuit Court of Appeals, Judges Noyes, Hough and Adams sitting, heard argument on May 25 and reserved decision on the appeal from the judgment of the circuit court in favor of the plaintiff in the suit of the receivers of the Metropolitan Street Railway against the Metropolitan Securities Company. The amount of the judgment was $5,271,000, the total amount sued for as the balance of $8,000,000 of three-year 5 per cent improvement notes turned over to the Metropolitan Securities Company by the Metropolitan Street Railway. Judge Ward in giving the judgment of the lower court held that the contract providing for the transfer of the $8,000,000 in improvement notes constituted a real and valid sale. Appeal from this judgment was taken on the ground that there was no actual sale but only an agreement to advance the $8,000,000 as a loan for which the improvement notes and their collateral were used as security.

New Orleans Railways & Light Company, New Orleans, La.—In connection with the plan of the New Orleans Railways & Light Company to create a $50,000,000 issue of bonds, as noted on page 1002 of the Electric Railway Journal of May 29, 1909, Hugh McCloskey, president of the company, has sent the following letter to the stockholders of the company, concluding it with a request for proxies: "As you are aware, the New Orleans Railway & Light Company has outstanding $30,000,000 of 4½ per cent bonds. This amount has either been directly issued or is held for the purpose of providing for payment of underlying bonds. As a result, when permanent work is to be done the earnings which could be credited to the stockholders are utilized for this permanent work, which will enure to the benefit of the system for many years to come. To finance the corporation so that the stockholders will derive some benefit in the way of dividends without waiting indefinitely is one of the objects which actuates your board of directors in submitting the enclosed proposition to you. It is also necessary to provide some means of retiring the present outstanding issue of 6 per cent notes, which mature in May, 1912, and as the present mortgage resting on your property is a closed instrument, and no other securities may be issued thereunder to cover purposes above named, it seems desirable to adopt some method for future financing. If the proposition is accepted, the financial arrangements will be such as to place the corporation in a position to keep pace with the growth of the city and to make such permanent and additional improvements as will enure to the benefit of the stockholders and all other parties in interest, and it will also place the company in such a posi-

tion as hereafter to be unhampered for the necessary capital to carry on the purposes of its creation."

Old Colony Street Railway, Boston, Mass.—The Old Colony Street Railway has petitioned the Railroad Commissioners for the approval of an issue of bonds not to exceed $275,000. This is part of an issue of $10,000,000 first mortgage refunding 50-year 4 per cent bonds authorized by the commission on May 10, 1904, of which there are now outstanding $7,712,000.

Philadelphia, Bristol & Trenton Street Railway, Philadelphia, Pa.—Judge Stout has entered a decree of foreclosure of the property and franchises of the Philadelphia, Bristol & Trenton Street Railway. The proceeding under which the decree was made is upon the mortgage of the Union Trust Company, of Maryland, to secure an issue of bonds amounting to $650,000, the company having twice defaulted in the payment of interest. The Bristol Trust Company was appointed receiver pending foreclosure proceedings. The property will be sold at public sale probably within the next 30 days. The upset price has been fixed at $200,000.

Rhode Island Company, Providence, R. I.—The plea of the Rhode Island Company, which is controlled by the New York, New Haven & Hartford Railroad through its ownership of the securities of the Providence Securities Company, to the bill in equity filed against it by the Government, was overruled by Judges Colt, Putnam and Lowell in the United States Circuit Court recently. The plea contended that three judges did not constitute a lawful Circuit Court of the United States. The court allowed the filing of a bill of exceptions to its ruling and also the filing of a demurrer.

Schuylkill & Dauphin Traction Company, Pottsville, Pa.—The Schuylkill & Dauphin Traction Company reports earnings as follows for the year ended April 30, 1909: Gross receipts, $27,876; operating expenses, $15,943; net earnings, $11,933; fixed charges, $9,606; surplus, $2,326. The increase in earnings over the corresponding years was 35.6 per cent.

United Railways Investment Company, San Francisco, Cal.—The purchase of the property of the Stanislaus Electric Power Company, at the recent foreclosure sale, by the United Railways Investment Company has been ratified, and the new company will at once take over the property. This is the conclusion of negotiations which have been pending for 15 months, and which have been frequently outlined in these columns. The new contract contemplates the issuance of first mortgage bonds on the property, which will take precedence over the original bonds; but it is held that the additional market for power and the improvements that will be made will advance rather than diminish the securities of the present bond issue. For the equities in the preferred and common stock of the power company the underwriters will receive $900,000 of preferred and $900,000 of common stock of the United Railways Investment Company. From the proceeds of the sale of the bonds it is contemplated that the fourth 10,000-hp unit will be installed at the Stanislaus power station; the storage dam at Relief Creek will be completed; the steam plant of 500 kw now under construction by the San Francisco Railway & Power Company at the North Beach power station will be purchased and the installation of an additional steam turbine plant of 9000 kw in the same station will be made. In addition, there will be the acquisition and construction of the necessary distributing lines, including the construction of two 100,000-volt, steel tower, transmission lines from Stanislaus to San Francisco. It is estimated that there can be developed by the Stanislaus property 60,000 hp. The contract made between the Stanislaus Power Company and the United Railroad Company provides for a rate of about $30 per hp, and the railroad company expects to use about 25,000 hp.

United Traction Company, Albany, N. Y.—The United Traction Company reports earnings as follows for the quarter ended March 31, 1909, as compared with the similar period for 1908: Gross receipts for 1909, $454,260, as compared with $453,702 for 1908; operating expenses for 1909, $295,210, as compared with $323,799 for 1908; net earnings for 1909, $159,049, as compared with $129,903 for 1908; taxes accrued for 1909, $33,000, as compared with $24,631 for 1908; operating income for 1909, $126,049, as compared with $105,272 for 1908; other income for 1909, $44,282, as compared with $39,990 for 1908; net income for 1909, $170,331, as compared with $145,262 for 1908; total deductions for 1909, $83,521, as compared with $74,999 for 1908; surplus for 1909, $86,809, as compared with $70,262 for 1908.

Washington, Frederick & Gettysburg Railway, Frederick, Md.—The Washington, Frederick & Gettysburg Railway has elected officers as follows: Dr. Franklin Buchanan Smith, president; Alexander Ramsberg and Charles Wertheimer, vice-presidents; Charles C. Waters, secretary; Oscar T. Coblentz, treasurer. The company is now operating temporarily by steam between Frederick and Thurmont.

Traffic and Transportation

International Railway Freight Interchange at Lockport

The Public Service Commission of the Second District of New York gave a further hearing on May 28 at the offices of the commission in the Chambers of Commerce Building, Buffalo, in the matter of interchange of freight and joint rates between the International Railway and Erie Railroad and the New York Central & Hudson River Railroad at Lockport, N. Y., and the tributary industrial district, and Chairman Stevens and Commissioner Olmstead took additional evidence in the complaint of the Niagara Sprayer Company and the Merritt Manufacturing Company relative to refusal of the International Railway and the Erie Railroad and the New York Central & Hudson River Railroad to provide facilities for such interchange.

The examination of Martin J. Sheehan, superintendent of the Niagara Falls, Lockport and Olcott divisions of the International Railway, was continued. He testified as to various details of the freight business between North Tonawanda, Lockport and Olcott Beach, stating that under the arrangement between the International Railway and the Erie Railroad the lines of the International Railway between these points were integral parts of the Erie Railroad, so far as freight is concerned. The International Railway is under contract with the Erie Railroad to handle all freight originating at or destined to the various points on its line between North Tonawanda, Lockport and Olcott Beach and in the Lockport manufacturing district. For this service it receives a pro rata freight revenue and terminal switching charges and the privilege of using the tracks of the Erie Railroad between Buffalo and Lockport for its trolley passenger service. For this freight business the Erie Railroad furnishes all freight cars, and Mr. Sheehan contended that if the compulsory interchange arrangement asked for by complainants should be established it would be a detriment to his company because it would curtail the exclusive arrangement of the International Railway with the Erie Railroad, releasing the latter from its obligation to furnish all freight cars needed and would necessitate the building of a large number of freight cars of different classes by the International Railway to provide for business originating on its line or subject the company to a per diem charge for the use of cars of other roads, for which there would be no adequate return in revenues. He stated that the number of freight cars handled averages 30 or 40 per day, running as high as 130 to 150 per day during the height of the fruit shipping season from the Olcott district. Mr. Sheehan further testified that the cost of installing interchange tracks and providing interchange facilities with the New York Central & Hudson River Railroad at Lockport, Brest and other junction points would be large and not warranted by benefits which complainants claimed would be gained. The Erie Railroad and New York Central & Hudson River Railroad also introduced evidence to the same effect.

Thomas J. McGrath, president of the Lockport Board of Trade, testified regarding the large number of manufacturing concerns located in the industrial district of Lockport, served by only one railway, which he believed would be benefited by a system of interchange between the International Railway, the Erie Railroad and the New York Central & Hudson River Railroad, as asked for by the complainants, and intimated that if the cost of the interchange terminal and facilities to the railways was the only bar to the arrangement the Board of Trade or the City of Lockport might provide such interchange terminals without cost to the railroads. Upon the conclusion of the testimony the complainants were given until June 20 to file their briefs with the commission, the briefs to be accompanied by a map showing the routes of the International Railway and the New York Central & Hudson River Railroad in Lockport. Respondents are to file briefs by July 1 and complainants are to file a reply brief on or before July 10, when the case will be considered as finally submitted for the decision of the commission.

Vestibule Order in Connecticut

As a result of a public hearing held in Hartford on April 20, 1909, on the subject of vestibules for cars operated over electric railways, the Railroad Commission of Connecticut has issued an order to the electric railways in the State which it concludes as follows:

"We take occasion to state the position which this board takes at this time on the whole question of vestibuling

cars and to modify or revoke our numerous previous orders relating to vestibuling cars and to substitute therefor an order on vestibuling which is applicable to all street railways operating cars in this State and to cover their operation at all seasons of the year.

"We find that by the operation of orders previously issued and by the acts of the street railways in providing their equipment, there are now in use in this State 950 closed cars of which 923 are provided with vestibules, but 185 of said cars are provided with what is known as the semi or bulkhead vestibule only.

"The two chief uses of the vestibule are the protection of the operators of the cars from cold and from storms. The operators, themselves, make a third claim, namely: protection from dust, cinders and other objects in the open air.

"We find that the open car is provided as additional equipment by the railways to meet the demands of its patrons and should be used only in the warm season of the year and on pleasant days in that season. We think that the traveling public demands that cars operated at such times should be in reality as open as it is possible to have them. We believe that the motorman operating the car can protect himself or be protected by the various simple devices now in use (such as glasses, storm coats, etc.) from the occasional short storms that occur in the summer months; that in severe or prolonged storms in said seasons the closed cars should be substituted for the open cars.

"Much testimony was heard tending to show the danger incident to operating cars in storms and the need of the operator having an unobstructed view. The testimony of witnesses and our inquiries fail to show any State where by statute or orders of Railroad Commissioners open cars used in summer months are required to be vestibuled.

"Therefore we deem it necessary in the interest of the public and of the employees concerned, and do order and direct each and every company operating a street railway within the limits of Connecticut fully to enclose the platforms of all so-called closed cars to be used in the transportation of passengers, with complete vestibules. And that all cars used by said street railway companies for the transportation of passengers between Nov. 1 (beginning in 1909) and April 1, inclusive, of each year be thus fully vestibuled, excepting from the provisions of this order cars used in an emergency or on such warm clear days in April and November as are suitable for the use of open cars."

Will Dim Lights in Twin Cities.—The Twin City Rapid Transit Company has decided to dim the headlights of its cars operated in Minneapolis and St. Paul. Owners of horses and of automobiles complained to the company about the intensity of the lights, and Horace Lowry, superintendent of the Minneapolis division of the company, who is president of the Minneapolis Automobile Club, agreed that the lights were a source of annoyance and possible danger.

Record of Arrivals and Departures Over the Fort Wayne & Wabash Valley Traction Company's Lines.—Frank Hardy, superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., reports that during the last year 90 per cent of the cars arrived and left terminal points on time. Within five minutes of schedule time is considered to be on time, but if a car is more than five minutes late the crew is required to make a report, giving the cause of the delay.

Employees at Evansville, Ind., Ask Arbitration.—On page 1003 of the Electric Railway Journal of May 29, 1909, mention was made of the request of the employees of the Evansville & Southern Indiana Railway for a change from the present rate of wages, 17, 18 and 19 cents an hour, according to the length of service, to 19 and 20 cents an hour for two grades of employees. The men met on May 26, and have proposed to the company that it agree to leave the settlement of the terms of service with a board of arbitration of five members, two of whom shall be selected by the company, two by the Central Labor Union and the fifth member jointly by the others.

Hearing on Application to Abandon Road.—The application of the Bennington & North Adams Street Railway, Hoosick Falls, N. Y., to abandon its line in Hoosick Falls because it does not pay was opposed before the Public Service Commission of the Second District of New York at the hearing on May 2, by the citizens of the village, who objected to the abandonment of the line. The company's representatives said the gross revenue in Hoosic Falls did not average $4 a day. The company agreed to modify its application so that only that part of the road in Hoosick Falls which lies beyond the Boston & Main Railroad should be abandoned. The commission reserved its decision.

Opinion of Attorney-General of California Regarding Electric Railways.—The statement was made recently in a San Francisco paper that the Attorney-General of the State had expressed the opinion that interurban electric railways in California come within the jurisdiction of the Board of Railroad Commissioners. W. D. Wagner, who was asked by the Electric Railway Journal to confirm the statement, has replied as follows: "The Attorney-General's opinion was a verbal one, given at a meeting of the Board of Railroad Commissioners. It was the Attorney-General's opinion, verbally expressed, that interurban electric railways are within the jurisdiction of the Railroad Commission of this State."

Summer Schedules on the Oneida Railway and the Utica & Mohawk Valley Railway.—The Oneida Railway and the Utica & Mohawk Valley Railway have made a number of changes in their schedules. Between 8:05 a. m. and 7:05 p. m. there is a limited car each way every hour between Utica and Syracuse except at 12:05 p. m. An extra limited car also leaves each terminal at 10:15 p. m. to accommodate people from the Oneida Lake resorts. The limited cars formerly ran every two hours between 7:05 a. m. and 5:05 p. m. The time of the local Utica-Syracuse service has not been changed. There is an hourly service from 5:30 a. m. until 9:30 p. m., all cars leaving the terminals on the half hour. There is also a local from each terminal at 11:30 p. m. The Utica & Mohawk Valley Railway now maintains half-hourly service between Rome and Little Falls from 5:30 a. m. until midnight on Mondays, Tuesdays, Wednesdays, Thursdays, Fridays and Sundays. When additional cars are required on Sundays, however, they will be run. On Saturdays a 20-minute service is established at noon and maintained until midnight.

More Washington, Baltimore & Annapolis Circulars.—The Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., has issued a new circular descriptive of the principal cities reached by the line and of the road itself. The principal points of interest in Washington, Baltimore and Annapolis and typical scenes along the line are illustrated. Two maps show the connections between the Washington, Baltimore & Annapolis Electric Railway and other lines in Washington and Baltimore. Places of interest in Washington and Baltimore are tabulated. The rates of fare for one way and the round trip between Baltimore and Washington, Baltimore and Annapolis, and Washington and Annapolis are given, as are also the rates for the tri-city trip, including Washington, Annapolis and Baltimore. The rates for twilight and other special excursions for parties are tabulated separately. The company has also issued a circular giving the program for the commencement exercises at the United States Naval Academy at Annapolis, which will be held the first week in June. In this publication there is a description of the facilities which the company proposes to offer during commencement week, and a statement of the requirements for securing admission to the different functions at Annapolis during the ceremonies.

Terms of Service at Scranton to be Arbitrated.—In accordance with a 10-year agreement which went into effect in the spring of 1906 between the Scranton (Pa.) Railway and its employees, the company has decided to submit to arbitration the request of its employees for a flat rate of 25 cents an hour for trainmen and an increase in wages of 25 per cent for all other employees. During the 10-year period covered by the agreement there can be neither strikes nor lock-outs, but it was provided that on April 1, 1909, and on April 1, 1912, the question of wages should be taken up for adjustment. The company is at present paying its car men 20 cents an hour for the first year of service, 21 cents for the second year and 22 cents for the third year and thereafter. The agreement between the company and the men provides that if terms cannot be arranged between themselves, matters in dispute shall be settled by a board of arbitration consisting of five members, two appointed by the company, two by the employees and the four so selected to select the fifth man. The company selected D. B. Atherton and H. E. Paine as its representatives on the board of arbitration, and the employees selected William Corless and P. E. Kilcullen to represent them. These gentlemen conferred recently and decided to extend an invitation to Judge George B. Gray of the United States Circuit Court of Appeals for the Third Judicial District to act as referee of the board, and Judge Gray has accepted. The hearings will be held in the Federal Building, Scranton, beginning on June 7. Judge Gray was president of the Anthracite Strike Commission and has been requested on several occasions to name an umpire when the Miners' Conciliation Board has been deadlocked.

Personal Mention

Mr. H. C. Hoagland has resigned as chief electrical and mechanical engineer of the Illinois Traction System, Decatur, Ill., to become vice-president of and general manager of the Missouri Central Railway, Columbia, Mo.

Mr. F. J. Gerdon has resigned as superintendent of transportation of the Utica & Mohawk Valley Railway, Utica, N. Y., and Mr. T. C. Cherry, formerly with the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has been appointed to succeed him, with the title of superintendent.

Mr. J. C. Larason has been appointed passenger agent of the Columbus, Delaware & Marion Railroad, Columbus, Ohio, to succeed Mr. W. T. Henderson, resigned. Mr. Larason was formerly ticket agent and cashier of the Ohio Electric Railway at Springfield, Ohio.

Col. Edwin W. Hine has been elected a member of the board of directors of the Public Service Corporation of New Jersey, and has also been selected as a member of the executive committee of the company to succeed the late Mark T. Cox. Colonel Hine has been secretary of the corporation for more than a year and is a member of the works committee.

Mr. Louis Ducor, engineer of the contracting firm of Messrs. Gèros & Loucheur, Paris, is in this country on a tour of inspection to study American developments in high-tension power transmission and single-phase and high-tension direct-current railroads. Mr. Ducor will remain here about 10 weeks, and will visit some of the far Western cities before his return.

Mr. Edgar S. Fassett, general manager of the United Traction Company, Albany, N. Y., and general manager of the Hudson Valley Railway, both of which are controlled by Delaware & Hudson Company interests, has resigned as general manager of the Hudson Valley Railway, and will be succeeded by Mr. A. E. Reynolds, with headquarters at Glens Falls, N. Y. Mr. Fassett, however, will continue as a director of the Hudson Valley Railway.

Mr. J. S. Shedd, superintendent of the Birmingham Division of the Pittsburg (Pa.) Railways Company, has been appointed general agent of the company in charge of the employment bureau. Mr. Shedd has had many years' experience in railway work. He was formerly identified with several Western railroads and later was claim agent of the Monongahela lines of the Pittsburgh Railways Company. At one time he was assistant superintendent of the Consolidated Traction Company, Pittsburgh.

Mr. E. Dana Durand, who is to succeed Mr. S. N. B. North as director of the United States census, was the author of Part I of the report on street and electric railways in the census of 1902, relating to the economic, financial and social features. Part II of that report, relating to the history and engineering features of street and electric railways, was written by Mr. T. Commerford Martin. Before he became associated with the census bureau Mr. Durand was connected with Harvard University in the capacity of professor of economics.

Mr. John De Lowry, superintendent of the Highland Division of the Pittsburgh (Pa.) Railways Company, has been appointed superintendent of the Birmingham Division of the company with jurisdiction over the Charleroi and Washington lines, succeeding Mr. J. S. Shedd, who has been appointed general agent of the company in charge of the employment bureau. Mr. C. C. King, superintendent of the Second Avenue Division of the company, has been appointed superintendent of the Highland Division of the company to succeed Mr. De Lowry, and Mr. W. H. Boyce, assistant superintendent of the Second Avenue Division of the company, has been appointed superintendent of the Second Avenue Division.

Mr. E. Stuart McLean has been appointed to the newly created office of chief inspector of the Boston & Worcester Street Railway, Boston, Mass., and will take over practically all the duties of the position of assistant superintendent which was abolished following the resignation of Mr. M. E. Nash, which was noted in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, page 963. Mr. McLean has had a varied railroad experience. He served as a motorman and a conductor on the Milford & Uxbridge Street Railway for about four years, and spent some time in the freight and express service of the company. He has been connected with the Boston & Worcester Street Railway for about six years. Entering the employ of the company as a motorman he was promoted to night foreman and then to foreman of the car house, in which position he served about four years. As chief inspector of the company Mr. McLean will be located at the general offices of the company in Framingham Junction.

Mr. Edward F. Reeves has been appointed chief of the employment bureau of the transportation department of the Brooklyn Rapid Transit Company. Mr. Reeves was born in Toronto, Ontario, in 1860. He entered the employ of the New York Central & Hudson River Railroad in 1885 and served with that company until 1895. His first position with the New York Central & Hudson River Railroad was as freight clerk at Albion, N. Y., where he remained until 1889, when he was appointed freight agent of the company at Medina. He served at Medina until 1890, and was then appointed freight and ticket agent of the company at Albion, which position he retained until 1893. Mr. Reeves was next appointed freight clerk and joint transfer agent of the New York Central & Hudson River Railroad at East Buffalo and remained with the company in that capacity until 1895, when he resigned to enter the employ of the Brooklyn Rapid Transit Company as master of the Fifty-eighth Street depot. This position Mr. Reeves retained until 1898 when he was appointed superintendent of terminals of the Brooklyn Bridge by the Brooklyn Rapid Transit Company. In 1902 Mr. Reeves was appointed superintendent of the Bridge Division of the Brooklyn Rapid Transit Company and continued in that capacity until quite recently when he was appointed to his present position.

Mr. Edward J. Bock, whose appointment as superintendent of the Chicago & Milwaukee Electric Railroad with headquarters at Highwood, Ill., was noted in the ELECTRIC RAILWAY JOURNAL of May 29, 1909, page 1004, was born in Holland on Jan. 1, 1876, and came to the United States when a small boy. After graduating from grammar school Mr. Bock spent several years in the northern part of Canada as a miner, at times being employed by the Canadian Pacific Railway in various subordinate positions. In February, 1897, he accepted a position with the Metropolitan West Side Elevated Railway, Chicago, as a trainman, and was promoted from time to time until he was made master of the Garfield Park Division of the company. Subsequently, Mr. Bock was appointed to the position of dispatcher of the Metropolitan West Side Elevated Railway, succeeding Mr. M. J. Feron, who was made the general superintendent, and Mr. Bock was given full charge of the Garfield Park Division of the company. On account of the close connection between the Metropolitan West Side Elevated Railway and the Aurora, Elgin & Chicago Railway, Mr. Bock became well acquainted with interurban electric railway operation. Mr. Bock was transferred from the Garfield Park Division to the Logan Square and Humboldt Divisions of the Metropolitan West Side Elevated Railway on May 1, 1908, and retained the position with these divisions of the road until he resigned recently to become superintendent of the Chicago & Milwaukee Electric Railroad.

OBITUARY

John W. Carter, formerly general superintendent of the Kansas City Railway & Light Company, Kansas City, Mo., is dead. Mr. Carter retired from the Kansas City Railway & Light Company in June, 1908, and after retirement devoted his time to agriculture.

Mark Walton Watson, president of the Standard Underground Cable Company, Pittsburgh, Pa., died at Philadelphia on June 1, aged 81 years. Mr. Watson was prominent in financial and business circles in Pittsburgh, and at the time of his death was president of the Exchange National Bank and the Monongahela Water Company, and was a director in several other companies.

Daniel E. Walsh, who was president of the People's Railway and the Tower Grove & Lafayette Railway, St. Louis, Mo., is dead. Mr. Walsh was active in street railway affairs in St. Louis before the organization of the St. Louis Transit Company and the United Railways, St. Louis, but retired from business about 10 years ago. Mr. Walsh was born in St. Louis in 1844, and was educated in the city schools there and at St. Louis University. He was a bachelor. In recent years Mr. Walsh was active in the affairs of the University and the Missouri Athletic clubs.

Edward A. Newman, secretary, treasurer and general manager of the Portland (Me.) Railroad, died at his home in Portland on May 21. Mr. Newman was born in Westbrook, Me., and was educated in the public schools of his native town and at Westbrook Seminary. For a time after graduating from Westbrook Seminary Mr. Newman was employed in the office of Mr. J. Winslow Jones in Portland, but in June, 1875, he was elected treasurer of the Portland Railroad and has held that office ever since. In 1885 Mr. Newman was appointed general manager of the company in addition to treasurer. Subsequently he was elected secretary of the company. Mr. Newman was also general manager and a director of the Biddeford & Saco Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Missouri Inland & Southern Railway, Licking, Mo.—Chartered to build an electric railway from Rolla to Licking, 40 miles. Capital stock, $400,000. Directors: Albert Campbell and C. H. Evers, Spokane, Wash.; A. E. Young, E. C. Comstock, A. H. Bradford and D. M. Meaders, Licking, Mo. [E. R. J., March 15, '09.]

***Third Avenue Bridge Company, New York, N. Y.**—Incorporated to construct a street railway about 2 miles in length over the Queensboro Bridge, extending from Third Avenue and Fifty-seventh Street, Manhattan, to the Queens terminus of the bridge at Jackson Avenue, Long Island City. Capital stock, $20,000. Incorporators: Alfred D. Sage, Walter J. Quinn, John E. Quinn, William P. Seaver, James F. Feeley, Raymond O'Neill and Edwin Goodwin, New York; Walter C. Burrows, Brooklyn, and Louis Kayer, Mount Vernon.

***Shawnee Electric Railway, Shawnee, Okla.**—Chartered to build an electric railway from Shawnee to Muskogee, a distance of 120 miles; also to build a railway from Shawnee to Oklahoma City, 40 miles. Incorporators: C. T. Edwards, A. Hargraves, C. E. Eastwood and W. S. Pendleton, Shawnee.

***Eugene-Pacific Western Railroad, Eugene, Ore.**—Incorporated to build an electric railway from Eugene to Florence. This company will take over the franchises and privileges obtained by the Eugene & Pacific Electric Railway recently organized for the purpose of building an electric railway to the coast. Capital stock, $300,000. Incorporators: F. J. Bergot, F. A. Anderson and Joseph Fellman, Eugene, Ore.

***Irwin-Herminie Traction Company, Irwin, Pa.**—Application has been made by this company for a charter to build an electric railway from Herminie to Irwin, 4 miles. Applicants for the charter are C. H. Bolton, I. H. Taylor, C. A. Thompson, Thomas P. Herron and John L. Pearce.

Hinton Street Car & Transportation Company, Hinton, W. Va.—Incorporated to build an electric railway from Hinton via Union, Avis and Red Sulphur Springs to the mouth of the East River. Capital stock, $50,000. Incorporators: James T. McCreery and W. H. Sawyers. [E. R. J., March 6, '09.]

FRANCHISES

Birmingham, Ala.—Application has been made to the City Council for a franchise for the Birmingham & Edgewood Electric Railway to build an electric railway from the southern terminus of the South Highlands line along the Twentieth Street road to the city limits. The object of the proposed railway is to connect Birmingham with Shades' Valley. [E. R. J., May 29, '09.]

Fresno, Cal.—The Board of Supervisors has granted to F. S. Granger, vice-president of the Fresno, Hanford & Summit Lake Interurban Railway, a franchise for an electric railway over certain streets in Fresno County. [E. R. J., May 8, '09.]

***Los Angeles, Cal.**—The Board of Supervisors has granted a franchise to M. J. Nolan to construct and operate an electric street railway on the extension of Washington Street, from the west city boundary to Rimpau Street.

San Mateo, Cal.—J. Barneson, who is said to represent the United Railroads, San Francisco, has petitioned the City Trustees for a franchise for an electric railway which will traverse B Street, south to Ninth Avenue, thence west to Palm, south to Sixteenth Avenue.

Washington, D. C.—President Taft sent to Congress on May 29 two short messages transmitting ordinances recently approved by the executive council of the island of Porto Rico. One granted an extension of time to the Ponce Railway & Light Company in which to complete certain extensions, and the other granted to the San Juan Light & Transit Company the right to operate an electric railway between San Juan and Rio Piedras, and to supply electric light to the public.

College Park, Ga.—A franchise has been granted to the Fairburn & Atlanta Railway & Electric Company by the City Council. It is the plan of the company to construct an electric railway from Fairburn through Stonewall and Red Oak to College Park, 11 miles. [E. R. J., Jan. 2, '09.]

***Covington, Ga.**—The City Council has granted to the Oxford & Covington Street Railway a 5-year franchise for an electric railway in Covington.

Joliet, Ill.—The City Council has granted the Joliet & Southern Traction Company an extension of two years to its franchise. By this new ordinance, the company has until April 23, 1911, to complete its interurban system.

New Orleans, La.—Announcement is made by the New Orleans Railway & Light Company that application will be made at the next meeting of the City Council for a franchise providing for the extension of the Clio Street line from Napoleon Avenue to the Protection Levee, a distance of about 3 miles.

Wellesley, Mass.—The Natick & Cochituate Street Railway has applied to the Selectmen for an extension of its franchise, in which to make certain improvements in its tracks.

***Houghton, Mich.**—C. D. Hanchette has petitioned for a franchise for a right-of-way through certain streets of Portage for an electric railway connecting Houghton and South Range.

Hibbing, Minn.—The Northern Traction Company has requested of the City Council a six months' extension of its franchise. The company proposes to build an electric railway to connect Hibbing, Chisholm, Buhl, Mt. Iron, Virginia and Eveleth. Grading has been done for a distance of about 3 miles and some track has been laid.

Columbia, Mo.—The City Council has granted a 20-year franchise to the Mexico, Santa Fe & Perry Traction Company for the entrance of an interurban electric railway from Mexico to Columbia, a distance of 60 miles. The franchise provides that the railway must be completed in two years. S. L. Robinson, Mexico, president. [E. R. J., May 15, '09]

West Orange, N. J.—The Town Council has granted to the Orange Mountain Traction Company a 50-year franchise to extend its tracks from its present terminus at Northfield and Benvenue Avenues, along Northfield Avenue to Walker Road.

Dayton, Ohio.—The Oakwood Street Railway has applied to the City Council for an extension of its franchise, which will allow the company to build from its present terminus on Salem Avenue to a point about 1 mile north on Salem pike.

Defiance, Ohio.—The Ohio Electric Railway, Cincinnati, has asked for a year's extension of time in which to begin the electrification of the steam line which it now operates between Lima and Defiance.

***Okmulgee, Okla.**—At a special meeting recently held in Okmulgee it was voted to grant an electric railway franchise to the Okmulgee Interurban Railway. J. B. Jones, Muskogee, is identified with the company.

Portland, Ore.—The City Council has granted the United Railways an extension of its franchise, for completing its track to Mount Calvary Cemetery and Hillsboro, until one year from July 1, 1909.

Allentown, Pa.—The City Council has defeated the ordinance presented by the Inter-County Electric Railway, Topton, for an electric railway franchise over certain streets in Allentown. [E. R. J., May 8, '09.]

Knoxville, Tenn.—Charles Dawes, representing the Knoxville-Kingston Interurban Railway, has applied to the City Council for an electric railway franchise. [E. R. J., May 1, '09.]

Grand Rapids, Wis.—The Common Council has granted the Grand Rapids Street Railroad a franchise to build an electric railway in Grand Rapids. The company plans to construct an electric railway between Grand Rapids and Nekoosa, 7 miles. Neal Brown, Wausau, president. [E. R. J., May 15, '09.]

TRACK AND ROADWAY

***Searcy, Ark.**—Louis Lorch, Searcy, is reported to be promoting a plan to build an electric railway from Searcy to Higginson, 4 miles, with a branch 2 miles long in Searcy to Searchlight Park. W. M. Wheeler, Little Rock, Ark., is also reported interested. The company will be known as the Searchlight Power & Electric Company and will be incorporated within the next few weeks. It is planned to build a power station at Searcy.

***Goat River Power & Light Company, Creston, B. C.**—W. F. Teetzel, general manager of this company, advises that construction work will be started within a year on a new 10-mile electric railway to extend from Creston to the Goat River. The line as proposed is more for the development of a large fruit district than for passenger traffic. The company proposes to build a power station on the Goat River Canyon. Power will be furnished for lighting and for other general purposes. Capital stock, authorized, $1,000,000; issued, $300,000. Officers: R. S. Lennie, Nelson,

B. C., president; W. K. Essling, Rossland, B. C., vice-president; J. D. Anderson, Trail, B. C., secretary-treasurer; W. F. Teetzel, Nelson, B. C., general manager.

British Columbia Electric Railway, Vancouver, B. C.—This company has appropriated $2,500,000 for new equipment and extensions to its lines on the southern mainland. It is stated that most of this amount will be used in constructing new lines in the vicinity of Vancouver. The work is expected to be done during the next 12 months.

Shore Line Electric Railway, New Haven, Conn.—The Board of Railroad Commissioners has issued a finding approving the layout and method of construction of a proposed street railway line by this company from Saybrook to Madison, passing through the towns of Westbrook and Clinton.

Savannah (Ga.) Electric Company.—This company advises that it expects to rebuild 5 miles of city track.

Chicago, Wheaton & Western Railway, Chicago, Ill.—This company has filed for record at Syracuse a mortgage to the Central Trust Company of Illinois, as trustee, to secure an issue of $500,000 of 40-year 5 per cent gold bonds. The company proposes to build an electric railway from Wheaton to Geneva by way of West Chicago. [E. R. J., May 22, '09.]

***Freeport, Ill.**—It is stated that W. T. Rawleigh is interested in a proposition to build an electric railway from Freeport, Ill., to Madison, Wis., via Cedarville, Rock Grove, Oakley and Brodhead.

Decatur, Sullivan & Mattoon Transit Company, Mattoon, Ill.—This company has filed a deed making the Windsor Trust Company, New York, N. Y., trustee in an authorized bond issue of $2,500,000. The company contemplates building an electric railway from Decatur to Mattoon, Ill., a distance of 48 miles. [E. R. J., June 20, '08.]

Tri-City & Northeastern Interurban Railway, Port Byron, Ill.—Preparations are being made by this company for making new surveys through Rapid City and Cordova. The work will be done under the direction of Wallace Treckler, chief engineer. [E. R. J., April 3, '09.]

Illinois Traction System, Springfield, Ill.—H. E. Chubbuck, general manager, is said to have announced plans for the construction of an electric belt railway entering Springfield. The line will be built at a cost of $200,000. F. B. Martin, Decatur, will be in charge of the work. The line will be used exclusively for freight traffic and is expected to be ready for operation within five months.

***Kansas City, Kan.**—It is reported that Martin J. Reitz is promoting a crosstown street railway to run irregularly from Thirteenth Street and Minnesota Avenue to Eighteenth Street and Muncie Boulevard in West Armourdale.

Central Kentucky Traction Company, Frankfort, Ky.—This company has awarded the contract for the construction of the proposed extension from Lexington to Nicholasville, 12 miles, to David Pepper, Jr., of Philadelphia. Swethurst & Allen, Philadelphia, will do the work. J. B. Crawford, Lexington, general manager.

Louisville (Ky.) Railway.—This company expects to let contracts within the next few days for the rebuilding of 8 miles of city track.

Boston & Northern Street Railway, Boston, Mass.—This company is said to have announced that it will expend $120,000 for improvements to its street railway and additional equipment for its power plant.

Oak Bluffs (Mass.) Street Railway.—This company expects to install during the summer a turn-out and will use a complete equipment of split switches, frogs and ground stands for a standard-gage, 45-lb. T-rail roadbed.

Guadalajara, Jalisco, Mex.—It is stated that the Southern Pacific Company has in contemplation an electric railway which will connect Guaymas with Aurora, San Jose de Guayma and Empalme. The proposed line would go westward to the Gulf beach beyond Aurora and the Hacienda Aranjuez to Empalme. It would be a scenic route about 16 miles in length.

Montana Rapid Transit Company, Helena, Mont.—F. W. Bibb, Helena, writes that this company plans to start construction work soon on a new 72-mile electric railway which is to connect Helena and Butte. The following towns are located along the route: East Helena, Montana City, Clancy, Alhambra, Jefferson, Beavertown, Amazon, Boulder, High Ore, Basin, Bernice, Calvin, Lowland, Woodville and Meadverville. Spurs will be constructed from East Helena to Lakeview, an amusement resort, also from Jefferson to Wickes, via Corbin. The company has secured the grade of the old Northern Pacific Railroad out of Helena and also the abandoned grade of the Great Northern Railroad from Weeks tunnel to Boulder. No contracts for material have been awarded as yet. The company has contracted with the United Missouri River Power Company for the necessary power to operate its lines. Officers: Jos. K. Toole, president; H. G. Pickett, vice-president; E. C. Day, secretary and treasurer. [E. R. J., April 17, '09.]

Babylon (N. Y.) Railroad.—The Public Service Commission of the Second District has authorized this company to extend its railway from its present terminus in Babylon to Amityville, a distance of about 5.81 miles.

Oneida (N. Y.) Railway.—This company has applied to the Public Service Commission of the Second District for permission to build an extension from Sherrill to Kenwood.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y.—The Public Service Commission of the Second District has granted the application of this company for permission to construct an extension of its railway from Seneca Falls across Cayuga Lake to Auburn. The order requires that the detailed plans for the crossing of Cayuga Lake be filed and approved by the commission before actual construction is started. The commission has also granted the company permission to change its name to the Geneva & Auburn Railway.

Northern Ohio Traction & Light Company, Akron, Ohio.—It is stated that this company is considering the advisability of building an electric railway between Akron and Massillon, over a right-of-way that was purchased and partly graded several years ago.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.—It is stated that this company plans to extend its railway to Rising Sun. The company is planning to extend its line to Scottsburg also, with a view of connecting with the Indianapolis & Louisville Traction Company, affording direct connection to Indianapolis and Louisville.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—The directors of the chamber of commerce and J. J. Breitinger, Cleveland, president of this company, recently held a special conference and discussed plans for the proposed railway entering Zanesville and also securing rights-of-way in the city. Mr. Breitinger stated that matters had so far progressed that the company was about ready to take up the work of a franchise with the City Council. The route entering the city has not yet been decided upon definitely. It is stated that construction work will be started at Coshocton by June 15. A power plant will be built at Otsego. [E. R. J., April 10, '09.]

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.—This company expects to place contracts during the next two weeks for special work to be used in connection with the Tiffin, Fostoria & Eastern Electric Railway so as to establish a union freight station.

People's Railway, New Hamburg, Ont.—Official announcement is made that this company expects to begin the construction of its proposed electric railway within the next few weeks. This line will connect Stratford, Woodstock, New Hamburg, Berlin, Guelph and intervening towns. It will be about 88 miles in length. The company intends to use 2800 ties to the mile and the track will be laid with 70-lb. steel rails with continuous rail joints and electrically welded bonds. Catenary construction will be installed. Power will be purchased from the Hydro-Electric Power Commission. A. N. Warfield, New Hamburg, construction engineer. [E. R. J., April 10, '09.]

Wasco County Electric & Power Company, Portland, Ore.—At the annual meeting of the stockholders of this company, held at Condon on May 13, a new board of directors and the following officers were elected: George S. Carpenter, president; H. I. Keeney, first vice-president; George Ainslie, second vice-president; Mark W. Gill, third vice-president; F. T. Hurlburt, treasurer; C. W. Lord, secretary; C. S. Greaves, assistant secretary; W. H. Hurlburt, general manager; H. C. Smith, superintendent. The electric railway to be built by this company will enter the Deschutes and John Day valleys and will be built south from Condon to Antelope Madras and Bend. Branches will be built to Howard and Dayville. [E. R. J., Nov. 7, '08.]

Southern Cambria Railway, Johnstown, Pa.—This company is said to have approved the plans prepared by the Tennis Construction Company for a viaduct entrance into South Fork and has authorized the building committee to contract with various bidders in order that work may begin in the immediate future. The viaduct will be 525 ft. long.

York (Pa.) Railways.—It is said that this company is planning to expend $100,000 for extensions and various other improvements if it can obtain certain concessions from the city.

San Antonio (Tex.) Traction Company.—This company expects to build at once a 3-mile extension to its street railway.

Pacific Traction Company, Tacoma, Wash.—This company has awarded a contract to Dibble & Hawthorne, Tacoma, for double tracking and relaying the tracks on paved streets in this city.

Vancouver (Wash.) Traction Company.—It is stated that this company has plans under consideration for extending its railway from Vancouver east to Camas, a distance of about 12 miles.

Grand Rapids (Wis.) Street Railroad.—This company is said to have placed a contract with the Knox Construction Company, Chicago, Ill., for the construction of its proposed electric railway, which is to connect Grand Rapids, Port Edwards and Nekoosa, 7 miles. [E. R. J., May 15, '09.]

SHOPS AND BUILDINGS

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—It is stated that this company will, during the summer, erect a new passenger and freight depot at Maine Street, Vallejo. The structure will cost, it is estimated, $20,000.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—It is stated that this company will soon award contracts for a new freight depot to be erected at First Street and National Avenue, Milwaukee.

Nevada Interurban Railway, Reno, Nev.—This company is engaged in erecting a new car house at a point midway between Reno and Moana Springs.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded a contract to Naylor Brothers, Huddersfield, Eng., for the enlargement of its hydraulic tunnel connecting Lakes Coquitlam and Buntzen. The capacity of the tunnel will be trebled by the improvement which is undertaken in connection with the construction of the new dam at the mouth of Lake Coquitlam, for which permission was recently given by the provincial authorities of British Columbia.

Southern Pacific Railroad, Los Angeles, Cal.—Construction is now under way on the power station of this company at Fruitvale which is to furnish power for the electrification of lines in Oakland, Alameda and Berkeley. The dimensions of the building are 228 ft. x 138 ft. and it will be three stories high. The exterior walls of the building, up to the height of the first-story windows, will be constructed of concrete finished on the exterior in cement stucco. The walls above this concrete work will be constructed of dark-red brick.

United Railroads, San Francisco, Cal.—This company expects to purchase about 20,000-kw motor generator sets for substations.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—John F. Vail, general manager, writes that this company is planning to increase the boiler capacity of its power plant by the installation of 1000 hp in boilers.

Savannah (Ga.) Electric Company.—This company has purchased recently a 1000-kw Allis-Chalmers steam turbine.

Louisville (Ky.) Railway.—This company plans to build a new boiler house which will necessitate the purchase of 2000 hp in boilers.

Old Colony Street Railway, Boston, Mass.—This company has plans under way to increase the efficiency of its service by providing for a secondary high-tension circuit all the way from the main power station in Quincy to Fall River. The secondary system will extend over the present course, the same poles and route to be used, passing through Brockton and Bridgewater to Taunton and Fall River, through the same transforming stations.

Grand Forks (N. D.) Street Railway.—This company advises that it is considering the purchase of the following second-hand power-plant equipment: 1 100-kw belted railway generator, 550-600 volts; 1 250-kw, 550-volt generator direct connected to a compound condensing engine; boilers, condensers, heaters, switchboard, etc., complete.

Morris County Traction Company, Morristown, N. J.—It is announced that this company will soon let contracts for additional power-plant equipment.

Rochester Railway & Light Company, Rochester, N. Y.—This company is said to contemplate installing a 1500-kw transformer in its substation at Mill Street and Commercial Street.

Kenosha (Wis.) Electric Railway.—It is stated that this company has secured a site for a new power station which it proposes to build at an estimated cost of about $75,000.

Manufactures & Supplies

ROLLING STOCK

San Antonio (Tex.) Traction Company is having 10 cars built by the American Car Company.

Rockford & Interurban Railway, Rockford, Ill., is in the market for four city cars for fall delivery.

Sapulpa (Okla.) Interurban Railway has ordered four cars from the St. Louis Car Company, St. Louis.

Dallas (Tex.) Electric Corporation, it is reported, will purchase two pay-as-you-enter cars through Stone & Webster.

Houston (Tex.) Electric Company has purchased one Warner non-parallel axle truck from the St. Louis Car Company.

Indiana Union Traction Company, Anderson, Ind., has purchased one 18-ft. motor car from the Dorner Railway Equipment Company, Chicago.

Beaumont (Tex.) Traction Company, which recently ordered five cars from the St. Louis Car Company, has just received these cars and placed them in service.

Portsmouth (N. H.) Electric Railway expects to purchase 20 fare registers within a month. The style of register to be bought has not been decided on.

Savannah (Ga.) Electric Company expects to build two single-truck, closed cars in its own shops. The company has purchased two GE-67 four-motor equipments.

Springfield (Mass.) Street Railway has not definitely decided on rolling stock to be purchased this season, as mentioned in the Electric Railway Journal of May 22, 1909.

Grand Valley Railway, Brantford, Ont., has decided not to purchase any new cars until next spring. Mention of the contemplated purchase of cars was made in the Electric Railway Journal of May 15, 1909.

Sheffield Car Company, Three Rivers, Mich., has placed an order with the Taylor Electric Truck Company for 12 trucks. These trucks will be used for gasoline inspection cars which the company is building.

Southern Wisconsin Railway, Madison, Wis., has ordered one car from the American Car Company. This is a sample car for which the company was reported in the Electric Railway Journal of March 6, 1909, to be in the market.

Chicago (Ill.) Railways Company will receive this week the first shipment of three all-steel cars from the Pressed Steel Car Company. The balance of the order for 50 all-steel cars which was placed last year will be received and placed in operation during the next 60 days.

Hattiesburg (Miss.) Traction Company has purchased four 20 rebuilt Pullman cars from the Dorner Railway Equipment Company. These cars are mounted on Brill 21-E trucks and are equipped with Westinghouse motors. Mention of the contemplated purchase of six cars was made in the Electric Railway Journal of Feb. 20, 1909.

Grand Forks (N. D.) Street Railway, mentioned in the Electric Railway Journal of May 8, 1909, as having ordered three cars from the American Car Company, advises that these cars will be mounted on single trucks, will be 20 ft. 8 in. in body length, will have a seating capacity of 32, and will be equipped with Smith heaters and two GE-57 motors.

Interborough Rapid Transit Company, New York, N. Y., has placed the order for 40 trailer cars for elevated service, dividing it equally between the St. Louis Car Company and the Wason Manufacturing Company. The contract for the motor cars was let as follows: Jewett Car Company, Newark, Ohio, 20 cars; Barney & Smith Car Company, Dayton, Ohio, 40 cars.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., reported in the Electric Railway Journal of April 24, 1909, as having purchased five cars from the St. Louis Car Company, advises that these cars will have 28-ft. 8-in. bodies, will be equipped with Brill No. 22 special maximum traction trucks and GE-210 motors and will be built under the license of the Pay-As-You-Enter Car Corporation.

Washington Water Power Company, Spokane, Wash., has placed an order with The J. G. Brill Company for 15 new double-truck cars for city service. The cars will be double end and equipped with four GE-80 motors each, contactor control, Hunter illuminated signs, Midvale steel wheels, Symington center and side bearings, Symington journal boxes, International registers, Brooklyn Heights headlights and Consolidated heaters.

Portland Railway, Light & Power Company, Portland, Ore., has drawn the following specifications for the 40 pay-as-you-enter cars bought from the American Car Com-

pany, other than those mentioned in the ELECTRIC RAILWAY JOURNAL of May 22, 1909:

Width over sills...7 ft. 2 in.	Headlights .. Crouse-Hinds
Over posts at belt..8 ft. 2 in.	Motors .....2 GE
Height from top of rail to sills.....2 ft. 7 3/16 in.	Push-button signal.L. M. E. Telephone Manufacturing Company
Interior trim.....Cherry	Sanders .....De Witt
Axles.....Jones & Laughlin	Safety treads.....Universal
Couplers..Van Dorn or Tomlinson	Trucks .....Eureka
Curtain fix....Curtain S. Co.	Varnish ..... Murphy
Destination signs....Hunter	Wheels ..... Griffin

Grand Rapids (Mich.) Railway has drawn up the details of the 12 pay-as-you-enter cars, reported in the ELECTRIC RAILWAY JOURNAL of April 10, 1909, as being built by the American Car Company, as follows:

Seating capacity 36	Axles ..... Brill
Weight, body.....28,000 lb.	Curtain fix....Curtain S. Co.
Length of body.....30 ft.	Curtain material...Pantasote
Over vestibule....46 ft. 4 in.	Fare boxes ..... Brill
Width over sills..8 ft. 5½ in.	Gears and pinions.....GE
Over posts at belt..8 ft. 9 in.	Gongs ..... Dedenda
Sill to trolley base.....9 ft.	Hand brakes ..... Brill
Height from top of rail to sills.....3 ft. 1¼ in.	Heating system.Peter Smith
Body ..... wood	Headlights .. Crouse-Hinds
Interior trim, Cherry and ash	Motors GE-210
Underframe ..... wood	Seats ..... Hale & Kilburn
Air brakes.....GE	Safety treads.....Universal
	Trucks..Brill Special No. 22

Tri-City Railway, Davenport, Ia., which was reported in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, to have ordered 10 cars, has placed the order with the Cincinnati Car Company, Cincinnati, Ohio. The specifications which will be followed are:

Length of body....21 ft. 6 in.	Fenders ..... Consolidated
Length over all.....33 ft.	Gongs ..... Dedenda
Width over all.....8 ft. 6 in.	Hand brakes .....Peacock
Sill to trolley base..7 ft. 8 in.	Heating system.Consolidated
Height from top of rail to sills.....2 ft. 4⅞ in.	Motors 2 GE-80
Body ..... ash	Paint ..... Willey
Interior trim.bird's-eye maple	Registers ..... International
Underframe...wood & metal	Roofs ..... Monitor
Couplers ..... Hovey	Sanders ..... Dumpit
Curtain fixtures.... National	Seats .....Hale & Kilburn
Curtain material...Pantasote	Step treads ...Carborundum
Destination signs.... Hunter	Trolley base.....U. S. No. 6
	Varnish ...Murphy—Chicago

The motors and registers will be installed by the railway company.

TRADE NOTES

Aluminum Company of America, Pittsburgh, Pa., has removed it Washington, D. C., office from 2204 Q Street to the Metropolitan Bank Building.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for equipping with its ventilators the 13 cars being built for the Rochester, Syracuse & Eastern Railway by the G. C. Kuhlman Car Company.

Francis X. Pund, vice-president of the D. T. Williams Valve Company, Cincinnati, Ohio, after a brief illness, died on May 8. In 1904, Mr. Pund with David T. Williams, formerly general manager of the Lunkenheimer Company, founded the D. T. Williams Valve Company. Mr. Pund is succeeded by Charles K. Thomas, formerly sales agent for the company.

Ohmer Fare Register Company, Dayton, Ohio, announces that the Detroit (Mich.) United Railway, which has 350 of its cars equipped with the Ohmer registers, has just given the Ohmer Fare Register Company another contract for equipping 241 cars, including equipment for the city lines at Ann Arbor, Pontiac, Port Huron, Mt. Clemens, and four additional interurban lines controlled by the Detroit United Railway. The Ohmer Fare Register Company has secured during the past few days contracts for installing the Ohmer system on six other properties.

Dayton Manufacturing Company, Dayton, Ohio, has secured the services of Franklyn M. Nicholl, who will aid the company in the promotion of sales of its curtain specialties for steam and electric railway cars. Mr. Nicholl is well known both as a railway man and as a salesman of railway supplies. For a number of years he was associated with the Rochester Railway Company, but later resigned his position to accept a place in the sales department of a truck manufacturer. During the past two years he has represented the O. M. Edwards Company as salesman in the central States.

Allis-Chalmers Company, Milwaukee, Wis., advises that the aggregate horse-power of its recent orders for electrical apparatus, mentioned in the ELECTRIC RAILWAY JOURNAL of May 29, 1909, page 1008, was 161,985 hp instead of 61,985 hp, as printed. The company reports that since Jan. 1, 1909, it has received orders for nearly 1000 air-brake equipments. These include straight air, straight-air emergency, combined straight and automatic air equipments and automatic air-brake equipments. Among the companies buying are the following: Tampa & Sulphur Springs Traction Company, Tampa, Fla.; Third Avenue Railroad, New York; Tarrytown & White Plains Railway, White Plains, N. Y.; Yonkers (N. Y.) Railway; Omaha & Council Bluffs Street Railway, Omaha, Neb.; Conestoga Traction Company, Lancaster, Pa.; Ogden Rapid Transit Company, Ogden, Utah; Atlantic Shore Line Railway, Kennebunk, Me.; General Construction Company, Omaha, Neb.; Sandusky, Norwalk & Mansfield Railway, Norwalk, Ohio; Shelbourne Falls & Colrain Street Railway, Shelbourne Falls, Mass.; Chester (Pa.) Traction Company; Lebanon Valley Street Railway, Lebanon, Pa.; Rochester (N. Y.) Railway; Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.; Transit Supply Company, Minneapolis, Minn.; Chicago (Ill.) City Railway.

Western Electric Company, Chicago, Ill., in April made a slightly better showing than in March, which was the best month in the fiscal year to that time. Sales in April, 1909, were nearly 50 per cent ahead of the sales for April, 1908. The company has expanded steadily during the last 10 years, the high record being reached in 1906, when sales ran up to $69,245,331, an increase of more than $25,000,000 over the preceding year. At the present time the Western Electric Company is operating at the annual rate of 65 per cent of the record of 1906 and about 85 per cent of the record of 1907, which was the second best year in the company's history with sales totalling $52,724,168. Demand for electrical supplies and electrical machinery is fully up to that of March and the business in small and moderate-size motors and generators is the best in the company's history. This is partly explainable by the fact that manufacturers have found it more economical, especially in cities where current is cheap and easily available, to give up the use of steam power and run their plants by many small motors, which are easily moved about from place to place and consume current only when in active operation.

ADVERTISING LITERATURE

F. Bissell Company, Toledo, Ohio, has issued a pamphlet describing electric sign receptacles.

British Thomson-Houston Company, Ltd., Rugby, England, is mailing a slip illustrating its B.-T.-H. motor-starting rheostats.

Detroit Sanitary Rag Company, Detroit, Mich., is sending out a folder describing the advantages of its sanitary wiping rags.

Lord Electric Company, 213 West Fortieth Street, New York, has published Bulletin G on Earll trolley retrievers and catchers.

National Brake Company, Buffalo, N. Y., has issued a leaflet illustrating the Ackley brake and calling attention to its many new features.

Frank Ridlon Company, Boston, Mass., has printed a new catalog illustrating principally its shop specialties for armature, field, commutator and bearing work.

Joseph Dixon Company, Newark, N. J., has printed a booklet on belt dressing which includes data for calculating the speed of pulleys and the horse-power of belting.

Elmer P. Morris Company, New York, N. Y., is mailing a wall map showing the western hemisphere, the Panama Canal district and numerous examples of its overhead line specialties.

Electric Storage Battery Company, Philadelphia, Pa., has issued a bulletin entitled "The Use of the Chloride Accumulator in Connection with Electrically Operated Drawbridges."

General Electric Company, Schenectady, N. Y., announces Booklet No. 3779, containing a list of this company's snap switches. It has also issued Bulletins Nos. 4659 and 4660, respectively, describing Type I a.c. switchboard instruments and tungsten economy diffusers.

Wason Manufacturing Company, Springfield, Mass., has prepared a splendid publication of over 100 pages on its products. The text is given in English, German, French and Spanish. The greater part of the book illustrates passenger and freight cars built for steam or electric service, each car being accompanied by full data. Illustrated references are also made to trucks and to various general constructional details. Cable codes and indexes are included to add to the value of the publication as an order guide.

TABLE OF MONTHLY EARNINGS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting, are solicited by the editors. *Including taxes. †Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Apr. '09	151,906	89,586	62,320	43,779	18,541
	1 " " '08	129,804	32,252	47,552	44,029	3,523
BELLINGHAM, WASH., Whatcom Co. Ry. & Lt. Co.	1m., Mar. '09	32,172	18,063	14,109	8,190	5,919
	1 " " '08	28,561	15,973	12,588	8,017	4,571
	12 " " '09	369,849	214,972	154,879	101,554	53,325
	12 " " '08	301,811	202,997	158,814	91,244	67,570
BIRMINGHAM, ALA. Birmingham Ry., Lt. & Power Co.	1m., Mar. '09	181,818	*114,204	67,614	44,787	22,827
	1 " " '08	177,003	*112,686	64,317	42,863	21,454
	3 " " '09	551,015	*342,287	209,328	134,356	74,972
	3 " " '08	522,091	*348,338	173,753	130,168	43,586
CHARLESTON, S. C. Charleston Con. Ry. Gas & Elec. Co.	1m., Apr. '09	59,976	36,256	23,720	13,917	9,816
	1 " " '08	61,049	39,528	21,450	13,817	7,634
	2 " " '09	120,370	75,886	44,484	27,833	16,651
	2 " " '08	122,564	80,263	42,283	27,633	14,650
CHICAGO, ILL. Amora, Elgin & Chicago R. R. Co.	1m., Apr. '09	106,412	64,183	42,230	28,553	13,677
	1 " " '08	97,934	57,378	40,556	28,330	12,225
	10 " " '09	1,183,401	653,439	529,962	280,245	249,717
	10 " " '08	1,156,467	641,509	514,858	278,979	235,978
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1m., Apr. '09	21,807	*12,559	9,248	8,383	865
	1 " " '08	20,834	*11,713	9,121	7,974	1,148
	4 " " '09	77,620	*44,398	33,222	32,840	382
	4 " " '08	77,189	*43,670	33,519	31,828	1,691
Lake Shore Elec. Ry. Co.	1m., Apr. '09	78,574	*45,651	32,923	34,353	†1,430
	1 " " '08	73,200	*45,280	27,920	31,135	†3,215
DALLAS, TEX. Dallas Electric Corporation.	1m., Mar '09	102,667	62,996	39,671	28,918	10,753
	1 " " '08	87,997	61,758	26,239	29,327	†3,088
	12 " " '09	1,268,226	787,035	421,192	345,748	75,444
	12 " " '08	1,132,032	749,192	382,840	336,808	46,031
DETROIT, MICH., Detroit United Ry. Co.	1m., Apr. '09	619,724	374,202	245,502	*154,155	91,347
	1 " " '08	551,101	*350,426	200,735	134,249	66,486
	4 " " '09	2,322,302	1,438,353	883,949	*614,404	269,545
	4 " " '08	2,069,47	1,360,240	709,231	540,132	169,099
EL PASO, TEX. El Paso Elec. Co.	1m., Mar '09	45,602	29,005	16,597	7,911	8,686
	1 " " '08	43,641	32,567	11,074	7,070	4,004
	12 " " '09	542,404	377,654	164,750	89,198	75,552
	12 " " '08	526,859	375,507	151,352	74,678	76,674
FAIRMONT, W. VA. Fairmont & Clarksburg Tr. Co.	1m., Mar. '09	33,085	13,189	19,896		
	1 " " '08	27,816	11,688	16,129		
	3 " " '09	93,153	37,934	55,219		
	3 " " '08	85,980	36,096	49,884		
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1m., Mar '09	105,812	64,721	41,091		
	1 " " '08	97,760	58,256	39,504		
	3 " " '09	314,721	187,284	127,437		
	3 " " '08	298,235	172,433	125,802		
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Mar. '09	109,013	60,357	48,656	17,173	31,482
	1 " " '08	91,051	48,403	43,248	14,269	28,979
	12 " " '09	1,124,025	657,058	466,967	198,310	268,657
	12 " " '08	1,004,116	592,853	471,263	163,030	308,233
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Mar. '09	95,011	59,070	36,535	21,578	14,957
	1 " " '08	83,539	51,033	32,505	20,476	12,029
	12 " " '09	1,119,176	649,063	470,113	249,067	221,046
	12 " " '08	1,063,113	628,093	453,021	232,631	202,390
HOUGHTON, MICH. Houghton County Tr. Co.	1m., Mar. '09	25,457	14,906	10,551	5,797	4,754
	1 " " '08	19,773	12,259	7,514	4,807	2,708
	12 " " '09	280,676	150,311	124,365	01,618	62,747
	12 " " '08	254,141	144,295	109,846	57,396	52,450
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Mar '09	41,047	23,591	17,457	9,558	7,899
	1 " " '08	36,965	21,983	14,982	9,184	5,798
	12 " " '09	445,411	259,254	186,157	112,155	74,002
	12 " " '08	397,658	237,307	160,351	92,936	67,414
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Mar. '09	548,061	303,888	244,174	154,370	89,803
	1 " " '08	488,741	267,037	221,704	153,824	67,880
	10 " " '09	5,397,181	3,054,437	2,342,744	1,544,973	797,772
	10 " " '08	5,127,918	2,658,672	2,469,246	1,532,896	936,351
KNOXVILLE, TENN. Knoxville Ry. & Lt. Co.	1m Mar. '09	47,131	*24,158	22,972	11,483	11,489
	1 " " '08	46,522	*23,251	23,270	11,623	11,647
	3 " " '09	139,215	*71,428	67,787	34,450	33,337
	3 " " '08	128,017	*73,346	54,672	34,469	20,203
LEXINGTON, KY. Lexington & Interurban Rys.	1m., Mar. '09	40,957	34,703	6,254		
	1 " " '08	43,985	31,380	12,605		
	3 " " '09	119,725	94,774	24,951		
	3 " " '08	120,954	87,975	32,980		
LITTLE ROCK ARK. Little Rock Ry. & Elec. Co.	1m., Mar. '09	56,589	*27,949	29,040	11,023	18,017
	1 " " '08	56,552	*28,220	28,326	8,191	20,136
	3 " " '09	171,031	*82,189	88,842	32,784	56,058
	3 " " '08	163,509	*81,439	82,070	27,500	54,570
MEMPHIS, TENN. Memphis St. Ry. Co.	1m., Mar. '09	133,151	*84,512	48,639	35,489	13,150
	1 " " '08	128,857	*83,705	45,152	34,836	10,316
	3 " " '09	379,712	*246,331	133,382	106,340	27,042
	3 " " '08	360,264	*237,464	122,799	103,786	19,013
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Apr. '09	339,718	167,001	172,717	103,841	68,876
	1 " " '08	309,848	157,762	152,085	93,024	59,061
	4 " " '09	1,341,187	688,407	652,780	411,807	240,972
	4 " " '08	1,233,854	676,293	557,561	383,486	174,075
Milwaukee Lt. Ht. & Trac. Co.	1m., Apr. '09	105,596	28,552	77,045	60,730	16,315
	1 " " '08	100,492	27,312	73,181	57,673	15,507
	4 " " '09	412,597	117,296	295,301	241,078	54,223
	4 " " '08	394,183	115,757	278,426	226,853	51,573
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Apr. '09	537,049	261,714	275,335	140,367	134,968
	1 " " '08	493,497	246,325	247,172	126,075	121,097
	4 " " '09	2,087,748	1,100,631	987,117	547,256	439,861
	4 " " '08	1,901,956	1,010,994	890,962	494,207	396,756
MONTREAL, CAN. Montreal St. Ry.	1m., Apr. '09	294,374	173,552	120,822	37,625	83,199
	1 " " '08	280,736	170,141	110,595	37,495	73,099
	7 " " '09	2,107,716	1,339,935	767,781	218,866	548,915
	7 " " '08	2,027,873	1,316,007	711,866	224,109	487,757
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Mar. '09	156,394	93,720	62,674	.....	.....
	1 " " '08	138,792	88,061	50,731	.....	.....
	3 " " '09	468,558	269,744	198,814	.....	.....
	3 " " '08	415,452	274,961	140,491	.....	.....
OAKLAND, CAL. Oakland Traction Co.	1m., Mar. '09	233,992	116,302	117,690	45,367	72,323
	1 " " '08	232,494	108,636	123,858	45,872	77,986
	3 " " '09	653,675	277,590	326,085	136,101	189,984
	3 " " '08	668,170	337,844	330,326	137,534	192,792
San Francisco, Oakland & San Jose Cons. Ry.	1m., Mar. '09	75,166	34,749	40,417	23,142	17,275
	1 " " '08	74,598	38,228	36,370	20,852	15,518
	3 " " '09	213,949	102,037	111,912	69,426	42,486
	3 " " '08	213,031	110,462	102,569	62,556	40,013
PADUCAH, KY. Paducah Traction & Light Co.	1m., Mar. '09	17,641	10,855	6,785	7,064	†279
	1 " " '08	18,304	8,976	9,328	7,038	2,290
	12 " " '09	224,435	133,677	90,758	82,601	8,158
	12 " " '08	236,597	147,056	89,540	82,886	6,654
PENSACOLA, FLA. Pensacola Electric Co.	1m., Mar. '09	19,013	11,549	7,464	4,339	3,125
	1 " " '08	19,205	13,320	5,886	4,165	1,721
	12 " " '09	214,323	138,677	75,646	51,808	23,837
	12 " " '08	228,927	152,131	76,796	48,745	28,051
PHILADELPHIA, PA. American Rys. Co.	1m., Apr. '09	222,076	.....	.....	.....	.....
	1 " " '08	213,955	.....	.....	.....	.....
	10 " " '09	2,330,260	.....	.....	.....	.....
	10 " " '08	2,394,999	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Mar. '09	7,580	6,393	1,186	1,980	†794
	1 " " '08	7,254	6,293	961	2,382	†1,421
	12 " " '09	123,479	86,112	37,367	25,925	11,442
	12 " " '08	121,037	86,324	34,714	27,370	7,343
PORTLAND, ORE. Portland Ry., Lt. & Pwr. Co.	1m., Apr. '09	377,488	170,838	206,650	*123,611	83,039
	1 " " '08	341,493	177,669	163,824	*114,521	48,303
	4 " " '09	1,442,446	699,812	742,634	*484,134	258,500
	4 " " '08	1,350,758	699,383	651,375	*468,113	182,262
ST. JOSEPH, MO. St. Joseph Ry., Lt., Heat & Pwr. Co.	1m., Apr. '09	72,440	41,782	30,658	*20,819	9,839
	1 " " '08	64,699	36,651	28,048	20,341	7,707
	4 " " '09	300,637	162,649	137,988	*83,332	54,656
	4 " " '08	268,265	146,157	122,108	81,463	40,645
ST. LOUIS, MO. United Railways Co. of St. Louis.	1m., Apr. '09	911,654	*569 702	341,952	233,527	108,425
	1 " " '08	865,691	*570,663	295,028	232,274	62,754
	4 " " '09	3,452,002	*2,333,337	1,218,665	939,517	279,148
	4 " " '08	3,327,451	*2,203,696	1,123,755	932,437	191,318
SAVANNAH, GA. Savannah Elec. Co.	1m., Mar. '09	46,814	29,215	17,599	101,071	87
	1 " " '08	48,161	35,162	12,999	85,249	†4,095
	12 " " '09	600,274	369,179	231,095	1,132,906	23,317
	12 " " '08	604,044	409,143	194,901	976,643	†5,196
SEATTLE, WASH. Seattle Elec. Co.	1m., Apr. '09	420,416	262,079	158,338	101,071	57,266
	1 " " '08	354,887	214,536	140,351	85,249	55,101
	12 " " '09	4,655,154	2,738,293	1,916,861	1,132,906	783,954
	12 " " '08	4,285,313	2,559,755	1,725,558	976,643	748,915
TACOMA, WASH. Puget Sound Elec. Ry. Co.	1m., Mar. '09	146,287	103,166	43,120	45,911	†2,790
	1 " " '08	127,448	83,035	44,413	42,154	2,259
	12 " " '09	1,729,026	1,150,308	578,719	523,431	55,288
	12 " " '08	1 689 304	1,047,239	642,065	476,916	165,150
TAMPA, FLA. Tampa Elec. Co.	1m., Mar. '09	48,176	27,702	20,475	4,609	15,8
	1 " " '08	43,121	29,234	13,887	2,236	11,65
	12 " " '09	568,226	365,701	202,505	47,078	155,427
	12 " " '08	531,949	380,420	151,528	17,438	134,090
TOLEDO, O. Toledo Rys. & Light Co.	1m., Apr. '09	215,553	122,473	93,080	70,915	22,165
	1 " " '08	202,342	109,216	93,126	70,702	22,424
	4 " " '09	873,085	494,498	378,587	283,781	94,806
	4 " " '08	832,327	465,486	366,841	276,655	90,186

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JUNE 12, 1909 No. 24

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL 9000 *copies are printed.*

Change in Date for Denver Convention

Official announcement is made of a change in the date for the Denver convention of the American Street & Interurban Railway Association and affiliated associations. It has now been determined to hold the convention during the week beginning October 4, instead of two weeks later as was announced originally. The reasons why this change is advantageous and in the interests of the delegates are made plain in the announcement which is published in another part of this issue. Undoubtedly, as the official statement suggests, many of those who have to travel from Eastern points to attend this convention will want to use the opportunity to go to the Alaska-Yukon-Pacific Exposition at Seattle or to travel to other points on the Pacific coast. The earlier date will permit those who plan an extended trip to take advantage of the excursion rates made by the railroads on account of the Seattle exposition. The change will therefore be of especial interest to delegates east of Denver. While it is still too early to judge definitely of the number who will attend the meeting of the American Association and the allied organizations, all reports indicate that the arrangements, as expected, have aroused widespread interest in the West and plans are under way for a good attendance from various Eastern points.

Shop Bookkeeping

The merchant who opens a store, however small, is pretty certain to provide himself with a day-book and ledger so that he can watch the outgo and income of his business. In fact, some kind of accounting is considered a necessity in every commercial enterprise, yet it is often neglected in electric railway shops despite the fact that the maintenance department handles material of enormous value. If it is urged that a comprehensive and accurate system of shop accounting should be established, the responsible management may plead that the best master mechanic makes the poorest bookkeeper. This excuse assumes that the shop superintendent himself would be pestered by many clerical details and his efficiency impaired in proportion. It is perfectly feasible, however, to have all necessary detail work done by a low-salaried shop clerk, leaving only the actual analysis of the figures to the master mechanic. If there are several shops, it would be even better to concentrate all records of importance at the executive offices where all cost and mileage calculations could be made.

A detailed record of equipment life and troubles is absolutely necessary if maximum economy is desirable in the first cost and the maintenance expense of apparatus. Without the aid of statistics, the master mechanic would be unable to recommend the purchase of material except on the basis of his personal technical knowledge. Unless he is further supplied with the cost per mile figures and other data embodying experiences throughout the system, he is in no position to give the company a properly-grounded opinion. If he is asked to decide on carbon brushes, he should have before him a record of mileages, breakages and rough commutators under like service conditions; if the subject is the choice of a bearing metal, he should know the life of each alloy and its relation to hot journals and dropped armatures; if it is a question of insulation, he

should be able to report on the limiting values of each compound; and so throughout the list, he should always have the facility to survey every side of the problem presented to him. In short, no railway is getting the full value of its expenditures unless it gives its maintenance experts every opportunity to reach just conclusions on the relative merits of the costly equipment and material placed in their charge.

Oil Engines

Although little is heard of oil engines in this country they seem to be used to a considerable extent abroad, and a paper comparing this type of engine and steam and gas engines was recently presented at a meeting of the British Institution of Electrical Engineers by the late manager of the Calcutta tramways. This road has had in use a 1000-hp plant for almost a year without a hitch of any kind and the paper as a whole gives the oil engine an excellent character. Its thermal efficiency at full load when burning petroleum of about 18,500 b.t.u. per pound is in the neighborhood of 45 per cent, and its mechanical efficiency about 70 per cent, making the total thermodynamic efficiency in the neighborhood of 30 per cent. The oil engine can be started up by compressed air within a few minutes of the time that work is expected of it, so that there are practically no more costly standby losses, and the labor in connection with fuel handling and boiler or producer plant is eliminated. It is also said that there is much less to get out of order in an oil-engine plant than with a steam or gas-engine station, an important consideration in places where skilled labor is scarce or expensive. Under these circumstances it is interesting to note that makers are prepared to build engines in sizes up to 4000 hp, although 800 hp is the largest yet constructed. The discussion brought out no serious objections to the arguments presented except the possible fluctuations in the price of fuel oil. But this would probably be of greater force in Great Britain than in this country.

Uncollected Taxes in New York

Ten years ago a strenuous Governor of New York State called the Legislature together in special session, to enact a bill which constituted a novel departure in corporation taxation. The public service companies, it was said, were the possessors of property of enormous value, called franchises, which had been acquired for the most part at a time when the future value of franchises was not fully understood. It made no difference that fares, rates and service had become adjusted to existing conditions, or that new companies had been organized to conduct business on what their stockholders naturally expected to be stable conditions of taxation. Public opinion had been accelerated to such an anti-corporation attitude that the legislators could not stand the pressure, and the bill was passed. The principal advocate of that measure has long passed from the gubernatorial chair, and is now hunting lions in Africa. But the franchise taxes, still largely uncollected, remain in New York State, a specter to frighten intending investors and discourage improvements. The adjudication of these taxes has been referred from year to year by the attorney general to various referees, and a recent list of the cases in New York City still under consideration occupies over two columns in small type in one of the New York papers. It includes most, if not all, of the principal public service corporations, electric lighting, gas, steam and electric railway in New York, and stands as a warning to future lawmakers against impracticable and confiscatory legislation.

Subway and Elevated Traffic Changes

Comparative ticket sales on the Subway and Elevated systems of Manhattan in 1907 and 1908, published in another part of this issue, show tendencies of travel which are of interest to students of rapid transit movements in great cities. The significance of the figures lies in the well-understood tendency in New York toward an increase in subway traffic and decrease in travel on all of the various elevated lines.

The subway carried 220,991,212 passengers in 1908, an increase of 38,431,222, or 21.1 per cent over 1907. The elevated lines carried 273,855,136 passengers in 1908, a decline of 15,944,440, or 5.5 per cent from the record in the preceding year. All four of the elevated lines showed decreases, ranging from 7,433,385 in the case of the Third Avenue line to 2,289,274 on the Sixth Avenue line. The percentages of decrease in the number of passengers carried on the elevated lines, as compared with the preceding year, were as follows: Second Avenue line, 7.9 per cent; Third Avenue line, 5.7 per cent; Sixth Avenue line, 2.7 per cent; Ninth Avenue line, 8.8 per cent. The percentage of loss in travel was therefore the greatest in the case of the Ninth Avenue line, and lowest on Sixth Avenue.

The heaviest business on the subway division was at the Brooklyn Bridge Station, where nearly 17,000,000 tickets were sold in 1908; this is a decline of over 6,000,000 from the previous year and results from the opening of the Brooklyn subway extension. On the elevated division the principal point of business was at the City Hall Station on the Third Avenue line, where the number of tickets sold in 1908 was in excess of 11,000,000. No other elevated station approached this one in the volume of business handled. Some stations of abnormally light traffic also appear in the record. Total sales at the 215th Street Station, on the Broadway branch of the subway, in 1908, were 103,743 tickets, indicating a gross revenue for the year from this station of $5,187. The smallest station on the elevated division was at 127th Street on the Second Avenue line, where 291,801 tickets were reported sold in 1908, indicating a gross revenue of $14,590.

Elevated lines on Manhattan Island have passed through varying degrees of public favor. They lost traffic when the surface roads were first electrified, but regained it when electricity was substituted for steam locomotives as the motive power on the elevated. It is urged by the Interborough Rapid Transit Company that permission be given for the installation of express tracks on the Second and the Third Avenue elevated lines; the addition of these facilities would undoubtedly attract some business. The tendency to decrease in the patronage of the elevated lines may be withstood to some extent if the authorities will grant the company the right to provide more rapid transit on the elevated lines mentioned.

Transmitting Train Orders

We referred in these columns, last week, to some of the changes in the interurban code of rules of the American Street and Interurban Transportation and Traffic Association which were made by the committee at the conference held in Washington, D. C., on May 25. The revision of the rules relating to the movement of trains by train orders resulted in changes of a far more radical nature than were made in any of the rules which precede them in the book. This section of the interurban code as originally drafted departed widely from the American Railway Association standard code owing to the fact that it was based on the use of the telephone in transmitting train orders direct from the dispatcher to the train crews, whereas, the American Railway Association code assumes the use of the Morse telegraph with operators at train-order stations through whom the orders are transmitted and by them delivered to the train crews. The desire of the majority of the members of the committee to adopt, as far as possible, the wording and procedure of the American Railway Association code was, no doubt, responsible for the major part of the changes made which bring the two codes more nearly in accord in this important respect.

Telephone train despatching is a comparatively new art, the first recorded instance of its use being on the Boston, Revere Beach & Lynn Railroad in 1892. It involves some chances for errors not common with telegraph dispatching and these must be guarded against in new ways. The general practice on interurban electric railways of having the train crews communicate directly with the dispatcher also requires a method of procedure to be outlined which differs from that best safeguarding the transmission of orders through an agent.

In the original draft of the interurban code rule No. 256, prescribed a method which required both members of the train crew to leave the car to call the dispatcher and alternated in a confusing manner the duties and responsibilities of the motorman and conductor. The revised rule is in every respect an improvement over the original. The motorman reports to the dispatcher, writes the order on the proper blank and repeats it back to the dispatcher, who gives an O. K. if correct. This completes his part of the responsibility. The conductor then repeats the order from the written copy and if correct the dispatcher returns the "complete." When the conductor has signed the order with the time and his initials his responsibility ends and the order is in full force. This is a clear division of duties and provides the double check of two voices repeating the order, and having the second repetition read from the written copy. It is largely a question of expediency as to whether the motorman or the conductor first receives and writes the order, the important point being that both repeat it back to the dispatcher before the "complete" is given. The psychological question of whether the strongest impression is made on the mind of the motorman who first receives and writes the order or on the mind of the conductor who afterwards repeats it from the written copy is hardly worth arguing over. One objection, however, which might be raised against having the motorman write the order is that the conductor's handwriting is usually more legible because his fingers are not cramped and stiff from gripping the controller handle. In this connection mention can be made of the practice of at least one road having the conductor and motorman signal each other on approaching each siding. This serves as a reminder against running by a meeting or passing point.

The addition to rule No. 258 which was adopted by the committee, we believe, is inadequate and introduces a peculiar conflict with the original paragraph which should be straightened out before the final adoption of the rules by the Association. Rule No. 258, as it originally stood, provided for the agent displaying a stop signal on notice from the dispatcher, and "the motorman and conductor must not pass a station where such signals are displayed without reporting to the dispatcher." The paragraph added provides for the agent receiving and writing the order in advance of the arrival of the train and delivering it to the train crew without notification to the dispatcher that the order actually has been delivered. The original rule makes it mandatory for the train crew to report to the dispatcher and the additional paragraph permits them to proceed after receiving orders from the agent without calling the dispatcher.

The effect of this rule is practically to nullify the safeguards provided for the use of a form "31" train order, which was adopted together with form "19" in place of the printed order form originally included in the code. The American Railway Association code provides that the "31" order shall be used when the signatures of those to whom it is addressed are desired, as for example in fixing a meeting point for two trains, and "complete" is not given by the dispatcher until after it has been read, signed and the initials of those who have signed it have been repeated back. The dispatcher thus has positive assurance that the order has been delivered to the proper persons. The rule adopted by the conference places the entire responsibility of receiving and delivering the order on the agent and the dispatcher has no notification that the order actually has been delivered. At the risk of making the rules more complicated we believe it would have been wiser to have incorporated the substance of rules Nos. 210 and 211 of the American Railway Association code.

The printed form of train-order blank with spaces left for writing in the orders, which was included in the rules as submitted to the association last fall, has been abandoned in favor of the two standard forms, Nos. 19 and 31 of the American Railway Association. The only argument in favor of the printed blank is that it saves time in writing the order. On the other hand there are serious objections to it which were voiced by some of the railway managers present at the conference. The blank has printed spaces for writing seven different forms of orders prescribed. It has happened that train crews have received orders of form A and form L simultaneously and entered them on one blank. The meet order (from A) at the top of the blank has been observed, but the order of annullment (form L) at the bottom has been overlooked. It is difficult to write an order legibly in the restricted space allowed on the printed blank and there is a difference of opinion as to the possible saving of time by its use. The standard blank forms, with ruled lines to prevent errors in reading across, we believe are a decided improvement.

STANDARDIZATION IN BROOKLYN—CLASSIFICATION OF ROLLING STOCK AND POWER EQUIPMENT PRACTICE

The broader aspects of the car standardization and maintenance problem before the Brooklyn Rapid Transit Company have been dealt with in the first article in this series printed in the May 29 issue. It is now in order therefore to present a detailed classification of the rolling stock as it exists to-day with descriptions of the advances made in the power equipments for the elevated and surface cars. Reference will also be made in this article to the recent changes in gear and pinion ratio and to the graphic gear mileage records.

CAR CLASSIFICATION ON WEIGHT BASIS

A few months ago the mechanical department divided all of the elevated and surface cars according to weight to determine whether it would be feasible to keep equipment records on a ton-mile basis. The ton-mile is admittedly the logical unit of comparison where speed conditions do not vary much, but it seemed doubtful that it could be applied to the diverse types operated in Brooklyn. Nevertheless, a careful analysis of the rolling stock has demonstrated that this advance over the mileage method is possible, although special allowances may have to be made for variations in service.

WEIGHT CLASSIFICATION OF ELEVATED CARS

As shown in the accompanying schedule the elevated passenger cars have been divided by weight into four classes, E-1, E-2, E-3 and E-4, weighing respectively 19, 34, 36 and 39 tons. The approximate average weight per seated passenger in the E-1 trailer is 679 lb. The least average weight per passenger on the motor cars is shown by class 1000 (built originally for summer operation) with 1076 lb. and the highest by class 1400 with 1352 lb. This gradual increase in the weight per passenger is due to the adoption of a heavier car construction and more powerful motive apparatus. The pressed-steel, semi-convertible car now in service makes a very favorable showing with its average of 1288 lb., although its equipment does not differ from class 1400.

The cars in class E-1 represent the original steam coaches shown in Fig. 1, which were built up to 1893 and are now used as trailers with an average seating capacity of 50. Class E-2 consists partly of steam coaches converted to motor cars. There are some slight variations in the design and weight of these converted motor cars with the old-type Westinghouse drum control, but the center-door type shown in Fig. 2 is typical of a number still in service. It may be added that the center doors are not used and permanent seats have been provided in front of the same. The cars grouped in class E-3 consist of type 600 closed car, built in 1901, type 1000-1100 semi-convertible and convertible cars, built in 1903, and type 1200 semi-convertible, built in 1904. One of the type 1200 cars equipped with Westinghouse turret control is shown in Fig. 3. The 1000 type, also forming a part of class E-3, and shown in Fig. 4, is the company's first convertible motor car built in 1903 as an open car intended for the Coney Island traffic, but later provided with removable panels and ventilators. Class E-4 includes the more substantial convertible car of the 1300 type, introduced in 1905, which is illustrated in Fig. 5. The 1400 type included in the last group is a semi-convertible car which was fully described in the Street Railway Journal of Feb. 8, 1908. Classes 1200 and 1400 are substantially alike except that the former has two 150-hp motors and the latter two 200-hp interpole motors.

WEIGHT CLASSIFICATION OF SURFACE CARS

The surface cars have been divided into six "S" classes, corresponding to respective weights of 12, 14, 17, 18, 20 and 27 tons. The weight per seated passenger on closed cars has steadily risen from the 738 lb. in classes 300, 500 and 700 to the 1085 lb. of cars 4550-4599. The weights per passenger on the open cars vary from 360 lb. in classes 1800 and 2000 of single-truck cars to 407 lb. in classes 1200, 1400, 1600 of double-truck cars.

Class.	Car Nos.	Number of cars.	Type of cars.	Seating capacity.	Weight of cars, light, in lb.	Weight with pass.††
E-1	1-6, 8-125, 127-271	269	closed trailer	*50	*33,939	20
E-2	600-632, 683	34	closed motor	*51	*61,138	34
	700-743, 745-758	58	" "	50	62,400	
	800-820, 822-832	32	" "	50	61,500	
	833-858	26	" "	50	61,620	
	859	1	" "	50	64,200	
	900-935	36	" "	52	61,200	
	936	1	" "	52	61,950	
E-3	1000-1078, 1080, 1082-1119	118	convertible motor	60	†64,548	36
	1079, 1081	2	semi-convertible motor	51	67,350	
	1200-1299	100	semi-convertible motor	53	67,350	
	633-682	50	closed motor	52	67,050	
E-4	1300-1399	100	convertible motor	62	†73,230	39
	1400-1499	100	semi-convertible motor	53	71,659	
	998	1	all-steel, semi-convertible motor	56	70,660	

*Average.
†Weights are of cars equipped with sash for winter service.
††Average weight, in even tons, with 75 per cent of seated passenger load and 150 lb. per passenger.

Schedule of Weights—Elevated Passenger Cars

Class	Car Numbers	Number of cars	Type of cars	Seating capacity	Actual weight of cars, light, in lbs.	Average weight in even tons, with 75% of seated pass. load, at 150 lbs. per passenger	Average weight per seated passenger
S-1	100-176	77	Single truck, closed	30	18,700	..	623
	1800-1899, 2000-2004	105	" " open	50	18,000	12	360
	2005-2062	58	" " "	50	20,000	..	400
S-2	420-499, 600-699	180	Double truck, open	65	26,460	..	407
	800s, 1000s	200	" " "	65	26,460	..	407
	1200s, 1400s	200	" " "	65	26,460	..	407
	1600-1649	50	" " "	65	26,460	17	407
	2700, 2703	2	" " semi-conv.	38	28,250	..	743
	2701, 2702, 2704	3	" " "	32	28,250	..	883
	2705-2718	14	" " "	38	28,250	..	743
	2719-2764	46	" " "	32	28,250	..	883
	2766-2799	34	" " "	32	28,250	..	883
	2900-2914	15	" " "	32	28,880	..	902½
	2915-2924	10	" " "	38	28,880	..	760
	2925-2999	75	" " "	32	28,880	..	902½
	3100-3142	43	" " "	32	28,250	..	883
	3143-3154	12	" " "	32	28,880	..	902½
S-3	3155-3199	45	" " "	38	30,940	..	814
	3300-3362	63	" " "	38	30,940	18	814
	3363-3399	37	" " "	38	31,420	..	826
	3500-3554	55	" " "	38	31,420	..	826
S-4	200s, 400-419	120	Double truck, open	60	23,070	..	384
	300s, 500s, 700-786	254	" " closed	34	25,100	15	738
	788, 1700s, 1900s	151	" " "	34	25,100	..	738
	2100s	100	" " "	34	25,100	..	738
	787	1	Convertible	36	25,100	..	697
	789-795	7	Double truck, closed, drop sash	32	25,100	..	784
S-5	2500-2599	100	Double truck, semi-convertible	38	35,200	20	926
S-6	3555	1	Double truck, conv'ble.	48	.....	..	.....
	3556	1	" " "	48	53,100	..	1,106
	3700-3799, 3900-3924	125	" " "	48	49,630	..	1,034
	3925-3957	33	" " "	48	49,060	..	1,022
	3958-3974	17	" " "	48	47,212	..	982
	3975-3999	25	" " "	48	48,520	28	1,011
	4100-4199	100	" " "	48	50,064	..	1,043
	4300-4349	50	" " "	48	51,150	..	1,066
	4500-4549	50	" " "	48	50,830	..	1,085
	4550-4599	50	" " "	48	52,100	..	1,059

Schedule of Weights—Surface Passenger Cars

Typical examples of the surface cars most used in Brooklyn to-day are shown in Figs. 6 to 12, inclusive. Fig. 6 illustrates a single-truck open car with 10 benches built during 1893, 1894 and 1895; Fig. 7, the double-truck, 13-bench open cars of later design; Fig. 8, the semi-convertible

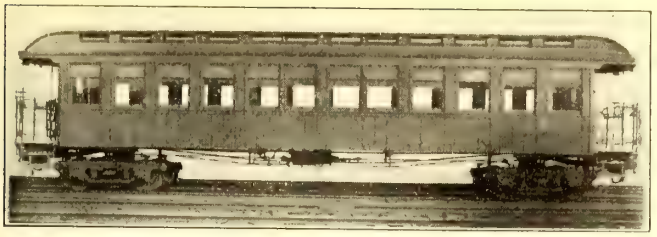


Fig. 1—Brooklyn Rolling Stock—Elevated Steam Car Converted to Electric Trailer

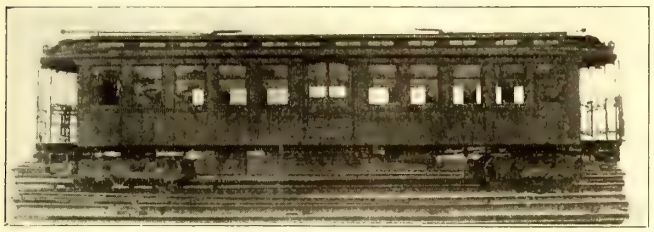


Fig. 2—Brooklyn Rolling Stock—Elevated Steam Car Converted to Electric Motor.



Fig. 3—Brooklyn Rolling Stock—Elevated Motor Car Fitted with Turret Control

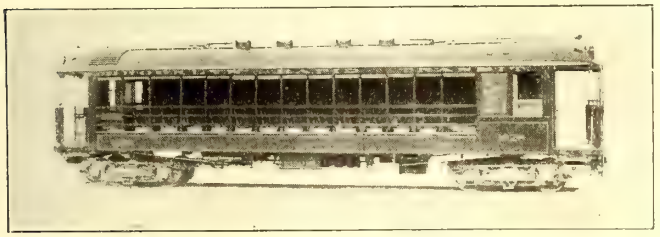


Fig. 4—Brooklyn Rolling Stock—Elevated Convertible Motor Car, Built Originally for Summer Service

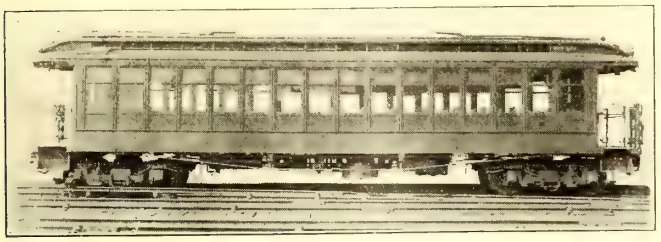


Fig. 5—Brooklyn Rolling Stock—Type 1300 of Elevated Convertible Motor Car

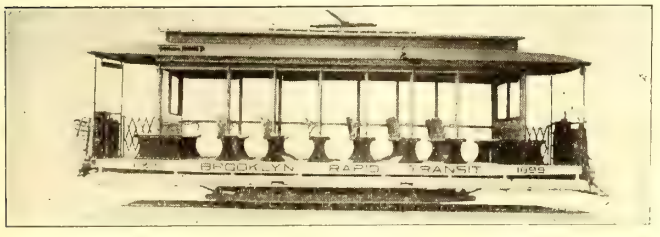


Fig. 6—Brooklyn Rolling Stock—Early Type of Single-Truck Open Car, with Ten Benches

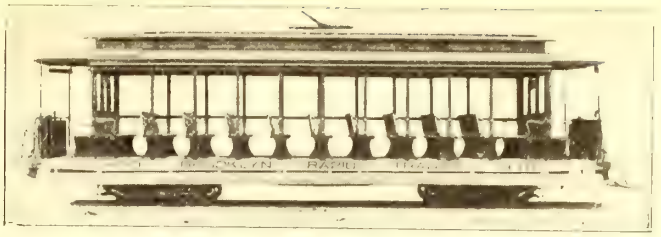


Fig. 7—Brooklyn Rolling Stock—Double-Truck Open Car, with Thirteen Benches

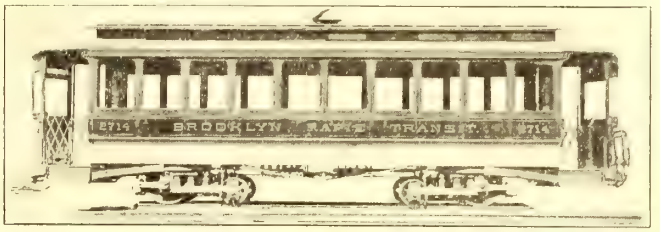


Fig. 8—Brooklyn Rolling Stock—Semi-Convertible Car, with Maximum Traction Trucks, 2700 Type



Fig. 9—Brooklyn Rolling Stock—Semi-Convertible Car, with Maximum Traction Trucks, 3500 Type

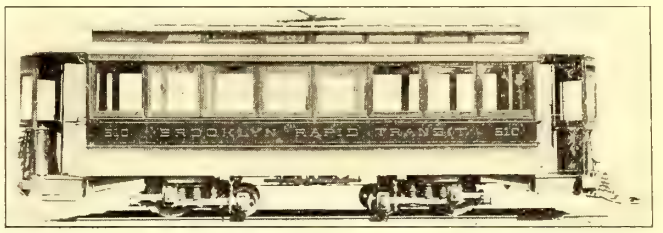


Fig. 10—Brooklyn Rolling Stock—Standard Closed Car with Maximum Traction Trucks



Fig. 11—Brooklyn Rolling Stock—Latest Type of Semi-Convertible Car, with Maximum Traction Trucks

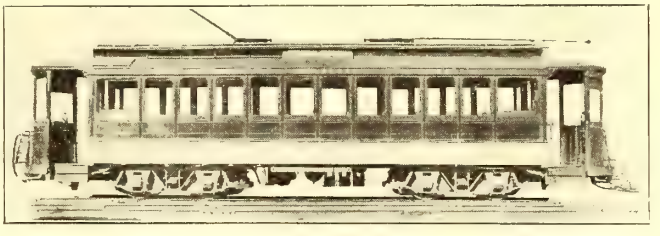


Fig. 12—Brooklyn Rolling Stock—Convertible Cross-Seat Car, with Air Brake Equipment

car built from 1902 to 1904, and Fig. 10, a closed car. Practically all of the single-truck cars carry two 40-hp motors and the double-truck cars two 60-hp motors.

The cars shown in Figs. 11 and 12 deserve special attention, as they represent two contrasting types built in large numbers since 1906. The class 2500 car,* with two 60-hp 926 lb. per passenger and is light enough for hand braking. It is rapid loading also because of longitudinal seating and accelerator doors and consequently is very desirable for rush-hour and Coney Island service. On the other hand, the average ride in Brooklyn is so long that the company thought it would best serve the convenience of its patrons by introducing a cross-seat car of the type shown in Fig. 12, equipped with four 40-hp motors and air brakes. Unfortunately, the clearance conditions in Brooklyn limited the over-all width of these cars to 8 ft. 2½ in., giving an aisle only 22¾ in. wide between the seats. As a result these cars have proved poor loaders. This disadvantage has been partially overcome in the class 4500 car by lengthening the longitudinal seats at the ends, but on the whole the class 2500 car makes just as good schedules with less power and is cheaper to maintain.

CLASSIFICATION ACCORDING TO POWER EQUIPMENT

In view of the extended articles previously published on the standardization of the elevated cars, it will be unnecessary to refer to their motive equipment at this time other than to point out that the company has shown its willingness to have the most advanced apparatus by adopting the Westinghouse 300, 200-hp commutating-pole motor for the class 1400 elevated cars. This represents an increase of fully 100 hp per car over the Westinghouse 50 E, B or L, 150 types previously installed. The new cars also carry the Westinghouse type 251-1-3 control instead of the turret system.

The standardization of the surface department has resulted in reducing the motive equipments to four types in passenger-car service. To attain this desirable end it was necessary to eliminate all GE-800, GE-1000, W. P. 50, Westinghouse 3 and Westinghouse 12 motors. The layout of the motors on the car is shown in the accompany table:

Style of car		Motors	Controllers	No. of cars
Convertible	4	40-hp West. 101 B, West. 68 or 4 GE80	K-28B	452
Semi-convertible with 28-ft. body	2	60-hp West. 81, West. 93-A-2 or GE64	K-11 and K-28L	554
Closed, double-truck with 25-ft. body	2	60-hp West. 81	K-11	513
Closed, single-truck	2	West. 68	K-11	77
12 and 13-bench double-truck	2	West. 68 permanently on 12-bench cars and equipments from 505 of the 25-ft. closed cars on 13-bench cars	K-11	750
Ten-bench single-truck	2	West. 68	K-11	163

MOTOR SPECIFICATIONS FOR ELEVATED AND SURFACE LINES

The motors which have been most recently adopted by the Brooklyn Rapid Transit Company are the following: West. 300 commutating pole motor for elevated lines; West. 93 A-2 motor for two-motor surface equipments, and GE80 and West. 101 for four-motor surface equipments. In view of this selection, the conditions which these several motors must fulfill should be of interest. The following data on each type is taken chiefly from the preliminary specifications prepared by the railway company for the motor maker.

*See Street Railway Journal, Nov. 2, 1907.

VOLTAGE AND RUNNING CONDITIONS FOR WEST. 300 MOTOR

The West. 300 elevated motor, while rated at 200 hp on 550 volts, operates under variations from 450 volts to 625 volts, the average being approximately 525 volts. It is capable of working on circuits up to 800 volts without producing flashes or sparks from the commutator and brush mechanism greater than the width of one commutator bar. To provide for a special service in conjunction with the Long Island Railroad, the motor has been built for operation on working pressures averaging 625 volts and having a normal maximum of 650 volts. At these voltages there must be no flashing when the greatest loads are such that the temperature rise of the motor does not exceed 75 deg. C. in the windings and 90 deg. C. in the commutator.

Two motors per motor car operate trains made up of motor cars and trailers over the Brooklyn Rapid Transit ele-

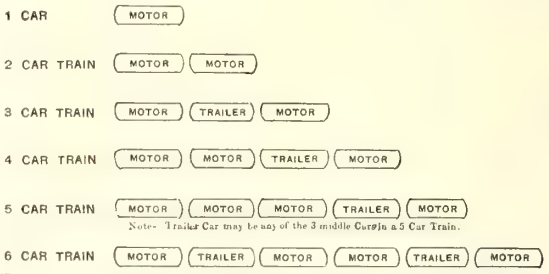


Fig. 13—Brooklyn Rolling Stock—Graphic Record of Elevated Train Make-up

vated system, which includes elevated lines, various surface lines connected thereto, and the Brooklyn and Williamsburg bridges. The most severe grades are one of 3 per cent for 1500 ft. on the Brooklyn Bridge and one of 4.6 per cent for 1100 ft. and 3.88 per cent for 1600 ft. on the Williamsburg Bridge.

The makeup of trains with these equipments varies as follows:

Train	Motor Car	Trailer
1	1	0
2	2	0
3	2	1
4	3	1
5	4	1
6	4	2

The makeup of elevated trains is also shown in one of the accompanying drawings. It may be added that the five-car train formerly had two trailers. The weights, dimensions and capacities of cars approximate the following:

MOTOR CARS

Weight of car and trucks complete, except motors and control	58,000 lb.
Weight of car completely equipped, empty	72,000 lb.
Weight of car completely equipped, loaded	92,700 lb.
Length of car body	40 ft. 5 in.
Length of car over all	48 ft. 11 in.
Number of seated passengers	53
Number of standing passengers	85
Total capacity	138

TRAILERS

Weight of car completely equipped, empty	34,000 lb.
Weight of car completely equipped, loaded	56,950 lb.
Length of car body	39 ft. 5 in.
Length of car over all	47 ft. 8¼ in.
Number of seated passengers	52
Number of standing passengers	161
Total capacity	153

The gear ratio of these motors is 19.64 and the accelera-

tion 1.75 m.p.h.p.s. The approximate weight of this motor without gears is 6000 lb., and with the gears and case 6400 lb. The service capacity of these equipments is such that they meet the following test conditions and requirements: Assume that the test train consists of five cars, three motor cars and two trailers.

Car wheels, 34 in. diameter.
Number of motors in train, 6.
Load, 27 tons per motor.
Length of run between stops, 1600 ft.
Duration of stops between runs, 15 seconds.
Schedule speed, including stops, 14.5 m.p.h
Line potential, 525 volts.
Test made on a level, tangent track.
Rate of braking, 1.5 m.p.h.p.s.

The above operating cycle must be repeated continuously during a period of 18 hours, with a temperature rise in the motors not exceeding 60 deg. C. in the windings and 80 deg. C. in the commutators, above the surrounding atmosphere.

REQUIREMENTS OF WEST. 93 A-2 MOTOR FOR TWO-MOTOR EQUIPMENTS

The 93 A-2 motors used two per surface car are rated at 60 hp at 500 volts. The weight of a complete motor with gears and case is about 3500 lb. These two-motor equipments are adapted for the operation of double-truck surface cars, 38 ft. long over all, mounted on maximum-traction trucks, and weighing, without motors, control equipment and passengers, approximately 28,000 lb. The car has a capacity of 39 passengers seated and 44 standing. The heaviest grade is one of 5.3 per cent for 1200 ft., this being a portion of a continuous grade of approximately 4000 ft. length. The motors when geared 17:70 accelerate a carload of 12 tons per motor at the rate of 1.5 m.p.h.p.s. from rest to the equivalent maximum speed without injurious sparking. The service capacity of the equipments is such that they meet the following conditions and requirements in a test made on single cars without trailers:

Wheel diameter, 33 in.
Load, 11 tons per motor.
Stops per mile, 10.
Duration of stops, 8 seconds each.
Schedule speed, including stops, 9 m.p.h.
Line potential, 525 volts, average.
Rate of braking, 1.5 m.p.h.p.s.
Track, level and tangent.

The above operating cycle must be repeated continuously during a period of 12 hours, with a temperature rise in the motors not exceeding 65 deg. C. in the windings and 80 deg. C. in the commutators above the surrounding atmosphere.

REQUIREMENTS FOR GE80 AND WEST. 101 FOUR-MOTOR EQUIPMENTS

The double-truck convertible cars carry four 40-hp, 500-volt motors, either GE80 or West. 101. The cars are 42 ft. 6 in. long, are mounted on Baldwin trucks, and weigh approximately 40,000 lb., without the motors, K-28 B control equipment and passengers. The car has seating capacity for 48 passengers and standing room for 38. Both motors are of the closed type, with nose suspension, and weigh about 2800 lb. each, including the gearing. The bottom half of the field frame is arranged to open downward for inspection and renewals.

The heaviest grade over which these equipments operate is 5.3 per cent for 1200 ft., this being a portion of a continuous grade about 4000 ft. long. The motors when geared 16:70 are capable of accelerating a carload of 7 tons per motor at the rate of 1.5 m.p.h.p.s. from rest to the equivalent maximum speed, without injurious sparking, and under level track conditions there is no injurious sparking of the motors at any time during 25 successive repetitions of this starting cycle.

The service capacity of the equipments is such that they meet the following conditions and requirements in a test to be made on single cars without trailers:

Wheel diameter, 33 in.
Load, 7 tons per motor.
Stops per mile, 10.
Duration of stops, 8 seconds each.
Schedule speed, including stops, 9 m.p.h.
Line potential, 525 volts, average.
Rate of braking, 1.5 m.p.h.p.s.
Track, level and tangent.

The above operating cycle must be repeated continuously during a period of 12 hours, with a temperature rise in the motors not exceeding 65 deg. C. in the windings and 80 deg. C. in the commutators above the surrounding atmosphere.

INCREASE IN GEAR RATIO

Early in 1907 the mechanical department made a detailed investigation of the speed question in its relation to power consumption and motor heating. This inquiry showed that the period when cars could operate at maximum speed was generally so brief that certain increases in the gear ratio could be made without affecting the schedules, more especially as the drop in maximum speed would be compensated for by higher acceleration. It was also understood that the saving in power would be accompanied by a decrease in the motor heating, which was then exceeding desirable limits.

The accompanying table gives a list of the motors that were in use on the surface division when the alterations in gear ratio were determined upon, and also presents comparisons in power consumption and speeds for the different ratios. The mileage shown in the table was determined by taking the average miles per car for the year 1906 and multiplying it by the estimated average number of cars planned for operation in 1907. The current consumption figures were taken from speed-time curves computed by the Westinghouse and General Electric companies for the several gear ratios indicated.

Average No. of cars operated during the year 1907.	Average weight of car with load in tons.	Type of motors.	No. of motors per car.	Total mileage a year.	Old gear ratio, speed and current consumption.					New gear ratio, speed and current consumption							
					No. of teeth in pinion.	No. of teeth in gear.	Gear ratio.	Maximum speed, m.p.h.	Current consumption in watt-hours per ton-mile.	No. of teeth in pinion.	No. of teeth in gear.	Gear ratio.	Per cent of increase in gear ratio.	Maximum speed, m.p.h.	Decrease of speed in m.p.h.	Current consumption in watt-hours per ton-mile.	Per cent of decrease in current consumption.	Per cent of equipment affected.
327	29	West. 101	4	7,886,913	16	68	4.25	27	177.2	14	70	5.00	17.6	23.5	3.5	157.0	11.39	21.06
112	19	West. 93	2	2,701,328	19	68	3.58	31.5	195.5	17	70	4.12	15.1	28.75	2.75	178.2	8.85	7.22
754	19	West. 81	2	18,185,726	18	68	3.77	31	188.5	16	70	4.38	16.17	28.25	2.75	171.8	8.86	48.55
143	..	West. 68	2	3,449,017	14	68	4.86	22	.....	14	68	4.86	0.00	22	0.00	.....	0.00	9.2
92	19	G. E. 64	2	2,218,948	19	68	3.58	25.5	148.0	17	70	4.12	15.1	21.5	4.00	140.0	5.41	5.92
125	29	G. E. 80	4	3,014,875	17	69	4.06	30	167.0	16	70	4.37	7.9	29	1.00	164.0	1.79	8.05

Alteration of Gear Ratio—Surface Passenger Equipment

By examining the table it will be noted that the gear ratios of all motors were increased except the Westinghouse No. 68, as the latter was geared 14:68 for the comparatively low maximum of 22 m.p.h. The gear ratios of the other motors were increased 7.9 per cent to 17.6 per cent over the former ones, thereby reducing the maximum speed between 1 m.p.h. and 3.5 m.p.h. The maximum speeds now range from 21.5 m.p.h. with the GE64 equipment to 28.75 m.p.h. with the Westinghouse 93 equipments. The saving in power consumption on the basis of watt-hours per ton-mile is largest, with 11.39 per cent, in the Westinghouse 101 motors, and smallest, with 1.79 per cent, in the GE80 motor.

On the elevated lines all of the Westinghouse 50 E and 50 L motors are being changed from a ratio of 19:52 to one of 17:54. The 50 B motors were originally geared for 17:52, and will remain thus. The 19:64 ratio of the new commutating pole motor, however, is satisfactory for operation in the same train as the 17:54 motors. The change in the elevated motor gearing saves from 11.5 per cent to 13 per cent in power and effects a reduction of the maximum speed from 33¼ m.p.h. to 30¼ m.p.h without increasing the schedules.

The alterations in gear ratio on the surface cars are made on the maintenance basis; that is, coincident with the replacement of the old gearing. On the elevated cars, however, the gears are replaced whenever it is necessary to change car wheels, even if the old gearing is still serviceable. The greater proportionate saving in the case of the elevated equipments accounts for this difference in practice.

The higher gear ratios were formally adopted in October, 1907. By April 30, 1909, 1036 surface equipments had been altered out of a total of 2840, and 626 elevated equipments out of a total of 1052.

GEAR AND PINION RECORDS

The mechanical department has made exceptionally thorough researches in gearing, and as the result has changed its metal requirements most materially, as will be detailed in a later article on metal specifications. To assist in obtaining reliable records of gear and pinion behavior, profile curves are made from time to time for different mileages. Samples of these records are shown in the accompanying illustration. They are made as follows: After the gear or pinion under test has been cleaned, an imprint is secured on a piece of thin paper hammered against the edges of the teeth. The individual profiles are then traced, but all the special lettering common to all records is kept on a separate tracing. The blue prints are therefore made from superimposed tracings, with the curves on the lower sheet.

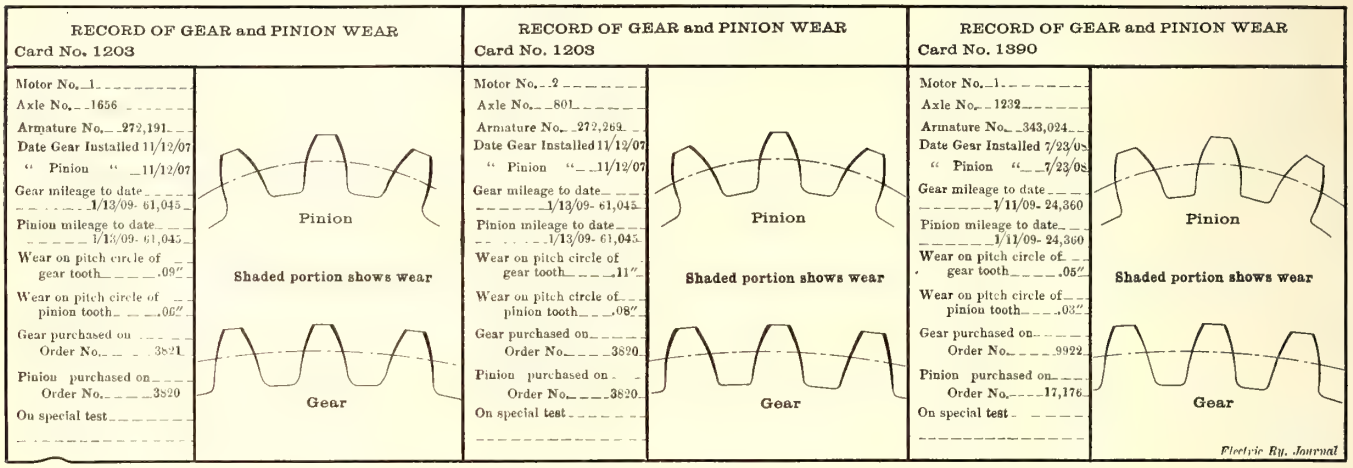


Fig. 14—Brooklyn Rolling Stock—Specimens of Gear and Pinion Records

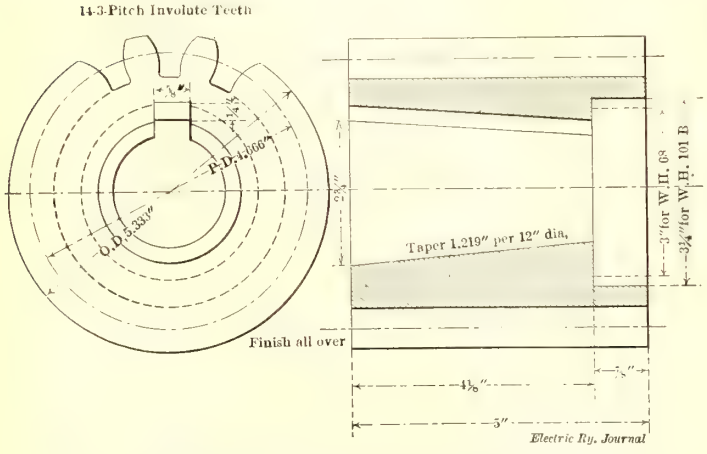


Fig. 15—Brooklyn Rolling Stock—14-Tooth Pinion for Westinghouse No. 101 and Westinghouse No. 68 Motors

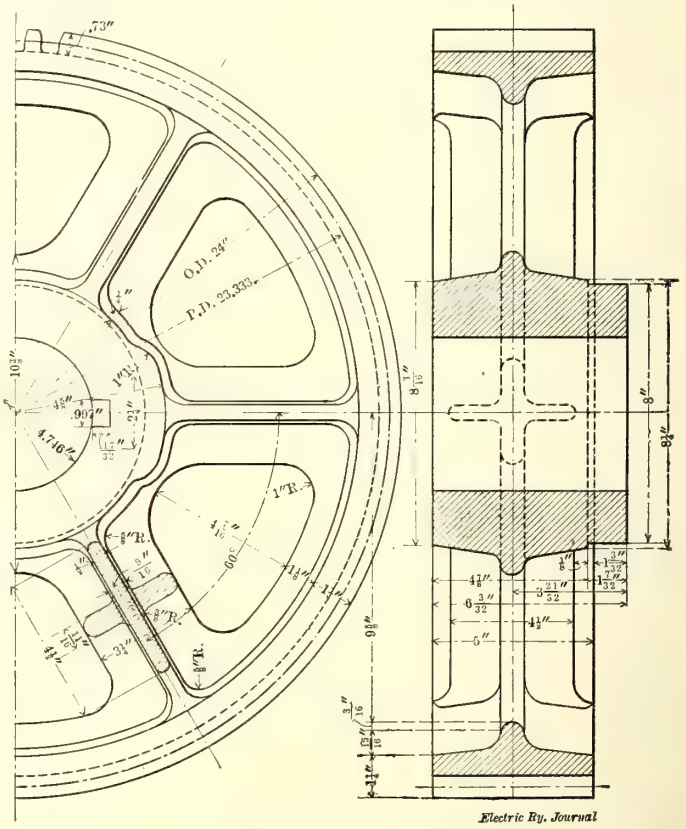
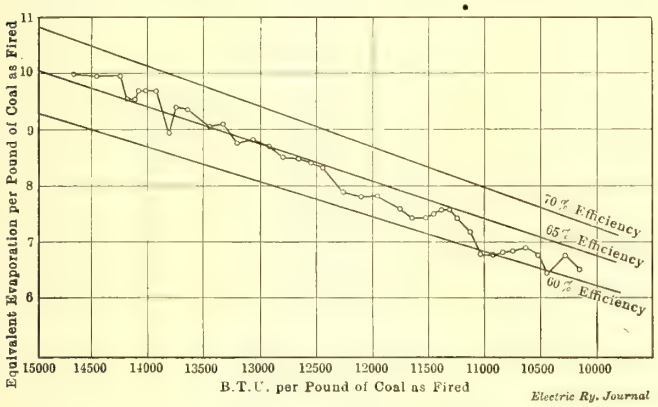


Fig. 16—Brooklyn Rolling Stock—70-Tooth Gear for GE-80A and Westinghouse 101-B Motors

COALS FOR HAND-FIRED STEAM PLANTS

An interesting paper on this subject was read at a meeting of the American Water Works Association at Milwaukee, last week, by D. T. Randall, engineer in charge of the fuel engineering department of the Arthur D. Little Laboratory, Boston, and recently engineer in charge of fuel tests, Technological Branch, United States Geological Survey.

Mr. Randall described the tests on different fuels made by the Technological Branch of the United States Geological Survey at St. Louis, and gave typical analyses, with the b.t.u. contained, of various coals. He stated that the size of coal is not of as much importance as is usually thought to be the case, but that the smaller sizes require more draft and are slightly less efficient. Nor does the ash affect results as much as might be expected. Owing to the fact that the moisture, ash and volatile matter usually increase together in the poorer coals, it is difficult to separate the effects of any one of them from the other.



Evaporation with Coals of Different Heating Values

He thought that with a good furnace, hand-fired, it would be possible to obtain practically the same efficiency with high volatile coals as with low volatile coals.

The accompanying diagram shows the relation between the heating value of the coal and the water evaporated in the boiler per pound of coal for about 400 tests. This diagram indicates that the evaporation is nearly in proportion to the heating value of the coals. Where this is not the case, probably either the coal did not burn completely or the method of firing, or air supply, may have been at fault. The results also are not corrected for influence of size of coal, loss of carbon in ashpit, loss of heat to evaporate moisture in coal and loss due to the use of excessive amount of air in burning the coal. Mr. Randall said that to evaporate the moisture in the coal requires about ½ per cent of the fuel value with good Eastern coal, about 1¼ per cent with Illinois coal, and about 5 per cent to 8 per cent with the lignites.

MEETING OF COMMITTEE ON POWER GENERATION

A meeting of the committee on power generation of the American Street & Interurban Railway Engineering Association was held May 11 at the Fort Pitt Hotel, Pittsburgh. There were present: G. H. Kelsay, chairman and superintendent of power, Indiana Union Traction Company; William Roberts, superintendent of motive power, Northern Ohio Traction & Light Company, and Fred Heckler, superintendent of motive power, Lake Shore Electric Railway Company.

The work allotted this committee this year was to devote especial attention to steam meters, flue-gas analyzers and exhaust-steam turbines, thus practically following up the work of last year's committee.

The committee mapped out a line of investigation on these three subjects, differing from that of last year's plan, in that it will be a canvass not only of manufacturers, but of users of this apparatus, whether industrial companies, railways or individuals. The committee expects to have ready for sending out in a short while a data sheet covering this work.

SANITARY RECOMMENDATIONS TO RAILWAY COMPANIES

At the conference of State and provincial boards of health of North America, held at Washington, D. C., June 4 to 5, a report on railway sanitation was presented by a committee of which Dr. J. N. Hurty, secretary of the Indiana Health Board, is chairman. After congratulating the steam and electric lines upon the advances made in railway and traction line sanitation in the last few years, the following recommendations were submitted:

(1) The ventilation of stations and coaches should be more carefully attended to. While fully recognizing the limitations and peculiar problems attendant upon coach ventilation, still it is true that ventilation could be bettered. Betterment could be accomplished by the more careful and thorough instruction of trainmen in the methods of ventilation with the means at hand, and requiring by rules and orders that careful attention be given to the matter. The abating of the foul and fetid air often existing in the waiting rooms of small stations is merely a matter of opening windows and doors at proper times, and continuous ventilation of such places could be furthered by the adoption of ventilating ducts or simple window-boards.

(2) The construction and sanitation of large stations are not here criticised, but all too frequently small stations are found which are unnecessarily dirty and foul. Some of these stations should be replaced with new ones. Others should be remodeled and newly painted, and all should be supplied with decent private sanitary facilities. As soon as this is accomplished and station employees instructed in the part they are to perform, an appeal to the public to help keep the station clean will certainly meet with the approval of all good people, and the present defective conditions will be greatly bettered.

The grass plots and flower beds frequently seen at small stations are a profitable investment, and any steps toward better small station sanitation will also prove a good investment.

(3) The final adoption of coaches with plain interior construction and with absence of absorbent materials as far as may be possible will certainly be only a question of time. The cleanliness of coaches at the beginning of trips is a mere matter of cleaning as ordered by the management, but keeping the coaches clean when in use involves the co-operation of the public. To secure this aid it is recommended that train porters be supplied with cards or advertising leaflets appealing to the people to help keep the cars clean.

(4) It seems practicable that certain traveling inspectors already employed could be instructed in railway sanitation and be required to make sanitary inspections and report violations of sanitary regulations and to make suggestions.

(5) It would probably be a good investment for some railroad companies to employ a trained sanitarian to suggest and maintain sanitary conditions.

A Royal Commission has reported favorably on the construction of subway for tramcars under the harbor of Sydney, New South Wales. The estimated cost is $2,300,000. The commission recommends that the tunnel be large enough to accommodate standard size cars.

SYSTEM OF ACCOUNTS PRESCRIBED BY WISCONSIN RAILROAD COMMISSION

Under the system of accounts prescribed by the Railroad Commission of Wisconsin for street and interurban railways three classes of companies are created and different classifications of operating expense accounts are set up for each. Three permanent reserve funds are required, covering, respectively, depreciation, sinking fund and amortization. These reserve funds are treated as deductions from gross income. The titles of the accounts, which have been received through the courtesy of W. J. Hagenah, statistician of the commission, are as follows:

Class A companies—those having gross earnings in excess of $500,000 per year.
Class B companies—those having gross earnings less than $500,000, but in excess of $80,000 per year.
Class C companies—those having gross earnings less than $80,000 per year.

SCHEDULE OF REVENUE ACCOUNTS.

A.—REVENUES FROM TRANSPORTATION.

Classes A, B and C.

1. Passenger revenue.
2. Chartered car revenue.
3. Parlor and chair car revenue.
4. Baggage revenue.
5. Mail revenue.
6. Express revenue.
7. Milk revenue.
8. Freight revenue.
9. Switching revenue.
10. Miscellaneous transportation revenue.

B.—REVENUES FROM SOURCES OTHER THAN TRANSPORTATION.

Classes A, B and C.

1. Station and car privileges.
2. Parcel room receipts.
3. Storage.
4. Car service.
5. Park and resort revenue.
6. Telegraph and telephone service.
7. Rent of tracks and terminals.
8. Rent of equipment.
9. Rent of land, buildings and other property (used in operation of railway).
10. Sale of power.*
11. Joint electric power revenue (profit).
12. Miscellaneous revenues from sources other than transportation.

*Revenues from the sale of power other than from the operation of a separate utility. If power is also generated at the power station for the conduct of another utility service a separate report by the latter excluded from railway operating expenses by means of the power accounts "Other Operations—Cr." or through the "Appointment Accounts" in the classifications prescribed for the respective utilities.

SCHEDULE OF OPERATING EXPENSE ACCOUNTS.

CLASS A.

I.—Way and Structures.

Superintendence of way and structures.
Maintenance of ballast.
Maintenance of ties.
Maintenance of rails.
Maintenance of rail fastenings and joints.
Maintenance of special work.
Maintenance of underground construction.
Maintenance of paving.
Miscellaneous roadway and track expenses.
Clearing and sanding track.
Removal of snow, ice and sand.
Maintenance of tunnels, bridges, trestles and culverts.
Maintenance of elevated structures and foundations.
Maintenance of crossings, fences, cattle guards and signs.
Maintenance of signal and interlocking systems.
Maintenance of telephone and telegraph systems.
Miscellaneous way and structure expenses.
Maintenance of poles and fixtures.
Maintenance of underground conduits.
Maintenance of transmission system.
Maintenance of distribution system.
Miscellaneous electric line expenses.
Maintenance of buildings, fixtures and grounds.
Other operations—Dr.
Other operations—Cr.

CLASS A.

II.—Equipment.

Superintendence of equipment.
Maintenance of power plant equipment.
Maintenance of substation, transformer station and storage battery equipment.
Maintenance of passenger and combination cars.
Maintenance of freight, express and mail cars.
Maintenance of locomotives.
Maintenance of service equipment cars.
Maintenance of electric equipment of cars.
Maintenance of electric equipment of locomotives.
Maintenance of shop machinery and tools.
Shop expenses.
Maintenance of utility equipment.
Miscellaneous equipment expenses.
Other operations—Dr.
Other operations—Cr.

III.—Traffic.

Superintendence.
Advertising.
Miscellaneous traffic expenses.

CLASS A.

IV.—Conducting Transportation.

Superintendence of power.
Wages of power plant employees.
Wages of substation, transformer station and storage battery employees.
Fuel for power.
Water for power.
Power plant lubricants.
Miscellaneous power plant supplies and expenses.
Substation, transformer station and storage battery supplies and expenses.
Power purchased.
Power exchanged—balance.
Other operations—Dr.
Other operations—Cr.
Superintendence of transportation.
Wages of passenger conductors, motormen and trainmen.
Wages of freight and express conductors, motormen and trainmen.
Wages of miscellaneous car service employees.
Miscellaneous car service expenses.
Wages of station employees.
Wages of car-house employees.
Miscellaneous station expenses.
Miscellaneous car-house expenses.
Operation of signal and interlocking systems.
Operation of telephone and telegraph systems.
Express and freight collections and delivery.
Loss and damage.
Miscellaneous transportation expenses.

CLASS A.

V.—General.

Salaries of general officers.
Salaries of general office clerks.
General office rent.
General office supplies and expenses.
Law expenses—general.
Miscellaneous general expenses.
Railroad Commission expenses.

VI.—Undistributed.

Injuries and damages.
Insurance.
Stationery and printing.
Operation of stores department.
Operation of utility equipment.
Rent of tracks and terminals.
Rent of equipment.

CLASS B.

I.—Way and Structures.

Superintendence of way and structures.
Maintenance of roadway and tracks.
Miscellaneous maintenance of way.
Maintenance of poles and fixtures.
Maintenance of underground conduits.
Maintenance of transmission system.
Maintenance of distribution system.
Miscellaneous electric line expenses.
Maintenance of buildings, fixtures and grounds.
Other operations—Dr.
Other operations—Cr.

II.—Equipment.

Superintendence of equipment.
Maintenance of power plant equipment.
Maintenance of substation, transformer station and storage battery equipment.
Maintenance of cars and locomotives.
Maintenance of electrical equipment of cars and locomotives.
Miscellaneous equipment expenses.
Other operations—Dr.
Other operations—Cr.

III.—Traffic.

Traffic expenses.

CLASS B.

IV.—Conducting Transportation.

Superintendence of power.
Wages of power plant employees.
Wages of substation, transformer station and storage battery employees.
Fuel for power.
Water for power.
Power plant lubricants.
Miscellaneous power plant supplies and expenses.
Substation, transformer station and storage battery supplies and expenses.
Power purchased.
Power exchanged—balance.
Other operations—Dr.
Other operations—Cr.
Superintendence of transportation.
Wages of passenger conductors and trainmen.
Wages of freight and express conductors, motormen and trainmen.
Miscellaneous car service employees and expenses.
Station employees and expenses.
Car house employees and expenses.
Operation of signal, interlocking, telephone and telegraph systems.
Express and freight collections and delivery.
Loss and damage.
Miscellaneous transportation expenses.

CLASS B.

V.—General.

Salaries of general officers.
Salaries of general office clerks.
General office supplies and expenses.
Law expenses—general.
Miscellaneous general expenses.
Railroad Commission expenses.

VI.—Undistributed.

Injuries and damages.
Insurance.
Stationery and printing.
Operation of stores department.
Operation of utility equipment.
Rent of tracks and terminals.
Rent of equipment.

CLASS C.

I. WAY AND STRUCTURES.

Superintendence of way and structures.
Maintenance of way.
Maintenance of electric lines.
Maintenance of buildings, fixtures and grounds.
Other operations—Dr.
Other operations—Cr.

II.—EQUIPMENT.

Superintendence of equipment.
Maintenance of power equipment.
Maintenance of cars and locomotives.
Maintenance of electric equipment of cars and locomotives.
Miscellaneous equipment expense.
Other operations—Dr.
Other operations—Cr.

III.—TRAFFIC.

Traffice expense.

IV.—CONDUCTING TRANSFORMATION.

Power operating labor.
Fuel for power.
Water for power.
Miscellaneous power supplies and expenses.

CLASS C.

Power purchased.
Power exchanged—balance.
Other operations—Dr.
Other operations—Cr.
Superintendence of transportation.
Wages of conductors, motormen and trainmen.
Miscellaneous transportation expenses.

V.—GENERAL.

General office salaries.
Miscellaneous general expense.
Railroad Commission expense.

VI.—UNDISTRIBUTED.

Injuries and damages.
Insurance.
Stationery and printing.
Operation of stores department.
Operation of utility equipment.
Rent of tracks and terminals.
Rent of equipment.

DEPRECIATION.

CLASSES A, B AND C.

Depreciation reserve charge.

CONTINGENCIES (EXTRAORDINARY).

CLASSES A, B AND C.

Contingencies (extraordinary) reserve charge.

TAXES.

CLASSES A, B AND C.

Taxes.

DEDUCTIONS FROM GROSS INCOME.

CONTRACTUAL ACCOUNTS.

CLASSES A, B AND C.

1. Interest on funded debt.
2. Interest on real estate mortgages.
3. Interest on floating debt.
4. Contractual sinking fund requirements.

RESERVE ACCOUNTS.

REQUIRED PERMANENT RESERVES.

CLASSES A, B AND C.

1. Depreciation reserve.
2. Sinking fund reserve.
3. Amortization reserve.

OPTIONAL RESERVES.

CLASSES A, B AND C.

1. Maintenane reserve.
2. Injuries and damages reserve.
3. Insurance reserve.

SCHEDULE OF STOCK ACCOUNTS.

CLASS A.

Roadway and track material.
Electric line material.
Car equipment material.
Electrical car equipment material.
Shop supplies.
Fuel.
Power plant lubricants and supplies.
Car lubricants and supplies.
Miscellaneous material and supplies.

CLASS B AND C.

Track and electric line material..
Car material.
Fuel.
Miscellaneous material and supplies.

SCHEDULE OF CONSTRUCTION AND EQUIPMENT ACCOUNTS.

CLASSES A, B AND C.

INTANGIBLE:
1. Organization.
2. Franchises.
3. Rights, licenses, etc.

TANGIBLE:
4. Land (used in operation of property).
   a. Right of way.
   b. Other land used in electric railway operations.
5. Roadway:
   a. Grading.
   b. Ballast.
   c. Ties
   d. Rails, rail fastenings and joints.
   e. Special work.
   f. Underground construction.
   g. Track laying and surfacing.
   h. Paving.
   i. Roadway and track tools.
   j. Tunnels.
   k. Elevated structures and foundations.
   l. Bridges, trestles and culverts.
   m. Crossings, fences, cattle guards and signs.
   n. Interlocking and other signal apparatus.
   o. Telegraph and telephone lines.
6. Electric line:
   a. Poles and fixtures.
   b. Underground conduits.
   c. Transmission systems.
   d. Distribution system.
7. Buildings, fixtures and grounds (used in operation of property).
   a. Dams, canals and flumes.
   b. Power plant buildings, fixtures and grounds.
   c. Substation, transformer station and storage battery buildings, fixtures and grounds.
   d. General office buildings, fixtures and grounds.
   e. Shops and car-house buildings, fixtures and grounds.
   f. Stations, waiting rooms and miscellaneous buildings, fixtures and grounds.
   g. Docks and wharves.
8. Power plant equipment:
   a. Boiler plant equipment.
   b. Steam power plant equipment.
   c. Gas power plant equipment.
   d. Hydraulic power plant equipments.
   e. Gas producer equipment.
   f. Substation, transformer station and storage battery equipment.
9. Rolling stock and equipment.
   a. Revenue cars.
   b. Locomotives.
   c. Service equipment.
   d. Electrical equipment of cars and locomotives.
10. Shop equipment.
11. Utility equipment.
12. Stores department equipment.
13. Miscellaneous equipment.
14. Miscellaneous construction and equipment expenditures:
   a. Salaries.
   b. Office supplies and expenses.
   c. Stationery and printing.
   d. Law expenses.
   e. Injuries and damages.
   f. Insurance.
   g. Taxes.
   h. Interest.
   i. Discount on bonds.
   j. Miscellaneous.
15. Cost of railway purchased (in lieu of railway constructed).

BALANCE SHEETS.

ASSETS.

CLASSES A, B AND C.

PROPERTY AND PLANT:
Cost beginning of year.
Construction and equipment current fiscal year.
Cost close of year.

TREASURY SECURITIES:
Treasury stock.
Treasury bonds.

INVESTMENTS:
Stocks and bonds of other companies.
Other investments.

RESERVE, SINKING AND SPECIAL FUND ASSETS:
Depreciation reserve fund.
Sinking fund.
Amortization reserve fund.
Special funds.

CURRENT ASSETS:
Cash.
Notes and bills receivable.
Accounts receivable.
Interest and dividends receivable.
Material and supplies.
Sundry current assets.

PREPAID ACCOUNTS:
Prepaid insurance.
Prepaid taxes.
Prepaid interest.
Sundry prepaid accounts.
Open accounts.
Deficit.

LIABILITIES.

CLASSES A, B AND C.

CAPITAL LIABILITIES:
Capital stock preferred.
Capital stock common.
Funded debt.

MORTGAGE LIABILITIES:
Real estate mortgages.
Other mortgages.

CURRENT LIABILITIES:
Notes and bills payable.
Accounts payable.
Matured interest on funded debt unpaid.
Matured interest on notes and bills payable unpaid.
Dividends unpaid.
Deposits.
Sundry current liabilities.

ACCRUED LIABILITIES:
Insurance accrued.
Taxes accrued.
Unmatured interest on funded debt accrued.
Unmatured interest on notes and bills payable accrued.
Dividends accrued.
Sundry liabilities accrued.
Open accounts.

RESERVE, SINKING AND SPECIAL LIABILITIES:
Depreciation reserve.
Sinking fund.
Amortization reserve.
Special funds.
Surplus.

Of a total number of 5746 rail failures reported by steam roads to the New York Public Service Commission, Second District, 3917 are for the period from Dec. 1, 1907, to April 1, 1908, and 1829 for the four months ended March 31, 1909.

NATIONAL ELECTRIC LIGHT ASSOCIATION CONVENTION

The 32d annual convention of the National Electric Light Association was held at Atlantic City June 1-4. The meeting was characterized by a large attendance and a very interesting program of papers and committee reports. While most of the papers related to commercial and special problems of central station management a number were devoted to broader aspects of electrical engineering. These are of equal interest to the managers and engineers of electric railway properties and are briefly abstracted below:

CONDENSER AND COOLING-TOWER DESIGN AND OPERATION

M. R. Bump in treating certain important points in the design and operation of condensers and cooling towers shows that the cost of pumping the circulating water depends directly upon the amount of heat imparted to each pound of water in the condenser. For a minimum pumping cost, the water should leave the condenser exactly at the temperature of the steam entering the condenser. In the surface type of condenser it is necessary to allow for a certain difference of temperature between the steam and the water because of the metallic tubes and the amount of heat transferred is directly proportional to the differential temperature allowed. As the amount of surface is increased the cost will increase in definite proportion, while the differential temperature required will decrease. This permits of a reduction in the quantity of water to be pumped and therefore reduces both the size and first cost of the pumps and also the power required to operate them. With the jet condenser it should be possible to reduce the differential temperature to a few degrees, although it is more common to find the difference greater than in the surface condenser. The greatest inherent advantage of the jet condenser is wasted by operating it with the discharge water at a temperature below 90 deg. when it should be at least 105 deg. There are many considerations which affect the selection of the type of condenser to be used. Dirty and scaly water call for a jet condenser, but if the scale is not thrown down in the condenser a surface condenser may be used to advantage if the water can be returned to the boilers and care is exercised not to have it pure distilled, which is believed to attack the iron in the boilers with avidity. It is often possible to effect a very material saving in cost and size of condensers by allowing for a reduced vacuum when the temperature of the water is high. It is then a problem of balancing the added cost of fuel, etc., against fixed and operating charges on the condenser equipment to determine the most economical installation.

With reciprocating engines the gain in economy by the last 1 in. or 2 in. of vacuum is relatively very much smaller than it is on the steam turbine, and the introduction of low-pressure turbines has emphasized the importance of high vacua, which are essential to their successful operation. The daily and annual load factor on the unit also have an important bearing on the condenser. Where the load fluctuates and is considerably below rated output, the question must be looked at in a different light. The important items outside the pump itself are, first, to keep the piping system from the point where the pressure goes below atmosphere to and including the condenser and its auxiliaries, as nearly bottle tight as possible, and, second, to cool the air entering the pump and remove from it as much of the water vapor as possible. In the jet condenser particular attention should be given to the air offtake, which should be so designed that all the air must pass in intimate contact with the cold water entering the condenser chamber. In the surface condenser, proper attention should be given to the distribution of the baffle plates in order to accomplish this result as nearly as possible. In many cases the air should be drawn off through a separate chamber in which it is cooled to a temperature almost that of the entering water. This would enable a considerable reduction to be made in the size of the air pump and in the work the pump does. The surface condenser is used almost exclusively on all large turbine installations and has given better results than jet condensers ordinarily show. There seems to be no inherent advantage, however, that would justify any appreciable difference between the two types of condensers. The selection of the pump-driven unit for any condensing installation must depend upon other plant conditions. If the exhaust is needed for feed-water heating steam driven pumps are the most desirable. Otherwise the selection depends on a comparison of first cost and operating expenses of motor and steam-driven pumps.

Cooling towers may be divided into two types, those using natural draft and those using forced draft for circulating the air. A comparison of the two types involves a study of climatic conditions, ground space, cost per unit of surface as compared with the cost of a circulating fan and other factors. Localities possessing a dry climate are best suited for using cooling towers. Various materials have been used for the wetted surface of cooling towers. Rough board, wood blocks, tile and galvanized wire screens have been tried, but the most satisfactory material is burlap curtains. Some of these curtains are now four years old.

Cooling ponds with jets scattered through the pond and discharging into the air over the water have been used to some extent. The amount of power required for pumping is very large and the first cost excessive. The majority of cooling towers installed in the United States are of the forced draft type, but European practice seems to be toward natural draft towers.

PERFORMANCE SPECIFICATIONS AND RATING

W. L. Waters, of the Westinghouse Electric & Manufacturing Company, in a paper entitled "Performance Specifications and Rating," made several recommendations having in view an improvement in the present very unsatisfactory condition surrounding the rating of generators and motors. After criticizing the present system of temperature guarantees, the author expresses the opinion that the most rational method of temperature rating is to specify the maximum continuous rating at which a unit can be safely operated with a certain room temperature—25 deg. C., for example; and where desirable, a safe two-hour or three-hour overload, with the same room temperature, can also be given. This reduces the system to a single guarantee of the maximum safe load which a unit will carry continuously with a specified room temperature; and this maximum load will be the greater the lower the temperature of the air which cools the machines. Referring to the influence of the power factor on the rating of a machine, any method giving alternators a different rating for every operating power factor would probably be too complicated for practical work. A method, however, is quoted in the paper whereby all machines shall be given a nominal rating in kilo-volt-amperes at 100 per cent power factor, and in addition the maximum load given which they will carry at various lower operating power factors. The maximum load at low power factors is decided for some machines by holding up the voltage, and for others by the heating of the field coils. In the latter case this maximum load should be referred to a definite room temperature —25 deg. C., for example. This method gives for the purpose of comparison a nominal rating at 100 per cent power factor, and in addition gives the purchaser exact information as to the operative characteristics of the proposed unit under any particular condition of load.

As to rotary converters and synchronous motors, the power factor with these should be kept strictly at 100 per cent, unless for some special reason definitely specified and understood at the time a machine is purchased. If synchronous motors are used to correct the power factor of a line, the maximum kilovolt-amperes at the required power factor should be specified, exactly as in the case of the alternating-current generator. A synchronous motor designed to operate at 100 per cent power factor is just as unsuitable for operating at a low power factor as an alternator would be in a similar case.

Testing to determine if a unit meets specified detailed performance guarantees is always a very difficult question. Unless the test is made in the laboratory the input-output efficiency test of, say, a motor-generator cannot be made with greater accuracy than 2 per cent or 3 per cent, and it is almost impossible to get an accurate direct test of the voltage regulation of an alternator. In both these cases the direct method of test has to be abandoned in favor of an indirect method, which will give more accurate results. Temperature tests are extremely difficult to carry out ac-

curately, and unless careful precautions are taken by experienced observers it is often impossible to be sure of results to 5 deg. It is concluded that in general a customer will do better to spend his time in investigating the conditions of operation and specifying a machine suitable for these conditions than to make tests to determine regulation and temperature rise. By means of suitable performance specifications, which can be definitely checked in operation, a customer can hold the manufacturer.

LOW-PRESSURE STEAM TURBINES

C. H. Smoot, in a paper with the above title, sets forth arguments in favor of the use of low-pressure turbines of the Rateau-Smoot type. This type is described in detail, and the advantages claimed for it are brought out by comparison with other types of similar turbines. The author states that it has now been thoroughly established that the most efficient steam engine is a compound unit, consisting of a reciprocating engine acting between boiler pressure and approximately atmospheric pressure and exhausting into a low-pressure turbine, which in turn discharges into a condenser. While it is still a mooted question whether the greater cost of a combined engine and low-pressure turbine plant over that of a turbine plant alone will compensate for the increased economy, there is no doubt that existing plants equipped with reciprocating engines will show an improved economy if run non-condensing in connection with a low-pressure turbine equipment. In conclusion the author strongly recommends that owners of non-condensing plants should consider the opportunity of utilizing the exhaust steam of reciprocating engines in low-pressure steam turbines.

GAS ENGINE REPORT

The committee reports considerable progress in the gas producer and states that there are now on the market producers that can gasify successfully fuels which cannot be burned economically under boilers. Referring to the operation of the modern gas engine, it is stated that its reliability cannot be questioned at this time, and that the committee has evidence of many plants, some of which were visited by its members, that have been operating over long periods without being shut down—even a month without intermission. Regulation has been so perfected by improved designs and methods of governing that all reliable makers to-day will undertake contracts for installing gas engines of either the two-cycle or four-cycle type to operate in parallel alternating current generators of 25 cycles or 60 cycles; and the committee adds that no member need hesitate to contract with any of these concerns on the score of reliability and regulation, as just as reliable results may be obtained as with the ordinary type of steam engine. As to the operation of gas producers, the personal equation enters largely and poor results are frequently the result of careless operation. Instructions for operation should be followed carefully, and a man of intelligence placed in charge of a producer installation. The report gives descriptions in greater or less detail of about a dozen plants visited, several of which supply current for railways.

The cost of these plants, including buildings, foundations and cost of erection, varied from $133 to $167 per maximum kilowatt capacity, the average figure being $152; the maximum capacity being about 20 per cent above the normal rating. The cost of the building varied from $16 to $44 per kilowatt, with an average of $33; of producer equipments, including piping, from $33 to $49 per kilowatt, with an average of $38; of the gas engine, from $38 to $55, with an average of $47; foundations, $5 per kilowatt; generators, $12 to $15, and switchboards, $3 per kilowatt. The maximum capacity of the plants ranged from 360 kw to 2700 kw, with an average of 1200 kw. Tests of short duration indicated a coal consumption as low as 1 lb. per hp-hour, which figure, it is stated, can be also obtained from units as low as 100 hp or even less.

SOME RECENT DEVELOPMENTS IN ELECTRICAL APPARATUS

E. W. Allen, of the General Electric Company, who is the author of the paper with the above caption, describes a 14,000-kw, vertical-shaft turbo-alternator, the novelty of which is the high speed of rotation which has resulted in the production of a generator of small diameter, large output per pound of materials and smaller radiating surface, but without commensurate decrease in cost. In order to conduct the heat away the generator is enclosed except at the intake and discharge openings. When the machine is running the revolving field acts as a powerful fan, and while the scheme is applicable to large generators, it does not apply to all sizes. Direct-current generators for high-speed work now have their commutator bars held in place by steel rings shrunk over the outer circumference of the commutator, thus affording great mechanical strength and ready insulation of the bars due to their plane shape. The difficulties encountered in the high frequency of commutation have been overcome by the adoption of auxiliary commutating poles. Full advantage is taken in the design, of the benefits to be derived from the use of commutating poles and particular attention has been given to the ventilation and to assisting the movements of air through the field and commutator coils by means of a fan mounted at the end of the shaft opposite the commutator. In the converting apparatus the author describes the regulating-pole, synchronous converter and its operation. Vertical-shaft synchronous converters rated at 2500 kw are being built for locations where space is limited. No change has been made in the general design of frequency changers except that vertical-shaft construction is used here also. A 6666-kilovolt-amp, 0.75 power-factor, 25-cycle to 60-cycle set is now being built for the Commonwealth Edison Company, which in point of output will be the largest yet built. The author notes the improvement made in the methods of circulating the oil in transformers, and by this means providing a more efficient means of conducting the heat from the seat of its generation. The aluminum-cell lightning arrester has increased in reliability on high-voltage transmission lines and may be termed one of the most important developments that has taken place in the design of protecting apparatus. The author records the commercial status and success which have attended its operation and which have caused the manufacturer to adopt and recommend it as a standard device for all classes of high-tension transmission lines.

DEPRECIATION ACCOUNTING FOR SMALL COMPANIES

George W. Caflin, United Electric Securities Company, in his paper on this subject, gave the following as the maintenance and depreciation charges of a small company in five years:

	Total maintenance, percentage of gross.	Additional allowance, percentage of gross.	Total depreciation, percentage of gross.
1904	8.10	8.45	16.55
1905	9.35	8.15	17.50
1906	10.90	6.89	17.79
1907	9.56	6.84	16.40
1908	10.01	7.10	17.10

A larger company adopted a system of charging a fixed monthly sum for depreciation in addition to the regular maintenance expenditures, similar to that followed by the small company. This sum has been increased during the period, and is to-day more than three times the amount originally charged. The total depreciation for the various years is a somewhat larger percentage of gross than was the case with the small company.

The two companies mentioned have preferred to use the replacement value of their properties as a basis for their depreciation allowance, and have each continued to make the monthly charge a fixed amount in addition to the maintenance expenditures.

Five or six years is perhaps too short a period in which to form definite conclusions, but the experience with these two properties seems to show that, in addition to regular maintenance expenditures, an annual allowance of 3 per cent of replacement value in the case of this small company, and of 5 per cent in the case of the large company, would properly provide for the depreciation of tangible property.

ELECTRICAL SECURITIES

Frank A. Vanderlip, president of the National City Bank of New York, in an address on this subject outlined the following conditions as necessary to make an electrical security attractive to the general investing public:

The company should earn at least twice its interest charges over operating expenses, maintenance and depreciation. The depreciation fund should be in some equivalent of cash.

It should serve a population of 50,000 or over.

The securities should, in the main, net the investor 5 per cent.

Expenditures that should go under operating expenses should not be charged to renewals. The careful bond buyer will analyze accounts rigidly to ascertain that the temptation to do this has been resisted.

If the plant is modern, with reasonable rates, and if the conditions mentioned are met, a security will be created that will be in many ways attractive. If, in addition, the security is large enough to secure marketability, a bond will result that will compare favorably with any other returning a similar rate of interest.

THE SIGNAL AND DISPATCHING SYSTEM ON THE MIMICO DIVISION OF THE TORONTO & YORK RADIAL RAILWAY

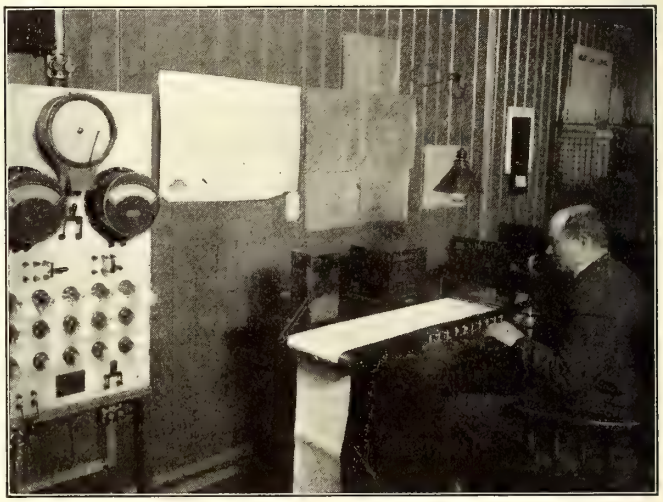
The Toronto & York Radial Railway has been using for several months on its Mimico Division, extending 10 miles west of Toronto, a signal and dispatching system installed by the Simmen Automatic Railway Signal Company, of Los Angeles, Cal., and Toronto, Ont. This is the first installation of this system on an electric interurban railway, but it has already been in regular service for over a year on an 18-mile Southern California division of the Santa Fé Railroad, as described in the Electric Railway Journal of July 4, 1908. The Mimico Division is probably one of the busiest single-track lines in existence, as the schedule provides for a 20-minute service during certain hours and requires about 2500 daily signal indications. The importance of accurate signaling and dispatching on such a line is self-evident. Through the adoption of the Simmen method the dispatcher is not only enabled to issue orders to the motormen over car telephones as given points are passed, but is also provided with a recording mechanism which shows him at all times the speed and location of every car in service. Further than this, interlocking arrangements on his switchboard make it impossible for him to order one car to proceed through a certain block until the block has been cleared by the car previously given the right of way.



Toronto Interurban Dispatching—View of Car Equipped with Shoe for Signal Current Rail Alongside

DETAILS OF APPARATUS

The train movement record sheet in the dispatcher's office consists of a chart divided into time lines in one direction and block lines in the other. The record of train movements is made by needles operated by clock work, each block having its own perforating needle. Thus, as a car enters the first block the corresponding needle proceeds to mark the sheet. When the car enters the next block the corresponding needle is set in operation while

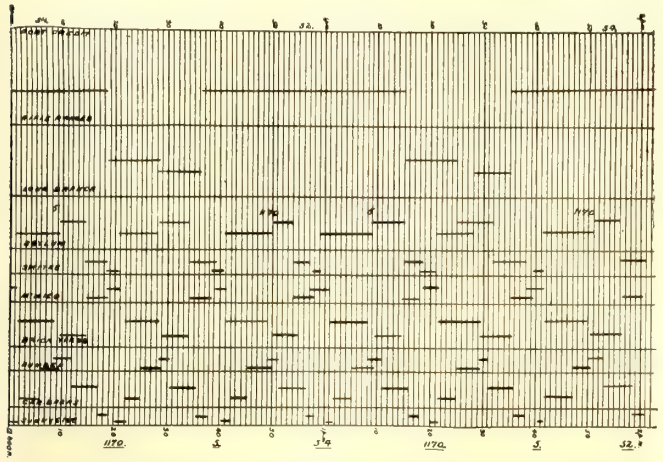


Toronto Interurban Dispatching—Dispatcher's Office, Showing Record Sheet



Toronto Interurban Dispatching—Motorman Receiving Orders by Telephone

the first one stops. Consequently the dispatcher is provided with an automatic and undisputed record of the car movements throughout the section under his care. It will be noted that some of the lines on the record-sheet overlap, thereby making it appear as if two trains were running in the block at the same time. This is not the case, however, as this is only the local circuit in the office, which is



Toronto Interurban Dispatching—Record of all Train Movements

controlled by the dispatcher. The overlap is explained by the fact that when the first motorman reports at the siding, his time ceases at that switch and appears in the next block until the opposing motorman meets him. It will be noted in one case where two cars meet at Long Branch that the eastbound car reported three minutes ahead of the westbound car, thus causing between Long Branch and Asylum switch an overlap of three minutes. This shows the time that the eastbound car had to wait at the siding for the westbound car. Other overlaps may be explained in like manner.

The instruments which make the station records receive current through auxiliary home and distant third-rails at the ends of every block on the line. It will be noted from the wiring diagram that a separate signal wire runs from the dispatcher's office to these third-rails, which are simply strap-iron contacts 40 ft. long. Connection to the car signal circuit is obtained through contact shoes carried on the trucks. The balance of the original car signal equipment comprises a relay, a red lamp, a green lamp, a storage battery, an alarm bell and a telephone. This equipment is being simplified by combining the bell, telephone and lamps in one portable box, which can be carried from one end of the car to the other according to the position of the motorman.

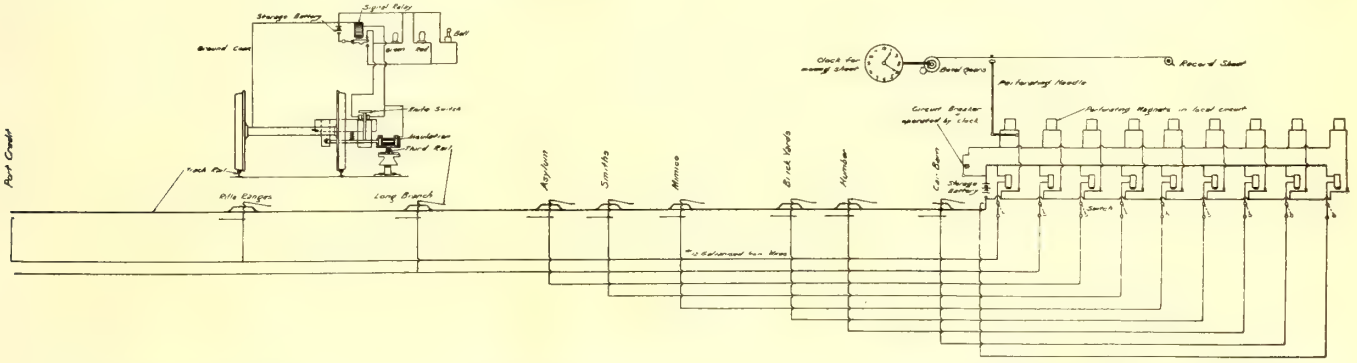
As the car passes a third-rail a circuit is established from a storage battery in the dispatcher's office through the individual line wire, contact shoe, signal circuit in the car to the wheels of the truck, thence through the track rails and a relay in the dispatcher's office to the opposite side of the battery. As the closing of this circuit energizes the dispatcher's main relay, the latter in turn closes the local circuit which actuates the perforating needle corresponding to the block. A continuous record line is obtained by polarized relays as long as the car is in any one block. A circuit-breaker in the local office circuit, operated by a make-and-break relay, vibrates the marking magnet to prevent friction on the record sheet.

The car signal main circuit passes through a relay and a knife switch. The relay controls two auxiliary circuits in which the signal lamps are located. As the knife switch is closed when the contact shoe is not on the third-rail, the relay is energized by current from the car battery on the car and gives a clear signal. As soon as the contact shoe touches a third-rail the knife switch opens and the car battery circuit has no further influence on the relay. If the third-rail is energized from the battery in the dispatcher's office the clear signal is retained, but should the dispatcher open the circuit in his office the car relay would be deprived of all energy. This will cause current from the car battery to light up the danger lamp and ring an alarm bell until the motorman calls the dispatcher for instructions. The telephonic communication between the cars and the dispatcher is established by the use of condensers.

FEATURES OF THE SYSTEM

These prominent visual and aural indications make it out of the question for a motorman to ignore the dispatcher's summons. The signals are given, no matter at what speed the car is running. Since the danger signal is inevitable unless the third-rails are energized by the dispatcher, the system may be defined as one having a normally closed "danger" circuit. The main car circuit passes through the front or top contact of the car relay, so that when the danger signal has been given and the relay energized the only possible way to clear the signal is by having the dispatcher close the switch in his office at West Toronto.

In general, the function of this system is to provide unmistakable dispatching instructions through the senses of hearing, sight and speech. If it were found desirable, the system could be also combined with automatic stops and semaphores. An important feature from the maintenance standpoint is that practically all of the apparatus, except the special recording mechanism in the dispatcher's office, is made of standard parts which can be purchased in the open market.



Toronto Interurban Dispatching—Wiring Connections of Dispatching Apparatus on the Mimico Division, Showing the Locations of the Contact Rails at Sidings

HINTS TO CONDUCTORS AND MOTORMEN OF THE MILWAUKEE SYSTEM

"Hints to Conductors and Motormen" of the Milwaukee Electric Railway & Light Company are distributed weekly. The practice of circulating good and helpful advice on small "hint cards" was started by George Kuemmerlein, Jr., superintendent of transportation of the company, on July 5, 1908, and as it was found to be successful, it has been continued regularly. When Mr. Kuemmerlein first started the issue of the cards it was his idea that he would be able to get a little closer to the trainmen by giving them in plain language information as to the wishes of the company and at the same time avoiding the necessity of issuing

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 1—JULY 5, 1908

Here are the Standard Phrases:

USE THEM
DON'T BE TIMID

Their use will make your work easier

Fares, Please
Step Quickly, Please
Let Them Off, Please
Enter Car Front Way, Please
Move Toward Center of Car, Please

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 2—JULY 12, 1908

COLLECT HALF FARES

If each Conductor misses
10 Half Fares per Day
at 3c each
30c per Day per Conductor
30 Days
$9.00 per Month per Conductor
12 Months
$108 per Year per Conductor
500 Conductors

$54,000 LOSS PER YEAR!

These figures are startling.

Greater Diligence Must Be Exercised

or severe measures will be resorted to.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 3—JULY 19, 1908

Be Polite and Courteous.

Be Patient with Passengers—make Ride Safe and Pleasant.

Be on look out for Passengers—Stop for them.

Be Watchful at Transfer Intersections.

Never Start Car Until All Are On Safely

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 4—JULY 26, 1908

KEEP YOURSELF NEAT AND CLEAN

KEEP YOUR CAR CLEAN AND TIDY

KEEP SHADES UP AFTER SUN SET

KEEP NEWSBOYS OFF CAR

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 5—AUG 2, 1908

Always secure address of injured party in case of accident. If they are strangers in city, always secure city address at which they are stopping.

Always direct passengers to vacant seats in car, and do not allow employes in uniform to occupy seats when others stand.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 6—AUG 9, 1908

Don't talk to motorman.

Don't ride upon front platform; Watch rear end.

Don't talk to passengers and neglect your duty.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 13—OCT. 4, 1908

Pay special attention to the ventilation of your car.

Don't talk to motorman. You cannot watch rear end and avoid accidents while in front end of car. Your place is upon rear end, and we must insist that you remain there when not collecting fares.

Caution passengers not to leave a moving car, and never start a car while passengers are leaving same.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 19 Nov. 15, 1908

Fares, Please
Step Quickly, Please
Let Them Off, Please
Enter Car Front Way, Please
Move Toward Center of Car, Please

Standard phrases shown above *MUST* be used. Their use will assist you in the collection of all the fares upon your car, facilitate the movement of passengers, and make your work easier in many other ways. A good conductor will use the above phrases without being urged to, and any conductor who is found unwilling to use his voice and these phrases will be removed from the service.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 21—Nov. 29, 1908

Many conductors are in the habit of giving "go ahead" signal upon answer to motorman's foot gong that all is clear upon rear platform without themselves looking to see whether all passengers have alighted or boarded. Conductor must never give "go ahead" signal unless he looks to rear, and also unless he knows that everybody is clear of rear step.

Help us to avoid accidents.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 24—DEC. 20, 1908

Conductors should always insist that passageway be kept clear on rear platform, thus allowing passengers to freely board and alight from car.

Conductors must always be firm in asking passengers to step to one side in order to clear passageway; but in doing so be polite and courteous.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 25—DEC. 27, 1908

Many women passengers are alighting from moving car and falling while conductor is inside either figuring his trip sheet or filling out his envelope. This usually occurs near end of line. Conductors must be upon rear platform while passengers are leaving cars, especially when car is not crowded and they are not engaged in the collection of fares. Women should always be cautioned not to leave a moving car, and if they insist upon jumping off they should be restrained by conductor putting arm across platform.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 31—FEB. 7, 1909

Conductors are becoming lax in allowing passengers to leave moving cars. This is especially true of women passengers. Conductors should insist that women stay upon car until it has come to a dead stop, as most of them jump off backwards and fall. If women insist upon jumping off moving car, conductor should put his arm across platform preventing them from doing so.

Hint Cards for Conductors of the Milwaukee Electric Railway & Light Company

stringent orders which would have to be obeyed under penalty of discipline. It was thought that if appeals were made to the men in this manner advantageous results would be obtained.

In the accompanying illustrations 12 of the cards issued to motormen and an equal number of those distributed among the conductors are shown. Some of the cards that have been issued are entitled "Hints to Trainmen," and in these cases the distribution was made to both conductors and motormen. The cards that were used for both classes of trainmen related to subjects in which they were equally interested.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 1—JULY 5, 1908

Ring Your Gong Loud

and often, approaching every crossing and vehicle.

Be Careful

when approaching children playing upon street. They have no judgment

USE YOURS

Accidents Cost Money
Help Us Reduce Them

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 2—JULY 12, 1908

DO NOT WASTE POWER

It costs money.

DRIFT CAR DOWN HILL

It will go fast enough.

DO NOT ABUSE YOUR CAR

Electrical machinery is delicate.

HANDLE IT CAREFULLY

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 3—JULY 19, 1908

DON'T

Run Car Wild and Reckless.

Run Fast Over Special Work.

Start Car Until Receiving Bell from Conductor.

Start Car While Passengers Board Front End.

Start Car While It Is Loaded Without Looking to See that Rear Step is Clear.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 4—JULY 26, 1908

DON'T Start Car Over Railroad Xing or Onto Draw Bridge Until Receiving "Come Ahead" Signal from Conductor.

DON'T Pass Stationary Car at Street Intersections at High Speed. Always Sound Gong Loudly to Warn Persons and Vehicles that You Are Approaching.

DON'T Run Around Curves at High Speed.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 5—AUG 2, 1908

Do Not Talk To Passengers

Announce Number Passengers Boarding Front Way

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 6—AUG 9, 1908

Always run car to red marker upon span wire at down town intersections.

Don't change doors before reaching extreme end of line.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 13—OCT. 4, 1908

Don't talk to passengers. You cannot operate your car properly and talk to passengers at same time. Ring your gong—not once—but many times. Don't run your car beyond your control. Car should always be under your control, and this will avoid striking vehicles, persons, or cars ahead of you or at an intersection.

Your motto should be
"AVOID ACCIDENTS."

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 14—OCT. 11 1908

Motorman must test fender on both ends of car before pulling out of station. He must also see that fender arms and split keys are in proper place.

Brakes and controller should be tested before pulling car out of station.

See that your sand box is in condition, as it may prevent an accident.

Before pulling car out of station be sure you have your tool box. Also a good supply of witness cards, that you may assist your conductor in case of accident.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN,
No. 19 Nov. 15, 1908

Too many fares are being missed account motormen not ringing conductor and announcing in a plain and distinct tone of voice how many passengers boarded front end of car, and as to their location on the platform or inside of car. If necessary, point out passengers to conductor.

It is the duty of every motorman to assist conductors in the collection of fares, and any motorman who fails to do this or shows an unwillingness to co-operate will be considered unfit for the service.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No 30 JAN 31, 1909

Don't start car until receiving two clear and distinct bells from conductor.

Don't pass stationary car at street intersections at high speed. Always sound gong loudly to warn persons and vehicles of your approach.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 32—FEB. 14, 1909

During this season of the year, when snow and ice impede traffic to a more or less extent, motormen could assist greatly in keeping the lines in operation by the use of the scrapers upon the car. Many times cars are stalled simply because motormen do not drop the scrapers and push the snow and ice to one side. The use of the scrapers will also prepare a much better rail for your car and thus make the progress of the car easier; with less work on your part. If the scrapers upon your car fail to work, report it for the good of the service.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 35—APRIL, 18, 1909

Police officers stationed at the down-town intersections frequently complain that Motormen block crossings and when spoken to become insolent. It must be understood that police officers have authority in the movement of vehicles and pedestrians at the down-town intersections and when a signal is given by a police officer it must be obeyed.

We want it distinctly understood that we desire harmony and co-operation between this company and the Police Department and every effort should be made to avoid friction.

More attention must also be paid to company's representatives who are at the intersections during rush hours. Some motormen do not watch for signal and as a result traffic is blocked while the man in the middle of the street is trying to get motorman's attention in order to flag him over.

Hint Cards for Motormen of the Milwaukee Electric Railway & Light Company

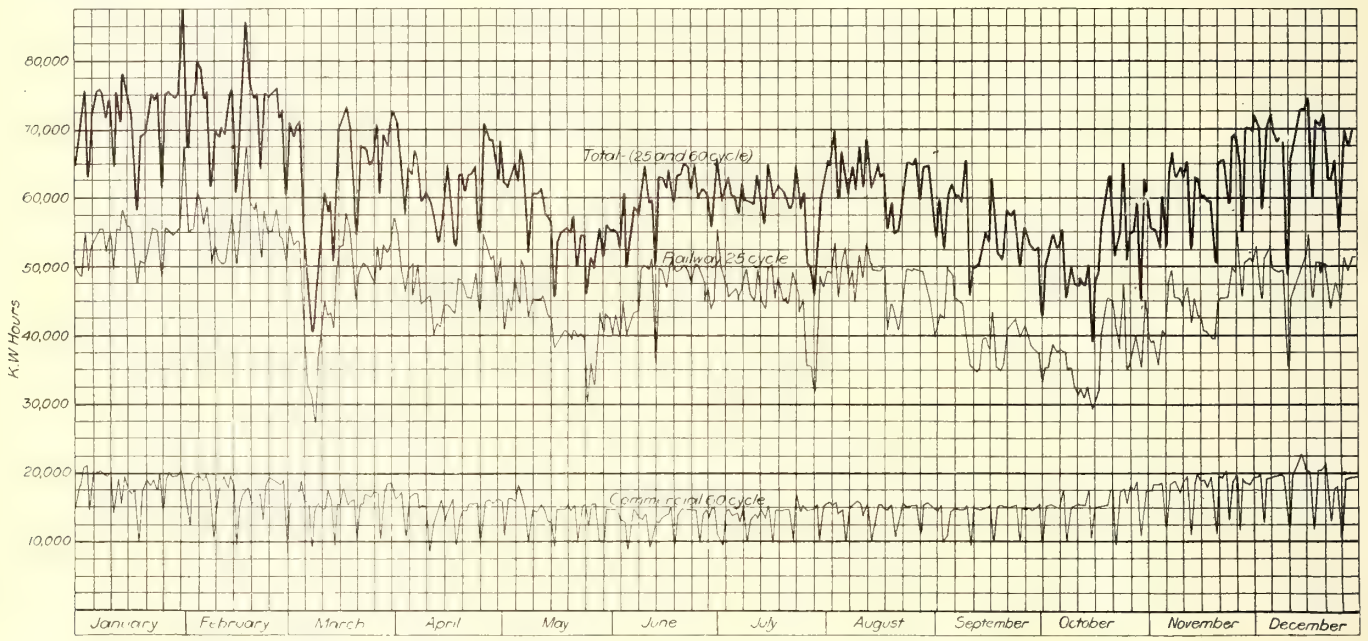
OPERATING FEATURES OF THE SPY RUN POWER HOUSE*

BY M. J. KEHOE, SUPERINTENDENT OF POWER, FORT WAYNE & WABASH VALLEY TRACTION COMPANY

The first power house of the Fort Wayne & Wabash Valley Traction Company, was located on Chestnut Street, Fort Wayne. It contained three 200-kw, and one 500-kw, direct current generators, belt-driven by simple non-condensing, heavy-duty type engines. This plant was built in the business district, where property values are high. As the floor space was large, due to the belted connections, the fixed cost was extremely high. The boiler room was very small, with practically no coal storage, owing to the fact that when this station was built an apparent abundance of natural gas was to be had. It was only a short time, however, until this source of cheap fuel supply was exhausted. At the time gas was used for fuel, the plant showed excellent results, producing a kilowatt at a very low operating cost, but when coal was substituted for fuel, this cost was increased 50 per cent. Later the Fort Wayne & Wabash Valley acquired the Wabash River Traction Company, which had a power station located at Boyd Park, containing somewhat more modern equipment, consisting of one 500-kw, a. c. generator, direct-connected to a cross-compound condensing engine, and two Allis, simple condensing engines, belt-connected to two 250 kw, d. c. generators. This plant was located on the Wabash River, where ample water was available for condensing purposes and had a siding on the Wabash Railway with ample coal storage room. It would appear that it would be possible to have a comparatively low cost per kw-hour, at this plant, but after operating it for several months, it was found that the cost per kw-hour was higher than at the Chestnut Street plant with its non-condensing belted equipment. This was accounted for by the load factor, which consisted of very high peak loads in proportion to the output, and required to be carried in service at all times the greatest part of the equipment of the plant to take care of the peaks, whereas, at Fort Wayne, the load was very even throughout the day, with the exception of a morning and evening peak load.

At Huntington, where the company had a still more modern plant, the conditions were found to be still worse than at Boyd Park. The Huntington plant consisted of two direct-connected, cross-compound, condensing units of more modern design than those at either Chestnut Street or Boyd Park. This high operating cost was also due to the small output and the large peaks, and also because no vacuum was carried on the engines which were designed with the proper cylinder ratio for 26.5 in. of vacuum. Steps were immediately taken to partially rectify this trouble by increasing the load factor. This was done by placing rotaries at Logansport and doing away with the Logansport power station. The Fort Wayne city lines were also cut in with the substations on the southwestern line, and by running the Huntington and Boyd Park engines in parallel, the peaks and the cost per kilowatt hour were reduced.

It soon became apparent, however, that it would be necessary to operate heavier and larger cars at a higher rate of speed, which would increase the output of the power stations to such an extent that the cost of power would be excessive. It was then decided to erect a modern central station, to enable the cost of power to be reduced to the minimum. A site was selected on Spy Run Avenue, Fort Wayne, on the St. Joe River, on account of the quality and quantity of water procurable for condensing and other purposes, and the good railway and switching facilities. On this site was erected, during the summer of 1906, a modern double-deck power station with an ultimate generating capacity of 8500 kw. Like many other railway companies, the Fort Wayne & Wabash Valley Traction Company, having adopted the policy of developing light and power business in connection with its traction system, and having purchased the property of the Fort Wayne Light & Power Company, decided to serve both traction and lighting systems from this central power station.



Yearly Load Diagram of Spy Run Power House

The principal features of this Spy Run station may be summarized as follows:

1. A two-story, rectangular brick structure with side wings for the accommodation of auxiliary apparatus, coal bunker, machine shop and stores.
2. Generating machinery on second floor above the boilers.
3. Structural foundations with concrete floor construction.
4. Independent twin barometric jet condensers, of the Buckley type.
5. Gravity conduit system for cooling water.
6. Independent, direct-driven exciters with common bus for each system.
7. Simple, short and direct steam pipes, with continuous upward slope from boiler nozzle to turbine throttle.
8. Sufficient superheater surface to maintain dryness or moderate superheat at beginning of expansion in the turbines.
9. Roney mechanical stokers with gravity fuel feed
10. Coal storage, served by a gantry coal crane.

*Abstract of a paper read before the Central Electric Railway Association, Ft. Wayne, Ind., June 3, 1909.

11. Steam-driven auxiliaries for feed heating.

12. Fireproof transformer compartments, with transformers mounted on rolling trucks to facilitate removal.

13. System of ventilation for turbo-generators.

14. Remote control oil circuit-breakers with time limit overload relay.

15. Tirril regulation on each generator.

16. Automatic damper regulators controlling dampers and stoker engines, and automatic feed water regulators.

The use of structural steel foundations for the turbines, in the writer's opinion, is not entirely justifiable. It was thought they would be free from vibration on account of the absence of reciprocating motion of unbalanced parts, but more or less disagreeable vibration has been noted, with no apparent bad effects, however. Concrete foundations built up from the ground should be used.

SPY RUN POWER STATION LOAD.

	Railway.	Commercial.	Total
K.W. output	16,984,642	5,698,029	22,682,671
Maximum per day	68,661	22,660	87,841
Average per day	46,406	15,568	61,974
Average demand factor	56.8%	18.5%	37.3%
Maximum demand factor	84.1%	28.1%	53.0%
Average load factor	66.3%	65.9%	70.3%

This could be done by a slight change of design, and extending certain portions of the side walls of the boilers on up to the engine-room floor.

The arrangement of boilers and turbines permits of the simplest form of piping, involving but two bends. An equalizing header running the length of the boilers, complicates the piping only to the extent of extra valves and pipe hangers. A direct path is provided from the steam header to the turbines. Every turbine has the advantage of being located directly over its own battery of boilers, and connected with them through this header. In the normal running of the plant, an effort is made to keep those boilers in service nearest the turbines in operation, thus giving the minimum distance of steam flow. When occasion arises, the plant may be operated on the unit system, valves being supplied for this purpose in the header between the various risers. Superheated steam is provided direct from the main to all the principal auxiliaries in the plant. This avoids an auxiliary steam main.

Mechanical stoking was adopted, not only to minimize labor costs, but also to provide ample forcing capacity for peak loads and emergencies. With Hocking Valley screenings three men can handle without difficulty, 10 boilers, or 1330 boiler-hp each. Hand firing for the same capacity would require 10 firemen and two water-tenders, or 400 boiler-hp per fireman, a reduction of 60 per cent.

The condenser plant consists of barometric jet twin condensers of the Buckley type, mounted near the level of the turbine exhaust. The tail pipe extends down to the normal river level and steam-driven reciprocating pumps are installed to overcome the excessive barometric head. These pumps are somewhat of a novelty, being 16 in. and 36 in. by 48 in. with wooden pistons to insure lightness. They have to handle a great amount of sediment and large quantities of water, as is the case with all barometric condensers. This type of condenser has proved very satisfactory, particularly with the double-deck layout, the condenser being suspended beneath the turbine where its bulky part is out of the way; its tail pipe drops down behind the boilers.

Normally about 150 tons of coal are burned per day. For coal storage, an elevated bunker of 400-tons capacity fulfils all requirements for gravity feed, and will tide the plant over a period of about 2½ days in case of failure of the coal handling apparatus. The main coal storage yard will hold about 6000 tons of coal, which is sufficient for 1½ months' supply, although normally only about 4500 tons are held in storage, except in case of impending fuel shortage, when the storage yard is filled to its utmost capacity. The gantry crane serving this storage yard combines the function of unloader, crusher, elevator and distributor. Its normal capacity is about 50 tons per hour, but the operator has unloaded a 40-ton car in 20 minutes, and a maximum of 11 40-ton cars in a short working day. The crane is electrically operated, and is controlled by one man.

The two sections of the generating plant, 25-cycle and 60-cycle, are, as stated previously, separated electrically, and therefore each is controlled by a separate switchboard. Two additional boards control the rotary converter output for both 25-cycle and 60-cycle systems, the latter consisting of d. c. power circuit for elevators and other power. A fifth board controls the exciters.

With perhaps the exception of the exciters, the generating plant is standard throughout. In place of the usual steam-driven exciter, with motor-driven duplicate, each generating unit is provided with its own direct-connected exciter, all generating at 125 volts. Each exciter has sufficient capacity to carry two generators, and all may be connected to a common bus, as an emergency condition. Normally, the 25-cycle and 60-cycle exciters are separate, to permit the use of independent Tirril regulators.

All the generators draw their supply of ventilating air from a sheet-steel duct running the length of the building above and in front of the boilers. During the summer months, a positive pressure fan which has been installed is used to accelerate the air flow during certain prevailing winds, and during extreme hot weather. This system of forced generator ventilation maintains a low generator temperature the year around and makes possible greater generator overloads.

At the Spy Run station, the engineer in charge of the turbine takes care of all speed adjustments by manipulating the individual governors. Each turbine has its own oil pump, cooler and strainer reservoir, all of which apparatus is readily accessible from the engine-room floor. When desired, the oil may be entirely drained out of any of the turbines into the filter below and a fresh supply of oil can be pumped into the machine.

OPERATION

Some difficulties were experienced in starting this plant. A great deal of trouble was caused by the 25-cycle generators breaking down. The vibration was very severe and blades were constantly rubbing out and the spindles bending. The cause of this was that the alignment was not properly taken care of by making allowances for contraction and expansion. The armature slots were not smooth enough, and the coils had a tendency to keep step with the cycles. It was necessary to smooth these slots up and wedge the coils in each slot very tightly, to keep them from burning out. The spindles had to be lined up at the normal temperature of operation. At the time, the vacuum maintained was very low, which caused a high temperature at the end of the bearings. This together with the generator fields being out of balance, caused considerable trouble and interruptions of service. After determining and removing the cause of the trouble, for the past two years, there has been no further difficulty.

FUEL CONSUMPTION OF SPY RUN POWER STATION.

	Tons.
Coal on hand Jan. 1, 1908	4,500
Received during year 1908	50,905.40
	55,405.40
Coal on hand Jan. 1, 1909	2,000
Total coal used	53,405.40
Coal actually consumed	47,633,609
Shrinkage, due to transportation and storage	5,771,791
Total	53,405.40
	Lb.
Coal consumed per K.W.H.	4.2
Shrinkage per K.W.H.	.508 +
Total coal per K.W.H.	4.708 +

The ease with which the turbo-generators take overloads of 75 per cent is remarkable, and the only fear of breakdown which is entertained is for the breakers and switches. The Tirril regulators maintain the voltage on the railway circuits very closely.

The efficiency of the plant as a whole is very good. The following data are of interest:

The maximum boiler horse power in service is 0.8 horse power per kilowatt generated. This is very low, taking into consideration the peaks which have to be taken care of. Very often peak loads of 6000 kw have to be handled. The output of the plant during the year 1908 was 22,682,671 kw hours, the maximum daily output being 87,841 kw hours and the average daily output being

61,974 kw hours. Other features are the reasonably high vacuum maintained at such a low investment cost; the length and construction of the transmission line, which is 114 miles long and carries 33,000-volt current with 6 ft. triangular spacing non-transposed wires; a heavy load carried at the extreme end of the line, and a power factor of practically unity.

JUNE MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The last spring meeting of the Central Electric Railway Association was held at Fort Wayne, Ind., on June 3. There were 124 railway and supply men present. Several manufacturers exhibited supplies in the parlors of the Anthony Hotel, where the meeting was held. A. A. Anderson, general manager, Indianapolis, Columbus & Southern Traction Company, president of the association, was in the chair.

Secretary A. L. Neereamer read the minutes of the previous meeting. S. D. Hutchins, chairman of the committee to consider methods for filing matters in periodicals, stated that at a meeting of the committee held in Indianapolis it had been found that there was considerable merit in the scheme proposed at the Cleveland meeting by R. N. Hemming, but as there were other methods perhaps equally as good, the committee asked for more time to consider the question fully.

On motion, 26 supply men were elected to associate membership.

A paper on piece work in electric railway shops was read by J. A. Gohen, representing the Cleanola Company. An abstract of this paper was printed in the Electric Railway Journal of June 5, page 1042. C. B. Fairchild, Jr., read some observations on piece work in electric railway shops, with particular reference to the practice of the Interborough Rapid Transit Company, New York.

C. E. Sawtelle, Tool Steel Gear & Pinion Company, Cincinnati, Ohio, said that this company was putting its employees on the piece work basis, and also was planning to make small blocks of company stock available for those employees who desired thus to invest their earnings. It was believed that these two innovations would increase the loyalty and efficiency of the men. Mr. Sawtelle knew of objections to the piece work system, but thought that the benefits far overweighed the defects.

President Anderson asked if any company represented at the meeting had installed the piece work system, but the replies were all in the negative.

George H. Whysall, Columbus, Delaware & Marion, had been investigating the results to be obtained by the piece work system, and had not thought it advisable to install this system for a road of moderate size unless an arrangement could be made whereby all or part of the men would work on hourly wages for part of a day and piece work for the remainder of the time.

H. A. Nicholl, Indiana Union Traction Company, also had considered the piece work system for his company, but had reached no definite conclusions.

E. C. Spring, Dayton, Covington & Piqua Traction Company, called attention to the experience of a large number of manufacturing plants in the city of Dayton, Ohio, with the piece work system. In these factories it had been shown that the results were most satisfactory where the work consisted of building assembled machines. In electric railway shops it might be found difficult to put the men on the piece work basis on account of the diversity of the operations. If, however, as suggested, the carpentry, armature and cleaning departments were put on the basis of piece work half a day and half a day regular time the results might be satisfactory and an improvement over present conditions.

T. W. Shelton, Indianapolis, Columbus & Southern Traction Company, did not favor piece work in a small shop. There the men must be called upon to do all classes of work and must be shifted hurriedly from one job to another. If the piece work system was installed in such a small shop a desire would be created for the men to do that work at which they could earn the most money, and dissatisfaction might result.

George H. Whysall said that the shop accounts of his road showed not only on what part of a car a man had worked, but the time taken for each operation, and with the present accounting system so subdivided he did not think it would be a very great task to install the piece work system. The employees then could state on "time slips" just how many operations they had performed, rather than how long they had worked on one car.

C. D. Paxton, Dayton & Troy Railway, thought that strict adherence to the piece work system in a small shop would interfere with the flexibility of the work.

Mr. Gohen, the author of the paper, in closing the discussion held that piece work would benefit any shop. The principle underlying the piece work system was that the men were made co-partners with the employer; they learned to be more independent, and low costs and harmony resulted.

The report of the committee on charges for handling equipment will be presented at the next meeting.

The secretary read a report on recommendations of the executive committee regarding the exchange of transportation between member companies.

At the opening of the afternoon session W. B. Wright, auditor, Indianapolis & Cincinnati Traction Company, read a paper on "The Auditing Department," which was printed in abstract in the Electric Railway Journal of June 5, page 1040.

M. J. Kehoe, superintendent of power, Fort Wayne & Wabash Valley Traction Company, next read a paper describing the interesting constructional features of the Spy Run power station of that company. This paper will be found on pages 1084 and 1085.

When questioned, Mr. Kehoe said that, roughly, the dividing line in the choice of units for railway stations could be put at 500 kw. For larger units he would favor turbines, and for smaller capacities he would choose reciprocating engines. However, the load factor and the condensing conditions had much to do with the choice in any particular situation.

George H. Whysall said he had held the opinion that the turbine, providing ample condensing water was available, was preferable, irrespective of size, largely on account of the high efficiency of these machines at widely varying loads.

T. W. Shelton, Indianapolis, Columbus & Southern, had had little experience with turbines, but thought that the reciprocating engine was more economical for small railway plants. The turbine, to operate efficiently, required a 28-in. vacuum. This necessitated relatively large condensing and pumping machinery, which at low loads was a drain on the plant.

Mr. Kehoe had under his charge both large and small units. Among the small units was one of 400-kw capacity

that used about 30 lbs. of steam per hp-hour. In contrast with this, the larger turbine units described as part of the Spy Run power plant used but 22 lbs. of steam per hp-hour.

Mr. Whysall stated that a 1000-kw turbine in his plant when first installed would run 40 minutes from an initial speed of 750 r.p.m. after steam and load were cut off. Now that the turbine has been used for some time, it would run for 65 minutes after cutting off steam. He thought that the choice between small turbine units and reciprocating engine units depended wholly on local conditions and a selection could not be made without knowledge of these.

Under the program heading of "New Things for the Benefit of Our Members," C. D. Emmons, general manager, Fort Wayne & Wabash Valley Traction Company, described the "Rymco" automatic trolley switch as installed at 12 switches on his road. This device is a trolley switch with its movable point mechanically connected for operation in unison with the track switch point. This device does away with the necessity for a second wire in advance of the switch point and the consequent changing of the trolley and loss of power while the conductor is changing the trolley wheel from the main wire to the siding lead. The results with this device, Mr. Emmons stated, had been very successful.

T. W. Shelton described a mandrel of varying diameter which he had effectively used in compressing babbitt metal in armature bearings. After a bearing had been rebabbitted and bored to within 1/32 in. of the finished diameter, the mandrel was pushed through with a wheel press. The passage of the mandrel through the bearing compressed the babbitt firmly against the shell, and this compacting resulted in a longer life to the bearing because the metal was made more dense. It also gave the bearing a very smooth surface.

E. Benjamin spoke of bearings on the Pacific Electric Railway filled with babbitt made by the Great Western Smelting & Refining Company that had run 143,000 miles and worn but 0.01 in.

Ross Taylor drew attention to the need for better ventilated cars, and told of the ventilation tests which have been carried on by the Chicago Board of Health (see ELECTRIC RAILWAY JOURNAL of May 8, page 876). Mr. Taylor described the device of the Automatic Ventilator Company, which, he stated, fully meets the requirements of proper ventilation. Fresh air is fed under the electric heaters at the floor level of the car and is withdrawn through exhaust ventilators placed at a number of points in the roof.

Arthur W. Brady, president, Indiana Union Traction Company, spoke of the work of the American Street & Interurban Railway Association, and urged those present to become active or associate members in this and affiliated bodies.

E. C. Spring, general superintendent, Dayton, Covington & Piqua Traction Company, was elected to honorary membership in the association on the occasion of his taking up work outside of the limits of active membership, as announced elsewhere in this issue. Several members spoke in appreciation of the work which Mr. Spring had done for the Central Electric Railway Association. The president requested all who could to travel in special cars to the next meeting, which will be held at Detroit, Aug. 26. Special cars were run to the Fort Wayne convention by the Toledo, Port Clinton & Lakeside, Indianapolis & Cincinnati Traction Company and the Indianapolis & Louisville Traction Company.

PHILADELPHIA STRIKE ENDED

The strike of the surface motormen and conductors of the Philadelphia Rapid Transit Company came to an unexpected end on June 5 through the mediation of Senator McNichol, leader of the Philadelphia Republicans. His offer to act as an intermediary was taken under consideration by both sides on Tuesday, June 2, and two days later a compromise acceptable to the company and to the great majority of the men was reached. The strike lasted exactly one week.

The agreement was signed by President John B. Parsons for the company and a representative from each depot for the men. The text follows herewith:

AGREEMENT BETWEEN COMPANY AND MEN

Made and entered into by and between the accredited representatives of the Philadelphia Rapid Transit Company, party of the first part, and the authorized committee of its employees, party of the second part.

Witnesseth, That in the operation of the lines of the company, including the elevated and the subway, that upon the signing of this agreement every employee who is now on strike shall immediately be restored to his former position in the company's service, without prejudice.

Section I. The company agrees, through its accredited representatives, to meet with the accredited representatives of its employees to adjust any differences or grievances which may arise.

Section II. The company shall advertise for proposals from reputable firms (not less than five in number) for furnishing uniforms in accordance with the specifications of the company, the employees to purchase uniforms from any firm (not less than five in number) to whom contracts for the same may be awarded. At least one firm supplying union-made uniforms shall be considered as being one of the firms to which employees may go to purchase the same.

Section III. The company agrees that when an employee is suspended or discharged and after an investigation it is found that he has been unjustly suspended or discharged, he shall be reinstated to his former position, and shall be paid for all time lost.

The wage schedule shall be 22 cents per hour for surface men and the same proportionate increase for the elevated men from June 5, 1909, to June 30, 1910, and shall become effective upon the signing of this agreement, provided that the report of the audit by the City Controller, for 1908, which shall be submitted to the company and to the committee, shall sustain the company's statement that the company's receipts do not warrant any further increase beyond 22 cents. Should the reports indicate that a higher rate can be paid, the wage scale shall be immediately adjusted in accordance therewith.

Section IV. This agreement shall be in full force and effect, beginning on the 5th day of June, 1909, and shall continue to be binding upon both parties hereto until and including the 30th day of June, 1910.

It will be noted from Section I that the company agrees to deal with committees of employees. The company issued a statement that there was a vast difference in dealing with a committee of representatives from each barn elected by a majority of the men and a committee representing a union. In the former case it would be dealing on a basis of friendliness and with the desire for mutual good understanding; in the other case it would be dealing with a committee of antagonists. The company also announced, after a directors' meeting on June 7, that it would distribute $25 000 to reward the men who remained loyal throughout the strike.

Section II, relating to uniforms, is a modification of the original rule. Instead of buying their suits from one clothier the men will have the choice of five firms whose prices and grades conform to the railway company's specifications. In Section III it is agreed that unjustly suspended employees should be reinstated with payment for lost time. The demand for 25 cents an hour was given up, the men agreeing to accept 22 cents an hour, an increase from 21 cents. This increase had previously been

made voluntarily by the directors, but was to begin July 1, the opening of the fiscal year, instead of June 5. The employees of the elevated subway division, some of whom had joined the surface men, are to receive a proportionate increase. The basis for any increase greater than that in the agreement is to be the audit of the railway company's books as made by the City Comptroller.

Another feature of the agreement is the stipulation for the immediate employment of all the strikers. The contract is to hold from June 5, 1909, to June 30, 1910.

The Philadelphia Rapid Transit Company made the following public announcement, on June 7, to define its attitude on problems involved in the recent strike:

PHILADELPHIA RAPID TRANSIT COMPANY'S STATEMENT

In the heat of such a struggle as that which ended Saturday it is impossible to see some features of the contest in their true perspective. It is important, however, that the public should be correctly advised as to the fundamental character of the struggle and the manner in which it is viewed by the management of the company. It has been made to appear that the company was not thoroughly prepared for and was surprised by the strike order issued in the early morning hours of May 29. So far from being unprepared, the management of the company was fully advised as to every step taken by the instigators of the strike, and early in the evening of May 28 every possible means had been taken to prepare for handling any situation that might arise as a consequence of the anticipated strike order. The results of this preparedness were evident in the large number of cars operated throughout the strike. It is a matter of record that no traction company under the same circumstances has given a service so nearly approaching normal conditions. From the first day of the strike to the period when negotiations were opened for its settlement, the company operated a constantly increasing number of cars. On Thursday, when the strike was at its height, 716 cars were on the street at 9 o'clock in the morning, and the company carried in excess of 300,000 passengers. This was accomplished in spite of the fact that service was practically discontinued after 9 o'clock in the evening, partly to relieve the strain upon the loyal men and partly to avoid as far as possible opportunity for rioting.

It is likewise extremely important to bear in mind that the strike was not brought about by any generally expressed desire on the part of the majority of the company's men. Prior to the calling of the strike two committees had called upon officers of the company to present demands for increased wages and changes in working conditions. These committees were not received for the reason that they had no other origin, credentials, or authority than were derived directly from a union comprising perhaps one-sixth of the company's employees. The company did not then and does not now recognize any obligation to deal with such an organization. It has always consented to receive complaints and communications of all kinds from its employees. The position of the company with respect to dealings with the union is believed to be thoroughly justified in this case by the fact that such dissatisfaction as existed among its men was the sole work of a single agitator specially employed for this purpose. Had the dissatisfaction of the men been general, spontaneous or justified by their working conditions, the situation would have been materially different. The fact that this was not the condition which faced the company cannot be too strongly emphasized.

Whether or not the responsibility for violence is traced directly to the promoters of the strike, it is evident that they profited largely by the rioting and intimidation with which the struggle was marked. Intimidation, in fact, was carried to extreme lengths; delegations of strikers visited the homes of loyal men, frightening the wives and children of the men at work; tradesmen throughout the city were warned not to supply provisions to the families of men who remained on the cars. The fact that so many men obeyed the strike order is not more remarkable than the number of men who remained loyal in view of the methods of intimidation employed as well as the effect upon the entire personnel of an artificially promoted agitation, which left to the majority who did not want to strike the choice between loyalty to the company and loyalty to friends and fellow-workers. The relations between the men on the cars and their immediate superiors, the barn superintendents, are close and friendly. These superintendents have received daily assurances from hundreds of men on strike that they were out against their will and greatly regretted the position into which they had been forced by the strike order.

Under all circumstances the duty of a public service corporation is to give the best service possible. This duty remains during a strike, and because of this the company felt obligated to bring 600 men from outside points to take the places of the strikers. The employment of professional "strike-breakers" was avoided and the best men obtainable were employed. As usual under such circumstances, men who had given up positions resented the employment of others to take their places, but it is believed that no justification is required of the company's policy in this respect. When on Thursday, June 3, intimations reached the company that persons connected neither with the strikers nor the company were taking steps to bring about a settlement, the management had the situation fully in hand and was beyond all doubt in a position daily to increase its service. It had every reason to believe that complete service would be restored within a few days. Nevertheless, it met these overtures in a friendly spirit and placed no obstacles in the way of an agreement honorable to both sides. In the settlement itself, few, if any, concessions were made that could not have been obtained by the employees without a strike, which cost the company, the employees and the general public hundreds of thousands of dollars. The wage increase of a cent an hour had already been granted, effective July 1; this increase was made effective 25 days earlier. It is provided in the agreement that 10 hours of work shall be completed within 12 consecutive hours, "as far as possible," and that the swing system shall be reduced to the minimum. This involves no change in the company's policy, and if entire frankness had characterized the statements of the union officials they would have conceded that with respect to hours street car employees in Philadelphia work under much more favorable conditions than prevail in other large cities.

The arrangement by which there is to be a standing committee representative of the company's employees as a whole, will, it is hoped, result in a better understanding on both sides. If, as we believe will be the case, this committee meets the management in a spirit of co-operation and good-will it will make impossible a repetition of such an unnecessary and unjustifiable strike as ended on Saturday. The agreement of June 5 is not, as has been reported, signed by the president and secretary of the union. It is signed, for the party of the first part, by the Philadelphia Rapid Transit Company, and for the party of the second part by 19 barn representatives.

MEETING OF THE CITY RULES COMMITTEE

A meeting was held, on June 7 and 8, of the Committee on Rules of the American Street & Interurban Railway Transportation & Traffic Association. The committee met at the headquarters of the association, 29 West Thirty-ninth Street, New York. There were present: R. E. Danforth, general manager of the Public Service Railway Company, Newark, N. J., chairman; L. H. Palmer, assistant to the manager, Metropolitan Street Railway Company, New York; D. A. Hegarty, general manager, Little Rock Railway & Electric Company, Little Rock, Ark., and George F. Reed, superintendent of transportation, Springfield Street Railway Company, Springfield, Mass. C. Loomis Allen, president American Street & Interurban Railway Transportation & Traffic Association, was also in attendance. Two members of the committee, H. H. Hunt, district manager Stone & Webster Managers' Organization, and Duncan McDonald, general manager, Montreal Street Railway Company, were unable to be present. The committee had met previously, and the present meeting was held to consider the suggestions which had been received since that time. It was decided very thoroughly to revise the standard code of rules in which no radical change has been made since the report of the 1906 committee.

A tentative set of rules was adopted and are printed below. The addition to the rules are printed in *italics*.

Where any portion of the old rules has been omitted, it is enclosed in brackets.

As will be seen, the committee decided to rearrange and re-group the rules which are now divided into three classes, each with a number of subdivisions as follows:

1. General rules
   a. Knowledge of rules.
   b. Responsibility.
   c. Personal conduct.
   d. Operative rules
   e. Handling passengers.
   f. Accidents.
   g. Ejectments.
   h. Car-house rules.
   i. Hearing by superintendent.
2. Rules for conductors.
   a. Operating rules.
   b. Handling passengers.
   c. Handling fares and transfers.
3. Rules for motormen.
   a. Handling cars.
   b. In regard to vehicles.
   c. In regard to pedestrians.
   d. Miscellaneous.

In the discussion, the question of special rules for pay-as-you-enter cars was considered, but the committee decided not to take up this subject this year. It was also decided to join in a conference with the committee on interurban rules upon the subject of bell signals so as to make the bell signals uniform on both the interurban and city roads. It will be remembered that the committee on interurban rules tentatively transposed the meaning of the two-bell and five-bell signals from the mortorman to the conductor. There seem to be objections, however, to the use in city service of five bells as a danger signal and the old signal of two bells for danger was tentatively retained. As will be noticed, rule 22 has been entirely omitted.

A: KNOWLEDGE OF THE RULES

1. Knowledge of Rules: Conductors and motormen are required to be familiar with the rules, and with every special order issued. The bulletin board must be examined daily for special orders. Employment by the Company binds the employee to comply with the rules and regulations, and ignorance thereof will not be accepted as an excuse for negligence or omission of duty. If in doubt as to the exact meaning of any rule or special order, application must be made to the proper authority for information and instruction.

In addition to these rules, special orders will be issued from time to time; such orders, when issued by proper authority, whether in conflict with these rules or not, must be obeyed while in force.

B: RESPONSIBILITY

2. [6.] Responsibility: The motorman is in charge of the car and is held responsible

(1) For the safe running of the car.

(2) For the proper operation of the car and its machinery.

(3) For running car according to schedule.

The conductor is in charge of the passengers on the car and is held responsible

(1) For the safety and convenience of the passengers.

(2) For the collection and proper accounting of fares.

Conductors and motormen will be held jointly responsible for any misconduct or negligence which either fails properly to report.

C: PERSONAL CONDUCT

3. Personal Appearance: Conductors and motormen must report for duty clothed in full regulation uniform, and must be clean and neat in appearance.

4. Politeness: Conductors and motormen must treat all passengers with politeness, avoid difficulty, and exercise patience, forbearance and self-control under all conditions. They must not make threatening gestures or use loud, uncivil, indecent or profane language, even under the greatest provocation. *Badge number of conductor and motorman must be given on request of a passenger at any time.*

5. Habits and Personal Conduct: The following acts are prohibited:

5 a. Drinking intoxicating liquors of any kind while on duty.

5 b. Entering any place where the same is sold as a beverage while in uniform or while on duty, except in case of necessity.

5 c. Constant frequenting of drinking places.

5 d. Carrying intoxicating drinks about the person while on duty.

5 e. Carrying intoxicating drinks on the Company's premises at any time.

5 f. Indulging to excess in intoxicating liquors at any time.

5 g. Gambling in any form, including the laying of bets (and playing raffles) while upon the premises of the Company.

5 h. Smoking tobacco while on duty.

5 i. Smoking tobacco while off duty in any part of the Company's buildings, except in the conductors' or motormen's room.

5 j. Reading books or newspapers while on duty.

6. [7.] Talking to Motorman: Motormen while operating cars are permitted to answer questions of superior officers, and to give proper instructions to students only. All other conversation with motormen while car is in motion is forbidden.

D: OPERATING RULES

7. [15.] Run on Time: Cars must never be run ahead of schedule time, but must pass time points and leave terminals promptly on time, unless unavoidably delayed. *Should a motorman be unavoidably detained he must not attempt to make it up by reckless running.*

Conductors and motormen must carry reliable watches which must show correct time and be compared daily with the standard station clock.

8. [30.] Starting: Motorman must never move car (whether stopped on signal or for any other reason) without signal from conductor, and then only when assured that no one is getting on or off front platform.

Conductor must never give signal to start when passengers are getting on or off.

Conductor must not put his hand on bell cord until passengers have boarded or left car; bell cord must not be touched until it is time to signal motorman to go ahead.

Conductor must never give signal to back a car unless he is on rear platform and knows track is clear behind the car.

9. [27.] Starting Cars After Blockade: In the event of a blockade of cars from any cause, the cars in such blockade must not all be started at one time, but singly, and at such intervals as will not burden the feeder line.

10. [28.] Bell Signals: From conductor to motorman, to be given on motorman's signal bell:

1 bell—"Stop at next crossing or station."

2 bells—"Go ahead."

3 bells—"Stop immediately."

4 bells—given when car is standing—"Back car slowly."

From motorman to conductor, to be given on conductor's signal bell:

1 bell—"Come [ahead] *forward.*"

2 bells—"Watch the trolley" and danger signal to the conductor.

3 bells—"Set rear brake."

4 bells—Signal to conductor that motorman desires to back the car.

5 bells—Warning—"Pull trolley down to roof."

Whenever a car in service is stopped, *for any cause except to take on or let off passengers,* the motorman will, as soon as he is ready to go forward, give two taps of the gong; after which, if the conductor is ready to proceed, he will give the "Go ahead" signal.

The motorman will answer the signal to stop from conductor by one loud tap of gong; and two loud taps of gong after receiving the signal to go ahead. If unable to proceed immediately upon receipt of signal, motorman will wait for another "Go ahead" signal before starting the car.

When the car is standing, and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify "All is clear behind." *However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends.*

When two or more cars are coupled together, "go ahead" signal must first be given by conductor of rear car and be repeated by each conductor in succession on his signal bell, when he is ready to start.

11. [29.] Signals Before Passing Obstructions Near Track: Before passing any vehicle or obstruction close to the track, where passengers or conductor are liable to be injured while standing on the step of an open car, motorman must give two taps [of] *on conductor's* signal bell as a warning, and must bring his car to a full stop before passing vehicle or obstruction unless he has received GO AHEAD signal from the conductor indicating that all is clear. Great care must be exercised in passing over all excavations, warning workmen of the approach of car by repeatedly sounding gong, car to be under full control. Where excavations are near regular stopping place, car should be run clear thereof before stopped.

12. [31.] Danger Signals: Red lights or flags indicate danger, and when placed on the track, cars must come to a full stop until such signal is removed.

13. [18.] Reporting Defects: Conductors and motormen will report to superintendent, inspector, starter or foreman any defect in car, track or wire, which needs immediate attention *and fill out blank provided for that purpose.*

14. [19.] Disabled Cars: The motorman or conductor of

any disabled car, withdrawn from the main track, must remain with the car until relieved by proper authority. *When a disabled car is being pushed or pulled, the signal for starting must first be given by conductor on rear car and repeated by conductor on forward car, each conductor being careful not to give the signal when passengers are boarding or leaving car.*

15. [32.] Leaving Car: When necessary for conductor to leave his car he must notify the motorman to protect passengers and car. Should passengers board car during absence of conductor, motorman will notify conductor of the number and location of such passengers upon his return.

Cars in commission must not be left unprotected; either conductor or motorman always remaining in charge.

16. [33.] Responsibility for Damages: Employees will be held responsible for any damages caused by their neglect or carelessness or by disobedience of rules.

17. [34.] Transfer Point Meetings: Motormen and conductors will be held equally responsible for leaving a transfer point so quickly as to prevent the transfer of passengers from an approaching car on a connecting line.

18. [16.] Steam Railroad Crossings: Car must be brought to a full stop at a safe distance, approaching steam railroad crossings at grade, and motorman must not proceed until conductor has gone ahead to the center of crossing, looked both ways, and given the COME AHEAD signal. Before starting, the motorman will look back to see that no passengers are getting on or off; and in no case proceed, even after conductor's signal, until he has also examined the crossing and satisfied himself that steam cars are not approaching.

When there is more than one track the conductor must remain in advance of the car until the last track is reached.

After boarding car, conductor will give GO AHEAD signal to notify motorman that he is aboard. Motorman is forbidden to proceed without this signal.

Where crossing is protected by derail, interlocking plant, or flagman (employed by the Company) this rule does not apply, special instructions being issued to govern in such cases.

E: HANDLING PASSENGERS

19. [8.] Safety: The safety of passengers is the first consideration. All employees are required to exercise constant care to prevent injury to persons or property, and in all cases of doubt take the safe side.

20. [9.] Warning to Passengers: Conductors and motormen must, in a polite way, endeavor to keep people from jumping on or off cars while in motion. If persons attempt to get on or off the car while it is moving, they should be notified politely to wait until the car stops. If the passengers are leaving while another car is approaching from the opposite direction, they should be courteously warned to look out for the car on the other track. *Conductors must give the danger signal (three bells) if an accident appears imminent.*

21. [10.] Standing on Steps. *Permit no person to stand* [Endeavor to prevent anyone from standing] on the steps or buffers. Passengers should be fully inside of the car or safely landed on the platform before the signal is given to start.

22. [11.] Stealing Rides: Any person caught stealing a ride on a car must never be pushed therefrom while it is in motion, *but car must be stopped at next street and such person put off.*

F: ACCIDENTS

23. [20.] Render Assistance: In case of accident, however slight, to persons or property, in connection with or near any car, the motorman and conductor in charge of the same will render all assistance necessary and practicable. In no case will they leave injured persons without first having seen that they are cared for.

24. [21.] Medical Attendance: Motormen and conductors are directed not to employ medical attendance to injured persons, except for the first visit, in cases of personal injury; nor will they visit such persons at any other time afterward, unless specially instructed so to do by an officer of the Company.

[22. Fatal Accidents: In the event of a fatal accident, it will not be necessary to blockade the line awaiting the arrival of the coroner or any other official. If an accident occurs where it is impossible to carry the body to a place of shelter and security, motorman and conductor will put the body on the car and convey it to some suitable place.]

25. [17.] Fire in Car: When there is evidence of car being on fire, motorman will immediately throw overhead switch to OFF and conductor pull down trolley, both motorman and conductor using every effort to prevent passengers becoming panic-stricken or leaving car before it is brought to a stop.

26. [23.] Reports to Be Full and Complete: A full and complete *written* report of every accident, no matter how trivial, and whether occurring on or near the car, must be made by the conductor. Accidents sometimes considered as not worth reporting are often the most serious, troublesome and expensive.

The conductor will obtain the name and residence in full of all witnesses on or near the car, *including badge number of any policeman, fireman, private officer, postman or uniformed employee of the Company.*

The motorman will assist the conductor in securing the names of witnesses whenever practicable, and will be held responsible for any neglect to render assistance.

In all cases full facts must be obtained and stated in the report, as follows:

The date, exact time, exact place, run and car number, and the direction in which the car was moving, the nature of the accident or collision, and the cause of its occurrence.

The full name and address of the person injured, or whose vehicle was in collision (giving the name of both the driver and the owner of the vehicle).

Ascertain the extent of injuries or damage, if any, before leaving the spot.

In case there has been an accident on the car, and the [conductors] *crews* change ahead, the conductor taking car on which the accident happened must secure the names of witnesses as above.

In case a person is struck by a car after passing around the rear of a *passing or* standing car, the numbers of both cars must be obtained, and both crews must report the accident.

If an accident is caused by any defect or damaged condition of car, conductor must report the same and its cause.

Accidents to employees will be reported the same as accidents to passengers.

Any trouble or disturbance of a boisterous or quarrelsome character which occurs on a car, or the ejectment of a person from a car, will be reported as an accident.

27. [24.] Report Accidents to Inspectors: Conductors and motormen will make a verbal report to the first inspector or official of the Company they meet of any accident, blockade or mishap of any kind. *The depot starter or dispatcher must also be notified.*

28. [25.] Give Information to Proper Persons: No employee shall, under any circumstances, give any information whatever concerning any accident, delay, blockade or mishap of any kind to any person, except to a properly authorized representative of the Company.

29. [26.] Telephone Information: In case of accident involving personal injury or serious damage to property, conductor, *after attending to the case and getting witnesses,* will telephone at once to headquarters, giving notice and particulars of accident.

In case of a blockade, where assistance is required to get cars moving, conductor of car first in block must [perform this duty] *summon assistance. Conductor of the second car, however, will also be held responsible for being sure that assistance has been summoned.* Expense of telephone message will be refunded upon application at office.

G: EJECTMENTS

30. [12.] Ejectments: Ejectments shall be made with the assistance of the motorman after the car has been brought to a stop, using "only such force as is sufficient to expel the offending passenger with a reasonable regard for his personal safety." *No passenger shall be forcibly ejected from the car for any cause whatever without order from an inspector, starter or official of the Company, unless the conduct of the passenger is dangerous or grossly offensive.*

31. [13.] Where to Eject.: Any person ejected from a car must be put off at a regular stopping place.

No passenger will be put off at a point where likely to be exposed to danger.

Particular attention must be paid to this rule during bad and inclement weather, late at night, or when a passenger is intoxicated.

32. [14.] Intoxication: No passenger will be ejected from a car for mere intoxication, unless said passenger becomes dangerous or offensive; such passenger must then be ejected with great care and must be guided until free from probable injury.

H: CAR HOUSE RULES

33. [2.] Report for Duty: Regular conductors and motormen must report for duty in sufficient time to permit of the car being started promptly on time from the starting point of the line.

Extra men must report at such time as ordered, or must give notice at least ten minutes before such time. They must not absent themselves after answering roll-call without permission.

I: HEARING BY SUPERINTENDENT

34. [35.] Hearing by Superintendent: A hearing will be given by the Superintendent to every employee who desires to complain. Reports or suggestions for the betterment of the service will always receive consideration.

RULES FOR CONDUCTORS

A: OPERATING RULES

101. Be on Rear Platform: Remain on rear platform when not collecting fares, keeping a lookout for persons desiring to board car. Keep careful watch of passengers to observe requests to stop car. When stops are made at principal streets,

places of amusement, churches, or at any point where a considerable number of passengers enter or leave the car, conductors should be on rear platform until such point is passed. *When descending steep grades, conductor will remain on rear platform.*

102. Announcements: Announce distinctly the names of streets, public places and transfer points when approaching the same.

[103. Removing Trolley: Do not remove trolley from wire at end of run, or elsewhere at night, until passengers have alighted from car.] (Transferred to end of 104.)

103. [104.] Route Signs: See that route signs are properly displayed on each half trip.

104. [106.] Watching the Trolley: *Trolley rope must be held* [keep your hand upon the trolley rope] when passing over switches, crossings, or going around curves. Should the trolley leave the wire, the conductor must at once pull down the trolley and signal the motorman to stop. After the car has stopped, replace the trolley on the wire, look around and through the car and see if any persons are boarding or leaving same before giving motorman signal to start. See that passengers keep their hands off the trolley rope. *Do not remove trolley from wire at end of run, or elsewhere at night, until passengers have alighted from car.*

105. [107.] Keeping Gates Closed: Front and rear gates on closed cars on the side between the tracks must always be kept closed and securely fastened [when running on the road]. On open cars the guard chains [and guard rails] must be kept fastened *and guard rail lowered* on the side between the tracks. When gates or chains or their fastenings are broken or out of order, prompt report must be made to superintendent, inspector, starter or foreman.

106: *Disabled Motorman: In case motorman is disabled from any cause while car is in motion, conductor must stop the car as promptly as possible.*

107: *Inspect Car: Conductors will carefully inspect floor, grab-handles, signs and all other parts of car to see that same are in proper condition before car is taken out on the road.*

B: HANDLING PASSENGERS

108. Moving Forward: On closed cars when standing passengers crowd the rear door, request them to PLEASE STEP FORWARD.

109. Seating Passengers: Standing passengers should be directed to vacant seats; and an effort made to provide them with seats where possible.

110. Assisting Passengers: Elderly and feeble persons, women and children should be given assistance getting on and off car when possible. *Crippled, blind or badly intoxicated persons should be assisted to sidewalk if necessary.*

111. *Information to Passengers: Conductors are expected to be familiar with principal points along their route, so as to be able to give information to passengers about streets, parks, connecting or intersecting railway lines, depots, ferries, public buildings, large stores, hospitals, theaters, etc.*

When on the stand at terminals, and when approaching passengers, conductors must announce the route and destination of car.

112. Spitting on Floor: No passenger will be ejected from a car for spitting on the floor. If a passenger violates the rule or law prohibiting spitting, the conductor will call the attention of the passenger to the law prohibiting such conduct and endeavor to persuade the passenger to desist.

113. [105.] Carrying Packages: Passengers must not be allowed to carry bulky or dangerous packages aboard cars.

Employees must not carry packages, letters or newspapers without an order from the proper authority, and must not [do not in any way take possession of, or] assume responsibility for any package which a passenger may bring upon the car, excepting such articles as are to be turned into the Lost Article Department.

They must [do] not hang nor allow articles to be hung on the brake handles.

114. *Lost Articles: Any article left in the car must be turned in promptly at once. Concerning articles found, conductors must not give information to any passenger, but must refer them to the proper office. The name and address of parties giving lost property to conductors must be obtained.*

115. [111.] Dogs in Cars: [No dogs should be allowed on a car except such small dogs as can be carried in the laps of passengers.] *Dogs will not be carried on any car.*

C: HANDLING FARES AND TRANSFERS

116. [113.] Collection of Fares: Fares must be collected promptly after passenger has boarded car and immediately registered. When more than one person boards car at a time, the fares must be registered immediately in the presence of the passenger who paid them before any more fares are collected. *Fares should be collected separately and not in bunches.*

Should a conductor for any reason return a fare to a passenger, or by error register more fares than he collected, he must not attempt to recover same by omitting to register fares subsequently collected, but should make report of such fact.

117. [114.] Change: When necessary to give change, first register fare, and immediately thereafter give change, *stating the amount received and amount returned.*

Should a conductor have any dispute with a passenger in regard to change, he must make a report in writing to the Superintendent.

Conductors will make change for passengers to the amount of two dollars.

118. [115.] Register Rings: Be careful to see that register rings each fare [and that dial shows it].

119. [116.] Register Out of Order: In case the register gets out of order, stop using it, make report of fares on back of trip report or on blanks supplied for that purpose, and report the fact to the first inspector, or starter, met on the road, and subsequently report to Superintendent.

120. [117.] Transfers in Blockades: In case any line is blocked, it is the desire of the company to carry passengers to their destinations on other lines. Under such circumstances conductors of parallel or intersecting lines will accept transfer tickets accordingly and will issue a transfer on a transfer if necessary. They will also accept transfer passengers without tickets on orders from any inspector or authorized representative of the Company, making report of same on back of trip report.

121. *Issuance of Transfers: Correctly punched transfers shall be issued only on request made at time fare is paid.*

122. *Acceptance of Transfers: Transfers shall be accepted only when properly punched and offered for ride at designated transfer point within the time limit punched on transfer.*

123. *Refusing to Pay Fare.—Transfers: When a passenger refuses to pay fare or presents a defective transfer or ticket, upon which, in the judgment of the conductor, the passenger is not entitled to ride, the conductor must secure the names of as many witnesses to the fact as is possible, whereupon the car must be stopped and the passenger requested to leave.*

If the passenger fails to comply with such request, the facts of the case must be brought to the attention of the first Inspector, Starter or official of the Company who is met, and the conductor must act according to instructions received from such Inspector, Starter or official. In all cases the passenger must be given the benefit of the doubt.

When a passenger who refuses to pay fare requests to be allowed to leave the car the car must be stopped and the person permitted to alight.

RULES FOR MOTORMEN

A: OPERATING RULES

201. Stopping for Passengers: Keep a careful lookout on both sides of the street and bring the car to a full stop for every person who signals, except that when a car has considerable headway, is overcrowded and another car *of the same line* follows within [the same block, or 200 ft.] 500 *ft.* passengers should be requested to take the following car.

Cars will stop on signal only at farther corners; at car stations; transfer points, and at points as provided in special orders.

Do not stop cars so as to block cross-streets or cross-walks.

202. Churches and Hospitals *and Schools:* When passing a church during the hours of service, and at all times when passing a hospital, run slowly and do not ring the gong unless necessary.

Cars must be run slowly and with great care, and gong sounded, in the vicinity of schools when there are children on the street.

203. [204.] Passing Standing *and Slowly Moving* Cars *and over Special Work:* When passing standing *or slowly moving* cars, gong must be rung and car brought to slow speed.

[208. Passing Cars: Never run against switch point of crossover when meeting a car, but slacken speed sufficiently to allow the car moving in the opposite direction to pass before striking switch point. This rule refers particularly to all crossovers having switch points facing opposite to the direction in which the car is moving.] *This rule is omitted entirely and in its place the following paragraphs have been added to new rule* 203:

Run slowly over special work, especially over all facing switch points, and if there is another car moving in the opposite direction on the other track, allow that car to pass before striking the switch point.

Motormen must see that all switches are properly set before passing them, coming to a full stop if necessary.

204. *Looking Back While Car Is Moving: Motorman must not look back either through or around car while it is in motion.*

205. *Changing Ends: When changing ends at terminals motormen must not pass through car.*

206. *Entering Terminals: Motormen must reduce speed when running into terminals to a rate just sufficient to carry the car into terminal.*

207. *Persons Authorized to Run Car: Motormen must not allow any person to run their car except men placed there for instruction or some inspector or duly authorized officer of the Company, known to the motorman to be such. Conductors must not be allowed to run cars. A motorman who has a student "breaking in" in his charge must, under no circumstances, allow the student to handle the car unless he (regular motorman) is at his side, ready to take the brake or controller immediately if necessary.*

208. *Motormen must test brakes, switches, controller, lights and other apparatus and examine sand boxes to insure himself that car is in proper running order before taking it out on the road.*

B: HANDLING CARS

209. Reversing Cars: [Never use the reversing lever to stop car except to avoid a collision or injuring a person or animal.] *Motormen must not use the reverse except to avoid accident* or when the brake rigging is disabled.

Do not reverse [the power] when the brake is set, but release the brake and *throw the* reverse [the power] *handle* simultaneously, and, when the reverse [lever] *handle* is thrown in position, apply the current one point at a time, otherwise the fuse will melt or the breaker will release. Sand should be used when making an emergency stop.

210. *Runaway Car: While descending grade should it not be possible to stop a car equipped with two motors by means of brake, the motorman must immediately turn off hood switch, reverse and advance controller cylinder to last position. In the event of car being equipped with four motors, simply reverse to stop.*

Should a car equipped with two motors start to roll backward while ascending a grade and the brakes be unable to hold it, the hood switch must be immediately turned off and the controller cylinder advanced to last position. Should the car be equipped with four motors if the reverse is set in forward position the car will stop.

211. Leaving Car: Never leave platform of car without taking controller [or] *and* reverse handles, throwing off the overhead switch and applying brake. [Be careful to see that the hands point to the "off" mark before taking off controller handle.] *Always remove reverse handle first.*

Before leaving car at any point set hand brake sufficiently to prevent car from drifting.

212. Throwing Overhead Switch[es]: An overhead switch must never be thrown until power is turned entirely off, except in case controller cylinder fails to turn when power is on. It must be thrown by hand only.

213. Power off Line: When the power leaves the line the controller must be shut off, the overhead switch thrown and the car brought to a stop; the light switch must then be turned on and the car started only when the lights burn brightly.

214. Economical Use of Current: In order to effect an economical use of the electric current it is necessary that the continuous movements of starting and increasing speed should be made gradually. In starting a car let it run until the maximum speed of each notch has been attained before moving handle to the next notch.

Rapid feeding of controller is injurious to the equipment of the car and causes discomfort to passengers.. Controller must never be thrown on last point if car does not start from preceding points. The controller must never be thrown from a higher to a lower notch. Controller must not be held for any length of time on any one point except the first and second running positions. If necessary to run slower than the first running position speed, power must be thrown on and off, and not be taken continuously from a lower notch than that of the first running position.

Do not apply brakes when the current is on.

Do not apply current when brakes are applied.

Do not allow the current to remain on when car is going down grade or when passing over section breakers. Endeavor to run car with the least amount of current, allowing the car to drift without the use of current when it can be done without falling behind time.

A great amount of power can be saved by using judgment and discretion in approaching stopping places and switches by shutting off the power, so as to allow the car to drift to the stopping place or switch without a too vigorous use of the brake.

215. Release Brakes Before Stop: When brakes are set to make a stop they should always be released or nearly so just before the car comes to a standstill.

216. Water on Track: When there is water on the track run the car very slowly, drifting without the use of power whenever possible.

217. Sanded Rails: Never run on freshly sanded rails with brakes full on except to prevent an accident. On cars provided with sand boxes, in case of slippery rail, always sand the track for a short distance before applying the brakes.

218. "Spinning" of Wheels: Care must be taken particularly during snowstorms to avoid "spinning" of the wheels with no forward or backward movement of the car.

219. Slippery Rail: On a slippery rail do not allow the wheels to slide; as soon as wheels commence to slide the brake must be released and reset.

Extreme caution must be used to keep car under full control approaching all intersections, junctions, railroad crossings and prominent driveways, being very careful when approaching wagons and other cars, disregarding schedule if necessary.

220. Do Not Oil Car: Do not oil or grease any part of a car.

C: REGARDING VEHICLES

221. [205.] Passing Vehicles: Motormen are cautioned to exercise great care when a vehicle is passing alongside of track ahead of car. Ring the gong vigorously to attract the attention of the person driving, as a warning not to pull in ahead of car; and run cautiously until the vehicle is passed in safety.

222. [206.] Fire Apparatus: When any fire department vehicles are observed approaching from any direction, cars must be stopped until such vehicles have passed.

223. [207.] Ambulances [and Police Patrol] *Patrol and Emergency Wagons:* Ambulances [and] police patrol *and the emergency wagons of the Company* must be allowed the right of way, and when approaching or passing cars must be kept under control to avoid collision.

D: REGARDING PEDESTRIANS

224. [203.] Persons Between Cars: Cars moving in opposite directions must not pass at points where persons are standing between the tracks, but must be operated so as not to occupy both tracks at such point simultaneously.

DENVER CONVENTION TO BE HELD TWO WEEKS EARLIER.

Formal announcement has been made by Secretary B. V. Swenson, of the American Street & Interurban Railway Association, of a change in the date of the Denver convention from the week beginning Oct. 18, 1909, to the week beginning Oct. 4, 1909. The announcement follows:

Although the selection of the date for holding the 1909 convention was given careful consideration by the convention location committee, and the week beginning Oct. 18 seemed to this committee to be the one which would best suit the members of the American and its various affiliated and allied associations, matters have since developed which have indicated to President Shaw that the attendance will be considerably greater if the convention is held during the week of Oct. 4.

While always a subject requiring careful discussion from the standpoint of its convenience to each of our affiliated associations, the question of the convention date was, this year, given even greater consideration by the convention location committee. This was due to the fact that while in late years the second week in October has seemed to be the most desirable one, it was felt that because of its gradual approach toward the first of the month, it had reached a date, this year, which would not prove most convenient to our affiliated bodies. Various other reasons were advanced to indicate that the week of Oct. 13 would prove to be most desirable to the association as a whole. Since this decision was reached, however, a very decided preference has been manifested toward a change of date and a selection of a convention week which would enable our members to take advantage of the attractive railroad rates which continue in effect until Sept. 30 and are good for return until Oct. 31. These rates would enable those wishing to combine pleasure with the serious business of the convention to contiune on to the Seattle exposition and to other Pacific coast points with but a comparatively small increase in the round trip fare.

President Shaw was convinced after an investigation that the moving of the convention date ahead two weeks would, undoubtedly, result in a much larger attendance at the 1909 convention, which it is expected will be the greatest in the history of the association. He at once brought the matter to the attention of the executive committee of the American Association and to the attention of the convention location committees of both the American and the Manufacturers' associations. Receiving the approval of these various committees, President Shaw finally decided to change the date, and the convention will be held at Denver Oct. 4 to 8, 1909.

News of Electric Railways

Cleveland Traction Situation

On June 7 the City Council passed the ordinance giving Herman J. Schmidt a grant on Payne Avenue. The ordinance prepared by Judge Tayler was referred to the street railway committee without comment. The ordinance giving the Cleveland Underground Rapid Transit Company a franchise was also passed. The Chamber of Commerce has prepared petitions asking for a referendum vote on the Schmidt ordinance and they were distributed on June 8.

By the withdrawal of Judge R. W. Tayler from the traction negotiations on Monday evening, May 31, and the same action on the part of Horace E. Andrews, president of the Cleveland Railway, on June 2, the situation was rendered very complicated. The administration forces were evidently surprised at the action of Mr. Andrews, as they expected that the threatened grant on Payne Avenue to Herman J. Schmidt would deter Mr. Andrews from withdrawing.

Mayor Johnson and the members of the City Council supporting him evidently did not receive the statement of the plans of Judge Tayler with the earnestness and candidness with which they were prepared and presented to the people. The opening of the meeting on May 31 was marked by jockeying of one kind and another after the statement had been read, and finally drifted to a discussion of the subject of valuation.

In reply to Mayor Johnson's statement that $7,000,000 or $8,000,000 might be eliminated by a revaluation, F. H. Goff said that if there is really that much inflated value in the stock of the Cleveland Railway, he owes an apology to the people of Cleveland for the part he took in appraising the property a year ago. Then he discussed the work of a year ago and said that Mayor Johnson had presented the formula upon which the value of all the various items had been found, including pavement, track and ties. The final conclusion of the negotiations, the offer of the securities on the assurance that they were as good as government bonds, the anxiety of the Mayor and his friends to secure money all over the country through the publicity given the new scheme were touched upon. Mr. Goff said he could not understand how the Mayor could be converted to the Bemis theory that the property is worth so much less than the figures found a year ago.

An extension ordinance, giving further rights to Herman J. Schmidt on a number of streets was introduced by Councilman Koch on May 31.

The city reserves the right to reduce the fare below 3 cents if it is shown that the returns are more than 6 per cent on the investment. It may also regulate the schedules and may purchase the property when it so desires. The franchise is to continue until Sept. 9, 1923.

As a result of an assertion made by Mayor Johnson at one of the meetings that he did not know that many street railway patrons had expressed themselves in favor of hastening a settlement, the Retail Board of the Chamber of Commerce has had 15,000 blank petitions prepared asking that the City Council adopt a franchise ordinance to be prepared by Judge Tayler and allow the people to vote upon it. These blanks have been sent out and the merchants are running the following in their advertisements in the daily papers: "Let car riders vote on an ordinance drawn by Judge Tayler. 'Peace' petitions may be signed at our store." Wm. Taylor, Son & Company, one of the largest dry goods houses, devoted a third of its advertising space in Friday evening papers to a discussion of the subject and urged the people to sign the petitions and work for a settlement.

At a special meeting of the City Council on the evening of June 4 an ordinance prepared by City Solicitor Baker, Mayor Johnson and others to take the place of the one introduced on March 22 was passed and signed by Mayor Johnson. It gives the Cleveland Railway a franchise for 25 years, but provides for a cash fare of 4 cents and seven tickets for a quarter with no charge for transfers. This is the maximum fare voted upon by the Council three weeks ago and reaffirmed when the Tayler provisions were being reconsidered a few days ago. This ordinance provides for a revaluation of the properties of the Cleveland Electric Railway and the old Forest City Railway separately. Provisions are also made for funding the company and providing a surplus for working capital. An arrangement has been made for making good any losses that may have been sustained by those who purchased the guaranteed stock of the company. In arriving at conclusions upon these matters the ordinance provides that the company shall choose one man and the city another as arbitrators and that Judge Tayler shall act as the third, in case the two fail to agree. The right of the city to nominate a purchaser for the property shall be exercised after Jan. 1, 1913, instead of 10 years after the passage of the ordinance, as advised by Judge Tayler. The provisions for the control of operation are about the same as in the original ordinance, as is the arrangement for a street railway commissioner whose salary the company must pay. Euclid Avenue is mentioned in the ordinance only in the provision that it shall not be applicable to that thoroughfare after the present contract with East Cleveland expires, as the Mayor is desirous of forcing the village to make a new contract.

Fender and Wheel Guard Hearing in New York

A rehearing on the question of equipping the surface cars of Manhattan and Bronx Boroughs, New York, with safety devices was held on June 7 before Commissioner Maltbie, of the Public Service Commission, First District.

The first witness was William Bennett, superintendent of the Central Park, North & East River Railroad, who testified at the morning session that the cars on his company's Fifty-ninth Street line were equipped with fixed pilot guards. He thought that an automatic trip fender would be bad on account of the numerous crossings and grade changes on his line. Snow and ice would also trip an automatic guard.

The first witness in the afternoon was A. W. McLimont, who was formerly electrical engineer of the commission and in charge of its fender and wheel guard tests at Schenectady and Pittsburgh. Mr. McLimont is now general manager of the Chicago & Milwaukee Railroad, and came from Chicago to give further testimony at this rehearing. In response to questions by H. H. Whitman, assistant counsel for the commission, Mr. McLimont described the fender and wheel guard tests made under his supervision as chairman of the sub-committee on safety devices and accident prevention. Mr. McLimont admitted that during the official tests he had waived trial of the Sterling pilot guard despite the manufacturer's request. He had told the maker's representative that it was unnecessary to test this device because it was so well known, but he had not been asked by him whether this meant that it was known to be efficient or not. As to his personal experience with this guard, he had operated 60 cars equipped with them in Lima, Peru, where the paving conditions are equal, if not better, than in New York, and the grades perfectly flat. Further, as engineer for the commission, he had studied the wheel guards in New York for a year previous to the tests, and was prepared to affirm his original report that any wheel guard which must be maintained in a fixed position close to the track must be condemned. If the rigid guard is kept at 2½ in. to 3 in. above the rail, the distance is enough to catch a child's limb or a woman's clothing. Such a guard could be effective only if it were carried 1 in. above the rail, but at that height it could not be kept in order. As to the testimony on the Fifty-ninth Street grades, he was certain that if they were great enough to trip an automatic guard held 5 in. above the rail, they would surely make it impossible to maintain a fixed guard.

Mr. McLimont also confirmed his original report in in which, referring to rescues of the clothed female dummy, he had said that wheel guards held down by springs made better pick-ups than those operated by gravity only. The springs should exert not less than 100 lb. pressure. He did not see much force in the snow and ice objection to automatic guards, for if there are 4 in. or 5 in. of snow on the track, traffic would be interrupted from that account alone. The Toronto Railway Company, for instance, maintains successfully at 4 in. above the rail a projecting automatic fender which is more sensitive than automatic wheel guards.

G. W. Linch, receiver for the Second Avenue Railroad, said that it was his intention to add more wire to the pilot guards and attach boards at the sides. Mr. McLimont said that in his judgment the fixed guards on the Second Avenue line could not be effectively maintained if carried 2½ in. above the slot rail. Mr. Tolles, counsel for the Second Avenue Railroad Company, then asked the witness numerous questions on the construction details and strength of fixed guards. In conclusion, Mr. McLimont summarized, at Commissioner Maltbie's request, the comparative merits of fixed and automatic wheel guards. He added that, under the conditions pertaining on Second Avenue and on Fifty-ninth Street, New York, an automatic guard would be more efficient.

The hearing was then adjourned to June 9.

Transit Affairs in Philadelphia

After a conference of the State Railroad Commission and the executive committee of the City Club of Philadelphia in Harrisburg on May 28, Nathaniel Ewing, chairman of the commission, ruled that he and his associates had no authority to make an examination of the financial affairs of the Philadelphia Rapid Transit Company, but could consider only the physical accommodations provided. In response to a question by George Burnham, Jr., president of the City Club, Chairman Ewing, of the Railroad Commission, said that the fare question involved a contract which the courts would have to pass upon.

Under date of June 7 John B. Parsons, president of the Philadelphia Rapid Transit Company, sent a letter to William H. Longstreth, chairman of the Committee of Fifteen, in which he said:

The board of directors of the Philadelphia Rapid Transit Company, at their regular meeting held this day, received and considered your communication of May 26 last, and have instructed me to reply as follows:

"The business accounts and management of the company are open to the regular audit of the city controller. The annual reports of the company, and its returns made to the auditor general and the secretary of internal affairs at Harrisburg, contain the fullest statements respecting the operation, management and condition of the company. The public address of the Retail Merchants' Association, published at the time that body presented the draft of its suggestion for a proposed contract between the city and the company, contains a comprehensive, impartial and lucid statement of the street railway situation in this city. All the papers and documents above referred to are easily accessible to your committee, or any citizen for such inspection or scrutiny as may seem proper. As to your specific proposition, I am instructed to say that neither in itself, nor with the conditional ultimatum, which you attach to it, could it be entertained."

Transit Affairs in New York

On June 4 the Board of Estimate approved the application of the Hudson & Manhattan Railroad for permission to extend its subway from Sixth Avenue and Thirty-fourth Street to the Grand Central Station at Fourth Avenue and Forty-second Street. The extension has already been passed upon favorably by the Public Service Commission, and as soon as the Mayor has signed the franchise and the necessary consents of abutting property owners have been obtained, the actual work on the new tunnel will be started. It is estimated that the through line between the Grand Central Station and New Jersey will be in operation within two years.

The Public Service Commission has forwarded to the Board of Estimate and Apportionment a requisition for the sum of $1,500,000 to be expended in lengthening the station platforms in the subway. A proposition to this effect was made by Theodore P. Shonts, president of the Interborough Rapid Transit Company, some weeks ago, when he submitted an informal application for authority to build the Lexington Avenue and Seventh Avenue extensions of the subway. At that time the law did not permit the construction of any such extensions by private capital as was proposed, but inasmuch as the law did permit the lengthening of station platforms that part of the proposition was at once approved. The express stations will be lengthened so as to accommodate 10-car trains and the local platforms to accommodate 8-car trains.

Max E. Schmidt, president of the Continuous Transit Securities Company, has submitted an amended offer to the Public Service Commission in regard to the construction of moving-platform routes. He said that, in view of the passage of the rapid transit law amendments, his company was ready to bid on the construction and operation of a moving-platform subway under Broadway from Union Square to Times Square. An arcade will be built in connection with this route if the commission approves. Two alternative moving-platform routes were also proposed in case the commission did not approve of the Broadway arcade plan. One of the alternative routes is a crosstown subway under Thirty-fourth Street from Second Avenue to Ninth Avenue. This is the original moving-platform route, for permission to build which an application was made several years ago by the same company to the Rapid Transit Commission. The other alternative route apparently contemplates the operation of the bridge loop subway, which is nearing completion. As proposed by Mr. Schmidt, this route would begin at the Brooklyn plaza of the Williamsburg Bridge, would cross the bridge on an elevated structure to the Manhattan plaza, and would continue by subway under Delancey Street and Centre Street to the Manhattan end of the Brooklyn Bridge, thence under Park Row, Nassau Street, Broad Street and Beaver Street to a connection with the present subway at Bowling Green.

Program of the Annual Meeting of the Street Railway Association of the State of New York

The 27th annual convention of the Street Railway Association of the State of New York will be held at the Fort William Henry Hotel, Lake George, N. Y., June 29 and 30, 1909. The following program has been arranged:

TUESDAY, JUNE 29.

Morning Session, 10 a. m.: Roll call; Reading of Communications and Minutes of Previous Meetings; President's Address; Reports of Executive Committee, Treasurer and Secretary; Reports of Committees—(a) Electric Express and Freight Service; (b) City Rules; (c) Classification of Accounts. Paper, "Electric Railway Accounting," by A. L. Linn, Jr., general auditor, New York State Railways. Discussion—W. H. Davies, comptroller, Delaware & Hudson Company; H. M. Beardsley, secretary, Elmira Water, Light & Railroad Company; J. C. Collins, secretary, New York State Railways. Miscellaneous Business.

Afternoon Session, 2 p. m.: Reading Communications. Paper, "Schooling of Trainmen," by N. W. Bolen, General Superintendent Public Service Railway Company, Newark, N. J. Discussion—George L. Radcliffe, superintendent, Schenectady Railway Company; John E. Duffy, superintendent, Syracuse Rapid Transit Railway Company; W. R. W. Griffin, superintendent, New York State Railways Company. Quarterly Meeting Reports—"Use of Curtains in Car Vestibules," "Signaling Interurban Cars at Way Stations," "Carrying Musical Instruments on Passenger Cars."

The above reports of committees submitted at the Schenectady quarterly meeting will be presented for discussion and definite action by the association. Miscellaneous Business; Appointment of Nominating Committee.

WEDNESDAY, JUNE 30.

Morning Session, 10 a. m.: Reading of Communications; Miscellaneous Business. Papers—"Latest Developments in Electric Railway Apparatus," by C. D. Eveleth, General Electric Company; J. L. Davis, Westinghouse Electric & Manufacturing Company. Election of Officers; Adjournment.

An attractive program of entertainment has been provided.

On Tuesday, at 10:30 a. m., through the courtesy of the president, cars will be provided for a trolley trip to Warrensburg. At 3 p. m. there will be a bridge whist tournament for the ladies. On Wednesday, at 10:30 a. m., clock golf and tennis tournaments will be held, and at 2 p. m. there will be a steamboat trip around Lake George, returning in time for evening trains.

J. H. Stedman, of Rochester, N. Y., will act as toastmaster at the banquet, which will be held on Tuesday evening, at 7 o'clock. Banquet tickets will be provided to members, associate members, guests, and the ladies. Each allied member will receive one banquet ticket. Extra banquet tickets will be sold at $5 each.

Members are requested to bring their badges and extra bars will be provided free. A charge of $1 each will be made for extra badges.

Accommodations at the Fort William Henry Hotel can be arranged by communicating directly with the hotel manager, J. F. Wilson, 243 Fifth Avenue, New York City. The hotel will open on June 26.

No provisions have been made for a general exhibit of appliances and apparatus by allied members, but any exhibit will be welcomed, and arrangements for space can be made directly with the proprietors of Fort William Henry Hotel.

Outing of the New England Street Railway Club.—The June outing of the New England Street Railway Club will be held on Tuesday, June 22, on Narragansett Bay, Rhode Island. The program will be announced in detail as soon as the arrangements are fully completed.

Wisconsin Electric & Interurban Railway Association.—The Wisconsin Electric & Interurban Railway Association and the Northwestern Electrical Association will hold a joint meeting at Waupaca, Wis., on June 28 and 29, to discuss operating subjects. The headquarters will be at the Grand View Hotel on the Chain-'o-Lakes, which is controlled and operated by Irving P. Lord, president of the Waupaca Electric Light & Railway Company.

Maryland Cabinet to Consider Public Utilities Matters.—Gov. Crothers, of Maryland, has issued a call for a meeting of the Maryland State cabinet on June 17, at 10 a. m., to

consider the question of a public-utilities commission and the regulation of public-service corporations in general. The meeting will be held in the Governor's office in the Union Trust Building, Baltimore.

Street Railway Men's Day at Seattle Exposition.—At the request of the officers of the Seattle (Wash.) Electric Company the managers of the Alaska-Yukon-Pacific Exposition have designated June 28 as street railway men's day. The Seattle Electric Company will so arrange its schedules that all its employees will be afforded an opportunity of attending the exposition on the day set aside for them.

Ohio Electric Railway's Columbus Ordinance Passed.—At a meeting of the City Council of Columbus, Ohio, on May 31 the Ohio Electric Railway was granted a 25-year franchise on its agreement to build a union station at South Third Street and Rich Street to cost at least $175,000. The company was also given permission to build a line on Town Street, between Third Street and Rich Street, so that cars can be operated to the new station. In the construction of this line the company will be permitted to lay T-rails. The passage of the measure means that the loop on Gay Street, over which all the interurban cars operate into the business district, will be removed, but arrangements will be made to run the cars of the Columbus, Delaware & Marion Railway to the depot on Gay Street. The franchise is before the Mayor for approval.

Canadian Company Offers to Sell to City.—The Kingston, Portsmouth & Cataraqui Electric Railway, Kingston, Ont., has through H. W. Richardson, president of the company, offered to sell its property to the city of Kingston. The company purchases power from the city, and the city and the company have recently been unable to agree upon the rate that should be charged the company for current. Mr. Richardson, in a communication to the Council, said: "We will transfer the railway and all that the company owns in the city, including Portsmouth and the township of Kingston, to the corporation of the City of Kingston, you paying us the amount invested since the reorganization, plus interest thereon at 6 per cent. Then the question of the cost of power would not need to be discussed." The matter has been referred to the light, heat and power committee of the Council.

Meeting of the Oklahoma Electric Light, Railway & Gas Association.—At the meeting of the Oklahoma Electric Light, Railway & Gas Association in Oklahoma City on May 18, 19 and 20, the name of the association was changed to the Oklahoma Public Utilities Association and Sapulka was selected as the next meeting place. The following officers were elected: Ed C. Reynolds, Sapulpa, president; Fred J. Bedford, Lawton, first vice-president; Noel R. Gascho, Alva, second vice-president; Charles E. Lehman, Vinita, third vice-president; Galen Crow, Guthrie, secretary; H. G. Stettmund, Chandler, treasurer; F. H. Tidnam, Oklahoma City; Arch Leonard, Tulsa; H. H. Stephens, El Reno; Anton H. Classen, Oklahoma City, and F. E. Bowman, Ada, executive committee. Galen Crow was elected as the official representative of the association at Guthrie, the capital of Oklahoma, to represent member companies before State departments.

Annual Meeting of the Canadian Street Railway Association.—The annual meeting of the Canadian Street Railway Association was held at the Royal Alexandria Hotel, Winnipeg, Manitoba, on May 31, June 1 and June 2. The sessions were private and no reports of the proceedings were made available for publication. The following officers were elected: Duncan McDonald, manager of the Montreal Street Railway, president; J. Anderson, manager of the Sandwich, Windsor & Amherstburg Railway, vice-president; Acton Burrows, managing director of the *Marine and Shipping World*, Toronto, secretary; Patrick Dubee, secretary of the Montreal Street Railway; E. A. Evans, manager of the Quebec Railway, Light & Power Company; J. E. Hutcheson, superintendent of the Ottawa Street Railway; R. J. Fleming, manager of the Toronto Railway, and C. B. King, manager of the London Street Railway, executive committee. The office of assistant secretary was created and Aubrey Acton Burrows, of the *Marine and Shipping World*, Toronto, was elected to that office. While in Winnipeg, the delegates to the convention were entertained at lunch by W. Phillips, general manager of the Winnipeg Electric Railway, and were escorted by him on an inspection trip of the city and suburban lines and power houses of the company. The selection of the meeting place for 1909 was left in the hands of the executive committee. Among those in attendance were: W. R. McRae, master mechanic, and J. H. Forrest, accounting department, Toronto Railway; Patrick Dubee, secretary, and N. P. Baker, assistant general manager, Montreal Street Railway; H. M. Hoofer, secretary-treasurer, W. Z. Earle, manager, R. B. Emerson, J. McCulloch, St. John Railway; F. S. Livingston, general freight and passenger agent, Toronto & York Radial Railway; George Royer, general manager, Toronto & Suburban Railway; J. D. Fraser, secretary-treasurer, Ottawa Electric Railway; C. B. King, manager, London Street Railway; James Brampton, treasurer, Sandwich, Windsor & Amherstburg Railway; W. Phillips, general manager, Winnipeg Electric Railway.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The joint select committee, consisting of nine members and two Senators, appointed to consider the subject of public utility legislation, began its hearings in the hall of the House on June 10. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, expected to appear before the committee on the first day, but as he was unable to be present he had Edward D. Robbins, attorney for the company, submit a letter for him. Mr. Mellen strongly opposes the proposed law and contends that the measure would injuriously interfere with the financial operations of the New York, New Haven & Hartford Railroad and seriously delay the development of the road. Mr. Mellen said he could not conceive a board which would conscientiously wish to hamper the financial arrangements of the largest business corporation in New England, but that even "assuming the most perfect good will toward the company on the part of every member of the proposed commission, the working of the machinery of financial control will inevitably act injuriously upon our finances." He also deplored the fact that the plans of the company would have to be prematurely revealed at public hearings, a proceeding that in most cases would work greatly to the embarrassment of the company. Mr. Mellen also said that the assumption that there should be public interference with the methods of raising new capital is an economic fallacy. Mr. Mellen said that the New Haven road had not issued any shares since it was organized in 1872 at less than 100 cents on the dollar; but that on the other hand, it has during that time received $22,808,537 in premiums on stock issued. Mr. Robbins also spoke in person for the New Haven road and its interests. P. H. Woodward and Ralph O. Wells, of the special committee which drafted the measure, spoke for it. The topic before the committee on June 2 was rates, and the session was continued until 5:30 p. m. Representatives of the Southern New England Telephone Company and of the lighting companies were the principal speakers. There was a short digression, however, during which Mr. Robbins was called upon again. In reply to a question as to whether he would object to the bill if the criticisms he had made were met, he said that he could not say unless he could study the bill carefully in detail. He expressed the opinion that the New York law has done more harm than good and said that the proposed law in Connecticut would render nugatory the efforts of his own company and other public servants in the State. The subject of rates was continued at the hearing on June 3. Mr. Robbins, for the New Haven road, said that rates over electric railways were originally based upon the principle of the short city haul, but that the 5-cent unit has been continued and applied to the suburban lines until in many cases companies have been compelled to adopt a new unit or to readjust fares so as to protect their property. He then cited the Massachusetts companies which have increased fares on this account. The next subject considered was the control of the management and operation of public service companies. W. R. Willcox and Milo R. Maltbie, of the Public Service Commission of the First District of New York, were introduced. Mr. Maltbie said that the idea of the control of public service corporations of the State of New York was not born with the creation of the commission in New York, but was the outcome of experience with railroad and gas commissions. Mr. Maltbie said that the Public Service Commission of the First District of New York spends between $900,000 and $1,000,000 a year, of which $250,000 is for pure regulation, while the Public Service Commission of the Second District of New York spends about $300,000 a year. He does not think the expense for a commission in Connecticut would exceed that of the commission of the Second District in New York. Mr. Maltbie said that the Public Service Commission of the First District of New York had not acted as a deterrent in preventing the investment of money, and that at this time applications are before the commission for grants that will involve the expenditure of about $200,000,000. Mr. Willcox spoke in confirmation of the statements made by Mr. Maltbie. He said that one of the most difficult problems of the commission is to determine where regulation ends and management begins, and cited the recent recommendations of the commission regarding fenders as an example. Mr. Willcox said that stockholders in corporations coming under the jurisdiction of a public service commission should not be eligible for appointment to the commission, stating that the reason for this would soon be realized after they had entered upon their duties as commissioners. The hearing was then adjourned until June 8.

Financial and Corporate

New York Stock and Money Market

June 8, 1909.

There has been an active and advancing market in Wall Street throughout the last week. Although there was some pause in the advance to-day, the activity remained and there were no material price recessions. The day was devoted largely to the affairs of the Southern Pacific Company, its board of directors being in session almost all day considering plans for the retirement of the preferred stock. The common and preferred issues of this company advanced as much as 5 points during the day and each closed with a net gain of more than 3 points. The feature of the week was the marked advance in all steel stocks.

The bond market continues to be strong and money is plentiful and cheap. Rates to-day were: Call, 1¾ to 2 per cent; 90 days, 2½ to 2¾ per cent.

Other Markets

Philadelphia Rapid Transit stock was still the active feature of the market in Philadelphia. More than 50,000 shares were sold during the past week. The stock went below 30 to-day and closed at 30⅛. Union Traction was also reasonably active.

There was little trading in traction issues on the Chicago market during the week. Chicago Railways, Series 1 and 2, were sold to a small extent with nominal price changes. Subway was less active.

In the Boston market, little interest was shown in traction securities. Massachusetts Electric preferred, Suburban preferred and Boston Elevated have been the only issues showing any particular life. Price changes were insignificant.

Bonds of the United Railways Company continued active in the Baltimore market. Closing prices to-day were: funding 5s, 80; incomes, 57, and 4s, 87⅞.

The only traction securities sold at the auction in New York last week were $2,000 Brooklyn Rapid Transit 5 per cent bonds, at 106⅞ and interest.

Quotations of various traction securities as compared with last week follow:

	June 1	June 8.
American Railways Company	45¼	a46
Aurora, Elgin & Chicago Railroad (common)	*38	a39¾
Aurora, Elgin & Chicago Railroad (preferred)	*87½	a87
Boston Elevated Railway	130	130¼
Boston & Suburban Electric Companies	*15½	*16
Boston & Suburban Electric Companies (preferred)	*71	70
Boston & Worcester Electric Companies (common)	*11	10
Boston & Worcester Electric Companies (preferred)	*56	54
Brooklyn Rapid Transit Company	79⅛	81¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	88	89
Capital Traction Company, Washington	a135⅞	*136
Chicago City Railway	190	a190
Chicago & Oak Park Elevated Railroad (common)	3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*14	*14
Chicago Railways, ptcptg. ctf. 1	*110	a109
Chicago Railways, ptcptg. ctf. 2	38½	a38
Chicago Railways, ptcptg. ctf. 3	*28	a26½
Chicago Railways, ptcptg. ctf. 4s	10¼	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a79	a79
Consolidated Trac. Co. of N. J., 5 per cent bonds	a107	a107
Detroit United Railway	a58	59¼
General Electric Company	161¼	159½
Georgia Railway & Electric Company (common)	86	90⅜
Georgia Railway & Electric Company (preferred)	*85	85
Interborough-Metropolitan Company (common)	16½	16¼
Interborough-Metropolitan Company (preferred)	46	45¼
Interborough-Metropolitan Company (4½s)	78⅝	78⅜
Kansas City Railway & Light Company (common)	50¼	a50⅛
Kansas City Railway & Light Company (preferred)	85¾	a86
Manhattan Railway	*147	a148
Massachusetts Electric Companies (common)	*12½	12½
Massachusetts Electric Companies (preferred)	*69½	67
Metropolitan West Side, Chicago (common)	*18	a19
Metropolitan West Side, Chicago (preferred)	*53	a55
Metropolitan Street Railway	*28	a27½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	81⅞	83½
Northwestern Elevated Railroad (common)	*24	a24
Northwestern Elevated Railroad (preferred)	69½	a70
Philadelphia Company, Pittsburg (common)	41½	a41¾
Philadelphia Company, Pittsburg (preferred)	43½	a43½
Philadelphia Rapid Transit Company	32	a30¼
Philadelphia Traction Company	a93	a92
Public Service Corporation, 5 per cent col. notes	a100¾	*100¾
Public Service Corporation, ctfs.	a80	a80¼
Seattle Electric Company (common)	108	*108
Seattle Electric Company (preferred)	100	102
South Side Elevated Railroad, Chicago	*58	a56½
Toledo Railways & Light Company	10	10
Third Avenue Railroad, New York	30	30
Twin City Rapid Transit, Minneapolis (common)	*104¼	*104½
Union Traction Company, Philadelphia	55¼	a56
United Railways & Electric Company, Baltimore	*12¾	a12½
United Railways Inv. Co., San Francisco (common)	a38	38½
United Railways Inv. Co., San Francisco (preferred)	a55	56
Washington Railway & Electric Company (common)	a43	*42⅝
Washington Railway & Electric Company (preferred)	a90⅝	*90¼
West End Street Railway, Boston (common)	92	a93
West End Street Railway, Boston (preferred)	105½	107
Westinghouse Electric & Manufacturing Company	84	85
Westinghouse Elec. & Mfg. Company (1st pref.)	121	a124

aAsked. *Last sale.

Annual Report of the United Railways Investment Company

The annual report of the United Railways Investment Company for the year ended Dec. 31, 1908, shows a total income of $1,558,790, of which $1,452,672 was from dividends on stocks owned, and $106,118 represented interest on loans and accounts receivable. Expenses were $50,586, and interest and other charges against income, $1,243,159, leaving a net income for the year of $265,045.

Ernst Thalmann, the president, states in his report:

"The position of the company during the past year has shown a constant and continuing improvement which has continued during the current year, as evidenced by the gross earnings for the quarter ended March 31, 1909, set forth in the preliminary reports of the Philadelphia Company and the United Railroads of San Francisco.

"The following is a comparative statement of gross earnings for the quarter ended March 31, for the years 1907, 1908 and 1909, based on such reports:

Quarter ended March 31—	1907	1908	1909
Philadelphia Company ...	$5,149,664	$4,795,428	$4,811,229
United Railroads of San Francisco	1,591,054	1,559,689	1,716,626

"Despite the serious falling off in gross earnings of the Philadelphia Company, due to the recent depression in Pittsburgh and surrounding territory, its net earnings have been sufficient to warrant the maintenance of the dividend of 6 per cent and to carry to improvements and betterments out of earnings a sum of $782,977.81.

"During the year 1908, the United Railroads of San Francisco, for the first six months ended June 30, showed a deficit of $227,390, which was written off to profit and loss. For the six months ended Dec. 31, 1908, that company showed a surplus of $200,400.08.

"During the year 1908 the United Railroads of San Francisco paid no dividend in cash or scrip, but in 1909, in February, it paid its first dividend on its first preferred stock as of Jan. 1, 1909, out of the surplus earnings made during the six months from July 1, 1908, to Dec. 31, 1908.

"If the increase in earnings of that company be continued, of which there is every reasonable prospect, having in view the improved conditions in San Francisco, the United Railroads of San Francisco in the course of the current year should have a considerable surplus over and above the dividend on its first preferred stock which will be available for dividends on its ordinary preferred stock, although, in view of the requirements of that company for further facilities to meet its increasing business it probably will be considered by the directors of that company wiser not to pay any cash dividend thereon during the current year.

"In the report to the stockholders for the year 1907, the board of directors called attention to the fact that the operations of the United Railroads of San Francisco had been greatly hampered by the lack of a proper supply of power under its own control. Since that time this matter has had the careful and continued attention of your board, with the result that in May, 1908, negotiations were opened with the committee representing the security holders of the Stanislaus power development, and these negotiations continued through the year, with the result that your board is now in a position to submit a proposition covering the purchase of that property, full advices of which you have received under the letter from the president of this company and the letter of the engineers of the company, accompanying the notice for the special meeting to take action with respect to such proposed acquisition. The letter of Ford, Bacon & Davis, the engineers of the company, sets out more fully the nature and character of the property proposed to be acquired and their views as to the value to this company of the acquisition of such property.

"The surplus earnings of this company during the year mentioned above have been applied toward the liquidation and extinguishment of its floating debt, which has been reduced from $2,443,803.75 to $1,653,673.04, a figure which includes a contingent liability of $50,000. This floating indebtedness has since been further considerably reduced."

Annual Report of the Norfolk & Portsmouth Traction Company

Gross earnings of the Norfolk & Portsmouth Traction Company and allied and affiliated companies in the year 1908 were $1,877,930, a decrease of $738,528, or 28.2 per cent from the preceding year, when traffic had the advantage of the attendance at the Jamestown Exposition. When the gross earnings are compared with those of the more normal year of 1906, $1,719,546, the increase is shown to be satisfactory. The operating ratio for the company and the

affiliated properties was 58.82 per cent in 1908, as compared with 63.08 per cent in 1907 and 61.89 per cent in 1906. Earnings of the properties for three years compare as follows:

	1908.	1907.	1906.
Gross earnings	$1,877,930	$2,616,458	$1,719,546
Operating expenses	1,104,346	1,655,654	1,113,883
Net earnings	$773,584	$960,804	$605,663
Other additions or deductions	.....	2,283	170
Gross income	$773,584	$958,521	$605,833
Fixed charges: Taxes, interest and rentals	790,630	704,809	501,556
Surplus	§$17,046	* $253,712	$104,277

§ Deficits.
* From this operating surplus of 1907 there was charged off $126,507; actual surplus carried forward, 1907, $127,205.

Illustrating the return to normal conditions of business and earnings, John Blair MacAfee, the president, gives the following comparative figures, stating that the more favorable conditions which they indicate have continued during 1909, and that gross earnings so far this year show an increase of 18 per cent over the corresponding period of 1908:

	1908.	1907.	1906.
Gross receipts for October	$156,795	$258,515	$142,151
Operating expenses for October	88,316	158,954	92,451
Gross receipts for November	156,732	202,006	145,950
Operating expenses for November	87,332	144,252	86,910
Gross receipts for December	169,168	167,739	153,964
Operating expenses for December	93,427	139,307	98,963

Mr. MacAfee says in his report:

"While there has been considerable increase in the fixed charges of the company, this increase represents interest upon properties acquired and improvements made not only to take care of existing conditions, but to provide for the exceptionally rapid growth of the community served. These investments have measurably realized the expectations stated in the report of last year, and while the increase in gross earnings compared with the year 1906, when business was abnormally stimulated by the preparations incident to the Jamestown exposition, is comparatively small, there has been a large reduction in operating expenses primarily due to the capital expenditures already referred to.

"The year 1908 was a most important one in your campany's history. The insolvency of the Jamestown exposition in November, 1907, had a disastrous effect upon commercial and industrial affairs in Tidewater Virginia during a great part of 1908. Coming at the lowest ebb of a great financial depression, many individuals and corporations with their main offices and places of business in Norfolk and vicinity were forced into bankruptcy.

"During the latter part of 1908 general business conditions improved materially. Building operations, which had almost ceased during the early spring, were renewed with vigor and more dwellings were erected during the latter part of 1908 than in the city's history, in any similar period, excepting only 1907. The Virginian Railway has been completed and early in 1909 complete operation will begin over the line of that road. The completion of its coal terminals at Sewell's Point will have a tendency to largely increase the earnings of your Norfolk & Atlantic Terminal railroad.

"The governing authorities of both Portsmouth and Norfolk have dealt with us agreeably respecting the item of new paving. During the past year the total charge to new paving account was $9,930, and the repairs to paving during 1908 amounted to $8,925, which was charged to operation.

"While the Norfolk & Ocean View Railway had a deficit from operation of $5,340 for the year 1907, the report for 1908 shows a net earning of $7,906 and a decrease in operating expenses of $13,245.

"In 1908 we expended $355.85 per mile of track maintenance, in 1907 $468.58 per mile, in 1906 $358.34 per mile and in 1905 $378.59 per mile."

The following railway statistics are published in the report:

All divisions.	1908.	1907.	1906.
Fare passengers	18,223,746	29,239,843	18,131,085
Free passengers	792,029	1,043,820	520,939
Transfer passengers	1,520,137	2,032,503	1,436,213
Total all divisions	20,535,912	32,316,166	20,088,237

Gainesville (Ga.) Electric Railway.—At the resale of the property of the Gainesville Electric Railway at foreclosure on June 1, R. L. West, Atlanta, Ga., representing the bondholders, was the successful bidder. The purchase price was $104,000.

Kingston (N. Y.) Consolidated Railroad.—Fred T. Ley, Harold A. Ley and Leo Ley, of Fred T. Ley & Company, Springfield, Mass., have secured control of the Kingston Consolidated Railroad through the purchase of the interests of August Belmont and John I. Waterbury, president of the Manhattan Trust Company, New York. A number of improvements have been decided upon and contracts for the necessary materials and supplies have been let.

Meadville (Pa.) Traction Company.—Prominent interests in the Meadville Traction Company have engaged Ford, Bacon & Davis, New York, N. Y., to make a complete financial and engineering report regarding the property of the company.

Missouri Water, Light & Traction Company, Nevada, Mo.—The property of the Missouri Water, Light & Traction Company was sold under foreclosure recently by Hiram Phillips, receiver, to A. Mitchell, St. Louis, Mo.

Third Avenue Railroad, New York, N. Y.—It is stated that the reorganization plan of the Third Avenue Railroad is well under way and that it will be formally announced within a few weeks. It is reported that the plan will require bondholders to authorize the expenditure of $7,500,000. Of this sum, $1,000,000 will probably be spent for new track, $2,500,000 will be employed to take up the certificates issued by Frederick W. Whitridge, receiver, and the remaining $4,000,000 will be used for improvements to the car barns, the rolling stock and the power station equipment.

Pacific Traction Company, Tacoma, Wash.—The Pacific Traction Company has filed for record a mortgage to secure an issue of $5,000,000 bonds.

Toledo Railways & Light Company, Toledo, Ohio.—The Toledo Railways & Light Company has arranged with Blair & Company, New York, for an extension of the time of payment of the 5 per cent consolidated first mortgage gold bonds of the Toledo Traction Company and the 5 per cent first mortgage bonds of the Toledo Consolidated Street Railway until Jan. 1, 1912, with interest at the rate of 6 per cent per annum, payable semi-annually, subject to redemption at the option of the Toledo Railways & Light Company at any time on 60 days' notice by publication, as provided in the agreement for extension. Holders of bonds desiring to avail themselves of the privilege of extension must present the bonds at the office of Blair & Company on or before June 28, 1909, to have annexed thereto certificates of extension and new coupon sheets. Holders of bonds who do not desire the extension will receive par for their bonds upon delivering them on or after July 1, 1909, to Blair & Company.

Westchester Electric Railroad, Mt. Vernon, N. Y.—Justice Tompkins of the Supreme Court, sitting at White Plains, has denied the motion to set aside all the dissolution proceedings of the Westchester Electric Railroad, now in the hands of a receiver, on the ground that the proceedings are illegal.

NEW PUBLICATIONS

Starkstrometchnik (Heavy Electric Currents). Berlin, Germany: Wilhelm Ernst & Son, 1909; 1168 pages, with index and 602 illustrations. Price, 20 marks, paper bound, or 21 marks, cloth bound.

This handbook has been prepared by E. von Rziha and I. Seidener, two Vienna engineers, with the assistance of numerous specialists. As the title indicates, the bulk of the data relates directly to applications of electricity on a large scale, as in lighting, manufacturing, traction and electrochemistry. This work differs considerably from American handbooks inasmuch as much of the material is treated from the standpoint of the designer. The treatment of electric motors, for instance, is thoroughly mathematical, not confining itself simply to descriptions and derived formulas. There are chapters on gas engines, turbines, single-phase motors and other up-to-date power subjects.

La Définition et la Mesure Industrielles de L'Accélération des Trains. By C. O. Mailloux, E.E., M.S. Paris: Gauthier-Villars. 12 pages. Illustrated.

This is a reprint from *La Revue Electrique* of Nov. 30, 1908, which gives the complete text of the original paper presented, in French, by the author, before Section V of the International Electrical Congress, at Marseilles, in September, 1908. The reprint also contains the discussion of the paper, by M. Legouez, managing director of the Paris "Metropolitan" (Subway system), who was one of the vice-presidents of Section V. It also contains a very intelligent and interesting editorial by M. Blondin, the well-known electrical writer and authority, who was for many years the editor of *L'Eclairage Electrique* and is now editor of *La Revue Electrique*. A condensed and paraphrased English translation of the paper was published in the ELECTRIC RAILWAY JOURNAL of Feb. 13, 1909, page 277, with an editorial comment, page 270.

Traffic and Transportation

Ticket Sales on Subway and Elevated Lines in New York

The Public Service Commission of the First District of New York has made public the reports of ticket sales on the subway and elevated lines of the Interborough Rapid Transit Company for 1907 and 1908. The ticket sales in the subway increased from 182,559,990 in 1907 to 220,991,212 in 1908. The ticket sales on the elevated railroad system, however, decreased from 289,799,576 in 1907 to 273,855,136 in 1908 or 15,944,440. This was owing partly to the loss of passengers to the subway system and to the falling off in travel due to the depression following the financial panic of October, 1907. As the subway gained 38,431,222, however, the loss on the elevated lines was more than compensated, the total traffic of both subway and elevated showing a net increase for the year of 12,486,782 passengers.

The total sales for 1907 and 1908 on the subway and elevated system follow:

	1907.	1908.
Elevated—Second Avenue Line	42,643,033	39,286,507
Elevated—Third Avenue Line	129,519,023	122,085,638
Elevated—Sixth Avenue Line	85,234,445	82,945,171
Elevated—Ninth Avenue Line	32,403,075	29,537,820
Grand total, Elevated	289,799,576	273,855,136
Subway	182,559,990	220,991,212
Subway and Elevated Systems	472,359,566	494,846,348

The ticket sales in detail for the two years at all stations follow:

SUBWAY TICKET SALES.

Station.	1907.	1908.
Atlantic Avenue	.....	6,857,990
Nevins Street	.....	2,055,762
Hoyt Street	.....	1,973,176
Borough Hall	.....	10,724,367
South Ferry	2,519,715	1,967,728
Bowling Green	1,883,683	3,507,475
Wall Street	4,797,924	6,522,220
Fulton Street	7,693,000	9,703,288
City Hall	752,271	653,413
Brooklyn Bridge	23,175,615	16,909,244
Worth Street	1,779,409	1,926,826
Canal Street	2,612,219	2,827,652
Spring Street	3,352,547	3,675,544
Bleecker Street	3,356,963	3,654,573
Astor Place	5,402,944	5,690,848
Fourteenth Street	9,454,712	11,107,454
Eighteenth Street	3,542,393	3,704,645
Twenty-third Street	7,058,419	7,899,276
Twenty-eighth Street	3,444,280	3,769,036
Thirty-third Street	4,093,110	4,535,453
Grand Central	11,041,818	11,752,264
Times Square	8,608,030	9,638,382
Fiftieth Street	3,229,686	3,576,076
Columbus Circle	4,243,438	4,727,454
Sixty-sixth Street	2,514,636	2,673,627
Seventy-second Street	3,407,160	3,677,501
Seventy-ninth Street	2,265,858	2,423,332
Eighty-sixth Street	2,332,846	2,501,288
Ninety-first Street	1,287,006	1,346,103
Ninety-sixth Street	3,713,471	4,044,752
110th Street (Lenox)	4,296,878	4,627,465
116th Street	5,632,221	5,924,344
125th Street	5,244,255	5,585,307
135th Street	4,408,123	4,807,329
145th Street	950,340	1,267,594
Mott Avenue	721,353	738,962
Third Avenue	3,036,056	3,406,938
Jackson Avenue	2,360,469	2,654,439
Prospect Street	3,179,832	3,765,695
Simpson Street	1,224,426	1,655,917
Freeman Street	1,804,548	2,195,048
174th Street	293,286	354,517
177th Street	957,476	1,497,982
180th Street	1,202,752	1,396,178
103d Street	2,726,233	2,887,687
Cathedral Parkway	1,601,654	1,964,833
Columbia University	1,439,839	1,731,228
Manhattan Street	2,462,523	2,873,651
137th Street	2,542,000	3,421,530
145th Street	2,347,753	3,031,813
157th Street	1,445,945	1,938,917
168th Street	1,071,950	1,494,188
181st Street	1,378,181	2,141,517
Dyckman Street	399,240	479,912
207th Street	37,991	132,955
215th Street	66,154	103,743
221st Street	45,096	.....
225th Street	273,388	260,834
230th and 231st Streets	1,716,523	1,488,329
242d Street	.....	925,973
Miscellaneous	130,352	209,638
Total	182,559,990	220,991,212

The ticket sales on the Second Avenue line of Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
Chatham Square	1,660,168	1,482,531
Canal Street	2,228,406	1,974,824
Grand Street	2,279,399	2,051,000
Rivington Street	2,660,926	2,614,911
First Street	2,866,211	2,652,301
Eighth Street	2,921,162	2,681,591
Fourteenth Street	2,156,558	1,940,901
Nineteenth Street	859,101	778,830
Twenty-third Street	1,254,269	1,173,997
Thirty-fourth Street	897,687	808,538
Forty-second Street	1,134,149	981,674
Fiftieth Street	852,102	775,859
Fifty-seventh Street	1,166,241	1,128,929
Sixty-fifth Street	1,339,659	1,247,039
Seventy-second Street	2,714,038	2,465,929
Eightieth Street	2,907,624	2,784,634
Eighty-Sixth Street	2,417,549	2,311,968
Ninety-second Street	1,951,802	1,825,042
Ninety-ninth Street	2,506,973	2,251,631
111th Street	2,391,783	2,142,369
117th Street	1,525,730	1,405,987
121st Street	1,551,855	1,484,822
127th Street	368,244	291,801
Miscellaneous	31,337	28,179
Total	42,643,033	39,286,507

The ticket sales on the Third Avenue line of the Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
Whitehall Street	4,124,704	3,321,929
Hanover Square	2,152,719	1,919,717
Fulton Street	1,783,662	1,691,245
Franklin Square	868,099	810,983
City Hall	12,152,355	11,233,974
Chatham Square	1,873,143	1,730,494
Canal Street	2,562,504	2,255,747
Grand Street	4,160,219	3,804,040
Houston Street	3,913,790	3,642,070
Ninth Street	3,920,000	3,714,332
Fourteenth Street	3,826,318	3,733,118
Eighteenth Street	2,183,316	2,182,298
Twenty-third Street	3,039,085	3,030,636
Twenty-eighth Street	1,926,136	1,772,294
Thirty-fourth Street	2,208,495	2,101,764
Thirty-fourth Street Ferry	2,186,032	1,873,549
Forty-second Street	2,175,872	1,948,897
Grand Central Station	1,069,599	1,053,875
Forty-seventh Street	991,892	894,945
Fifty-third Street	1,683,367	1,548,936
Fifty-ninth Street	3,278,404	3,153,228
Sixty-seventh Street	2,063,545	2,000,521
Seventy-sixth Street	2,973,360	2,758,110
Eighty-fourth Street	3,684,135	3,585,442
Eighty-ninth Street	3,118,418	2,988,983
Ninety-ninth Street	3,369,214	3,216,521
106th Street	6,187,582	5,767,378
116th Street	5,748,412	5,661,330
125th Street	4,049,002	3,746,418
129th Street	988,860	859,866
Willis Avenue	387,968	351,578
133d Street	2,135,940	1,955,055
138th Street	4,262,339	4,240,059
143d Street	2,467,139	2,380,708
149th Street	2,711,715	2,475,266
156th Street	2,015,074	1,922,351
161st Street	2,768,154	2,678,287
166th Street	2,224,104	2,239,658
169th Street	2,365,855	2,468,405
Wendover Avenue	2,481,957	2,516,015
174th Street	1,591,749	1,664,707
177th Street	2,974,855	2,871,441
183d Street	1,819,611	1,866,297
Pelham Avenue	1,087,192	1,068,688
Bronx Park	3,766,760	3,189,524
Miscellaneous	196,312	134,953
Total	129,519,023	122,085,638

The ticket sales on the Sixth Avenue line of the Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
Rector Street	2,592,707	2,569,088
Cortlandt Street	3,250,168	3,133,744
Park Place	2,693,764	2,327,992
Chambers Street	2,328,176	2,170,184
Franklin Street	1,410,151	1,335,489
Grand Street	1,799,931	1,673,916
Bleecker Street	2,381,687	2,197,743
Eighth Street	2,299,181	2,158,907
Fourteenth Street	3,425,356	3,361,956
Eighteenth Street	3,820,085	3,837,281
Twenty-third Street	4,557,589	4,258,157
Twenty-eighth Street	2,602,280	2,473,375
Thirty-third Street	4,867,798	4,794,106
Forty-second Street	3,346,135	3,473,268
Fiftieth Street	1,477,393	1,491,013
Fifty-third Street	1,191,734	1,136,914
Fifty-eighth Street	1,110,376	1,052,315
Fifty-ninth Street	1,879,903	1,803,660
Sixty-sixth Street	2,173,913	2,170,213
Seventy-second Street	1,602,894	1,614,699
Eighty-first Street	2,753,769	2,723,374
Ninety-third Street	3,163,914	3,065,977
104th Street	4,036,744	3,868,258
110th Street	1,929,728	2,108,715
116th Street	4,007,042	3,784,656
125th Street	4,221,279	4,276,256
130th Street	1,860,054	1,879,627
135th Street	3,235,857	2,781,215
140th Street	2,408,488	2,441,464
145th Street	2,600,742	2,817,360
155th Street	3,362,035	3,564,508
Miscellaneous	843,572	599,741
Total	85,234,445	82,945,171

The ticket sales on the Ninth Avenue line of the Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
South Ferry	2,057,382	1,660,075
Battery Place	1,558,446	1,543,832
Rector Street	770,227	576,353
Cortlandt Street	3,492,805	3,319,303
Barclay Street	1,548,051	1,483,598
Warren Street	2,610,659	2,374,050
Franklin Street	1,290,518	1,224,367
Desbrosses Street	1,508,838	1,359,458
Houston Street	1,108,857	999,834
Christopher Street	2,684,858	2,483,842

Fourteenth Street	2,235,647	2,016,710
Twenty-third Street	2,917,988	2,616,812
Thirtieth Street	1,143,920	1,028,504
Thirty-fourth Street	1,821,373	1,641,530
Forty-second Street	2,639,367	2,460,797
Fiftieth Street	2,030,473	1,836,545
Fifty-ninth Street	965,500	892,640
Miscellaneous	18,166	19,570
Total	32,403,075	29,537,820

Through Service Between New York and Yonkers

An agreement has been reached between the Westchester Electric Railroad and Frederick W. Whitridge, receiver of the Third Avenue Railroad and the Union Railway, New York, by which cars of the Westchester Electric Railroad will be operated over the lines of the Union Railway and the Third Avenue Railroad to a connection with the New York subway at 177th Street for 10 cents. The official notice to passengers of the Westchester Electric Railway regarding the new service, which went into effect on June 8, says:

"On and after June 8, 1909, and until further notice, the cars of the Westchester Electric Railroad will be operated from Larchmont to 177th Street, New York, at the subway. The fare on this line will be 10 cents. The second fare will be collected at 233d Street, from both north- and southbound passengers. No transfers will be issued or received on this line in Mt. Vernon. Cars will also be operated from Mt. Vernon to Bedford Park, upon which a fare of 5 cents will be charged. Transfers will be issued from this line to all Mt. Vernon short lines of this company and will also be received on this line from such short lines. Transfers from the cars of the Westchester Electric Railroad to the cars of the Yonkers Railroad in Mt. Vernon will not be issued except on payment of cash fare upon the Harlem Station line. Transfers will not be accepted from the Yonkers Railroad cars in Mt. Vernon except on the Harlem Station line."

Reduction of Fare and Continuance of Schedule Ordered in Massachusetts

The Railroad Commission of Massachusetts has issued the following finding in the case of the petition of the Selectmen of Westford relative to an increase in fare and the discontinuance of service on the Lowell & Fitchburg Street Railway in Westford:

"On May 17, 1909, the Lowell & Fitchburg Street Railway increased the fare on what is known as the 'Branch,' from Westford Center and Brookside, to 15 cents. The fare so charged is entirely for transportation within Westford, and this, together with a 5-cent fare on other portions of the company's line, results in a maximum fare of 20 cents for a ride in Westford.

"The fare complained of is, in the opinion of the board, unreasonable and excessive. As was said May 9, 1908, in the Montague case: 'We are confirmed in this decision by our inability to find anything in the way of comparative rates for like service under like conditions upon this road or elsewhere in Massachusetts to justify the company in charging 15 cents for a ride over a part only of its system in the township, thus creating a 20-cent fare within the town limits.' We, therefore, recommend a reduction. In view, however, of the income from operation over that portion of the line upon which the fares have been raised, we are unable to recommend any increase in service."

Pennsylvania Road Begins Freight Service.—The Easton & Bethlehem Transit Company is operating a freight service between Easton, Bethlehem, Nazareth, South Bethlehem and Freemansburg.

To Suppress Disorder on Louisville Cars.—So many complaints have been made to the Police Department of Louisville, Ky., about disorder on street cars and interruption to traffic on account of the hoodlum element, that the chief of police has issued a general order quoting the statutes in regard to profane language and quarreling on street cars and refusal to pay fares, and has ordered the police to enforce the law strictly.

Prizes for Trademark.—The Toledo Railways & Light Company, Toledo, Ohio, has offered a series of cash prizes for a trademark that may be used to make the company's stationery and literature distinctive. For the best design, $100 will be paid; for the second best, $50; for the third best, $35, and for the fourth best, $15. Competitors must be residents of Toledo and must have their designs filed with the company by 6 p. m. on July 31, 1909.

No Transfer on a Transfer in Seattle.—The Seattle (Wash.) Electric Company recently issued a general order to conductors not to issue transfers on transfers on any line except the James Street cable road between First Avenue and Broadway. The abuse of the transfer privilege is given as the reason for the order. A protest lodged with the company by A. V. Bouillon has resulted in the rescinding of the order, pending a settlement that shall not work quite so seriously to the inconvenience of the public as did the original order. The company, however, is determined to put a stop to the organized efforts made to defraud the company by manipulating transfers.

Evansville Strike Broken.—On page 1003 of the ELECTRIC RAILWAY JOURNAL of May 29, 1909, and on page 1060 of the ELECTRIC RAILWAY JOURNAL of June 5, 1909, mention was made of the request of the employees of the Evansville & Southern Indiana Traction Company, Evansville, Ind., for a readjustment of the terms of service with the company and of the attitude of the company in the matter. The company refused flatly to accede to the demands for recognition of the union and an increase in wages, and as a consequence about 125 employees did not take out their cars on May 29. The company was prepared for this emergency and filled the places of the strikers at once. Attacks were made on cars in various parts of the city by sympathizers with the strikers, but no serious damage was done to the company's property. Realizing that they had been misled, about 30 strikers applied for reinstatement on June 5, and on June 6 the company re-employed 23 of these men. Conditions are now practically normal.

Strike on Pittsfield Electric Street Railway.—The employees of the Pittsfield Electric Street Railway went on strike on June 3, but were only out one day. The company had an agreement with the employees which expired on June 4. On June 1 a committee of the men called upon the company and were received by F. J. Dolan, acting manager, who told the men that the requests which they made would have to be considered by P. C. Dolan, president of the company, and P. H. Dolan, superintendent, both of whom were then absent. The men desired a graduated wage scale, ranging from 21 cents an hour for first-year men to 25 cents an hour for fifth-year men and recognition of the union. The men voted to strike, with the result that the system was tied up on June 2. Negotiations were resumed, however, and a settlement was reached on June 3, according to which the company will grant the request of the men for an increase in wages but will not recognize the union, treating in the future with a committee of the employees as employees.

New York Commission Grants Permission for Abandonment of Part of Route.—The Public Service Commission of the Second District of New York has given the Bennington & North Adams Street Railway, Hoosic Falls, N. Y., permission to abandon a portion of its route in Hoosic Falls, beginning at the intersection of the easterly line of the right of way of the Boston & Maine Railroad with River Street, running thence westerly on River Street to Third Street, thence northerly on Third Street to Elm Street, thence easterly on Elm Street to the Boston & Maine Railroad, on condition that the company make the terminus of its line in Hoosic Falls at the intersection of the easterly line of the Boston & Maine Railroad's right of way with River Street and furnish such facilities as have been customary at the present terminus of its line for the convenience of passengers boarding and alighting from its cars at such terminus. It was shown, the commission says, that the line did not pay operating expenses and that no controlling reasons appeared to warrant continuance of operation.

Settlement of Wage Question in Winnipeg.—Early in the year a committee of the conductors and motormen employed by the Winnipeg (Man.). Electric Company waited on officials of the company and asked for a readjustment of wages and the conditions governing service with the company. As it was impossible to reach an agreement, a board of arbitration was appointed as provided for under the Lemieux act. W. J. Christie was selected to represent the company and J. G. O'Donohue was selected to represent the employees. The Government then appointed the Rev. C. W. Gordon (Ralph Connor, the author) as chairman. The board began holding sessions on May 11 and concluded them on May 31, having reached an agreement. This agreement was accepted by the men on June 2. The men desired a 9-hour day instead of a 10-hour day, with pay for 10 hours. The board recommended the following schedule of wages: 21 cents for first six months, as compared with 21 cents formerly; 23 cents for second six months, as compared with 22 cents formerly; 24 cents second year, as compared with 23 cents formerly; 26½ cents for third year, as compared with 23 cents formerly; 27 cents for fourth year, as compared with 23 cents formerly; 27 cents for fifth year and thereafter, as compared with 26 cents formerly. Senior men will be permitted to select routes, subject to a rating for efficiency.

Personal Mention

Mr. Gardner Rogers has been appointed manager of the Houghton County Traction Company and the Houghton County Electric Company, Houghton, Mich. Mr. Rogers was formerly general superintendent of the Minneapolis (Minn.) General Electric Company.

Mr. A. R. Koonce has been appointed master mechanic of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed Mr. W. J. Tunnah, who has been appointed master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala.

Mr. M. C. Carpender has been appointed general manager of the Plattsburgh (N. Y.) Traction Company to succeed Mr. A. E. Reynolds, resigned, who, as noted in the Electric Railway Journal of June 5, 1909, has been appointed general manager of the Hudson Valley Railway, with offices at Glens Falls, N. Y.

Mr. E. T. Steel, who has been purchasing agent of the Savannah (Ga.) Electric Company since January, 1908, has been appointed general manager of the Ponce Railway & Light Company, Ponce, Porto Rico. Mr. Steel was connected with the Ponce Railway & Light Company before becoming connected with the Savannah Electric Company.

Mr. Oliver T. Boyd has been appointed general passenger agent of the Hudson & Manhattan Railroad, New York, N. Y. Mr. Boyd is 30 years old, and has been connected with the Pennsylvania Railroad for 12 years in various capacities in its passenger department. For the last three years he has been city passenger agent of the Pennsylvania Railroad in Washington, D. C.

Mr. J. Harry Dufresne has been appointed assistant treasurer of the Northern Texas Traction Company, Fort Worth, Tex. Mr. Dufresne was formerly assistant treasurer of the Houghton County Traction Company and the Houghton County Electric Light Company, Houghton, Mich., and has been connected with properties managed by Stone & Webster for some time.

Mr. G. G. Gale has been appointed general superintendent of the Hull Electric Company, Deschenes, Que. Mr. Gale entered the employ of the Hull Electric Company in January, 1907, as superintendent of power. In November, 1908, he was appointed acting general superintendent of the company, in control of operation, accounting and construction. This appointment was recently confirmed.

Mr. J. G. Holtzclaw has been appointed purchasing agent of the Savannah (Ga.) Electric Company, to succeed Mr. E. T. Steel, who has accepted the position of manager of the Ponce Railway & Light Company, Ponce, Porto Rico. Mr. Holtzclaw entered the employ of the Savannah Electric Company in January, 1908, as a student from the Boston office of Stone & Webster, and has been connected with various operating departments of the company since that time.

Mr. John F. Stevens has resigned as vice-president of the New York, New Haven & Hartford Railroad, New Haven, Conn., in charge of operation, to become connected with the Great Northern Railroad, St. Paul, Minn. According to L. W. Hill, president of the Great Northern Railroad, Mr. Stevens has been engaged to inspect and report on the company's water powers in Montana and Washington and to consider other engineering questions which are under consideration.

Col. E. C. Spring, general superintendent of the Dayton, Covington & Piqua Traction Company, Dayton, Ohio, has tendered his resignation to take effect on Sept. 1, 1909. Col. Spring will thereafter represent a syndicate of Dayton capitalists as operating manager of electric railway, electric light and water properties now operating and to be built in Lawrence and Parsons, Kan. Mr. Thomas J. Brennan, who has been assistant superintendent of the Dayton, Covington & Piqua Traction Company, will, on Sept. 1, assume the title of general superintendent of the company.

Mr. Clarence Wolf has resigned as a representative of the City of Philadelphia on the board of directors of the Philadelphia Rapid Transit Company and has been elected first vice-president of the company to succeed Mr. George D. Widener, resigned, who continues as a director of the company. Mr. Wolf succeeds Mr. George H. Earle, president of the Real Estate Trust Company, as a director of the Philadelphia Rapid Transit Company. Mr. Wolf is a State Senator. He has important banking and commercial interests in Philadelphia, and has been active in regular Republican politics for some years.

Mr. J. R. Bibbins, who since 1902 has been associated with the Westinghouse interests at Pittsburgh, Pa., recently serving the Westinghouse Machine Company as commercial engineer, after June 18 will become associated in the work of the Public Service Commission of New York as assistant to Mr. B. J. Arnold, consulting engineer and director of appraisals. Mr. Bibbins is a graduate of the University of Michigan, and has served in various technical capacities with the Detroit Public Lighting Commission, the Detroit Edison Company and the Detroit United Railways Company, in operating and construction work. During his late connection with the Westinghouse Machine Company, Mr. Bibbins' work has included an intimate association with the development of prime movers in East Pittsburgh, including gas engines, producers, turbines and condensers. His new offices will be in the Tribune Building, City Hall Square, New York.

Mr. William Wallace has been appointed chief city street car inspector of Cincinnati, Ohio, by the Board of Public Service, to inspect the equipment of street cars operated in Cincinnati in the interest of the city. Mr. Wallace will be assisted by six inspectors and five subordinate inspectors. Mr. Wallace has been connected with the street railways in Cincinnati for more than 20 years. He began his railway career in December, 1885, as a driver, and in 1891, when the Cincinnati Street Railway placed its first line in operation, he entered the employ of the company as a motorman. In January, 1895, he succeeded Mr. William Crowley as superintendent of the Eighth Street division of the company, and remained in this capacity 10 years, finally resigning on account of ill health. After an extended vacation in the country Mr. Wallace returned to Cincinnati and entered the service of the city, for which he served recently as assistant member of the Board of Public Service. Mr. Wallace will have as assistant car inspectors Mr. William Hoyser, Mr. James Duncan, Mr. John Halpin, Mr. James Powers and Mr. Nicholas Weber, all of whom have had extended experience in street railway work.

Mr. H. C. Hoagland, whose resignation as chief electrical and mechanical engineer of the Illinois Traction System, Decatur, Ill., to become vice-president and general manager of the Missouri Central Railway, Columbia, Mo., was noted in the Electric Railway Journal of June 5, 1909, page 1061, was born in Covington, Pa., on April 17, 1865, and moved with his parents to Elmira, N. Y., when about five years old. Mr. Hoagland was educated at the public schools in Elmira and at Warner's College, Elmira, from which institution he was graduated in the spring of 1882. On Sept. 25, 1882, he became connected with Mr. A. S. Turner, who installed the first electric light plant in Elmira, which later became part of the holdings of the Elmira Water, Light & Railway Company. In 1886 Mr. Hoagland entered the employ of the Thomson-Houston Company and installed apparatus at Elmira, Fulton, Phoenix, Syracuse and other places in New York State, and after installing the property at Oneida, N. Y., remained there for six years as superintendent. On Feb. 1, 1893, Mr. Hoagland went to Kalispell, Mont., where he rebuilt the water works and electric light plant, and in 1894 he was employed by the White-Crosby Company on the construction of the Buffalo-Niagara Falls Electric Railway. On the completion of this road, Mr. Hoagland became superintendent and electrician of the municipal light plant at Kalamazoo, Mich., resigning after a year's service to become general superintendent of the Kalamazoo Electric Company, which was soon absorbed by the W. A. Foote interests and succeeded by the Kalamazoo Valley Electric Company, which has since become the Commonwealth Power Company, by which Mr. Hoagland was employed eight years as general superintendent. During Mr. Hoagland's connection with this company the water power plants at Trowbridge, Pine Creek and Plainwell, and the 41,000-volt transmission line from Trowbridge to Jackson were built. On March 1, 1904, Mr. Hoagland accepted the position of general superintendent of the Danville, Urbana & Champaign Railway and the street railway, gas, electric light and steam-heating systems at Danville, Ill., and on Jan. 1, 1905, was appointed electrical and mechanical engineer of the Illinois Traction System. Mr. Hoagland will retire from the Illinois Traction System on July 1, about which time active construction will be begun on 60 miles of line for the Missouri Central Railroad, of which he will be vice-president and manager.

OBITUARY

William B. Clements, treasurer of the Peekskill Lighting & Railroad Company, Peekskill, N. Y., and the Northern Westchester Lighting Company, Ossining, N. Y., is dead. Mr. Clements was born near Fredericton, N. B., 38 years ago.

John J. Horgan, superintendent of the Cambridge division of the Boston (Mass.) Elevated Railway, died at his home in Cambridge on May 28. Mr. Horgan was born in Lexington, Mass., and had been connected with the Boston Elevated Railway 35 years.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Oil Belt Traction Company, Oblong, Ill.**—Incorporated to build a railway from Charleston to Bridgeport. Capital stock, $100,000. Incorporators: G. E. Groves, D. W. Odell, D. J. Odell, Geo. P. Murrin and F. P. Willard, Oblong.

***New Bern Power Company, New Bern, N. C.**—Incorporated to build a street railway in New Bern. Capital stock, $500,000. Incorporators: R. P. Foster, J. W. Stewart, R. A. Nunn and M. D. Lane.

Okmulgee Interurban Company, Guthrie, Okla.—Chartered to build an electric railway from Okmulgee to an amusement park, 8 miles. Capital stock, $200,000. Incorporators: J. B. Jones, Muskogee; A. M. Gammon, Chelsea; J. M. Sims, W. D. Todd, and O. A. Lambert, Okmulgee. [E. R. J., June 5, '09.]

Johnstown & Gallitzin Railway, Johnstown, Pa.—Application will be made on June 18 by this company for a charter to build an electric railway between Johnstown and Gallitzin. Applicants for the charter are: Wallace Sherbine, Thos. J. Pearce, Alvin Sherbine and H. W. Storey. [E. R. J., Feb. 6, '09.]

FRANCHISES

***Edmonton, Alta.**—A syndicate of French capitalists, represented by Messrs. Short, Cross & Biggar, Edmonton, are reported as seeking franchises to build a number of radial railways from Edmonton, Alta. At a meeting of the City Council the Aldermen were strongly in favor of granting the syndicate the privileges asked and it is expected active construction will be started this year. The syndicate has plans for constructing 160 miles of track at the start.

Los Angeles, Cal.—Application for a franchise to build an electric railway on East Seventh Street from the city limits of Long Beach to the easterly line of Redondo Avenue has been made to the Board of Supervisors by the Pacific Electric Railway.

Sacramento, Cal.—The Board of Supervisors has granted to the Central California Traction Company a franchise to construct an electric railway on Magnolia Avenue in Oak Park. [E. R. J., May 1, '09.]

New London, Conn.—The Senate has granted to the New London & East Lyme Street Railway an extension of its franchise, to Nov. 1, 1910, for extending its lines to the Connecticut River. The bill will next go to the House for consideration. [E. R. J., Feb. 6, '09.]

Elgin, Ill.—Application has been made to the City Council by the Aurora, Elgin & Chicago Railroad through its president, J. Wolf, for a franchise to extend its lines over Park Street.

Kankakee, Ill.—The Chicago, Kankakee & Champaign Electric Railroad has applied to the City Council for a 50-year franchise to build an electric railway on River Street and Schuyler Avenue. [E. R. J., May 29, '09.]

New Orleans, La.—An ordinance has been introduced in the City Council for the sale of a franchise for the operation of a street railway from Galvez Street along Franklin Avenue to St. James Avenue. The franchise is to be sold by the Comptroller at public auction in block, the bidder offering to pay no less than one-half of 1 per cent of the gross annual income, less taxes, to be awarded the franchise for a period of 39 years, June 30, 1912.

Moberly, Mo.—The City Council has granted to Manning, Wellman & Company a franchise to build an electric railway between Moberly and Huntsville. [E. R. J., April 24, '09.]

Springfield, Mo.—The Springfield Traction Company has asked the City Council for a 20-year extension of its franchise. The company is to build a line on Nichols Street and Atlantic Street to the new Frisco shops. [E. R. J., March 13, '09.]

New York, N. Y.—The Board of Estimate and Apportionment has granted a franchise to the Hudson & Manhattan Railroad to extend its tunnel from Sixth Avenue and Thirty-third Street to the Grand Central Station in Manhattan.

Columbus, Ohio.—The City Council has granted to the Ohio Electric Railway a 25-year blanket franchise over city streets to secure a new $175,000 union interurban station at South Third Street and Rich Street and also established a new electric light rate of 7 cents net for a 5-year period. The franchise measure permits the laying of T-rails and the abandonment of the loop in Columbus.

***Chickasha, Okla.**—The City Council has granted to Lawrence Martin a franchise to build a street railway. The franchise runs for 25 years and provides that the railway must be in operation within one year from the time construction is begun. An election will be held at which the question will be submitted to the people.

Astoria, Ore.—The United Public Service Company, Philadelphia, has paid the treasurer of Astoria $1,000, the amount provided in the ordinance granting a franchise to the Oregon Seacoast Railway, as a deposit and guarantee of good faith in constructing an electric railway between Astoria, Seaside and Tillamook. Under the conditions of the franchise work must be commenced on or before Aug. 7, 1909, and the line completed from the corner of Twelfth Street and Duane Street, Astoria, to a connection with the north approach of the Young's Bay bridge, and completed to Seaside within two years from March 7, 1909. [E. R. J., March 30, '09.]

Portland, Ore.—Dr. Henry Waldo Coe, president of the St. Helens Public Service Company, has applied to the City Council for a franchise to enter the city of Portland by the way of Tenth Street east and west. This company has already secured franchises in all towns on the main route. [E. R. J., Oct. 20, '06.]

Portland, Ore.—Mayor Lane has vetoed the ordinance, passed by the City Council at its last session, granting to the United Railways one year's extension of time for completing its track to Mount Calvary Cemetery and Hillsboro. [E. R. J., June 5, '09.]

Watertown, S. D.—Application has been made to the City Council by A. L. Rowe for an extension of his franchise to build an electric railway to Lake Kampeska. [E. R. J., May 29, '09.]

TRACK AND ROADWAY

Phœnix (Ariz.) Railway.—This company contemplates extending its Indian School line for a distance of about 2¼ miles.

Pacific Electric Railway, Pomona, Cal.—It is announced that this company will build a 1½-mile extension to its railway in Pomona preparatory to placing it in operation.

***Del Monte Townsite Company, Del Monte, Cal.**—This company is said to have made surveys and secured capital for the construction of a 3-mile electric railway from Monterey to Del Monte Heights. Contracts for construction of the line will be let soon. F. M. Fairchild, Oakland, Cal., chief engineer; Geo. W. Phelps, San Francisco, Cal., president.

Denver, Colorado Springs & Pueblo Interurban Electric Railroad, Denver, Col.—The promoters of this proposed electric railway which is to connect the cities named in the title announce that they have decided to let the matter drop for the present, at least. [E. R. J., May 22, '09.]

Twin Falls, Idaho.—George D. Aiken, Twin Falls, writes that the franchise which recently was granted to him was for a short extension of the present track operated for warehouse purposes only and installed about one year ago. Rails and ties for this extension were purchased from the Short Line Railroad. [E. R. J., May 15, '09.]

Climbing Hill, Ia.—The ELECTRIC RAILWAY JOURNAL is advised that the examination of the route for the proposed electric railway which is to connect Sioux City, Climbing Hill and Ida Grove, is practically completed, and R. H. Baldwin, Chicago, Ill., who has charge of the preliminary work for the temporary organization is now preparing the report. If the report warrants it, a permanent company, to be known as the Sioux City & Eastern Traction Company, will be organized and surveys begun immediately. This project has no connection with any other railway project now under way in this section of Iowa. The headquarters for the present will be at Climbing Hill. [E. R. J., May 29, '09.]

Arkansas Valley Interurban Railway, Wichita, Kan.—It is stated that the plan of building an electric railway from Wichita to Hutchinson, 50 miles, and thence to Newton by way of Burrton, and from Newton to Wichita by way of Valley Center and Sedgwick, has been revived. A company has been organized and stock to the amount of $100,000 has been subscribed by Wichita business men. Among those interested in this project are: W. O. Van Arsdale, C. H. Smythe, E. T. Battin, R. L. Holmes, O. A. Boyle, James Allison, James L. Tuttle, Geuda Springs, A. H. Barnes, Oxford.

***Absarokee, Mont.**—G. M. Hawkins, Absarokee, advises that he is interested in a project to build a 12-mile electric railway in the vicinity of Absarokee. Mr. Hawkins states that the land is very rich and productive, the market good at the Northern Pacific Railroad and there is an easy grade, no bridges will be necessary and abundant water power.

*Springdale, Mont.—It is stated that James A. Murray, Butte, is considering a plan to build an electric railway from Springdale to Hunter's Hot Springs, 2½ miles.

*Kansas City, Mo.—It is announced that the Townsend-Enright Syndicate will build a double-track railroad to be operated by both steam and electricity between Kansas City and St. Joseph, Mo., 52 miles. Construction is reported begun 6 miles from Dearborn. George Townsend, Kansas City, and Chas. F. Enright, St. Joseph, Mo., are said to be interested. A branch to Cameron, Mo., is proposed. The Kansas City Junction Railway, the Jackson County Railway, the Missouri River & Cameron Railway, and the Lewis Bridge Company will, it is reported, be consolidated as the Kansas City & St. Joseph Terminal & Railway Company. Two bridges will be built, one costing $500,000 over the Kaw River and another $1,500,000 over the Missouri River. A terminal on the river front, estimated to cost about $2,000,000 with a large depot, is in the plan.

Mountain Railway, West Orange, N. J.—This company advises that it will build a ½-mile extension to Essex County Park, contracts for which will be placed during the next six weeks.

Third Avenue Bridge Company, New York, N. Y.—Frederick W. Whitridge, receiver of the Third Avenue Railroad, has announced that this company has been incorporated for the purpose of operating shuttle cars over the Queensboro Bridge, transferring to and from all lines of the Third Avenue Railroad. [E. R. J., June 5, '09.]

Geneva & Auburn Railway, Seneca Falls, N. Y.—The State Land Board has granted perpetual easements to lands under the waters of Cayuga Lake to the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, so as to permit the erection of a bridge a mile long. The company was recently given authority by the Public Service Commission, Second District, to construct an extension of its railway from Seneca Falls to Auburn, crossing Cayuga Lake. [E. R. J., June 5, '09.]

Watertown & Carthage Traction Company, Watertown, N. Y.—Governor Hughes has signed the bill permitting the construction of this 20-mile electric railway between Watertown and Carthage by extending the franchise secured some years ago. John N. Carlisle, Watertown, president.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.—As the result of a mass meeting held June 1, preparation is being made to hold an election to vote a 2 per cent subsidy tax to this company to build an extension from Aurora to Madison, thence to Scottsburg, connecting with the line of the Indianapolis & Louisville Traction Company. The company proposes to operate a through freight service from Cincinnati to Louisville. [E. R. J., June 5, '09.]

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—This company has awarded a contract for the extension of its line from the present terminus at Gahanna to Johnstown, a distance of 14 miles, to the Dominion Construction Company, Pittsburgh. The company has also appropriated $650,000 to cover the cost of construction. Engineers are already on the ground and a number of routes have been surveyed. The most favorable route will entail considerable grading and the construction of several bridges.

Toledo, Bowling Green & Southern Railway, Findlay, Ohio.—At a conference held recently, a plan was considered for extending the Toledo, Bowling Green & Southern Railway through to Columbus by way of Kenton and Marysville. This plan would include lifting the receivership of the Toledo Urban & Interurban Railway. The bondholders are said to be willing to take over this property and merge it with the Toledo, Bowling Green & Southern Railway.

Lake Erie & Youngstown Railway, Youngstown, Ohio.—It is announced that this company plans to begin, within 30 days, the construction of its proposed electric railway to extend from Conneaut through Andover and other points to Youngstown. The contract has been awarded to the Stanley Construction Company, Conneaut, and the cost of the building and the equipment will be, it is estimated, $3,000,000. The new line will connect with the Youngstown & Southern Railway, which extends from Youngstown to East Liverpool.

Ardmore, Okla.—Oscar Ayers, who recently submitted a proposition to Ardmore for the construction of an interurban electric railway from Ardmore to Chickasha, which was accepted, is quoted as saying that the work of making a preliminary survey for the route will begin at once. Ardmore's offer is a bonus of $50,000 and right-of-way from Ardmore to Springer, 12 miles northwest. [E. R. J., May 29, '09.]

Oklahoma Midland Electric Railway, Hobart, Okla.—This company has awarded to the J. A. Kauffman Company, La Fayette, Ga., the contract for building the proposed electric railway which is to extend from Sayre to Oklahoma City via. Hobart, a distance of 150 miles. The contract also covers the construction of two 8,000-hp water power stations. Surveyors were placed in the field on June 7 to make the preliminary surveys. [E. R. J., April 17, '09.]

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—It is stated that this company has agreed to extend its railway from Welland to Port Colborne provided satisfactory terms can be made with Port Colborne. It is said that eventually the line will be extended east along the shore of Lake Erie from Port Colborne to Buffalo.

Dunnville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—H. Lloyd, Dunnville, has been awarded the contract for the construction of the first 10 miles of the Dunville, Wellandport & Beamsville Electric Railway. The proposed railway will connect the cities named in the title and will be about 23 miles in length. James A. Ross, Wellandport, president. [E. R. J., May 8, '09.]

Montreal, Que.—It is stated that the Dominion Government is considering the electrification of the Intercolonial Railway from Montreal to Moncton, N. B. The water power at Grand Rapids will be developed to furnish electricity to operate the railway if the plan is carried through.

*Greenville, S. C.—It is reported that Clemson College will build an electric railway to connect with Calhoun, and will eventually extend it to Cherry Station, on the Blue Ridge Railroad.

Nashville Railway & Light Company, Nashville, Tenn.—This company has filed an application to amend its charter so as to permit it to made a number of extensions and improvements in and around Nashville. It is proposed to construct lines to connect Goodlettsville, Nolensville, Paradise Ridge, Una, Belle Meade, Old Soldiers' Home, Masonic Widows and Orphans' Home, Franklin, Bordeaux and other places. Percy Warner, president of the company, is quoted as saying that it is not intended to immediately build these extensions, but it is desired to give the company authority to make them as circumstances may demand. Altogether about 18 pieces of track may be constructed under the amendment.

*Beaumont, Tex.—Col. I. D. Polk, Beaumont, is quoted as saying that financing has been arranged to build the proposed electric railway from the Beaumont Country Club via Beaumont and Spindle Top to Port Arthur and the docks. No announcement has been made as yet as to when construction will begin.

*Houston, Tex.—The South End Land Company, according to a press report, contemplates building a street railway from its property near Rice Station to connect with Houston.

Central Texas Development Company, Temple, Tex.—This company has been organized to make preliminary surveys, secure rights-of-way and franchises for the proposed electric railway between Temple and Waco. Chas. M. Campbell is chairman; G. E. Wilcox, Temple, president; W. J. Neale, Waco, vice-president; W. L. Prather, Waco, secretary; P. L. Downs, Temple, treasurer. [E. R. J., May 22, '09.]

Spokane & Inland Empire Railroad, Spokane, Wash.—It is announced that this company is considering plans for a branch line 20 miles long into the Coeur d'Alene Indian reservation, which is to be opened in August. The proposed electric railway would leave the main line near Ochlare, Wash., and run to Plummer, Idaho.

Tacoma-Seattle Short Line Electric Railway, Tacoma, Wash.—At a stockholders' meeting recently held in Tacoma, this company was reorganized, the controlling interest going to E. J. Felt and H. A. Eastman, who signed a contract to finance, build and equip the railway ready for operation. The line will be double-tracked and will connect Tacoma and Seattle, a distance of about 30 miles. The following officers and directors were elected: James B. Murphy, Seattle, president; Henry Ewing, vice-president; Arthur G. Prichard, Tacoma, treasurer; Alfred E. Rothermel, Tacoma, secretary. These, with L. P. Hornberger, Seattle, and C. L. Hoska, Tacoma, constitute the board of directors. The capital stock of the company, originally placed at $6,000,000, has been reduced to $4,000,000 by the setting aside of $2,000,000 out of the six as treasury stock which is to be used only in building extensions and not in the main line between the two cities. A bond issue of $3,500,000 of 6 per cent 20-year bonds was authorized, which will be taken over by the Eastman syndicate. [E. R. J., Nov. 14, '08.]

Sparta-Melrose Electric Railway, Sparta, Wis.—This company has awarded a contract to G. W. Orton and W. G. Horn, of New Lisbon, for the grading of 5 miles of track. [E. R. J., May 29, '09.]

SHOPS AND BUILDINGS.

Los Angeles-Pacific Company, Los Angeles, Cal.—This company proposes to build a new passenger station at Trolleyway and Pier Avenue, Ocean Park. It is estimated that the depot and store rooms in connection with it will cost $11,000.

Denver (Col.) City Tramway.—This company is said to have completed plans whereby it will erect a seven-story modern office building of concrete construction to cost, it is estimated, $500,000 on the northwest corner of Fourteenth Street and Araphoe Street, which will contain the headquarters of the company. [E. R. J., March 27, '09.]

Inter-Mountain Railway, Denver, Col.—This company will erect a six-story building and depot at Fourteenth Street and Curtis Street, Denver.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company advises that it will build a ticket office and freight house at Elkhart and Mishawaka. A new freight station and a car house will be erected by the company at South Bend.

Maryland Electric Railways, Baltimore, Md.—Announcement is made that this company will erect a new park terminal on its property bounded by Druid Hill and Fulton Avenue and Francis Street. Plans and specifications for the building have been prepared by Messrs. Baldwin & Pennington, architects. The car house will be leased to the United Railways & Electric Company. The building will be 191 ft. x 472 ft. in size, two stories high and will not only have storage room for cars but a large open concourse near the front of the building to accommodate the cars waiting for passengers. It will be constructed of reinforced concrete throughout, with exterior walls of vitrified brick and terra-cotta cornice and trimmings. On the second floor will be a large lecture room to accommodate 600 men with a platform at one end; an instruction room, 45 ft. x 80 ft.; a reading room, 64 ft. long; locker rooms, superintendents' rooms, clerks' rooms, waiting rooms and washrooms. Bids for the work will be opened on June 14. The car house is planned to provide accommodations for five lines—the Druid Hill Avenue, Linden Avenue, Gilmor Street, Carey Street and Preston Street.

Mexican Electric Tramway, Mexico, Mex.—This company has placed an order with the United States Steel Products Export Company for several hundred tons of structural steel for the erection of car houses at Indianilla. The contract for the construction of the structure has been let. The car houses will cover nearly two blocks in length.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company has awarded to Edward K. Fenno, Auburn, the general contract for the erection of new repair shops which are to be built south of the present car houses of this railway. The building, which will be 132 ft. x 240 ft. in size, will be fireproof, and will be built of brick and steel construction. The steel will be furnished by the Archbold-Brady Company, Syracuse. The plans and specifications for the structure were prepared by Sheaff & Jaastad, Boston, Mass.

Portland Railway, Light & Power Company, Portland, Ore.—It is stated that work will soon be started by this company on the first of its car houses which when completed will accommodate 200 cars and will represent a total outlay of close to $100,000, including tracks, yards, etc. The ground space covered by the building will be about 250 ft. x 450 ft. It is announced that the company will build in such a way that it can add more space and trackage whenever the needs require. The first section of the car houses which will be built during this season will represent an outlay of about $30,000, and it will have a capacity of about 70 cars. It is the intention to increase the size of the buildings until the available ground space of 250 ft. x 450 ft. has been covered.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Champaign, Ill.—The engineering department of this company is now at work on plans for a new power plant to be built at East St. Louis on the lower side of the new Mississippi River bridge now in course of construction. This plant, which will be the largest on the system, is designed to supply all the lines with current south of Springfield. At present the Riverton plant, near Springfield, is furnishing the southern end of the system, but has been found inadequate. The new plant is to have a 10,000-hp capacity, which can be doubled. It is said that plans will also be drawn for the new St. Louis station as soon as the site has been selected.

Oklahoma Midland Electric Railway, Hobart, Okla.—This company has awarded a contract to the J. A. Kauffman Company for the construction of two 8000-hp water power plants. [E. R. J., April 17, '09.]

Manufactures & Supplies

ROLLING STOCK

Patten Manufacturing Company, Chattanooga, Tenn., is asking prices on dump cars.

United Railways & Electric Company, Baltimore, Md., may purchase some motor cars, though the number cannot be learned.

Ithaca (N. Y.) Street Railway has purchased two 20-ft. closed cars fully equipped from MacGovern, Archer & Company, New York.

Rockland, South Thomaston & Owl's Head Railway, Rockland, Maine, has purchased three cars from Wason Manufacturing Company, it is reported.

Winona Railway & Light Company, Winona, Minn., has purchased four more 8-bench open trail cars from the Dorner Railway Equipment Company, Chicago.

Twin City General Electric Company, Ironwood, Mich., has purchased two 10-bench open cars with Brill 21-E trucks from the Dorner Railway Equipment Company, Chicago.

Wallkill Transit Company, Middletown, N. Y., has purchased two Brill Narragansett 15-bench open cars, two Jackson-Sharp 10-bench open cars and two work cars from John B. Watson, Philadelphia, Pa.

Nebraska Traction & Power Company, Omaha, Neb., has purchased two 21-ft. motor cars, mounted on Brill 21-E trucks and equipped with two GE-800 motors, from the Dorner Railway Equipment Company.

Slate Belt Electric Street Railway, Pen Argyl, Pa., is having five of its cars repainted and overhauled by J. S. Mettler, of Pen Argyl, and will not purchase any new rolling stock at the present time, as reported in the ELECTRIC RAILWAY JOURNAL of May 8, 1909.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is preparing plans and specifications for 100 double-truck city cars. It is planned to build the bodies of these cars of steel below the window rail and to introduce several new detail features of design.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has ordered five single-truck cars from the McGuire-Cummings Manufacturing Company, Chicago. Mention of the contemplated purchase of this rolling stock was made in the ELECTRIC RAILWAY JOURNAL of May 29, 1909.

Calumet & South Chicago Railway, Chicago, Ill., it is learned, has plans drawn for the funeral cars to be operated by the Chicago City Railway over this company's property. That this company would purchase several funeral cars was mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1908.

Interborough Rapid Transit Company, New York, has decided to divide the order for all-steel subway cars between American Car & Foundry Company, Standard Steel Car Company and Pressed Steel Car Company, though no decision has at this time been reached as to how the order will be split up nor has it been definitely decided whether 150 or 250 cars will be purchased.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont., mentioned in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, as asking for bids on four pay-as-you-enter cars, has purchased these cars from the Preston Car & Coach Company, Preston, Ont. The body length is specified to be 31 ft.; length over vestibules, 42 ft. The bodies will be of wood. Westinghouse air brakes, Jenkins fenders, Crouse-Hinds headlights, four Westinghouse 101-B motors and Brill G-27 trucks were ordered.

Chicago (Ill.) Railways Company placed an order for 350 cars and trucks with the Pullman Company on June 4. These cars are to be of the pay-as-you-enter type and are to have the following dimensions: Over-all length, 46 ft.; length over corner posts, 31 ft. 6 in.; length over crown pieces, 45 ft.; width over drip rails, 8 ft. 4 in.; width over guard rails, 8 ft. 6 in.; height top of rail to top of trolley boards, 11 ft. 8½ in.; wheel base, 19 ft. 11 in.; seating capacity, 40. The special devices called for in the specifications were published in the ELECTRIC RAILWAY JOURNAL of May 22, 1909.

Pacific Electric Railway, Los Angeles, Cal., has ordered 20 interurban and 30 city cars from the St. Louis Car Company. The trucks are being built by the company, and in addition to the bolsters, bearings, axles and car trimmings being furnished by the car builder, the following specifications were drawn on the interurban cars:

Seating capacity 48	Curtain material...Pantasote
Weight, body .....23,650 lb.	Destination signs,
Bolster centers, length, 24 ft.	Company's
Length of body.....32 ft.	Fenders ..... Worcester
Height over vestibule, 40 ft. 1 in.	Gears and pinions.....Bliss
	Gongs .....St. Louis

Width over sills...8 ft. 1 in.
Width over posts at belt, 8 ft. 1 in.
Sill to trolley base, 9 ft. 5⅞ in.
Height from top of rail to sills.....2 ft. 10¾ in.
Body ..... Wood
Interior trim .... Mahogany
Underframe .... Composite
Air brakes..West. A. M. M.
Axles ..... St. Louis
Control System, West. Multiple
Couplers ..... Washburn
Curtain fixtures, Curtain Supply Company
Heating system, Company's electric
Headlights, Anderson-Smith
Journal boxes, St. Louis M. C. B.
Paint.....Heath & Milligan
Registers ..... Ohmer
Rollers .....Hartshorn
Seats ..... Walkover
Step treads.... Am. Mason
Trolley retrievers, Company's
Trolley poles.....Shelby
Trolley base, Company's pneumatic
Varnish....Flood & Conklin
Wheels.....American Car & Foundry Company

Mention of the contemplated purchase of these cars was made in the Electric Railway Journal of May 29, 1909.

TRADE NOTES

John F. Ohmer, president of the Ohmer Fare Register Company, Dayton, Ohio, sailed for Europe on a business trip on June 5.

Belden Manufacturing Company, Chicago, Ill., will soon place on the market a new insulated wire suitable for use in winding armature and field coils for railway motors and generators.

Norvell-Shapleigh Hardware Company, St. Louis, Mo., has appointed J. C. Reed traffic manager. He will assume his new duties in connection with his present position as manager of the railway supply department.

Western Electric Company, New York, N. Y., has sent out a fine bronze desk paperweight. Each side of the disk shows a map of the United States and the location of all the company's sales offices.

Arthur S. Partridge, St. Louis, Mo., offers a large variety of railway generators from 150 kw to 850 kw in size in his schedule dated June 5, 1909. Rotary converters, motors, cars and steam equipment are also listed.

St. George H. Cooke, Assoc. M. Am. Soc. C. E., has changed the location of his offices from the Cambridge Building, Chester, Pa., to the Real Estate Trust Building, Philadelphia, where he will continue to conduct a general civil engineering practice.

Westinghouse Machine Company, Pittsburgh, Pa., has received an order from the Detroit United Railways for another turbine unit. The new turbine is 1000-kw capacity and is to operate at 150 lb. steam, 28-in. vacuum and saturated steam.

Lord Electric Company, 213 West Fortieth Street, New York, announces that it has closed one of the largest orders it has ever received. The contract, which amounts to nearly $500,000, includes among other of the company's material its well-known laminated soldered rail bonds.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., announces that Franz J. Dommerque will represent the company in an engineering and advisory capacity as general representative. Mr. Dommerque is a mechanical engineer and will have his headquarters at Rochester.

Worden-Allen Company, Chicago, Ill., general contractor for fireproof construction and manufacturer of steel construction, with shops at Milwaukee, Wis., and Buffalo, N. Y., advises that J. W. Cowper is now connected with it in the capacity of vice-president. Mr. Cowper was formerly with James Stewart & Company, general contractors.

Meikleham & Dinsmore, New York, bankers and engineers, have moved into new offices on the 16th floor of 25 Broad Street, thus bringing the banking and engineering departments, which were formerly in different buildings, into adjoining suites. The firm has just instituted a department of car design engineering and also one of car equipment financing.

National Railroad Trolley Guard Company, 37 Wall Street, New York, has closed the following contracts for its trolley guard: 900 ft. each to People's Railway, Dayton, Ohio, and Syracuse Rapid Transit Railway, Syracuse, N. Y., and 600 ft. to the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia. Orders from other railway companies amounting to about 2000 ft. have also been received.

Keystone Lubricating Company, Philadelphia, Pa., states that the Interborough Rapid Transit Company, New York, has adopted Keystone grease for all the escalators at its elevated stations. This service is particularly severe because of the sudden and variable loads on the machinery. The gear cases are packed with No. 4 density, and require no attention for long periods. No. 1 density is used for other parts where the feed of the lubricant is from grease cups.

Graphite Lubricating Company, Bound Brook, N. J., is sending out to electric railways in all parts of the world an announcement that the United States Navy now has in use 10,298 "Bound Brook" graphite and bronze bearings which, it is claimed, require no oil or grease. Russia and Japan are also extensive users of "Bound Brook" bearings in their navies and shipyards. These self-lubricating bushings give satisfactory service in heavy sizes and under exacting conditions, as well as for lighter uses, such as for trolley wheels.

Arthur D. Little Laboratory, Boston, announces that Karl M. Way, E. M., and Perry Barker, M. S., have been appointed engineers upon the staff of the fuel engineering department of that laboratory. Mr. Way will be connected with the mining branch of the department, and is a graduate in mining engineering of the Ohio State University. Mr. Barker will be associated with the chemical branch of the department, and is a graduate in chemical engineering of the University of Illinois. He was also formerly chemist to the Peabody Coal Company, Chicago, and research chemist at the Illinois State Engineering Experiment Station.

Gulick-Henderson Company, Pittsburgh and Chicago, inspecting engineers and chemists, announces that it has opened an office in New York at 30 Church Street, rooms 517 and 519. Henry Gulick will have direct charge of the office and will be assisted by T. W. Cohill. This company has also retained Samuel E. Duff, the well-known consulting engineer, of Pittsburgh, Pa., to advise and direct its inspectors in matters of engineering, erection and fabricating shop methods. Mr. Duff will continue his general engineering practice, with offices in the Empire Building, Pittsburgh, and will also be represented at the Chicago and New York offices of Gulick-Henderson Company.

New York Switch & Crossing Company, Hoboken, N. J., has built an extension to its works which will increase their capacity about 40 per cent. The new building is fireproof and has a cement floor. It will be fully equipped with modern tools, all arranged to be driven by electricity. A novel method of handling material in the shops which the management has found to be more satisfactory for its particular needs than a traveling crane has been installed. Eight 9-in. girder rails forming runways for trolley hoists are mounted on the roof trusses at intervals across the shop. Each of these carries one Harrington Peerless hoist and trolley carriage. Down the center of the shop and communicating directly with the foundry is a floor track, and by means of the transverse hoists material can be placed in any part of the building without difficulty. One of the overhead girders runs directly into the machine shop, thus forming a connection into this branch of the works also. Among some recent large orders for track layouts and special work which have been received by this company are the following: Brooklyn Rapid Transit Company, Syracuse Rapid Transit Railway Company, Virginia Passenger & Power Company, Public Service Railway, United Traction Company of Albany, Coney Island & Brooklyn Railway. These orders all include the company's well-known Anti-Straddling type of tongue switch.

ADVERTISING LITERATURE

H. W. Johns-Manville Company, New York, has printed a folder on J-M conduits for heating and lighting plants.

Industrial Progress, published at Milwaukee, Wis., in its June issue describes the construction of Allis-Chalmers d. c. railway motors.

Frank Ridlon Company, Boston, Mass., has just issued its June list of second-hand material, which includes an assortment of electrical apparatus.

Stone & Webster Engineering Corporation, Boston, Mass., has issued a series of illustrated blotters entitled "Permanent Versus Transient Organization," "Construction Speed and Low Costs," "Power Station Profits" and "Electrification."

Milwaukee Locomotive Manufacturing Company, Milwaukee, Wis., describes in publication No. 100 its gasoline-driven locomotives. The publication contains a large number of illustrations showing the locomotives used for hauling passenger coaches, line cars, freight cars and for various other services, including industrial plants.

Meikelham & Dinsmore, New York, has published a booklet from its car engineering department entitled "A Car is Not a Car," which briefly states the advantages of having cars ordered by specialists who are not only familiar with every phase of rolling stock, but who also study the conditions of operation to decide on the various details that would give the best results.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JUNE 19, 1909 No. 25

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

The Summer Traffic Season

Opening of the summer traffic season is coincident with the issue of circulars by various lines, describing the attractive points of interest which may be reached by short rides. While it is relatively a simple matter to prepare a folder or booklet giving train schedules, it is much more difficult to arrange one that, because of its well-written text and attractive arrangement of carefully-selected illustrations, will lead observers to travel. Since summer tourists will probably be evident in larger numbers this year than ever before the possibilities for gross earnings from this source will be inviting, and electric lines may prepare to get their full share of the business.

Encouraging Motormen to Save Power

It is generally recognized that a large saving in power consumption could be made by an electric railway company if it were possible to operate each car under ideal accelerating and braking conditions. Automatic controller devices may accomplish a great deal, but they can never be a complete substitute for brains, nor will they prevent considerable waste of energy on the part of some motormen. A course in an instruction school where practice can be had with controllers connected with indicating lamps or other devices, will serve to impress on a motorman's mind the current values for different steps in the controller. This indoor practice lacks one element essential to the most economical operation of cars—that is, the adjustment of the speed of the car to the alignment and grades of the road, so that a minimum amount of power will be used while the required schedule speed over the entire run is maintained. On some roads coasting signals have been placed at the top of grades and in advance of stations and curves in an endeavor to reduce the amount of power wasted through sudden stops at high speeds. The Metropolitan West Side Elevated Railway, of Chicago, is trying still another plan by issuing the circular letter which will be found on another page in this issue. This letter expresses the waste of power in terms of dollars per month lost by the company, the loss being estimated at $5,000 per month or $60,000 per year. The request for co-operation of the motormen in an effort to reduce this loss is accompanied by the statement that hereafter the records of the men will include the results of observations of their efficiency in saving power on the part of the superintendent and other officers.

A Transfer on a Transfer

Additional evidence is obtainable frequently regarding the increasing appreciation by street railway managers of the serious losses resulting from abuse of the transfer privilege. The latest company in a large city to take summary action designed to prevent the continuation of unlawful drain upon its revenues from this cause is the Seattle (Wash.) Electric Company, which, pending definite reformative measures, has given an order to its conductors directing them not to issue transfers on transfers except between certain streets on one line. The issue of universal transfers, when given freely either for cash or on transfers, is somewhat similar, as a business inducement, to the action

of the merchant who seeks to secure general advertising for his establishment by offering $5 gold pieces at the marked-down price of $4.95. Either practice increases the risk of business failure if it does not make disaster certain. While the danger of universal transfers is understood more generally now than it was in past years, some companies are still laboring under the burden of ordinances containing provisions governing transfers which have proved to be extremely onerous. If companies will give transfers freely to passengers who pay either cash fares or tender transfers received from other lines, abuse will be difficult to prevent. The ultimate effect of continued excessive abuse will be the reduction of the average fare per passenger to a point that will not meet the requirements. Many companies have stood all the reduction in the average gross fare per passenger carried that they can bear if they are to struggle along without receivership and resultant reorganization.

Results of Single-Phase Operation on the Erie Railroad

W. S. Murray's recent "Log of the New Haven Electrification" was an early portent of the new conditions under which steam railroad electrification is to be discussed in the future; that is, from the standpoint of results in service instead of from theoretical assumptions. We are glad to add to Mr. Murray's paper along those lines the modest account of the pioneer single-phase electrification of the Erie Railroad now in operation for two years between Rochester and Mt. Morris, N. Y. There is little in common between the New Haven and Erie installations except in the use of a single-phase line potential of 11,000 volts, but the experience of the Rochester-Mt. Morris line proves that a single-phase railway unhampered by d.c. complications can operate from the very start as reliably as the most conservative railway manager could desire. It seems really extraordinary to maintain the line, rolling stock and power service of a 34-mile railway with no more than five men and give at the same time a far better service than was possible under steam operation. A direct-current electrification for such a line with its inevitable substations would certainly have doubled this force, leaving aside the question of additional investment for buildings and machinery. The several changes in line and car equipment which have been made in the Erie installation involved little expense and were not serious. The only considerable delays were due to failures in the hydro-electric transmission lines, a drawback having no relation whatever to the type of electric current in use for transportation.

The Improvements in Brooklyn

Six years ago the Brooklyn Rapid Transit Company began to carry out a thorough rehabilitation of every department of its properties. At that time the power service was so inadequate that schedules could not be maintained, nor was it possible to complete the electrification of the elevated division. The line and track department was practically homeless. In the rolling stock department the car bodies, trucks and electrical equipments were of the most diverse types; there were no real facilities for storage and maintenance, and few systematic records of service performance. Through the efforts of President E. W. Winter and Vice-President and General Manager J. F. Calderwood, the directors of the company have appropriated since 1903 the enormous sum of $40,000,000 to remedy these conditions and give Brooklyn an adequate transportation system. Every department has been thoroughly reorganized, so that to-day the Brooklyn Rapid Transit Company is equipped to offer the public first-class service in every department for years to come. The improvements in the rolling stock which are now being described in a series of articles in this journal are necessarily those most conspicuous to the patrons of the company. Clean and comfortable cars, free from breakdowns, have become an established condition. These betterments were in the province of the mechanical department, which, under W. G. Gove, its superintendent of equipment, has given special attention to the standardization of the cars and uniformity in maintenance. The intimate relation between improved equipment on the one hand and better service, lower accident charges and increased economy, on the other, imparts an interest to these articles which is not confined to the engineering features described. The practical effects of such a plan are widespread and favorably concern every department of the company. The courageous foresight which prompts a manufacturer to scrap a half-worn tool for a later but more productive design has its counterpart in the policy of a management which adopts the recommendations of its engineers and supplies the funds for carrying them out in the realization that better equipment must eventually pay, even if the discarded material could still move along the rails.

A New Departure in Electric Locomotive Design

The powerful electric locomotive built for service in the Detroit River tunnel of the Michigan Central Railroad which is described on another page in this issue embodies many new features in the design of its mechanical parts. To the casual observer it appears to be of the ordinary double-truck type such as have been built in large numbers for interurban roads. It is designed on an entirely different principle of traction, however. In the ordinary double-truck type of car or locomotive the tangential tractive effort exerted by the motors through the axles and wheels is transmitted through the journal boxes, truck frames, bolsters, center plates and body framing to the draft gear. The Detroit River tunnel locomotive consists of two independent traction units or trucks connected together with a hinge to permit curving. From the truck frames the tractive effort exerted by the wheels is transmitted directly to the draft gear and not through the bolster, center plates and body framing. In other words, the body or cab of the locomotive is subjected only to the stresses due to its own weight. When it is considered that the draft gear of these locomotives, which is attached directly to the truck end frames, was designed to resist buffing shocks of 500,000 lb., the advantage of relieving the underframe of the cab from such stresses is evident. Another reason for the adoption of this design was that owing to the large diameter of the driving wheels and the size of the motors mounted on the axles, it would have been impossible to have lowered the cab underframing to a point where its neutral axis would approximately coincide with the standard height of center line of draft which is 36½ in. above the rail.

The locomotive is designed for hauling heavy loads up the steep approach grades of the tunnel at a normal speed of about 10 m.p.h. Its maximum speed is but 35 m.p.h, and hence no pilot wheels are required to relieve the stresses on the rail induced by high speed when rounding curves. The articulated principle has been demonstrated to be successful for slow speeds by its application to steam locomotives of great power both in this country and in Europe so that its adoption in this type of electric locomotive as well as in the Great Northern three-phase locomotive is not altogether an experiment.

The electrical equipment of the locomotive is interesting because of the large size of the direct-current geared motors suspended on the axles. These motors have an approximate rating of 300 hp each and are wound to give an exceedingly high torque at starting. With a gear reduction of 1 to 4.37, each motor can exert an instantaneous starting tractive effort at the periphery of the 48-in. driving wheels of from 12,500 lb. to 15,000 lb. In order to provide adhesive weight sufficient to prevent the wheels from slipping the locomotive has been loaded down with ballast and extra heavy truck members. At the normal operating speed the capacity of the motors is sustained by forced ventilation which is a novelty in direct-current railway motor design. The number of resistance steps in the control circuits is unusually high, affording smooth acceleration, which is very essential under operating conditions such as will exist in the Detroit River tunnel with its steep approaches and sharp changes of grade.

Train Dispatching by Telephone

The standard code of interurban rules as revised by the committee of the Transportation & Traffic Association at the Washington conference departs from the standard code of the American Railway Association in the method of transmitting train orders. It has been contended by most interurban railway officers that the use of the telephone instead of the telegraph in transmitting orders makes necessary an entirely different procedure to guard against errors arising from imperfect speech or hearing. The general practice of transmitting orders from the train dispatcher directly to the train crews, which is one marked advantage of the telephone over the telegraph, is also advanced as a reason for requiring both members of the crew to participate in the routine of reporting and receiving orders. Up to about two years ago telephone dispatching was confined almost exclusively to electric interurban lines, and telegraph dispatching to steam railways, and a fair comparison could not be made of the relative merits of the two systems. Within the past year a number of important steam railways have introduced telephone train dispatching on some part of their lines and have had an opportunity of giving it a fair trial under exactly the same conditions as formerly obtained with the telegraph. The letters from officers of six steam roads using the telephone, which are printed elsewhere in this issue, throw some new light on the much-discussed question of whether the American Railway Association standard code is applicable to telephone dispatching. They also suggest some special precautions to insure accuracy of transmission which may be of interest to electric railway officers.

A careful perusal of the letters reveals the fact that, without exception, the American Railway Association code is followed in every important particular. The majority of the train orders issued by these roads are transmitted through operators at stations, but the Chicago & North Western Railway, Pennsylvania Railroad Company and the Chicago, Burlington & Quincy Railroad make provision for the train crews receiving orders at outlying stations or sidings where no operator is on duty. Mr. Morse, general superintendent of the Chicago & North Western, in his letter says: "The person in charge of the train performs the same functions as the operator." The North Western special rule No. 1, under the heading "Relaying Telegraph Train Orders by Telephone," uses the words, "the person receiving it," and does not specifically state whether the engineman or conductor shall receive the order. In rule No. 3, under the same head, however, the conductor is required to mail his copy of the order to the superintendent after executing it. It will be remembered that rules Nos. 210 and 211 of the American Railway Association exempt the engineman from signing an order in the presence of the operator, and a strict construction of these rules would not require the engineman to be present when the order is received and signed at an outlying telephone station.

The Burlington places the responsibility of receiving an order at a station where no operator is on duty on the conductor, who for the time being assumes the place of the operator, as defined in rules Nos. 210 and 211. The practice of the Pennsylvania Railroad under ordinary circumstances is to have the conductor alone receive the order at stations where no operator is on duty, but it is interesting to note that Mr. Myers says: "In some instances where conditions are possibly a little more exacting than others, we require the conductor to receive the train order and the engineman to repeat it back." On these three roads it seems to be thought sufficient under ordinary circumstances to have but one member of the train crew participate in receiving orders directly from the dispatcher. The practice of having one member of the crew receive, write and repeat the order and the other member again repeat it from the written copy, as defined in the revised rule No. 256 of the interurban code may not be absolutely necessary under all circumstances, but, at least, it leans to the side of extra safety.

Spelling out the names of stations and numerals has not been practised, to our knowledge, by any electric interurban railway. It would seem to be a rather slow process, but, on the other hand, the steam roads dispense with the second repetition of the order by the other member of the train crew. There probably would be little if any difference between the two methods in the total time required to transmit an order and obtain the "complete." The probability of conscious or unconscious error in writing and repeating a spelled-out order is exceedingly small; less, we believe, than when both members of the crew repeat the order back. Mr. Melcher says that after more than a year's experience he has yet to learn of a case of discourtesy or inaccuracy arising from the use of the telephone according to this plan, and he also states that the telephone has the advantages over the telegraph of rapidity and general efficiency.

ROLLING STOCK STANDARDIZATION IN BROOKLYN—IMPROVEMENTS IN DETAILS OF POWER EQUIPMENT AND WIRING

The process of car standardization in Brooklyn has been accompanied by improvements and economies from time to time in the several details of motor and control equipment. It will be noted later that in some items like carbon brushes very extended tests have been made to select the best, regardless of first cost, but with an eye to the ultimate cost and to reliability in service. The suspension of motive apparatus and the use of fireproof wiring are two other important power subjects considered in this article.

STANDARDIZING AND MAINTAINING BRUSH TENSION ON SURFACE AND ELEVATED LINES

The determination and maintenance of standard brush tensions for the surface and elevated motors, respectively, has had a valuable influence on the reduction of commutator troubles. Formerly, the motors were operated with any brush-holder spring tension which seemed desirable to the individual repair man. After extended investigation, the tension on the surface motors was placed at 7 lb., while that on the elevated motors ranges from 6½ lb. to 8 lb. Whenever a motor is inspected, the brush-holder tension is determined with a cylindrical pocket spring balance placed at a point directly over the brush, with the hammer even with the top of the brush guide. This scale is of 15-lb. capacity, and in size and shape resembles a dime savings bank.

CARBON BRUSHES

The Partridge carbon brush has been made the standard for the surface motors. The greater requirements of the elevated service, however, led to an elaborate series of carbon brushes tests which extended over the period from March 27, 1908, to Jan. 1, 1909, and resulted in the selection of the Le Carbone brush. In view of the results indicated in the accompanying table, two grades of this brush were adopted—grade "E" for the West, 300 interpole motors and West. 50 motors with slotted commutators, and grade "G" for the West. 50 motors with non-slotted commutators. The slotting of commutators on the West. 50 motors, however, is being carried on at the present time, and as soon as this work is completed the grade "E" Le Carbone brush will be standard for all elevated motors. While the grade "E" brush costs more than others per possible 1,000 miles, it proved far superior with regard to the proportion of chipped, broken and wornout brushes. Thus 59 per cent of the 51 brushes installed on the interpole motors were in good condition after eight months' service, when six other types had dropped out entirely. The average mileage of the discarded "E" brushes was 15,872, which was in excess of all others. The possible mileage of the perfect brushes was 159,600. This comparison indicates that the policy in brush selection was not to secure the lowest cost per 1000 miles, but to find a brush which would reduce to a minimum the costly flash-over troubles which result from broken or chipped brushes. Perhaps the most interesting feature of the table is the much lower wear of the same grade brushes when used on the interpole motors. These differences in wear throughout afford a splendid tribute to the value of the commutative feature of the No. 300 motor.

DATA ON TESTS OF CARBON BRUSHES OF ELEVATED RAILWAY MOTORS, MARCH 27, 1908, TO JAN. 1. 1909

Brush.	Brushes installed.	Brushes chipped.	Brushes broken.	Brushes worn out.	Brushes good.	% brushes good to those installed.	Aver. mileage of brushes chipped.	Aver. mileage of brushes broken.	Aver. mileage of brushes worn out.	Aver. mileage of brushes good.	Aver. wear of brushes, in. per 1000 miles.	Av. mil. for all brushes.	Aver. mileage for brushes chipped, broken and worn out.	Cost per 100 brushes.	Cost per 1000 miles for chipped, broken and worn.	Possible mil. per brush based on wear per 1000 miles.	Cost per 1000 miles for possible mil.
Westinghouse No. 300 Interpole Motor:																	
A	122	33	67	2	20	16.4	12,842	14,000	18,532	19,385	.008203	14,644	13,714	$7.43	$0.00541	121,800	$0.000611
A B E	51	6	15	0	30	59	12,532	17,208	....	20,643	.00626	18,678	15,872	22.00	.01386	159,600	.001380
A C	28	8	16	0	4	14.3	3,970	5,418	....	11,411	.01165	5,860	4,935	10.60	.02148	85,800	.001235
B	48	45	3	0	0	..	4,585	7,883	....	....	*.004104	4,791	4,791	9.90	.02066	243,600	.000406
C	3	6	2	0	0	..	7,412	7,412	....	....	....	7,412	7,412	4.05	.00546	....	....
D	27	18	9	0	0	..	4,812	3,144	....	....	....	4,256	4,256	4.05	.00951	....	....
E	57	39	17	1	0	..	9,580	10,467	6,222	....	*.00650	9,786	9,786	4.05	.00414	153,800	.000263
F	48	30	16	2	0	..	7,694	9,984	5,788	....	*.00991	8,378	8,378	4.05	.00482	100,900	.000401
G	26	17	9	0	0	..	7,798	10,462	....	....	*.00946	8,720	8,720	4.05	.00463	105,700	.000383
Westinghouse No. 50-E Motor, Non-Slotted:																	
A C	112	4	2	76	30	26.8	10.645	10,417	14,630	16,143	.0423	14,817	14,333	13.40	.00935	23,600	.00568
H	12	6	1	2	3	25	10,754	7,715	12,666	13,296	.0524	11,455	10,841	13.61	.01255	19,100	.00714
I	8	2	4	1	1	12.5	15,131	10,807	15,029	15,805	.0445	13,040	12,645	4.54	.00359	22,500	.00202
Westinghouse No. 50-E Motor, Slotted:																	
A C	11	0	0	4	7	63.6	....	....	13,086	9,171	.05354	10,594	13,086	13.40	.01024	18,700	.00717
H	18	3	1	4	10	55.5	5,722	8,035	10,977	12,532	.0506	10,801	8,639	13.61	.0158	19,780	.00689
I	11	5	4	0	2	18.2	5,812	6,996	....	7,204	.0338	6,495	6,338	4.54	.00718	29,600	.00154
J	34	10	0	7	17	50	8,667	....	10,869	8,959	.0488	9,266	9,574	4.54	.00475	20,500	.00222
Westinghouse No. 50-L Motor, Slotted:																	
A C	13	5	3	4	1	7.7	3,945	2,384	8,707	8,707	.06139	5,416	5,142	12.90	.02314	16,300	.00792
H	11	7	2	1	1	9.1	3,909	7,197	10,248	10,248	.0427	5,659	5,200	16.36	.0315	23,400	.0070
I	5	2	3	0	0	..	4,075	6,545	....	....	†.0388	5,557	5,557	7.29	.0131	25,800	.00282
														5.36	.0106	....	.00208
J	18	3	1	12	2	11.1	3,119	1,604	8,335	9,451	.0588	7,216	6,936	7.29	.0105	17,000	.00428
Westinghouse No. 50-L Motor, Non-Slotted:																	
A C	10	8	0	2	0	..	2,318	....	1,884	....	†.1407	2,231	2,231	12.90	.0578	7,107	.018
H	18	9	2	1	6	33.3	2,375	1,679	2,932	7,497	.03265	4,036	2,305	16.36	.071	30,600	.00535
I	12	9	1	0	2	16.7	2,904	5,354	....	7,497	.0439	3,874	3,149	7.29	.0232	22,800	.00319
														5.36	.0170	....	.00235

Notes.—"Number of brushes installed" includes only brushes of which record is complete.
*Taken from report of Oct. 5, 1908.
†Taken from report of Nov. 14, 1908.

ARMATURE SHAFTS AND MATERIAL

It will be unnecessary to refer to any but the surface armature shafts in the following account, as the elevated shafts were standardized at the Thirty-ninth Street shops between the years 1904 and 1906. Before the work of standardization was begun there was no uniform practice in the size of armature bearings and the permissible wear of armature shafts. All bearings are now made only at the Fifty-second Street shops, in accordance with the fixed standards given in the accompanying table. No shaft is allowed to stay in the same motor after its wear exceeds 1/64 in. All non-standard shafts and those with bad keyways have been entirely eliminated.

The wornout armature shafts are not scrapped, but are

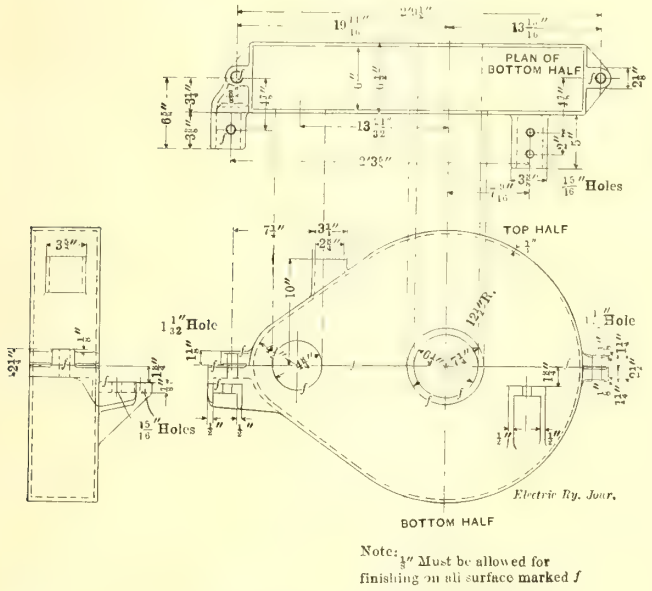
re-turned to the proper diameters for other motors in accordance with the following conversion list:

Motor	Armature Shafts Turned from Same
West. 300	GE64, West. 93 and 93A, West. 81, West. 68, West. 101, West 101B, GE80.
West. 50 E and L.	Walker L-15, West. 81, West. 68, GE64, West. 93 and 93A, West. 101, GE80.
Walker L-15	West. 68.
West. 93 and 93A.	West. 68, West. 81, Wes. 101.
West. 81	West. 68.
GE64	West. 68.
West. 101B	West. 68.
West. 68	Compressor armature } Occasionally.
GB80	Compressor armature }

The saving introduced by this practice is very considerable, as will be noted from the following comparison: Cost of new No. 93-A armature shaft is $7.50 for material and $3.50 for labor, while the cost of cutting down a No. 50 E armature shaft for a No. 93-A motor is only $1 for material and $4 for labor, a saving of $6.

As the armatures go into the shop from time to time, the round tapered keyways are changed to square-bottomed keyways. This alteration is being made because it was found that when a pinion was being pressed on the round key moved away from its seat, thereby tending to wear out the keyway and loosen the pinion. The use of the better holding square key has avoided this trouble without weakening the shafts appreciably.

An advance in armature material has been made by winding railway and compressor armatures with an asbestos insulated fireproof magnet wire. This wire is particularly suited for overload conditions, and the insulation is not too thick to prevent securing the right number of turns in railway motors.



Note: ⅛" Must be allowed for finishing on all surface marked *f*

Fig. 1—Brooklyn Power Equipment—Malleable Iron Gear Case for Westinghouse 68 Motor

The elevated armatures wound with ribbon or bar copper have the coils made up with mica insulation in place of the usual oil linen. This involves greater first cost, but pays through the material reduction of maintenance troubles All newly wound armatures, elevated or surface, are given an insulation breakdown test of 2000 volts a.c., and all repaired armatures a breakdown test of 1000 volts a.c.

After testing 10 armature varnishes, the company adopted "Ajax" black baking varnish for dipping armature, field and magnet coils. The tests were made at the Fifty-second Street shops, and were of both mechanical and electrical nature. Pieces of cloth were dipped in the different varnishes and then baked at a temperature of 190 deg. Fahr. for 12 hours, 24 hours, 62 hours and 300 hours. The pieces baked 300 hours were given two dippings before baking and were the specimens chiefly considered in judging the merits of the varnishes. The trials showed that the varnishes could be divided electrically into four classes,

STANDARD ARMATURE SHAFT AND BEARING SIZES

Type motor.	Diameter shaft and bearing, pinion end.	Diameter shaft and bearing, commutator end.
West., 50-B	4¼ in.	3¾ in.
West., 50-E	4½ in.	3¼ in.
West., 50-L	4½ in.	3¾ in.
West., 68	3⅞ in.	2¾ in.
West., 81	3½ in.	3 3/16 in.
West., 93-A2	3¾ in.	3½ in.
West., 101-B	3¼ in.	3¼ in.
West., 300	4¾ in.	4 in.
G. E., 64	3½ in.	3⅛ in.
G. E., 80	3¼ in.	2¾ in.
G. E., 800	2½ in.	2½ in.
Walker, 15-L	3¼ in.	3 in.

as follows: Insulation value up to 6000 volts (the highest a.c. potential available in the shops); breakdown potential between 5000 volts and 6000 volts; breakdown potential between 3000 volts and 4000 volts; breakdown potential of 3000 volts or less. One of the interesting results shown by the test was that the best electrical varnish was also superior mechanically. After being baked for 300 hours at 190 deg. Fahr., it was still pliable, elastic, non-cracking and non-scaling when the cloth was creased or torn. The tests made on four air-drying varnishes resulted in the selection of the same maker's "Ajax" black air-drying compound. This is used at the inspection and maintenance shops for

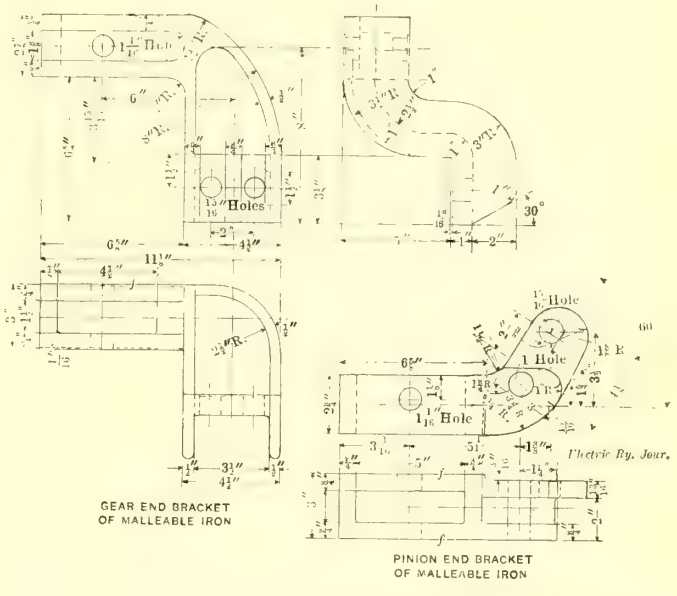


Fig. 2—Brooklyn Power Equipment—Gear Case Brackets for Westinghouse 68 Motor

touching up and painting armatures, fields and control apparatus insulation.

MOTOR BEARING FITS

The motor shells of West. 68 motors are being bored out to secure larger axle and armature bearing fits, as the old fits had worn to such an extent that it was impossible to keep the bearings tight except temporarily with shims. The old axle bearings had an outside diameter of 5¾ in. and the new ones will be 6 in. Similarly the armature bearing diameter has been increased from 4¾ in. to 5 in.

GEAR CASES

Malleable-iron gear cases made by the company are standard throughout. One interesting feature in this connection is the adaptation of the West. 101-B gear case for West. 68 motors by using some special brackets and enlarging the gear and pinion bores. The details of this practice are shown in three accompanying drawings of the standard West. 68 case, the combination case and the special brackets, Figs. 1, 2 and 3.

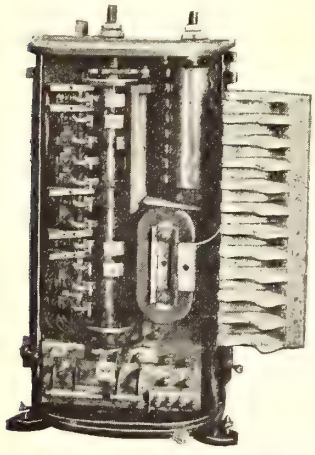


Fig. 4—Improved Controller

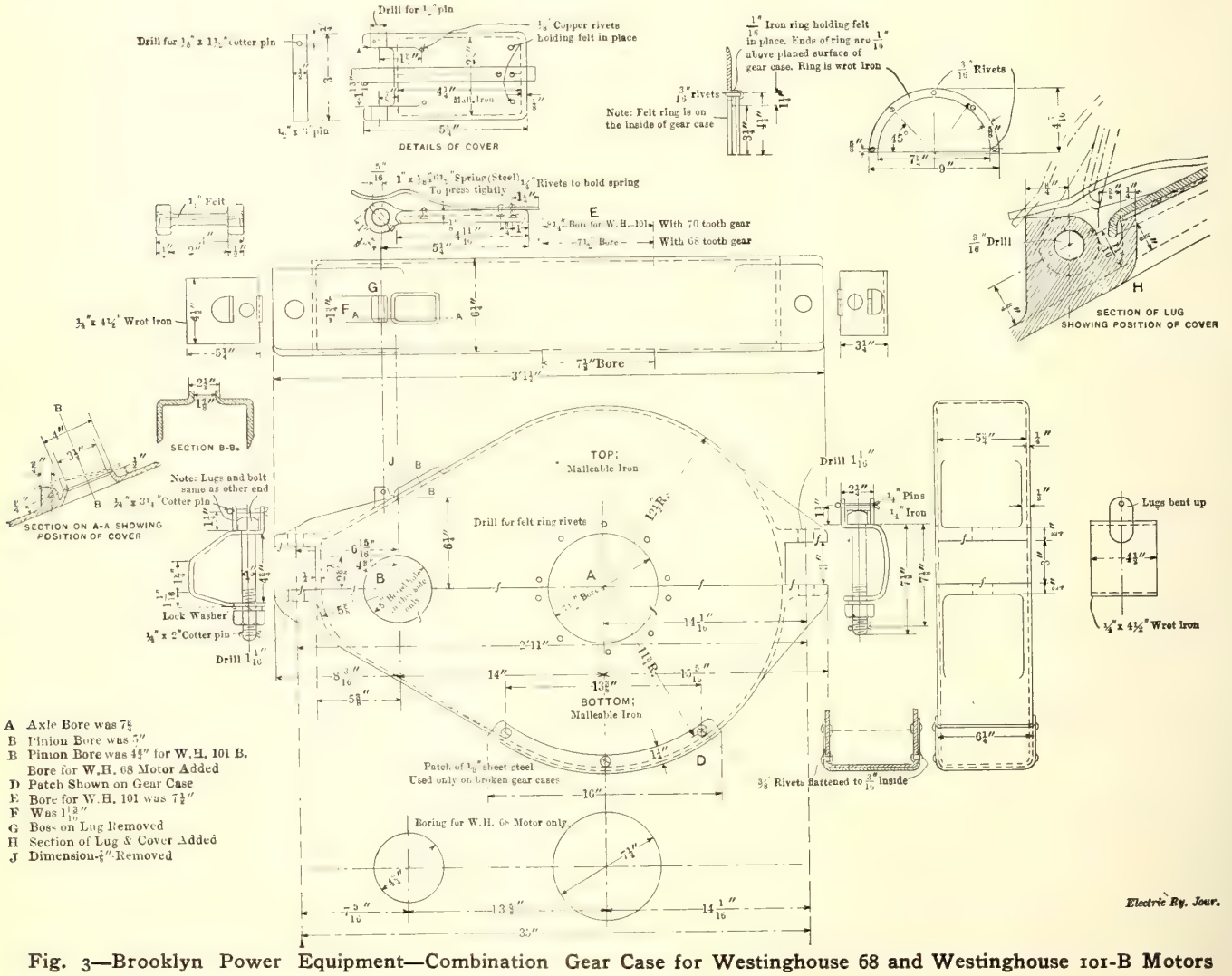
CONTROLLER IMPROVEMENTS

Controller service in Brooklyn is severe, as the operating conditions require a good deal of running on resistance points when traversing the bridges and in the lower parts of the city. Improvements in the insulation and other features of the controllers were begun, therefore, as early as 1904. In all the K-11 controllers the 1/16-in. fiber separator between the reverse cylinder and main drum was replaced by ½-in. vulcabeston. The same material was also used for additional insulating partitions between controller fingers, as follows: Trolley and R; R 4 and R 5; 19 and 15; 15 and E. The use of the extra insulating pieces, which are shown applied in Fig. 4, made it necessary to change the shape of the arc deflector plates so that the controller could be closed.

The K-11 controller has been furnished with a new style terminal, the screw of which is inserted perpendicularly on the wire ends. In the original design the screw was placed at an angle, thus cutting the strands of the wire. The old No. 6 wire has been replaced by No. 4 wire. Early this year the company began to remove the switch blade of the No. 2 motor cut-out switch connecting to wire F 2 from the reverser, because considerable trouble had been experienced from the burning of the switch contacts and terminal. The No. 2 motor is now directly connected to the F 2 wire.

TROLLEY STANDS

There are still several types of trolley stands in service, but it will be noted from what follows that the tendency is to adapt the Nuttall No. 11 ball-bearing base as the standard for closed cars. The open cars are supplied chiefly with Nuttall No. 1 stands and the freight cars with Malloy stands. The standard surface line trolley-base tension with the pole at an angle of 45 deg. is 18 lb. On the elevated lines the Nuttall No. 6 stand is used at a tension of 24 lb. with the pole at 45 deg.



A Axle Bore was 7⅛
B Pinion Bore was 5"
B Pinion Bore was 4⅛" for W.H. 101 B. Bore for W.H. 68 Motor Added
D Patch Shown on Gear Case
E Bore for W.H. 101 was 7½"
F Was 1 3/16"
G Boss on Lug Removed
H Section of Lug & Cover Added
J Dimension-⅝"-Removed

Fig. 3—Brooklyn Power Equipment—Combination Gear Case for Westinghouse 68 and Westinghouse 101-B Motors

The changes in surface trolley bases were made as follows:

During 1906 the company installed 150 Sterling-Meaker roller-bearing trolley stands on 150 new convertible cars. In 1907 602 No. 11 ball-bearing stands were installed, 200 on 100 new convertible cars (two per car) and 402 on 201

old convertible cars, replacing 201 6-in. Nuttall No. 1 spindle stands. These 6-in. stands in turn were substituted on closed cars for 3-in. stands which were scrapped. In 1907 150 No. 11 ball-bearing stands were purchased for 75 convertible cars to replace roller-bearing stands which were added on 75 other convertible cars having then only one stand each. In other words, this last lot of cars was

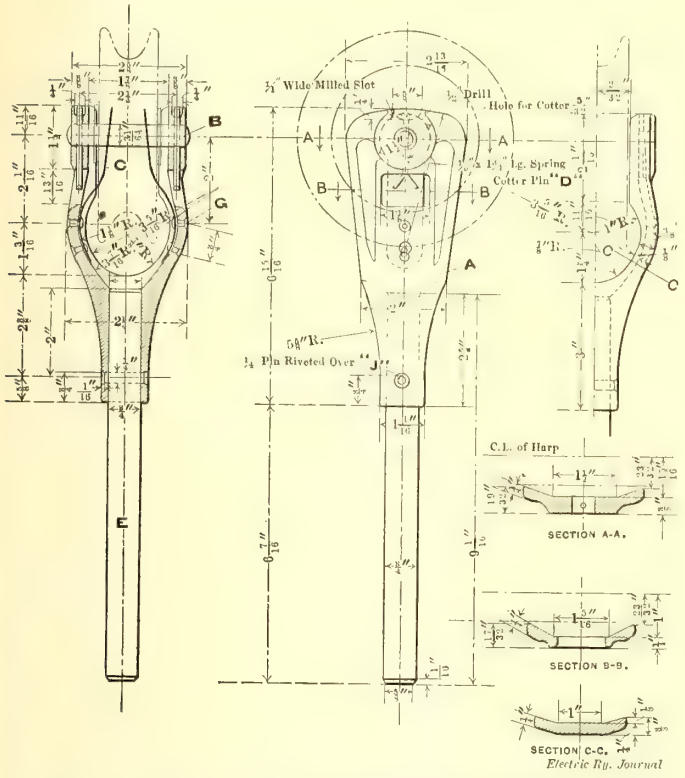


Fig. 5—Brooklyn Power Equipment—Standard Trolley Harp, Surface Division

equipped for double pole operation. One hundred No. 11 ball-bearing stands were placed on 100 new semi-convertible cars and 267 were bought for semi-convertible cars, to displace No. 1, 3-in. spindle stands. During 1906 and 1907 the company overhauled and placed new bushings on 1275 No. 1, 6-in. spindle stands and discarded 728 No. 1, 3-in. spindle stands in all.

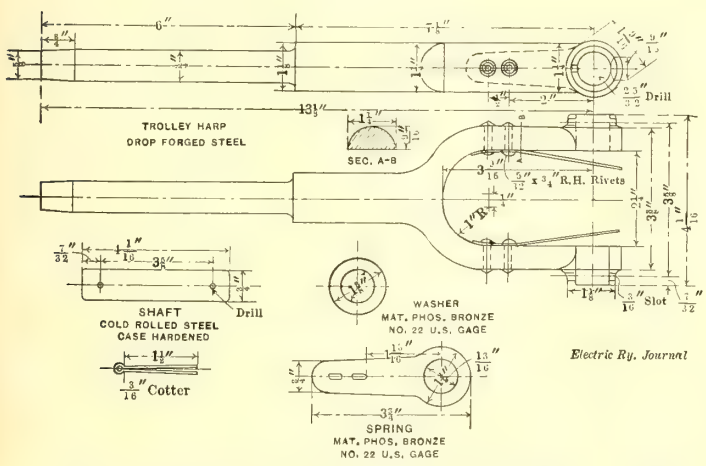


Fig. 6—Brooklyn Power Equipment—Standard Trolley Harp for the Elevated Service

TROLLEY HARPS, WHEELS AND SHOES

The company is now making its own trolley harps for both the surface and elevated lines, in accordance with the construction details shown in Figs. 5 and 6. The new surface harp can take either a 4½-in. or 5-in. diameter wheel. The special variations from the older design are the widening of the top to reduce the wear of the wheel on the contact shunts and the dishing of the harp as shown in section *aa* of Fig. 5. This dishing brings the harp so close to the wheel that there is little danger of the trolley wire cutting in between the wheel and the harp. The elevated harp was altered by extending the hub and placing longitudinally the cotter hole, which was formerly transverse to the prong of the harp. The latter change prevents the burning of the cotter pin when the trolley harp and wheel are being replaced on the wire.

The trolley wheel question is still a very active one, as may be judged from the fact that during 1908 some 20 dif-

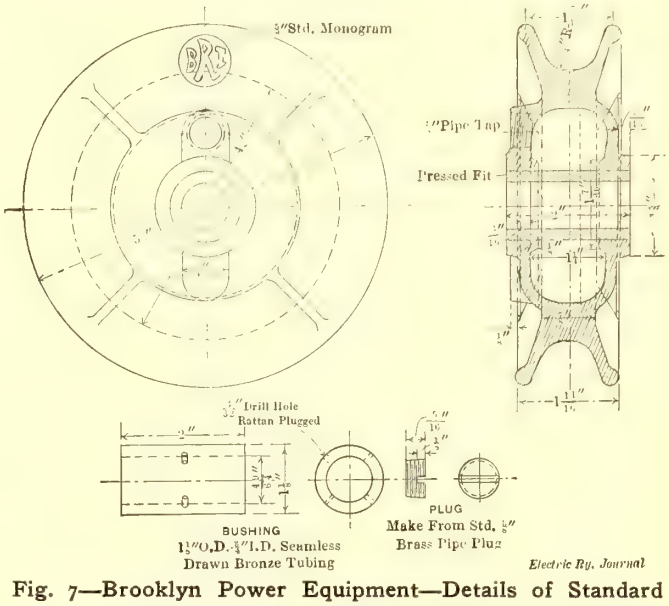


Fig. 7—Brooklyn Power Equipment—Details of Standard Trolley Wheel for Elevated Service

ferent kinds of wheel were under test. The accompanying curve sheet, Fig. 7, shows the considerable variations in cost per 1000 car-miles of steel and composition wheels. The latest wheel adopted is 4½ in. in diameter and weighs 1¾ lb. It has been in service only a few months, so that it is not yet possible to state whether it is likely to become the standard.

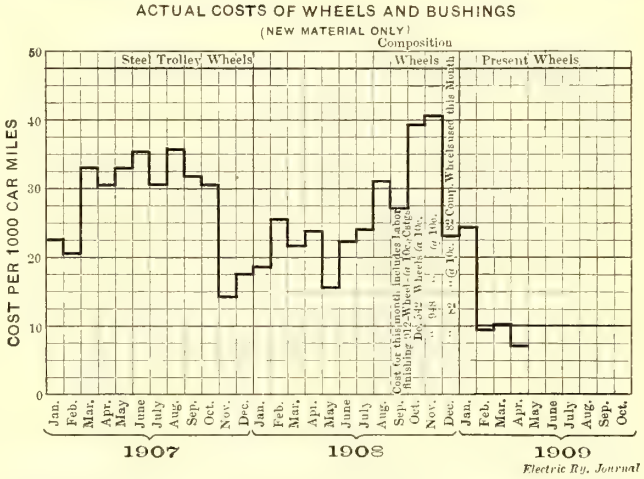


Fig. 8—Brooklyn Power Equipment—Passenger Surface Trolley Wheel Costs on Mileage Basis

A feature of the elevated trolley wheel, which is shown in Fig. 8, is the oil well with bronze bushings and rattan oil feeders. This wheel is 5⅞ in. in diameter, weighs about 5 lb. and is made of 88.4 per cent copper, 5.5 per cent tin, 2.8 per cent lead, 3.3 per cent zinc, with maximum

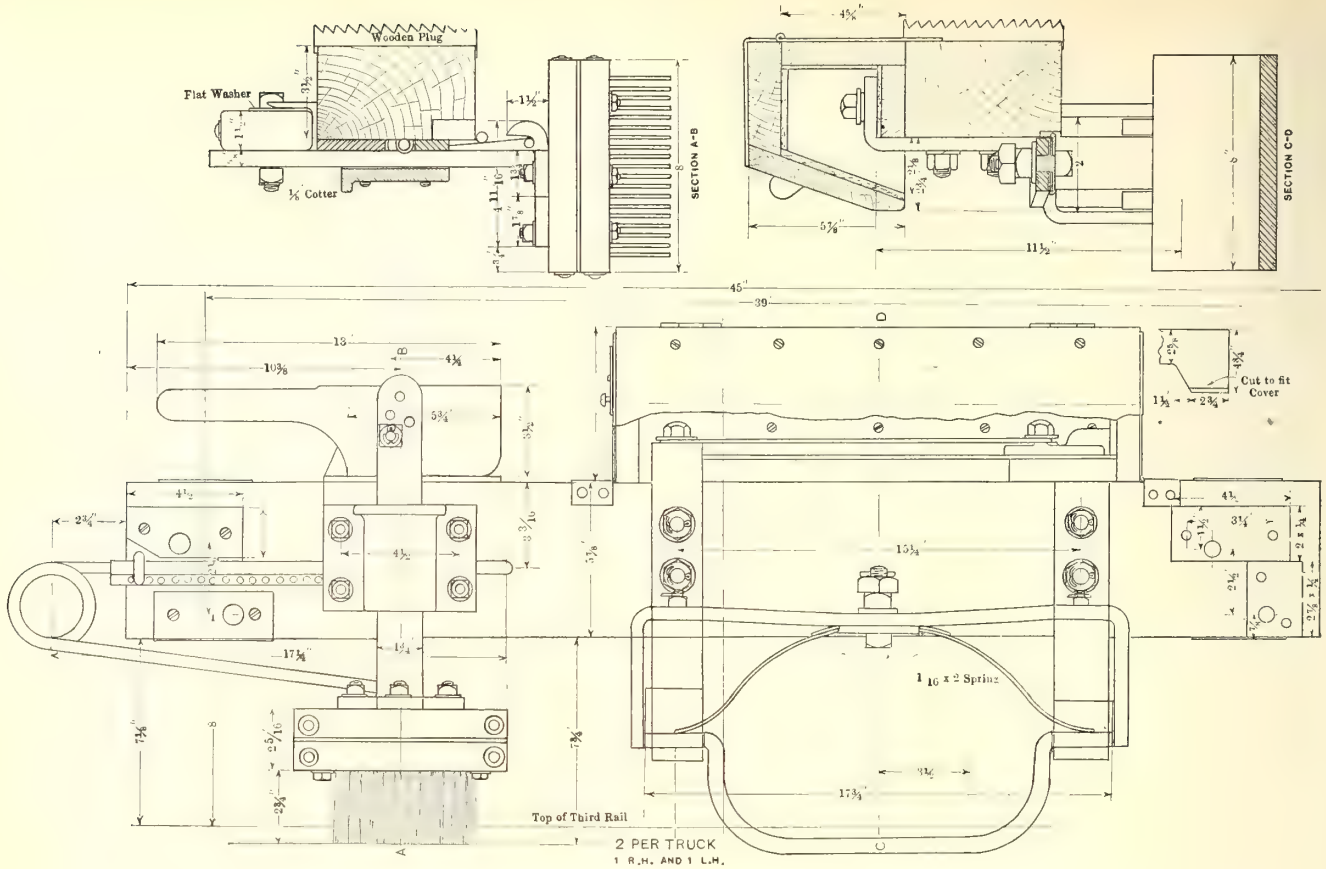


Fig. 9—Brooklyn Power Equipment—Sleet Brush and Third-Rail Shoe

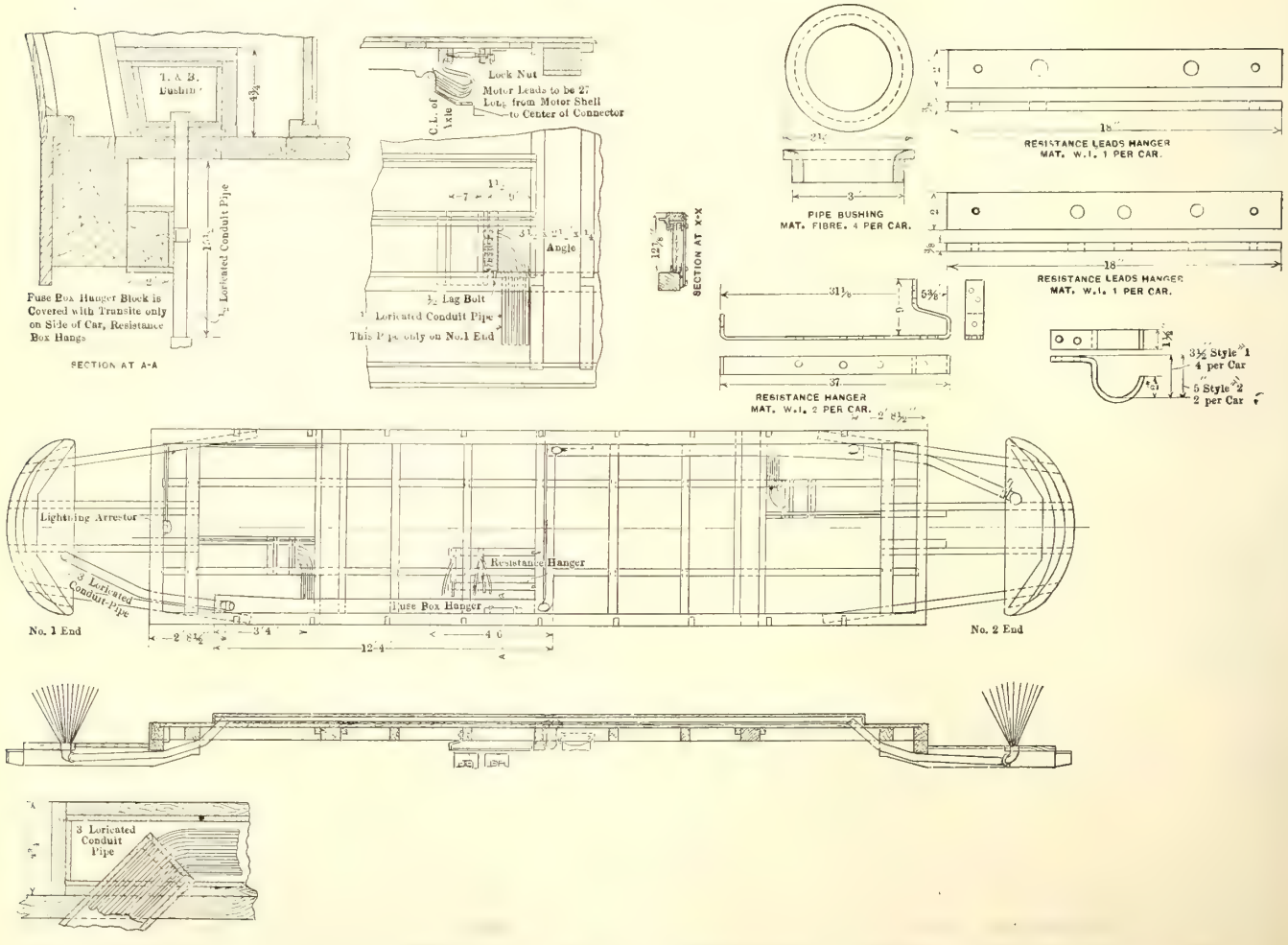


Fig. 10—Brooklyn Power Equipment—Control Wiring of Semi-Convertible Surface Passenger Cars, 1907 Type

impurities of 3.3 per cent. Its average mileage is 1500 and its cost per 1000 car-miles is 54 cents to 55 cents. This cost is based on a net price of 82 cents per wheel, as there is 50 cents scrap value in wheels which cost $1.32 when new.

The standard contact shoe for elevated service has lately been redesigned, as per Fig. 9, to eliminate all links and castings. The shoe is manufactured simply of wrought iron forged in the company's shops. It is designed for a maximum height variation of 2½ in. The former shoe consisted of castings which were continually breaking. It was a link-suspended shoe with copper shunts, but in the new type enough contact is secured through the flat spring and the shoe pressure, without using shunts. Fig. 9 also shows the sleet brush. This is made of No. 23 B & S gage wire, which is renewed practically every season.

SUSPENSION OF APPARATUS, POWER WIRING AND FUSES

Several improvements have been made in the method of carrying power equipment and circuits from the underside of the surface cars, the latest cars being wired as shown in Fig. 10. The iron hangers, which replaced those of wood, are bent to overlap the tops of the car sills so that the strain will be taken off the bolts. In some cases, however, the only way of carrying the hangers is to bolt them to the side of the sills. By changing from wooden to iron hangers, all trouble from decayed wood is eliminated and a material reduction is attained in the amount of combustible material under the car floor. These metal hangers are coated with a black anti-corrosive paint, which avoids the danger of rust. Strap iron of different thickness is used for all material except the resistance hangers, which are of angle iron. There is no excessive leverage of the resistances, as only enough room to reach the wiring readily has been left between them and the car underside. In fact, all the apparatus is hung as close to the car body as practicable. Johns-Manville vulcabeston insulated bolts are used for insulating the electrical apparatus and resistances from the hangers.

Loricated conduit in place of canvas hose for the surface power wiring was first applied on a large scale in the class 2500 semi-convertible built in 1907. Fig. 10 also shows the layout of these conduits. These are 3 in. diameter for the control cables to the platforms and across the middle of the car and ½ in. diameter from that part of the cables carried in transite-lined boxes under the longitudinal seating of the cars. The resistance leads are also carried in loricated conduit.

Another important betterment was the substitution of the old wood motor lead junction boxes by Westinghouse standard knuckle-joint connectors. The original wood junction boxes required 16 set screws for their connections, and their frequent loosening resulted in troublesome if not dangerous arcing. The knuckle joints are covered with a piece of circular loom for insulation. The motor and car body ends of the leads are supported by two cleats attached to the car body. About 2½ in. beyond the second cleat and 2 in. below the under side the loricated conduits pass through 3½-in. x 2¼-in. x ¼-in. angles, where each conduit is held by a lock nut. To disconnect the motor circuits when a truck is taken off, the cleat supporting the motor end of the leads is removed, the circular loom slid back and the knuckle-joint connectors separated. To insure ample flexibility, the leads are 27 in. long between the motor shells and connectors.

Figs 11 and 12 show respectively the latest elevated wiring and equipment practice as adopted on a car having two

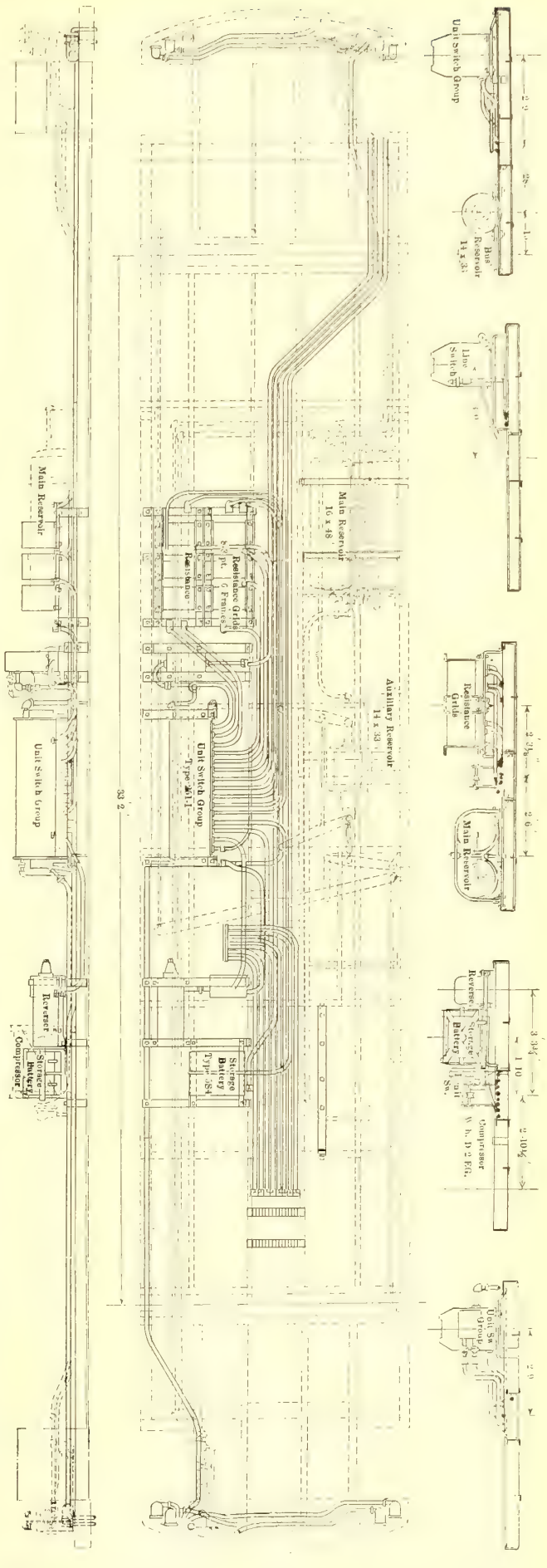
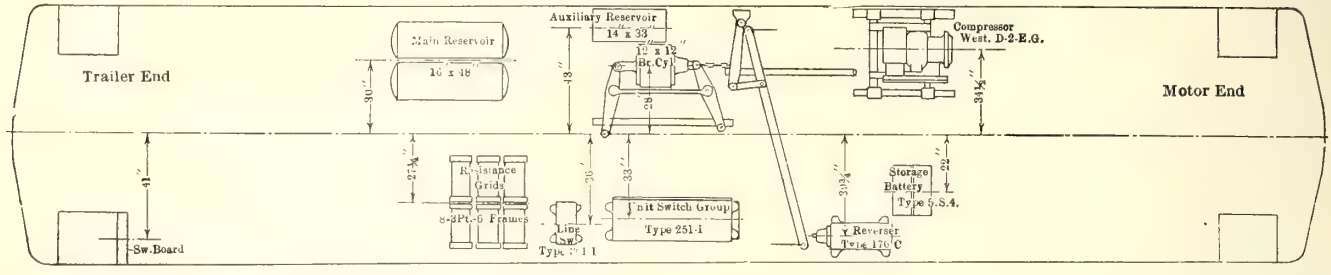


Fig. 11—Brooklyn Power Equipment—Conduit, Control and Brake Apparatus on Elevated Car

Westinghouse 300 interpole motors and 251-I-3 unit switch group control. Fig. 11 shows the general plan and floor sections taken at the unit switch group resistance guide, line switch and compressor. The underside of this car is protected by ¼ in. transite. The problem of balancing the under-car equipment has been very successfully handled in the case of the car shown in Fig. 12. It will be noted that the difference in weight between the air-brake and

EQUIPPING NEW CARS

All car bodies, trucks and motor equipments purchased by the Brooklyn Rapid Transit Company are delivered separately to the Thirty-ninth Street shops to be assembled and equipped for service. This work is done under the several maintenance foremen, who have charge of the additional men engaged for the occasion. Thus about 200 men were hired specifically to equip 100 elevated motor



Air Brake Side				Unit Switch Control Side			
Apparatus	Weight in Pounds	Distance From Ctr. Line	Moment Inch-Pounds	Apparatus	Weight in Pounds	Distance From Ctr. Line	Moment, Inch-Pounds
Compressor and Cage	1,070	34½″	36,915	Unit Switch Group	802	33″	26,446
Cylinder and Supports	479	28″	13,412	Line Switch	169	36″	6,084
Cylinder Levers	85	14″	1,190	Resistance Grids	636	27¼″	17,330
Push Bar	15	18″	270	Reverse	189	39¾″	7,513
Multiplying Lever Support	35	25″	875	Storage Battery and Cage	149	22″	7,678
Multiplying Lever, with Bracket, Links and Chain	54	30″	1,620	Switch Board	80	41″	3,280
Cylinder Lever Supports	35	9″	315				68,331
Main Reservoirs	283	30″	8,490				
Auxiliary Reservoir	69	43″	2,967				
			66,054				

68,331 lbs.
66,054 "
2,277 lbs.

30″ 2,277 lbs.

75.90 lbs. at Side Bearings

Fig. 12—Brooklyn Power Equipment—Balancing of Brake and Control Equipment on Elevated Car

unit switch control sides is only 2277 lb. This makes the pressure against the side bearings not more than 76 lb.

The protection of electrical equipment on the surface cars has been bettered and standardized by replacing the open fuses by Noark enclosed fuses on all cars and circuit-breakers in addition on all but the smallest cars. All fuses are carried in iron boxes. The several types of rolling stock are equipped as follows: Single-truck cars with K-11 controllers, 150-amp fuse; double-truck, two-motor cars with K-11 controllers, 200-amp fuse and circuit-breakers; double-truck, two-motor cars with K-28 controllers, 250-amp fuse and circuit-breakers; double-truck, four-motor cars with K-28 controllers, two 300-amp fuses and circuit-breakers. Contact shoe fuses only are installed on the elevated cars. This shoe fuse consists of two strands of No. 8 soft drawn, bare copper wire 13 in. between terminals, and it is carried in a box of asbestos wood.

cars of the 1400 type, but the mill, blacksmith and machine-shop labor was handled by the regular forces. The job was started Sept. 20, 1907, and ended June 30, 1908.

As shown in the accompanying table, it is the custom to record the progress of every car included on a given order from the day erection of the car began in the builder's shops until it was delivered to the operating department. Fifty of these cars were made by the Jewett Car Company, and the balance by the Laconia Car Company.

Car No.	Builder	Erection Begun	Bottom Frame Erect'd	Side and End Frame Erect'd	Flooring in Place	Roof Canvas in Place	Wiring Begun	Outside Painting Begun	Outside Paint'g & Varnishing Comp'd	Brake Rigging Completed	Inside Trimmings Completed	Wiring Completed	Ready to Ship	Shipped	Rec'v'd at 39th Street Shop	Del'v'd to Operating Department	Car No.
1400	THE JEWETT CAR COMPANY.	7-1	6-19	7-3	6-25	7-25	7-15	7-13	8-24	8-26	9-3	7-19	9-5	9-11	9-20	2-11	1400
1401		6-27	6-20	6-29	7-1	7-23	7-13	7-10	8-23	8-31	"	7-16	"	"	"	2-9	1401
1402		7-1	7-5	7-11	7-8	7-29	7-27	7-22	8-28	"	9-5	7-29	"	"	"	2-12	1402
1403		7-2	7-6	7-9	"	7-27	7-26	7-18	8-27	"	"	7-27	"	"	"	2-13	1403
1404		7-5	7-1	7-8	7-3	7-26	7-23	7-15	8-26	"	"	7-25	"	"	"	"	1404
1405		7-7	7-8	7-16	7-9	7-31	8-1	7-24	9-9	9-12	7-13	8-1	9-16	9-21	9-30	2-5	1405
1406		7-8	7-9	7-13	7-10	7-30	7-31	7-22	9-12	"	"	7-31	"	"	"	1-31	1406
1407		"	7-10	7-19	7-11	8-2	8-3	7-29	9-11	"	"	8-5	"	"	"	E 2-3	1407
1408		7-9	7-11	7-20	7-12	8-1	8-2	"	9-7	"	"	8-3	"	"	"	2-7	1408
1409		7-10	"	7-22	7-13	8-5	8-6	7-31	9-10	"	9-14	8-7	"	"	"	2-5	1409
1410		"	"	7-24	7-15	8-7	8-8	8-1	9-16	9-19	9-25	8-9	9-25	9-26	10-3	1-31	1410
1411		7-11	7-12	7-29	7-16	8-13	"	8-2	9-14	"	"	8-10	"	"	"	1-29	1411
1412		7-12	7-17	7-30	7-19	8-14	8-10	8-8	9-17	"	"	8-16	"	"	"	"	1412
1413		7-13	7-18	7-31	7-20	"	8-16	8-10	9-18	"	"	8-17	"	"	"	"	1413
1414		"	"	8-1	"	8-15	8-17	8-8	9-19	"	"	8-19	"	"	"	6-8	1414
1415		7-16	7-20	8-3	7-22	8-16	8-20	8-9	9-24	9-26	10-2	8-21	10-2	10-5	10-12	5-25	1415
1416		"	7-25	8-8	7-27	8-18	8-22	8-17	9-25	"	"	8-23	"	"	"	4-4	1416
1417		7-17	7-26	"	7-29	8-20	8-21	8-15	9-26	"	"	8-22	"	"	"	4-7	1417
1418		"	7-22	8-9	7-24	8-23	8-22	"	9-27	"	"	8-24	"	"	"	6-5	1418
1419		"	"	8-10	7-23	8-26	8-24	8-17	9-28	"	"	8-26	"	"	"	"	1419
1420		"	7-23	8-15	7-25	8-30	8-31	8-24	10-5	10-8	10-9	9-3	10-10	10-12	10-22	6-8	1420
1421		7-20	7-27	8-17	7-30	8-28	8-26	8-23	10-1	"	"	8-28	"	"	"	4-18	1421
1422		7-22	"	"	"	8-29	8-28	"	10-5	"	"	8-30	"	"	"	4-22	1422
1423		7-23	7-29	8-19	7-31	9-3	9-4	8-24	10-7	"	10-10	9-5	"	"	"	4-18	1423
1424		7-24	"	8-24	"	9-6	9-7	9-1	10-8	"	"	9-9	"	"	"	3-23	1424
1425		7-27	8-10	"	8-14	9-5	9-5	8-29	10-10	10-15	10-18	9-6	10-18	10-21	10-31	3-28	1425

Part of Progress Sheet of 100 1907-Type Elevated Passenger Cars

The new cars are equipped in accordance with standard blueprints prepared in advance by the drafting room of the mechanical department, and no variations are permitted. The drawings call for the exact amounts of non-contract material which is to be furnished by the storeroom. Consequently, the construction gangs find the exact amounts of conduits, hangers, etc., ready for them in every case, thereby avoiding waste and numberless requisitions.

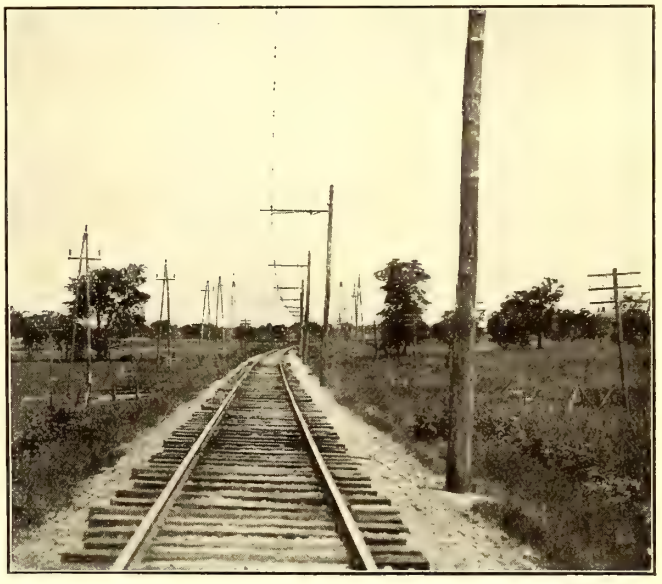
NOTES ON SINGLE-PHASE OPERATION ON THE ERIE RAILROAD

The Erie Railroad placed in operation on June 18, 1907, a 34-mile, single-track, alternating-current line between Mt. Morris and Rochester, N. Y. This was the first single-phase line operated over a steam railroad in the United States, slightly antedating the electrification of the New York, New Haven & Hartford Railroad, although the latter began conversion first. Current for the operation of this Erie division is received from a Niagara Falls 60,000-volt transmission line and transformed to the trolley potential of 11,000 volts at the Avon station, about midway on the line. The motor equipments are operated at 256 volts, single-phase throughout, because the line is on right-of-way and runs only to the outskirts of Rochester, so that there was no necessity for using a combination a.c.-d.c. motor.

On the Rochester-Avon section there are now operated 14 electric and 9 steam trains, and on the Avon-Mt. Morris section 19 electric and 2 steam trains. On the Mt. Morris branch there were formerly 6 steam trains, which have been taken off. On the Rochester-Avon section the steam trains are about the same as they were



Erie Single-Phase Line—Deflector and Bracket Construction



Erie Single-Phase Line—View of Trolley and High-Tension Transmission Poles

before electric operation went into effect. The electric service takes care of a through mail car from Buffalo to Mt. Morris from Avon, and also handles a milk car from Mt. Morris to Rochester and return each day. Since electrification the passenger travel, as based on local ticket sales, has increased 40 to 50 per cent.

For dispatching purposes the rolling stock operated over this section is divided as follows: First class, electric passenger; second class, steam passenger; third class, fast steam freight; fourth class, local steam freight. The electric service is usually operated with trains consisting of one motor car and one trailer, and on special occasions with trains of two motor cars and two trailers, using the Westinghouse multiple-unit system. The average daily run of such trains is about 160 miles. The motor cars weigh 48 tons and the trailers 27 to 28 tons. Including all flag stations, there are 32 possible stops in 34 miles, but only seven scheduled stops. The motor equipments are geared for a maximum speed of 55 m.p.h. and an acceleration of 1.55 m.p.h.p.s. The schedule time for the distance is 80 minutes.

LINE DELAYS

The number of delays from failures in line or car equipment has been very small, and even during the earlier periods of operation there were not more than four or five failures a month. The best record made was during the month of October, 1908, when there was not a single delay from any cause whatsoever. It is noteworthy that the entire steam history of this division fails to show a single perfect month. The causes for delay are rather interesting to mention, although further operating experience has obviated their repetition. So far as the overhead work is concerned, it was found that the frequent high winds in this district made it advisable to add steady strains at every third pole, or 360 ft. Previous to this there were several accidents from the swaying of the line in wind storms. At one time a pantograph broke by striking a cross-arm, and on a second occasion the line was grounded through the breaking of a cross-arm. A third delay was caused by the breaking of a tie-wire on an insulator, thereby allowing the messenger to fall on the cross-arm.

The composition insulators which were originally used for dead-ending wires were replaced by the engineers with porcelain spool insulators at the beginning of operation, as it was found that the earlier insulators were cracked by weathering which made them liable to short-circuits.

On Sept. 21, 1908, a pantograph became tangled up in a deflector and lost its shoe. Investigation showed that the accident was due to the distortion of the deflector. There have been no further accidents of this kind, as the deflectors are not permitted to become badly bent.

Interruptions from heavy snow and sleet storms have been few. The worst one was a 20-minute delay which occurred on Feb. 15, 1909, when so much snow and ice accumulated on the pantograph that it had to be cleaned by one of the crew to prevent it from losing contact. However, this was only necessary on the first run in the morning, as the succeeding cars found the wires less heavily coated. There were three other shorter delays during February from the same cause.

It may be of interest to note that the original copper shoes in the pantograph have been satisfactorily replaced

by steel. The copper shoes cost from $5 to $6, and ran about 10,000 miles. The steel shoes cost about $1.80 each, and give a life of 15,000 miles without burning or excessive sparking. The shoes are 48 in. long, with 5-in. face, and are held against the wire with a tension of 8 lb.

It is worth mentioning that there has been no line trouble whatever from corrosion by the blasts from steam locomotives. Current was formerly on for 15 hours only, but is now in use 24 hours. The first electric car starts at 6:40 a. m. and the last completes its trip at 12:40 a. m.

The telephone system, which is a complete metallic circuit, with an induction coil at each end, and which is transposed every third trolley pole, has proved entirely satisfactory. The overhead work, including the telephone line, is inspected daily by a single lineman. If necessary, in special cases a steam work train with roundhouse men can be secured from Avon.

CAR EQUIPMENT

The car equipment changes have been of very slight character, such as the substitution of cambric insulated cable by the engineers for the rubber-insulated cable originally installed for the high-tension circuits which was done at the beginning of operation. The only transformer breakdown was caused through the grounding of a high-tension coil which made current jump across to a low-tension coil in the auto-transformer. Due apparently to the high starting currents of 1600 to 1800 amp, the built-up mica and paper insulation of the auxiliary motor windings broke down several times. Excessive heat has sometimes resulted in the burning out of auxiliary windings of the field and has been held responsible even for hot axles. The normal running current is about 192 amp per motor at 256 volts. There has been no trouble from burned or flat commutators, and only one armature band has been torn off.

Some little difficulty was experienced with the original carbon brushes used with the motors, but the defect has since been corrected by replacing them with the No. 15 National brush. These brushes are ⅜-in. x 2¼-in. face, and are installed 12 to a motor at 4-lb. tension. This tension is somewhat light, but is very suitable for this line because of the excellent roadbed. The brushes average a life of over 10,000 miles. The brushes in the motor compressors were also replaced by the No. 6 Columbia type. The compressors are operated from the 123-volt tap of the auto-transformer. Nuttall cast-steel gears have been in successful use ever since the line was electrified. Only four have been broken, while others have been in continuous service for over 125,000 miles.

CAR INSPECTION AND OPERATING COSTS

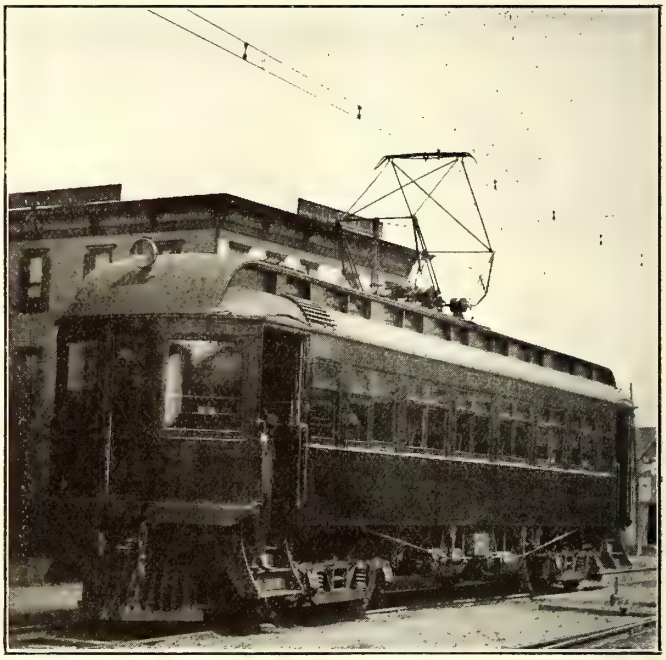
Of the six motor cars now used on the Rochester-Mt. Morris division, five are in service while the sixth car stays in the shops. The car control system is inspected about every three days, or 480 miles, while the motors are inspected every sixth day. The schedule is so arranged that the car to be inspected can end its run at Avon every third day, without obliging the passengers to transfer. The electrical inspection and repairing is done at Avon by two day men and one night man, who also look after the substation. The car cleaning, sweeping and occasional lubrication of motor and journal bearings are done at Rochester.

The total cost of operating the electrified division is 15.6 cents per car-mile and 21.8 cents per motor-mile. This covers maintenance of overhead line, the rolling stock, the substation and power. The right-of-way is maintained by the steam division. Not counting, therefore, the car crews and the track men, this 34-mile electric railway is maintained by three car inspectors, one line man and a general supervisor.

POWER SERVICE

As previously stated, the electric service of the Rochester-Mount Morris branch of the Erie Railroad depends for power on a hydro-electric transmission system from Niagara Falls. In the past some severe delays have resulted from interruptions in this transmission circuit. The worst one was experienced April 10, 11 and 12, of this year, when it was necessary to return to the steam service for two and one-half days on account of the Niagara Falls ice blockade. The transmission company's only reimbursement for most delays is to deduct a sum equivalent to the cost of the power which the railroad company would have purchased under average load conditions during the time that power was off the line. Twice the amount is deducted only in such cases where the power company interrupts the service of its own accord to clean intake pipes and inspect machinery or negligence in maintaining the line can be proved.

The contract with the transmission company calls for a minimum of 914 hp. The average peaks for one minute are



Erie Single-Phase Line—Motor Car at Avon

about 973 hp. In March of this year the railroad used 130,617 kw-hours at a load factor of 24.19 per cent. The cost of power delivered at Avon averages slightly over 1 cent per kw-hour, as appears from the following figures: December, 1908, $0.0103; January, 1909, $0.0106; February, 1909, $0.0119; March, 1909, $0.0107. The power company's invoice is based on daily load curves made by the station wattmeter at Avon.

The three-phase-two-phase connection of the transformers at Avon makes it possible to operate with one phase from Avon to Mount Morris and with the other phase from Avon to Rochester. It has been found that with one car starting up at the Rochester end of the line and no other cars on the same phase, the loss in the line is about 10 per cent for a distance of 20 miles.

MANAGEMENT

The Mt. Morris-Rochester electrified division was equipped by Westinghouse, Church, Kerr & Company, engineers, of New York. The line was finally turned over to the Erie Railroad about Sept. 1, 1907, and has since been operated under R. C. Thurston, electrical superintendent.

TRANSMITTING TRAIN ORDERS BY TELEPHONE

The practice of transmitting train orders by telephone was one of the most important points discussed at the recent conference called by the committee on interurban rules of the Transportation & Traffic Association, which was held at Washington, D. C., on May 25. The discussion developed wide difference of opinion as to procedure, and it was thought that interurban railway managers would be interested in the practice of such steam roads as had adopted telephone dispatching to replace the Morse telegraph. Letters were addressed by the editor of this paper to the officers of six steam railway companies which are using the telephone for train dispatching, asking them to state what differences, if any, existed in their practice of transmitting train orders to operator and non-operator stations by telephone and their former practice with telegraph dispatching. Replies have been received from all of the six companies to which letters were sent, and they are reprinted below. Comment on some features of the practice outlined in these letters will be found on the editorial pages of this issue.

PRACTICE OF THE CHICAGO & NORTH WESTERN RAILWAY COMPANY

W. E. Morse, general superintendent, sends a copy of the special rules governing train dispatching by telephone, with the following comment:

There is no difference between our method of delivering and acknowledging receipt of train orders submitted by telephone to train crews and the method outlined in the standard code of the American Railway Association for dispatching by telegraph. If, however, orders are given direct to train crews by the dispatcher by telephone, the person in charge of the train performs the same functions as would the operator and in the same way as is prescribed by the standard code of the American Railway Association.

The special rules governing the movement of trains by telephone are as follows:

RULES GOVERNING TRAIN MOVEMENT BY TELEPHONE

1. Rules 201 to 222, inclusive, as well as all other rules and regulations governing the movement of trains by telegraph must be complied with, and in addition thereto the following:

2. In transmitting or repeating an order by telephone the names of the stations, conductors, train and engine numbers and time must first be pronounced plainly, then spelled out, letter by letter, and figures duplicated, naming each figure separately; the train dispatcher writing it in the train order book as it is being sent and underscoring it as it is being repeated.

EXAMPLE 1

Order No. 49.

To C. & E. No. F-i-f-t-y F-i-v-e (Five Five):

Extra E-l-e-v-e-n S-i-x-t-y S-i-x (Double One Double Six) and No. F-i-f-t-y F-i-v-e (Five Five) will meet at O-s-h-k-o-s-h (Oshkosh) instead of N-e-e-n-a-h (Neenah).

EXAMPLE 2

Order No. 5.

To C. & E. No. T-w-e-n-t-y T-w-o (Double Two):

No. T-w-e-n-t-y T-w-o (Double Two) will meet No. T-h-i-r-t-y F-i-v-e (Three Five) at S-p-a-r-t-a (Sparta).

NOTE.—The parentheses and separations between letters, shown in Examples 1 and 2, are to illustrate the transmission or orders and do not appear in a written order.

3. Each operator receiving an order should observe whether the others repeat correctly.

4. The train dispatcher's telephone circuit is to be used exclusively for handling trains, and no message or other business will be allowed upon it except as may be directed.

5. The train dispatcher's receiver is in the circuit at all times, but stations are not.

6. Intermediate stations cannot call each other except through the train dispatcher's office.

7. When the train dispatcher wishes to call an office he will electrically ring a bell in the particular office desired. The person in charge will answer promptly by taking his receiver off hook and speaking his name and station.

8. A person desiring to communicate with the train dispatcher will remove the receiver from hook and speak his name and station.

9. In speaking, keep the mouth about one inch from transmitter and speak in a natural tone of voice.

10. Receivers must be placed on hook immediately conversation is finished and kept there at all times except when in use.

11. In reporting trains, take down the receiver, and if wire is not being used, send report without waiting response from the train dispatcher. The bell will not be rung except in case of important business and when the train dispatcher fails to respond in the usual manner.

12. Do not put receiver against the transmitter, as it interferes with the proper working of the line.

13. When offices are closed, the telephone must be cut off the line by a switch provided for this purpose, and restored again when resuming work. When leaving office for meals or similar intervals during regular hours, cut the telephone off and restore it upon return.

RELAYING TELEGRAPH TRAIN ORDERS BY TELEPHONE

1. To relay a train order through a telegraph station to a train at a telephone station, the train dispatcher will transmit it to the operator at the relaying point, from which it will be transmitted by telephone to destination. The person receiving it must repeat it to the relaying point, and each word and number must be underscored by the receiver at that point. It must then be repeated to train dispatcher, and if correct the train dispatcher will respond "correct." After the parties addressed at destination have signed the order the signature must be given to relaying office, and from there to train dispatcher, and "O. K." time, and chief train dispatcher's initials will be given, as per rule 210.

2. An order relayed to a superior train restricting its rights or superiority must be sent and "O. K." given and acknowledgment received before the "O. K." is given to the inferior train.

3. A copy of every telephone order must be filed at the point of relaying, also at the point of destination, bearing the name of the person receiving and repeating the order. After executing the order the conductor must mail his copy to the superintendent.

4. Upon the arrival of a train at a closed telephone station, where a train is to be met or passed, if it is not in sight the conductor must immediately communicate with the train dispatcher through the relaying operator, and report arrival of his train, giving his name, number of train or engine and name of station or siding.

PRACTICE OF THE ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY

J. E. Hurley, general manager, describes the practice and experience with telephone train dispatching of this railway as follows:

We do not have a different practice in delivering and acknowledging receipt of train orders transmitted by telephone from that governing the handling of train orders transmitted by telegraph. In the transmission of telephonic train orders we require the spelling out of all numerals and names. The use of the telephone for the transmission of train orders is comparatively new to us, having been in use only a few months. However, the results are very satisfactory, and we are preparing to enlarge upon the use of the telephone instrument.

PRACTICE OF THE ERIE RAILROAD COMPANY

A. J. Stone, general superintendent, writes:

In the application of the telephone in train dispatching we have made no change whatever in our method of handling train orders. The train orders are transmitted in exactly the same language and copied in exactly the same form by telephone as was done by telegraph, and when the orders are handed to the engineer and conductor there is

absolutely nothing in regard to same to indicate that any change has been made in the method of transmission. We have been for several months past dispatching trains by telephone on our Delaware division, which is one of our main line divisions, extending from Port Jervis to Susquehanna, a distance of 104.7 miles. The operation of the telephone has been eminently successful, and we are much pleased with the results experienced from its use. All train orders are transmitted by the dispatcher to the telephone operator, and are not sent direct to enginemen or trainmen.

PRACTICE OF THE PENNSYLVANIA RAILROAD COMPANY

W. H. Myers, general manager, outlines the practice of this company in the following letter:

It is our practice generally to transmit train orders by telephone to stations where we have operators in exactly the same manner as by telegraph, the only difference being in the means of communication, the train order being transmitted by the dispatcher, repeated by the operator, and made complete in the regular way in accordance with the standard code of the American Railway Association.

At outlying places, where we do not have an operator, train orders are transmitted directly to the train crew. It is the practice for the dispatcher to send a train order to the conductor, who receives it, repeats it back, and it is made complete in accordance with the standard code. In some instances where conditions are possibly a little more exacting than others, we require the conductor to receive the train order and the engineman to repeat it back, but in either case the rules for transmitting train orders by telegraph, as shown in the standard code, are followed in transmitting train orders by telephone.

In order to secure accuracy in the transmission of the names of stations and numbers of engines or trains, the name or number is first pronounced by the sender and then spelled out. Thus in transmitting the number 7, it would be pronounced "seven" and then spelled out (s-e-v-e-n).

PRACTICE OF THE CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY

F. E. Ward, general manager, replies as follows:

We are following out literally the rules of the standard code of the American Railway Association in the handling of train orders. Where the telephone is used by a conductor at a station where no operator is on duty, the conductor handles the order in identically the same way as would the operator.

PRACTICE OF THE CHICAGO, ROCK ISLAND & PACIFIC RAILWAY

F. O. Melcher, general manager, includes in the following statement the special rules which have been adopted by this company:

The Chicago, Rock Island & Pacific Railway is using the telephone for transmitting train orders on two operating districts, and will immediately extend its use to four more operating districts. We are convinced that there are many advantages in the use of the telephone for train dispatching, the principal features being rapidity and general efficiency, which, of course, result in economy. Information is gathered by the telephone with but little effort. The dispatcher can talk personally with the conductor or the engineer relative to his work in connection with which information is desired.

We do not make any difference in the method of delivering and acknowledging receipt of train orders transmitted by telephone from that employed in the use of the telegraph. Below is given a memorandum of the instructions issued by this company governing the movement of trains by telephone:

(1) Rules 201 to 222, inclusive, which agree with the American Railway Association standard code, and other rules and regulations governing the movement of trains by telegraph, must be complied with in moving trains by telephone.

(2) In transmitting and repeating a train order by telephone the order, train and engine numbers, names of stations and (in time orders) time must be pronounced, then spelled out; these numbers and time being duplicated in numerals, the dispatcher writing the train order in the book provided, during transmission, and underscoring the words and numerals as each is repeated.

EXAMPLE 1

(31) Order No. (One) O-n-e (1)
To Second (2-d) No. Four (4) Herington.
To No. Three (3) McFarland.

No. (Three) T-h-r-e-e (3) Eng. (Eleven Naught One) E-l-e-v-e-n N-a-u-g-h-t O-n-e (1-1-0-1) meet (Second) S-e-c-o-n-d (2-d) No. (Four) F-o-u-r (4) Eng. (Eight Sixty Five) E-i-g-h-t S-i-x-t-y F-i-v-e (8-6-5) at (Alta Vista) A-l-t-a V-i-s-t-a.

EXAMPLE 2

(31 and 19) Order No. (Two) T-w-o (2)
(31) To No. Nineteen (1-9) Bureau,
(19) To Extras Fifteen Nineteen (1-5-1-9) and Fifteen Sixty Two (1-5-6-2) West, Geneseo.

No. (Nineteen) N-i-n-e-t-e-e-n (1-9) Eng. (Eight Fifteen) E-i-g-h-t F-i-f-t-e-e-n (8-1-5) run (Twenty) T-w-e-n-t-y (2-0) minutes late (Bureau) B-u-r-e-a-u to (Silvis) S-i-l-v-i-s.

EXAMPLE 3

(31) Order No. (Fifty Seven) F-i-f-t-y S-e-v-e-n (5-7)
To No. Six (6) Atlantic.
To No. Seven (7) Valley Junction.

No. (Six) (6) Eng. (Eight Twenty One) E-i-g-h-t T-w-e-n-t-y O-n-e (8-2-1) meet No. (Seven) S-e-v-e-n (7) Eng. (Ten Twenty Two) T-e-n T-w-e-n-t-y T-w-o (1-0-2-2) at (Van Meter) V-a-n M-e-t-e-r.

(3) The brackets and spacing between letters and figures shown in examples must not be used in train orders.

(4) The dispatchers' telephone circuit is to be used only for moving trains and business pertaining thereto, unless otherwise directed.

(5) The dispatcher is cut in on the telephone at all times, and operators may report trains without saying "dispatcher," but will first give name of station.

(6) Operators must not handle the receiver roughly when taking it off or placing it on the hook, as this interrupts the transmission of business on the line.

(7) In talking, a natural tone of voice should be used, with the mouth about 1 inch from the transmitter, promptly placing the receiver on the hook when through and keeping it there except while in use.

(8) When operators are relieved by the dispatcher for a short time or for meals, or when they close their offices for the night, their telephones must be cut out of circuit by the switch provided.

(9) When an operator answers his telephone he will give the name of his station instead of saying "Hello." Before repeating train orders he will make sure that he has the dispatcher by taking off the receiver, saying "dispatcher," and receiving the response "dispatcher."

The telephones are on the superintendents' and train masters' desks, and frequent opportunity is given for checking the work of the operators and the dispatchers.

I do not know of any case of discourtesy or inaccuracy, and cannot cite any incident which would indicate that the telephone is not a desirable arrangement. It is absolutely necessary that all concerned follow the prescribed forms and not "short cut," as to abbreviate or depart from the outlined procedure might result in misunderstandings. We have experienced no trouble up to the present time, and have been transmitting train orders by telephone for more than a year.

CAR WEIGHTS AS AFFECTING OPERATING COSTS

At the regular monthly meeting of the Massachusetts Street Railway Association, held at Young's Hotel, Boston, on June 10, Milan V. Ayres, electrical engineer of the Boston & Worcester Street Railway Company, read a paper on "Car Weights as Affecting Operating Costs." He began by referring to the constant tendency to increase both the size and weight of electric car units in late years, stating that cars for urban service have risen from weights of 6 or 7 tons to 28 tons, while for interurban service cars as heavy as 40 tons are frequently encountered, and a 56-ton car for purely fast interurban traffic is not uncommon. Much of this increase has been necessary, and has been brought about by the desire to obtain greater seating capacity and higher speed, and to a lesser extent by the introduction of devices intended to secure greater safety and more comfort to the passengers. While this increase of weight has been in progress the cost of power has been dropping, due to improved machinery; hence the cost of power has not gone up in quite as striking a manner as the increase in car weights would lead one to expect. It has become evident, however, that the general expenses of operation of electric roads have increased in an alarming manner, and it is therefore timely to investigate the effects of car weights on the cost of operation, to see if there is a prospect of effecting substantial savings by reducing them.

Fig. 1 shows the performance of one of the surface cars of the type used by the Boston Elevated Railway Company, weighing 28 tons empty and equipped with four G. E. 202 motors having a gear ratio of 4.73. The passenger load is assumed to be four tons. The speed-time curve shows that the car accelerates at the rate of about 2 m.p.h.p.s until all resistance is cut out, then at a constantly decreasing rate until a speed of 33 m.p.h. is reached at the end of 140 seconds, during which time the car has

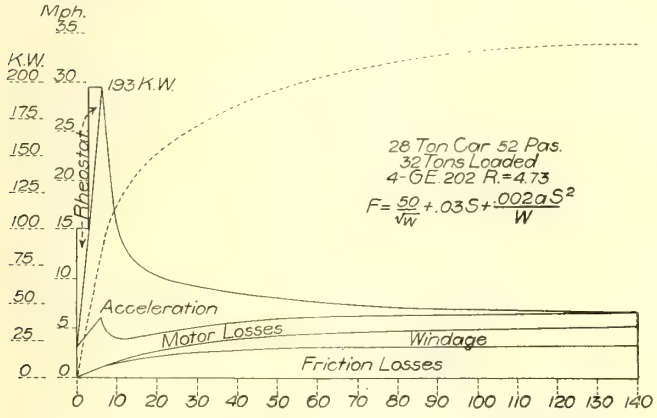


Fig. 1—Performance Curves of 28-Ton Surface Car

passed over 5900 ft. The areas enclosed by the solid lines represent the power consumption. The curve was computed by the Armstrong formula:

$$F=\frac{50}{\sqrt{W}}+.03S+\frac{.002\ a\ S^2}{W}$$

where F = train resistance, S = speed in miles per hour, a = area of car end in square feet and W = weight of car in tons. The first two terms represent track and bearing friction and the third term wind friction.

In Fig. 1 the car takes power at the rate of nearly 100 kw while the motors are in series, and then at 193 kw when they are in parallel, after which the power falls off first rapidly and then slowly, to a constant value of 44 kw. The division of losses under the power curve is indicated.

The usual type of run is shown in Fig. 2. Six stops per mile are allowed here, with a schedule speed of 12 m.p.h. Coasting begins after 20 m.p.h. has been reached, with a stop at the end of 40 seconds. The losses are totalized in watt-hours in Table I:

TABLE I.—DIVISION OF LOSSES IN TYPICAL RUN.

	Watt Hrs.	Per Cent of Total.
Acceleration	345	65.3
Rheostatic	70	13.3
Motor losses	81	15.4
Windage	5	.9
Friction	27	5.1
	528	100.00

The importance of acceleration is clearly evident from this. It is not safe, however, to assume that nothing much

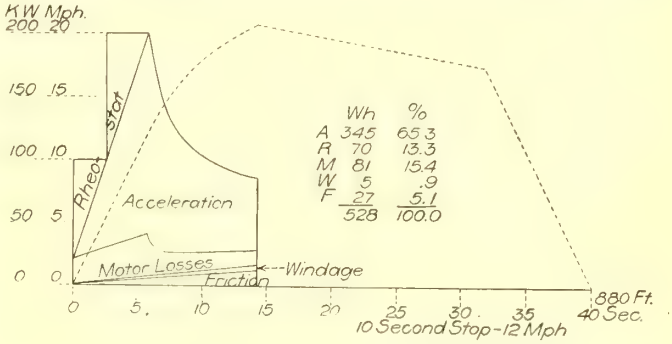


Fig. 2—Curves of Typical Run of 28-Ton Surface Car

would be gained by the elimination of friction, were that possible. Much greater savings than the 5.1 per cent indicated could be made through the reduction of electrical losses following quickened acceleration. Mr. Ayres particularly emphasized the fact that most of the demands for power are proportional to the car weight. Table II shows the result of reducing the car weight one-half, and running it upon the same schedule:

TABLE II.—POWER REDUCTION FOR 50 PER CENT WEIGHT REDUCTION.

	Car Weights.		Reduction
	32 Tons.	16 Tons.	Per Cent.
Acceleration	345	173	50
Rheostatic	70	37	47
Motor losses	81	42	48
Windage	5	5	0
Friction	27	19	30
Total	528	276	47.8

Here for all practical purposes the power consumption is proportional to the weight. For the run shown in Fig. 2 the watt hours per ton mile are 100, which is a fair average for rapid transit service. Table III shows the cost of power on this basis:

TABLE III.—COST OF POWER.

Watt hours per ton mile at car	100
" " " " " " station	125
Miles per car per day	150
Cost per kw-hour at car	1.5 cts.
Cost per pound per year	5 cts.

This gives a yearly cost of power at $100 per ton per car weight. This is based on the assumption of an average mileage of 150 per car per day, which is probably high, and a cost per kw-hour at the car of 1.5 cts., which may or may not be high, according to circumstances. For companies that make their own power 1.5 cts. per kw-hour is high as an operating cost, though probably not if fixed charges are included. Any complete estimate should include fixed charges in the cost of power. Of the other expenses of operation, platform labor is evidently unaffected by car

weights, while car repairs and track maintenance unquestionably increase with car weights. Mr. Ayres concluded that the cost of car repairs is very nearly proportional to car weight, and therefore to power consumption. He reached this opinion partly from his own observation of the comparative cost of repairing heavy and light cars and from a study of the reports of the Massachusetts Railroad Commission. Fig. 3 shows the relation between the cost of repairs and the cost of power on several of the most important street railways of Massachusetts. The roads selected were chosen to eliminate erroneous deductions on

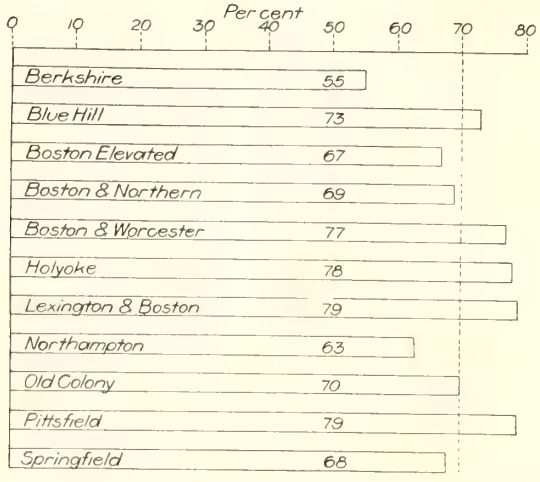


Fig. 3—Relation Between Cost of Repairs and Cost of Power

account of companies buying or selling power. A fair average of the figures is that the cost of repairs is 70 per cent of the cost of power, when only operating cost enters into the latter figure.

To illustrate how these deductions could be fitted to a particular case Mr. Ayres submitted Table IV, which was calculated to find the comparative value of open cars and semi-convertible cars for summer service on a moderate speed interurban line. The line assumed was 40 miles long and the schedule speed 20 mph., requiring 2 hours for a one way trip and 8 cars to fill the schedule on half-hour service. It was assumed that 50 per cent more cars than the schedule called for were on hand to meet contingencies, including laying up of rolling stock for repairs. It was further assumed that the summer business requires twice the frequency of service and twice the mileage of the winter service, and that the summer period lasts 100 days and the winter period 256 days. The cost of power was taken at 1 ct. per kwh. at the substation switchboard, exclusive of fixed charges. The power station required was figured at twice the average killowatt demand at the time of the 15 minute schedule, which is a low estimate; and sub-station capacity at 25 per cent above the power station rating. The power station cost was assumed at $125 per kw, and the substation investment $25 per kw. Three different cases were assumed. In the first case 24 semi-convertible cars constitute the entire equipment, to be used the year around. In the second case 12 semi-convertibles are provided for constant service, with 12 open cars in addition for summer use only. In the third case 12 semi-convertibles are provided for winter only, with a complete outfit of 24 open cars for summer use with full equipment.

TABLE IV.—OPEN VERSUS BOX CARS IN INTERURBAN SERVICE.

Assumed: 40-Mile Line; 2-Hour Run.

Cars, semi-convertible..... 72,800 lb.; cost, $10,500; seat, 60
Cars, open..... 38,000 lb.; cost, $7,000; seat, 70

Winter schedule, 30 min. time, 2720 m.p.-day, 12 cars.
Summer schedule, 15 min. time, 5400 m.p.-day, 24 cars.

	Case 1.	Case 2.	Case 3.
Semi-convertible cars	24	12	12
Open cars	..	12	24
Size power station, kw	3,640	2,770	1,900
Size substation, kw	4,560	3,850	2,380
Investment cars	$252,000	$210,000	$294,000
Investment power plant	$568,800	$432,600	$297,500
Cost power per year	$57,540	$51,635	$45,730
Cost platform labor	31,600	31,600	31,600
Cost repairs	40,200	36,200	32,000
Total operating cost	$129,340	$119,435	$109,330
Adding 10 per cent fixed charges on cost of cars	$154,540	$140,435	$138,730
Adding 10 per cent fixed charges on power plant cost	$211,420	$183,695	$168,480

The full semi-convertible equipment is the most expensive to operate, and the full double equipment the least. This would naturally be expected for operating cost alone, but Mr. Ayres stated that it would no doubt be a surprise to many that it can be figured as more economical to pay fixed charges on a full double equipment, which is the result, even if the fixed charges are figured on the investment in cars alone. It is evident that the increased investment in power plant ought also to be taken into account; and when that is done the difference in favor of the open car equipment becomes very pronounced. Besides being cheaper the double equipment gives 16 per cent more seating capacity than the semi-convertible apparatus. There would be a somewhat increased expense for car houses with the double equipment; but that would be more than offset by the additional cost of feeder copper for the full semi-convertible equipment. The difference in track maintenance would also be considerable. For city service the size of the power equipment will usually be determined by the winter, and not by the summer load, so that the double car equipment will not exhibit as great an advantage as in the case assumed. It will still, however, show the lowest operating cost, and it is a serious question whether the increased liability to accidents is enough to outweigh this, especially in view of the undoubted superiority of the open car in attracting pleasure riding. Another question is the lightness of the single track car compared with the double truck equipment. If the oscillating motion which we have come to regard as inseparable from the single truck design has been as successfully overcome as some manufacturers now claim, there will be a large field for the use of that type of car.

Mr. Ayres stated that in the direction of new designs appears to be the best chance of reducing weights, as soon as the real importance of lightness is appreciated. Table V represents an effort to appraise the quality of lightness in a money equivalent:

TABLE V.—COST PER YEAR PER POUND OF CAR.

Average daily mileage	150
Power cost taken at 1 cent per kw-hour	$0.0342
Fixed charges, power plant, 7 cents per kw-hour	.024
Repairs, at $0.000875 per ton mile	.024
Total cost per ton per year	$0.0822
Present value of $0.0822 for 15 years	.855

This indicates that one can afford to pay 85 cents for every pound of permanent reduction in the weight of a car, or $8,500 for every 5 ton reduction in weight. In any individual case correction must obviously be made for varying conditions. If the average car mileage throughout the year is to be less than 150 miles per car per day, the total charge should be reduced proportionally. For this reason it is the cars for all the year service which should be made especially light, rather than those for seasonal use only. Mr. Ayres stated that after making the most drastic reduction in the above figures it is clear that in any case

one can afford to pay much more than double the price for any car, if the weight can be cut in half. This ratio will also hold for any reduction in the weight of a permanent fixture. If one can save 50 lbs. per seat in a car containing 24 seats one can afford to pay about $1,000 extra for those seats. If the motor manufacturers and truck builders can each save a ton in weight by the use of a better steel the railway company can afford to divide about $3,400 between them. Even if the factors are reduced greatly, lightness will be worth all it costs.

In conclusion Mr. Ayres suggested that the use of the rounded or turtle back roof would give a car less weight than the customary double deck roof, which is not a success as a ventilator. Steel is lighter than wood, strength for strength. Fig. IV. shows the comparative size of a 6 in. I beam and a hard pine timber, 6 in. high. and of the same strength. The wooden beam is 15.6 in. wide and weighs 29.2 lbs. per foot against 12.5 lbs. per foot for the I beam. The figure below shows a common floor framing construction for cars—a steel beam with wood fillers. In this case the wood adds 80 per cent to the weight and only 35 per cent to the strength. When the steel has to be used in simple rectangular forms, instead of in special shapes to which it is particularly adapted, it does not exhibit so great an advantage. Such a case is shown at the right of the drawing, where a ⅜-in. by 18 in. steel plate is compared with a hard pine timber 4,8 in. x 18 in. When used as beams on edge these are of the same strength. The wood weighs 27 lbs. per foot and the steel 23 lbs. One-tenth of

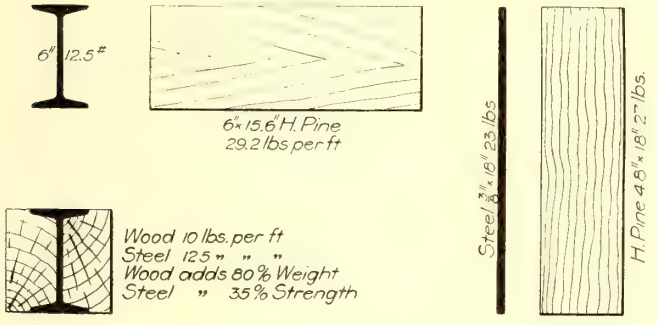


Fig. 4—Graphic Comparison of Strength and Weight of Steel and Wood Sills

an inch of steel has about the same weight as an inch of wood, and about 20 per cent more strength. There is much room for saving in the weight of the car furniture and fittings.

Pressed steel can take the place of cast iron with advantage to strength, appearance and lightness. When wiring is run in conduit thin steel tubing is preferable to wrought iron pipe. Steel should be depended upon in place of wood for strength. Probably it would pay well to use the high strength alloy steels for some parts in place of ordinary steel. Aluminum will probably prove to be a very valuable metal, both in the form of sheets to replace wood and sheet iron, and as castings in place of brass fittings. A truss form of side frame, using extra strong steel for tension and compression members, and pressed sheet aluminum for siding and panelling, might prove very efficient. Hard wood is heavy material, and double floors, heavy posts and siding three layers thick run into weight rapidly. It will ultimately be desirable to abolish wood altogether from car construction on account of fire risk. The manufacturers can probably reduce the weights of electric and air equipments if it is made worth their while, but such incentive must come from the operating companies.

DISCUSSION

In the brief discussion which followed the paper E. W. Holst, Superintendent of Equipment of the Boston and Northern and Old Colony Street Railway Companies, stated that in a recent specification of cars for his roads, 4,000 lbs. were saved by the use of a steel underframe. A 28-ft. four motor semi-convertible car weighed 2 tons more than a 30 ft. four motor car with straight sides. W. D. Wright, of the Rhode Island Company, Providence, emphasized the good points of open cars, and pointed out the importance of steel underframing in future work. J. W. Corning, of the Boston Elevated Railway Company, described the inverse relations between power station load and temperature which have been observed on that system, the average variation in load being from .6 to .8 per cent per degree F.

REPORT OF INDIANA RAILROAD COMMISSION

The third annual report of the Railroad Commission of Indiana, relating to the year 1908, has been issued. Inspections as to the physical condition and operation of 21 electric lines, with a total mileage of 1087 miles, were made during the year by the inspectors of the commission. The following work has been done on electric railways:

On the electric lines, cases of unsatisfactory management corrected	5
Shelter sheds erected	3
Safety devices installed	1
Bridge defects corrected	10
Unsatisfactory shelter sheds corrected	20
Unsatisfactory switch stands corrected	68
Unsatisfactory switch stands pending	10
Switch lights installed	69
Dangerous highway crossings-interlocks installed	2
In complying with the law in stopping at railroad crossings	1
Highway crossing signs erected, on miles of road	496
Whistling posts erected, on miles of road	142
Highway crossing bells installed	2
Highway crossing bells pending	7
Obstructions to signals corrected	2
Defects on bridges corrected	6
Defective derails corrected	2
Defective depot corrected	1
Defective track corrected	5

The uniform rules for interurban roads have been placed in force, with one probable exception, by all the lines of the State.

Electric lines are building shelter sheds and some substantial depots. The report includes a cut of a concrete shelter shed of the Evansville, Suburban & Newburgh Railway, "which is very creditable to that company and most useful to its patrons."

The commission will enlarge upon the practice of making addresses by its members and inspectors to railroad men at various points in the State.

In some cases, including those concerning interchange of traffic between interurban and steam roads, the steam lines have resisted the orders of the commission by proceedings instituted in the State courts.

A number of recommendations for new legislation are made by the commission, including the following:

The safety appliance law should be so amended as to provide punishment for wrongful destruction or interference with the operation of safety appliances or appliances used to protect highway crossings, such destruction or interference being made a misdemeanor.

A statute should be passed to prevent trespassing upon railway tracks, and punishing all persons who use such tracks as a footway. The railway employees, including section men, trainmen and inspectors, should be given constabulary powers in the enforcement of the law.

The safety appliance law should be so amended as to require adequate and properly working hand brakes to be placed upon all cars, both freight and passenger, including interurbans, and as to the latter the hand brakes should be required to operate independently of the air or power brakes.

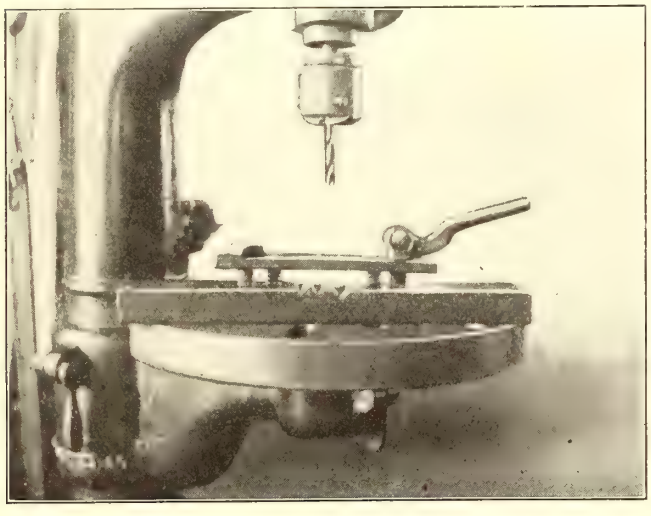
A law should be enacted providing for the elimination of grade crossings throughout the State by requiring the steam and electric railroads to separate a specified number of grades each year, for each 100 miles of railroad or fraction thereof, owned or operated by them. The expense of separation should be divided between the railroads and the counties, cities or towns wherein the crossings are located according to some fair basis.

In an appendix to the report Alexander Shane, chief inspector of the commission, states:

On the part of the traction systems our work has been very gratifying. At the beginning of the work of this commission there was very little uniformity of operation, so that it was deemed advisable to recommend to them that they compile a standard code of rules, which they readily did, and which all the roads of the State, with one or two exceptions, have adopted, and while all of their men are not as conversant with those rules as they should be, yet an effort is being made to have them post themselves, and they are continually being urged to literally comply. This is being done not only by the officials of the road, but by your inspectors, who take advantage of every opportunity to impress upon these men the importance of this thing and the responsibility that rests upon them. What few defects have been located on the interurban lines have been promptly corrected, their physical condition and equipment have been found in very good condition generally, so that few exceptions have been taken, and your inspectors have not been able to report to the commission a single instance where railroad men have been arbitrary or have declined to heartily co-operate with us in our work.

CLAMP USED IN DRILLING COTTER-PIN HOLES

The accompanying illustration shows a clamp devised by E. C. Barnes, of the Newport News & Old Point Railway & Electric Company, Hampton, Va. This clamp is used for holding bolts and brake rigging pins while drilling the cotter holes. The base consists of a piece of 1½-in. x 3-in. iron and the top piece of ½-in. x 2-in. iron. The top



Clamp for Drilling Cotter-Pin Holes

piece is held up by two coil springs set in holes drilled in the bottom piece to keep them in place. The clamp on the upper piece permits rapid adjustment for rods varying from ½ in. to 1½ in. By using the holes drilled in the top piece over the centers of the V-slots in the bottom piece no centering is required.

VALUATION OF STREET RAILWAY PROPERTIES

During the last few years the subject of valuation of various semi-public properties has assumed great importance, not only to owners of securities in these corporations, but also to their customers, and indirectly to the business, politics and social economics of the community. Heretofore such infrequent valuations as have been made have been usually for the purpose of acquiring such properties for public ownership and operation. These, for example, were the conditions surrounding the valuations of railroads, tramways and other utilities in Great Britain and Continental Europe and in many cases of water works in this country. The recent development of the subject of valuation in the United States has been in connection with proposed rate making and taxation for steam railroads and with the adjustment of terms in the extension of expiring franchises for street railways and other public utilities.

The methods of valuation of street railway properties in Chicago and Cleveland have been so widely quoted that they are often assumed to be the only ones which can be used in valuating this class of property. Briefly, the method was to make what was practically an inventory of the properties, with prices as of date of inventory, then to add small percentage allowances to cover certain overhead charges, such as engineering, superintendence and incidentals. The value of the remaining life of the franchises was then determined by a capitalization of estimated net earnings for the remaining term, discounted to date of the valuation, such earnings being based upon existing rate of fare, taxation and service rendered.

The subject is an active one in New York City at present owing to the valuations being carried on by the Public Service Commission of the First District. This commission has been confronted with several rate problems, in the solution of which the valuations now being secured will undoubtedly be used, although the commission has not yet announced the weight which will be given to the several valuations in determining what constitutes an equitable fare.

The attention which is being given to the relative influence of valuations and other elements bearing upon the question of what is a reasonable rate recalls the speech of ex-President Roosevelt on Decoration Day, 1907, at Indianapolis. Mr. Roosevelt said:

At the outset let it be understood that physical valuation is no panacea; it is no sufficient measurement of a rate; but it will be ultimately needed as an essential instrument in administrative supervision. * * * Therefore the physical valuation can never be more than one of many elements to be considered; but it is one element, and at times may be a very important element, when taken in connection with the earning power, franchises, original cost, character of management, location and business possibilities in reaching an estimate on the property and rights of a corporation as a going concern.

The effect of such valuation and supervision of securities cannot be retroactive. Existing securities should be tested by the laws in existence at the time of their issue. This nation would no more injure securities which have become an important part of the national wealth than it would consider a proposition to repudiate the public debt. But the public interest requires guaranty against improper multiplication of securities in the future.

President Taft has also referred to this subject. In his speech of acceptance of July 28, 1908, he said:

It is clear that the physical value of a railroad and its plant is an element to be given weight in determining its full value; but as President Roosevelt in his Indianapolis speech and the Supreme Court have in effect pointed out, the value of the railroad as a going concern, including its good-will, due to efficiency of service and many other cir-

cumstances, may be much greater than the value of its tangible property, and it is the former that measures the investment on which a fair profit must be allowed. Then, too, the question what is a fair profit is one involving not only the rate of interest usually earned on normally safe investments, but also a sufficient allowance to make up for the risk of loss both of capital and interest in the original outlay. These considerations will have justified the company in imposing charges high enough to secure a fair income on the enterprise as a whole. The securities at market prices will have passed into the hands of subsequent purchasers from the original investors. Such circumstances should properly affect the decision of the tribunal engaged in determining whether the totality of rates charged is reasonable or excessive. To ignore them might so seriously and unjustly impair settled values as to destroy all hope of restoring confidence and forever to end the inducement for investment in new railroad construction which, in returning prosperous times, is sure to be essential to our material progress. * * *

From what has been said the proper conclusion would seem to be that in attempting to determine whether the entire schedule of rates of a railway is excessive the physical valuation of the road is a relevant and important, but not necessarily a controlling, factor.

It has been generally assumed that the valuations in New York, being for rate-making purposes, would embody different principles from those employed in Chicago and Cleveland. Not only are the legal points involved, such as powers of the authorities, methods of regulation and methods of corporate organization not the same, but the entire physical, financial and operating structures of these properties are dissimilar. For instance, the New York franchises are perpetual, whereas those of Chicago and Cleveland were expiring, and it would be manifestly impossible to value a perpetual franchise by the methods used where franchises are for limited terms. In the one case the physical valuation is for the purpose of fixing a present reasonable rental for a perpetual leasehold and in the other the valuation is largely for the purpose of determining the physical value to be turned over to the owner at the expiration of the leasehold.

The positions taken by the representatives of the railway companies in regard to the valuations and their use indicate that they recognize and mean to insist on this difference. Thus in the case of the Coney Island & Brooklyn Railroad, for which Ford, Bacon & Davis are the technical advisers, Frank R. Ford early in the year submitted to the Public Service Commission a list of seven methods by which a valuation could be made. They were as follows:

1. Amount of cash capital actually invested in the property.
2. Amount of securities outstanding allowed to be issued by the State or other authority.
3. Valuation of State franchise tax assessing board of physical and other property in streets, plus estimated value of physical property not in streets.
4. Commercial valuation based on market value of securities as used by Prof. H. C. Adams for census report.
5. Capitalization of average net earnings as adopted by Swiss and French laws of appropriation of railroad property for national ownership.
6. Methods used in water-works valuations in New England.
7. Physical valuation or present cost of reproduction new.

"Physical valuation" for rate-making purposes, according to Mr. Ford, should be based on the present cost of reproduction new of not only the physical property, but also the rights to construct such physical property together with certain costs of development, as follows:

a. Cost of acquiring public rights under conditions of competition.
b. Cost of development of business (organization, financing, etc.).
c. Cost of development of physical property (superseded construction, etc.).
d. Overhead charges on construction.
e. Physical value (inventory-priced).

To emphasize the large amount of intangible property value of a street railway company Mr. Ford submitted to the commission the following memorandum outlining the various items of expenditure necessary from the inception of the street railway enterprise to the completion of the project and operation of cars:

COST OF REPRODUCTION OF STREET RAILWAY PROPERTY

1. Cost of promotion.
   1. Preliminary technical expenses.
      1. Survey and location of line.
      2. Estimate of cost of construction and equipment.
      3. Estimated gross earnings and operating expenses.
   2. Preliminary legal and miscellaneous expenses.
   3. Preparation of prospectus.
2. Profits of promotion.
3. Cost of organization.
   1. Legal expenses.
      1. Incorporation.
      2. Legal organization (minutes, directors' fees, etc.).
      3. Form of securities.
      4. Mortgage.
   2. Organization expenses.
      1. Engraving stock certificates.
      2. Engraving bonds.
      3. Registration of stock and bonds.
      4. Services of trustee in certification.
      5. Officers' salaries and general expenses.
4. Cost of charter and franchises under conditions of competition.
   1. Fees to State for charter.
   2. Consent of State commission.
      1. Legal expenses.
      2. Technical expense of presenting project.
      3. Organization expense of presenting project.
   3. Property owners' consents, original and for change of motive power.
      1. Legal expense (vacation of injunctions, etc.).
      2. Technical expense (maps, etc.).
      3. Organization expense.
      4. Cost of consents.
   4. Consent of local authorities (franchise).
      1. Legal expenses.
      2. Technical expenses.
      3. Organization expenses.
      4. Payments for franchise.
         1. Lump sum.
         2. Franchise requirements other than car service, capitalized.
            1. Grading and widening streets.
            2. Removing sub-surface street obstructions.
            3. Paving, first cost.
5. Cost of development.
   1. Technical.
      1. Past supersession and obsolescence.
         1. Changes in art and experiments, such as
            1. Stage coaches.
            2. Horse system.
            3. Cable system.
            4. Storage battery system.
            5. Compressed air system.
         2. Improvements in art, such as
            1. Double-truck cars.
            2. Improved motors.
            3. Improvement of grade and alignment of track.
            4. Girder rails.
            5. Improved paving.
            6. Steel poles.
            7. Underground conduit.
            8. Fireproof barns and shops.
            9. Steam turbines in large units and other power-house developments.
            10. Alternating-current distribution.

2. Extra cost of construction due to non-interference with operation.
3. Piecemeal construction.
4. Solidification of roadbed.
5. Adaptation of construction and equipment.
6. Development of park and amusement enterprises.

2. Suppression of intangible capital due to consolidation.
3. Cost of corporate consolidation.
   1. Premium paid for securities.
   2. Legal and organization expenses.
   3. Payments to State or city.
4. Business and organization.
   1. Loss of early operation.
   2. Loss of outlying sections of line.
   3. Loss of inefficient managements during original organization.

6. Cost of financing.
   1. Legal and organization expenses of obtaining permission for issue.
      1. State.
      2. State commission.
      3. City authorities.
   2. Legal and organization expenses of submission to bankers.
   3. Cost of sale of securities, commission to bankers.
   4. Discount on securities.
7. Company's overhead charges upon construction.
   1. Organization, accounting department and office expenses.
   2. Storeroom and stable expenses.
   3. Permits of authorities and city inspection.
   4. Engineering, organization, consulting engineers and architects.
   5. Interest during construction.
   6. Taxes during construction.
   7. Legal expenses during construction.
   8. Wear and tear during construction.
8. Contractors' overhead charges and profit.
   1. Organization and office expenses.
   2. General superintendence, watching and lights.
   3. Insurance during construction, fire, accident and liability.
   4. Maintenance and use of tools.
   5. Profits.
9. Physical extras, incidentals and contingencies.
   1. Incomplete inventories.
   2. Loss and wastage of material during construction.
10. Cost of material and labor of present physical construction.
   1. Inventory priced on basis of sub-contracts.
11. Cost of reproduction of land, such as right of way and sites for power houses, car houses, shops and terminals.
   1. Assessed value.
   2. Additional sales value.
   3. Additional value for railroad purposes.
      1. Contiguity factor.
      2. Necessity of discarding part of real estate purchased.
      3. Necessity of discarding buildings purchased.
      4. Additional cost of condemnation.
      5. Monopoly value due to location.
   4. Overhead charges for acquisition of real estate, comprising brokerage, legal expenses, cost of search, title insurance and other similar expenses.
12. Working capital.
   1. Cash.
   2. Cost of current materials and supplies.
   3. Accounts receivable.
   4. Accounts payable.
   5. Prepaid accounts.
13. Reserve funds and special deposits.
14. Investments, including contracts and leases.
15. Good-will, earning power, franchise value and patent rights.

In previous valuations some of the overhead charges included in this list have been lumped together as a percentage of the physical value, but most of the other intangible items were omitted altogether. For instance, this percentage charge was taken as 5½ per cent in Cleveland and about 20 per cent in Chicago. If each of the items in this list is carefully figured out and an allowance made therefor, the total will represent, with most properties which have been in operation for any considerable length of time, a much larger percentage of the value of the physical property than these figures.

In the valuation of real estate, for example, in some instances the assessed value has been taken and in others an appraisal has been made based on the sales value of surrounding real estate. Generally, the additional cost or value of such real estate for railroad purposes is considerably more than the sales value of surrounding property for general purposes. In some of the railroad commission valuations in Western States a large additional value has been allowed, for instance, in the right of way of a railroad, due to the contiguity factor, or the location of land in a long strip. This is somewhat similar to plottage value for a large piece of real estate in the center of a city. The value of this contiguity factor has been placed by the Minnesota commission at three times the sales value. In other words, it is well recognized that there is an additional value to real estate suitable for and used for railroad purposes due to the necessity of acquiring large tracts of land or to the necessity of location. In cities it is almost always necessary to discard the buildings purchased with the land, although in some cases they have borne a large proportion of the total cost of the real estate. This is the case with many of the car barns, power houses and substations in New York City. Furthermore, in case of some kinds of buildings, such as power houses, which have to be located on or near the waterfront and be provided with railroad facilities, there may be only one location available, and this, in consequence, possesses a monopoly value. In addition, for purposes of valuation on a reproduction basis, all of the necessary overhead charges on real estate, such as brokerage, title insurance and legal expenses, should be included.

Other items which have not usually been given careful consideration are "Supersession of intangible capital due to consolidation" and "Cost of corporate consolidation." Most of the large city systems have been built up by consolidation of a number of small competing companies, each one of which has usually spent a considerable portion of its capital in acquiring property rights and in developing its corporate and financial organization. Upon the consolidation of these properties some of this cost was superseded, and consequently would not appear at present in the cost of reproducing this property. There is also the actual cost of corporate consolidation, such as premium paid for securities and the expenses of consolidation, all of which benefited not only the security holders of the consolidated corporation, but also the traveling public through the extension of the transfer privilege and the betterment of operating conditions and service.

The list of these intangible items may be amplified to cover each particular case, and when included in a valuation should represent the difference between cash investment and strictly physical value.

The secretary of the American Street & Interurban Street Railway Engineering Association has sent to all members blanks for submitting subjects for discussion in the "Question Box." It is requested that replies be sent in early, so that the questions and answers can be printed in time for distribution before the convention meets.

DETROIT RIVER TUNNEL LOCOMOTIVE

A series of acceptance tests has been completed recently by the General Electric Company and the Detroit River Tunnel Company, jointly, upon electric locomotive No. 7500, the first of six locomotives for the Michigan Central Railroad, one of the New York Central lines, and to be operated in the tunnel under the Detroit River now under construction. The electrical equipment of this locomotive, which is the most powerful in point of tractive effort ever designed for operation by direct current, was built and installed by the General Electric Company. The mechanical details, including the trucks and cab structure, are the product of the Schenectady works of the American Locomotive Company.

The Detroit River tunnel will connect the West Detroit yards of the Michigan Central Railroad with the new Windsor yards in Windsor, Ont. The electrified zone, embracing the tunnel with its approaches, terminal tracks and sidings, will cover a distance of approximately 33,000 ft. Maximum grades are encountered on the approaches, where a 2 per cent grade extends for approximately 2000 ft. at each end of the tunnel.



Articulated Electric Locomotive for Service in Detroit River Tunnel of the Michigan Central Railroad

The locomotives are designed for hauling both freight and passenger trains through this tunnel, and also for switching service at the terminals. The specifications under which they were built demand a maximum service, consisting of hauling an 1800-ton trailing train up the 2 per cent grades at a speed of not less than 10 m.p.h., with two locomotives operating as multiple units. Their capacity is such that they are capable of repeating trips with this weight of train continuously with a lay-over of 15 minutes at each end without undue heating of the motors.

The locomotive is classified by the builders as of the 0440-E-200-4GE209 type, which is the conventional method of stating that it is an articulated four-axle type of electric locomotive, weighing 200,000 lb. and equipped with four GE-209 motors.

The articulated running gear may be considered as consisting of two four-wheel trucks coupled together; but the method of coupling and the relation of the equalizing systems on the two trucks make it necessary to consider the two trucks together. The truck side frames, as will be seen from the illustrations, are heavy steel castings of a truss pattern. In order to obtain the necessary weight on drivers the members of this frame are made heavier than actually required for strength, the top member having a section 5 in. x 7 in., while the other members are proportionally heavy. This gives a peculiarly massive and substantial appearance to the whole running gear. The truck end frames and bolsters are castings of heavy box girder type, rigidly bolted to the side frames and fitted in such a manner as to relieve the bolts of shear. Draft gear, buffers and all truck frame members are calculated for buffing stresses of 500,000 lb. and pulling stresses in proportion.

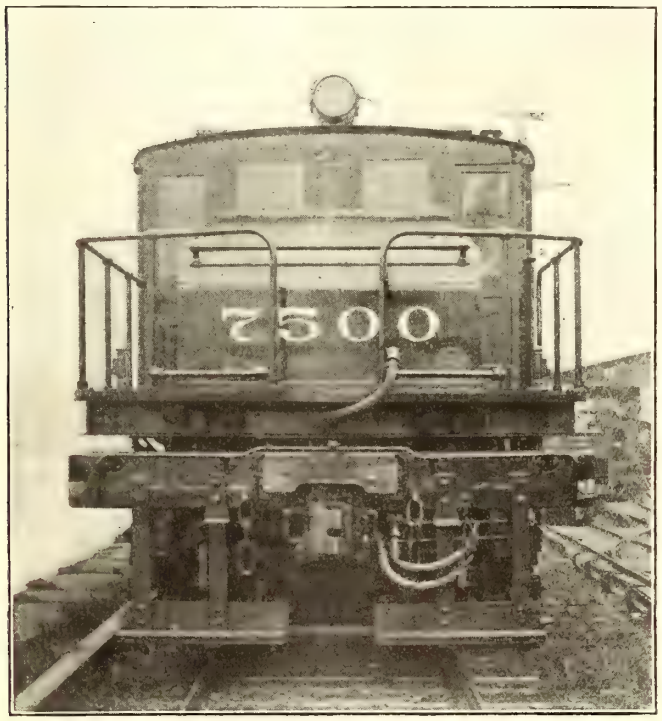
The system of spring suspension is of the locomotive type, the weight being carried on semi-elliptic springs resting on the journal box saddles. The system of equalization by which these springs are connected together is ingenious and interesting. The *A* end of the running gear—or what may be called the forward truck—is side equalized, the two springs on each side being connected together through an equalizer beam. This equalizes the distribution of weight between the two wheels on one side, giving to this truck a two-point support, and consequently leaving it in a condition of unstable equilibrium as regards tilting stresses—that is, stresses tending to tip the truck forward or backward. The *B* end of the running gear, or what may be called the rear truck of the locomotive, is cross-equalized, the two springs on the rear axle being connected together through an equalizer beam. The other two springs on this truck are independent and are connected directly to the truck frame. This results in a three-point suspension on the rear truck, leaving it in a condition of stable equilibrium, capable of resisting stresses in any direction, whether rolling or tilting. The two trucks are coupled together by a massive hinge, so designed as to enable the rear truck to resist any tilting tendency of the forward truck. This hinge combines the two trucks into a single articulated running gear, having lateral flexibility with vertical rigidity. It will be noted from the above description that the running gear has what may be called a compound three-point suspension. The rear truck has in itself a three-point suspension, while the forward and rear trucks together form an articulated frame having a three-point suspension, consisting of the two-point support of the for-

ward truck and the independent equalization of the rear truck.

The braking equipment is arranged so that the action is mechanically independent on each truck. Two pairs of 12-in. brake cylinders apply the brakes, and separate valves and cutout cocks are supplied, so that the pair of cylinders controlling either truck may be cut out without affecting the other.

The draft rigging consists of a standard M.C.B. vertical plane coupler, with yoke, springs and follower plates, designed to comply with the railroad company's specifications. This draft rigging, as well as the spring buffers, is mounted upon the outer end frames of the trucks. This arrangement insures that all pulling and buffing stresses are transmitted on the same horizontal line through the draft rigging, side frames and connecting hinge pin of the trucks. The center pins and cab platform framing are entirely relieved of all longitudinal stresses except those due to the weight of the cab, platform and equipment.

Center pins and side bearings are provided on the running gear for the support of the cab. The center pin on the



Detroit River Tunnel Locomotive—End View

A end is a swivel pin, having a turning motion only, while that one the *B* end has a turning and sliding motion. This construction allows the longitudinal motion necessary to take care of the variation in distance between the truck center pins occurring as the locomotive passes around curves. The side bearings on the *A* end have a clearance of about ⅛ in. when the cab is level, while those on the *B* end have a clearance of about ½ in. The result of this arrangement is that under ordinary circumstances the cab is carried on a three-point suspension, since the side bearings on the *A* end support all normal rolling action of the cab, the side bearings on the *B* end coming into play under abnormal conditions only.

The cab platform is built of four 10-in. longitudinal channels running the whole length of the locomotive, which are tied together by the end channels and bolster plates. Such ballast as is necessary to bring the weight of the locomotive up to the required amount is bolted to the two center sills, and the space remaining between them forms a passage leading from the blower to the motors for carrying the air for forced ventilation. A floor plate, consisting of two sheets of ⅜-in. steel, is riveted to the platform sills, and serves to stiffen and square the platform framing. In the operating cab a ⅞-in. wood flooring is placed over this steel floor.

The sides and ends of the cab are built of ⅛-in. steel plate, supported by a framework of small angles, while the roof is of No. 8 gage steel. The main operating cab occupies the central portion of the locomotive and covers a floor space of 15 ft. 6 in. x 10 ft. It is fitted with windows on each side and two windows and two glazed doors in each end, allowing a practically unobstructed view in every direction. The cab contains the engineer's seat, and such apparatus as is required in the operating compartment of the locomotive. Auxiliary cabs extend from the main cab to the ends of the locomotive, and occupy a floor space of 9 ft. x 6 ft. each. These cabs house the air tank, sand boxes, rheostats and contactors. Hinged perforated doors in the sides of the auxiliary cabs, clearly shown in the illustration, give access to the rheostats and the connections back of the contactors, while folding doors between the auxiliary and main cabs allow access for inspection of the contactors. The edges of the auxiliary cabs are bolted to the platform and main cab, so that they can be readily removed when it is necessary to make heavy repairs.

The difference in width of the auxiliary and main cabs allows room for a narrow platform or running board, extending from the main cab along the sides of the auxiliary cabs to the ends of the locomotive. This running board is protected by hand rails running around the outside of the locomotive from one side of the main cab to the other. The doors of the main cab open to this platform, and the steps reaching the ground are located near the doors. One marked advantage of this construction is the unobstructed view given the engineer, both ahead and to the rear.

A type C-79 controller and the operating handles for the air brakes are located in the cab within easy reach of the engineer's seat. Sander valves are located beside the engineer, and over his head are switches for the headlight and control circuits. Directly in front are illuminated air gages, ammeter and a foot-operated trolley valve for raising and lowering the overhead trolley. Sanders are arranged to sand the rails in front of the leading wheels on either truck.

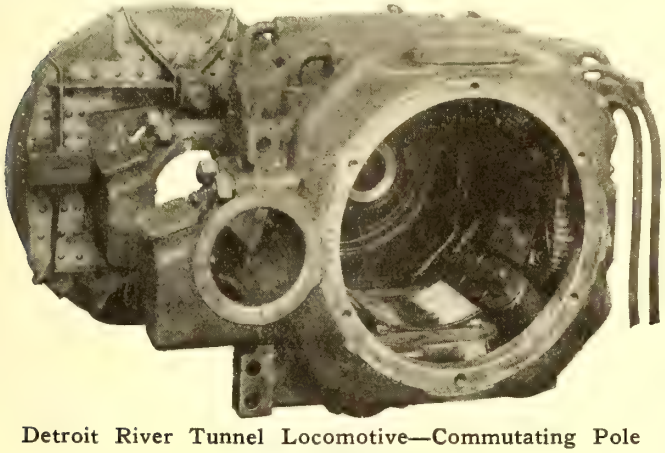
A CP-26 air compressor is located in the center of the main cab. This is a two-stage, four-cylinder compressor, geared to a 600-volt, direct-current series motor. The compressor has two low-pressure and two high-pressure cylinders so arranged as to divide the work of compression into four equally distributed stages per revolution. It has a capacity of 100 cu. ft. piston displacement per minute when pumping against a tank pressure of 135 lb. Ample circulating pipes are provided for cooling the air between stages and between pump and tanks, in order that a moderate temperature may be maintained. The compressor is controlled by a governor, consisting of a pneumatically operated piston controlling the contact of the motor circuit switch, and so arranged as to close or open this circuit at any predetermined limits of pressure.

The motor equipment consists of four GE-209 motors. This is a standard General Electric box frame, commutating pole type of motor, and has a rating of approximately 300 hp. At its one-hour rating the motor will develop a torque of 4050 lb. at 1-ft. radius. The gearing between

motor and axle has a 4.37 reduction, and the driving wheels are 48 in. in diameter. With this reduction, each motor will develop a tractive effort of 9000 lb. at the rail head, which gives a total tractive effort for the four motors of 36,000 lb. at 12 m.p.h. The motors have an overload capacity sufficient to slip the driving wheels, and the locomotive can develop at the slipping point of the wheels an instantaneous tractive effort of 50,000 lb. to 60,000 lb. The maximum speed of the locomotive, running light upon a level track, is about 35 m.p.h.

There are two gears and pinions per motor, one at either end of the armature shaft. This construction was used on account of the unusually heavy torque and the excessive overloads that the motors will be called upon to carry. In large sizes of motor equipments, with a gear and pinion at only one end of the shaft, it has often been claimed that a large proportion of the wear and breakage of pinions is due to the tilting of the motors under heavy loads, which concentrates the pressure at one end of the tooth. The form of construction adopted in the Detroit locomotive will eliminate any such danger.

The motors are designed for forced ventilation. Air is delivered into the motor frames at the end farthest from the



Detroit River Tunnel Locomotive—Commutating Pole 300-Hp Motor

commutator, passes between the field coils and around the armature, and finally escapes through suitable discharge openings over the commutator. The blower used for this purpose has a capacity of 2000 cu. ft. of air per minute at 2¼ in. of water pressure, and is driven by a direct-current series motor. This blower delivers air to the passage between the two center sills above described, from which the ventilating ducts are tapped off to the motors at appropriate points.

The control system used is the Sprague-General Electric multiple unit type, with two master controllers in the main cab and the contactors in the auxiliary cab. Multiple unit connections have been supplied, so that three locomotives may be operated in unison, if necessary. The problem of starting and accelerating a train of from 1000 tons to 1500 tons weight, which may consist of 40 or 50 cars, is a rather delicate one. Such a train is not a rigid mass, but a long, elastic body, and any inequality in the starting torque results in waves of jerking and buffing strains, which may reach abnormal values in some parts of the train. Consequently, the control for these locomotives was designed especially to produce a uniform increase of speed and torque during the period of acceleration. The control combinations are arranged so that the motors may be operated four in series, two in series and two in parallel, or four in parallel. There are nine resistance steps in series, eight in series-parallel and seven in the parallel position. In a test run with a train of 1578 tons weight, consisting of one locomotive and 26 freight cars, the acceleration from a standstill to 10 m.p.h. was accomplished with marked smoothness. The maximum increase of drawbar pull was about 6500 lb. on the first few steps, after which the maximum throughout the remainder of the acceleration was from 2000 to 3000 lb. To an observer standing in the caboose of such a train the rear end of the train is started so gradually that the beginning of the motion is almost imperceptible. The contrast with the results obtained with a steam locomotive is very striking.

The locomotive is equipped with third-rail shoes to take current from an inverted third-rail. It is also fitted with an overhead trolley, which, as stated previously, can be raised or lowered by a foot-operated valve in front of the motorman.

General data of the locomotive are given in the following table:

Number of motors	4
Gear ratio	4.37
Number of driving wheels	8
Diameter of driving wheels	48 in.
Total wheel base	27 ft. 6 in.
Rigid wheel base	9 ft. 6 in.
Length inside coupler knuckles	39 ft. 6 in.
Length of main cab	15 ft. 6 in.
Height of cab	12 ft. 6 in.
Maximum height, trolley up	15 ft. 6 in.
Maximum height, trolley retracted	14 ft. 10⅛ in.
Maximum width	10 ft. 2⅝ in.
Width of cab	10 ft. 1 15/16 in.
Total weight	199,000 lb.

REDUCING POWER CONSUMPTION OF TRAINS ON THE METROPOLITAN WEST SIDE ELEVATED, CHICAGO

B. I. Budd, general manager, Metropolitan West Side Elevated Railway Company, believing that the useless waste of power could be largely cut down by stating to the motormen the exact money loss from careless operation of trains, recently had tests made and obtained comparative figures, which showed that with a two-car train poorly operated there was an excess of power consumption of 26 per cent over the amount required properly to operate such a train. The results of this test were incorporated in a form letter addressed to each motorman on the road, which called to their attention the existing conditions and the improvements that might be expected, and asking their co-operation. The text of one of these letters follows:

THE METROPOLITAN WEST SIDE ELEVATED RAILWAY COMPANY

CHICAGO, June 1, 1909.

MR. R. R. JONES, Motorman,
Logan Square Division.

DEAR SIR:—Your personal interest and active co-operation are desired in bringing about a reduction in the amount of power consumed in train operation.

We have made certain tests and collected information on the subject of power consumption in order that you may have an intelligent understanding of the problem. We are all equally interested in bringing about a high standard of operation, and therefore, with the following facts before you, I feel sure that you will endeavor in every way to be economical and careful in operating your train.

The following tests were conducted with the same train, carrying passengers and making all stops each day and during the same hours. Train consisted of one motor car, No. 848, equipped with two Westinghouse No. 114 motors, 160 hp each, electro-pneumatic automatic acceleration con-

trol, and one coach, No. 514. Weight of motor car, light, 33 tons; weight of coach, light, 16 tons.

TEST "A"—ECONOMICAL AND EFFICIENT OPERATION

May 11, 1909, weather clear, average temperature 50 deg., no heat and no light, all current used being recorded by wattmeter connected to main leads and placed under seats in the middle of motor car. Motorman used care in observation of coasting signals, making good stops with no needless waste of air in order to reduce pump motor consumption, drifting as much as possible through curves, and generally using good judgment in the operation of train. Seven round trips were made, and the total average kilowatt hours per trip consumed was 74.5; 14.7 being consumed on the Loop and 59.8 on the Metropolitan structure. On the Loop the average kilowatt-hours per car-mile was 3.67. On the Metropolitan, 2.30. Average, including both the Metropolitan and Loop, was 2.48. The higher consumption per car-mile on the Loop was due to frequent stopping and starting.

TEST "B"—CARELESS AND WASTEFUL USE OF POWER

May 11, 1909, weather clear, average temperature 50 deg., no heat and no light. Motorman used as much power as possible, paying no attention to coasting signals, running in full multitple close to station and then making heavy applications in order to make stops; running in full multiple close to the entrance of curves, making heavy application, slowing train nearly to a stop, and then requiring additional power to pull through curve. Wasteful in the use of air at all station and other stops, and generally using poor judgment in the operation of train. Seven round trips were made, and the total average kilowatt-hours per trip consumed was 92.5, 17.2 being consumed on the Loop and 75.3 on the Metropolitan structure. On the Loop the average kilowatt-hours per car-mile was 4.29 and on the Metropolitan 2.90. Average, including Metropolitan and Loop, 3.09.

The average time gained per trip of test "B" over test "A" amounted to 2 per cent.

The excess power consumed per trip of test "B" over test "A" amounted to 26 per cent.

Taking the results of these two tests, the first one being termed proper operation and the second improper operation, we have used the consumption per car-mile in each case as a unit to base a calculation of what our current consumption and cost would be, applied to our total mileage for one month.

The excess kilowatts used by improper operation amounts to 736,000; figuring this quantity at the average cost of production per kilowatt, amounts to $5,000 per month.

These figures are interesting, as they show clearly what a vast amount of power could be wasted by careless and inefficient operation, with no material gain made in time or other advantage to any one concerned.

The efficiency of a locomotive engineer is based on his cost of operation, which means cost of fuel, oil, waste, etc., per ton mile in case of freight, or per car-mile in case of passenger service, and his record as an engineer is largely formed from these figures, together with the showing of good judgment, freedom from accidents, making his time, etc., and this will soon be true of a motorman operating an electric train, although at the present time the matter of power consumption has not been given as much attention as the subject deserves.

In view of the above facts, and effective this date, the operating efficiency of each motorman, as regards power consumption, will be hereafter entered on and made a part of his record of service, and a copy of each entry will be sent to him. These entries will be made from personal observation of each man's work by the trainmaster and inspectors, and approved by the superintendent. Hereafter this phase of a man's work will be given attention when his record is under inspection.

Thanking you in advance for your personal interest in this matter, I am

Yours very truly,

B. I. Budd,
General Manager.

A general strike of street railway employees in St. Petersburg, Russia, is in progress.

TRACTION REHABILITATION IN CHICAGO*

BY GEORGE WESTON, MEMBER BOARD OF SUPERVISING ENGINEERS

The traction ordinances of Feb. 11, 1907, authorized the Chicago City Railway Company and the Chicago Railways Company to construct, maintain and operate systems of street railways in the streets of Chicago and also created the board of supervising engineers to administer these ordinances. Owing to the magnitude of the work to be undertaken the working force of the board of supervising engineers was organized into divisions, each division being in charge of a division engineer as follows:

Division D—Track and roadway.
Division E—Electric power distribution.
Division G—Buildings and fixtures.
Division I—Power plant equipment.
Division K—Cars and car routing.
Division P—Tunnels and subways.
Division of Drafting—in charge of a chief draftsman.
Division of Accounts—in charge of a certified public accountant.

The working force of the chief engineer's organization comprises 137 persons, consisting of engineers, accountants and general office employees.

On March 30, 1908, the City Council passed a similar ordinance in favor of the Calumet & South Chicago Railway Company, providing for the rehabilitation of about 40 miles of single track. This company is a consolidation of the Calumet Electric Street Railway Company and of the South Chicago City Railway Company and has 98.44 miles of single track. A similar ordinance was passed March 15, 1909, in favor of the Southern Street Railway Company (formerly the Chicago General Street Railway Company) covering about 7 miles of track, but providing that the Chicago City Railway Company was to conduct the work of rehabilitation and operate the road as a part of its own system. The Southern Street Railway Company owns about 18 miles of single track.

TRACK AND ROADWAY

The division of track and roadway was organized in May, 1907, and track construction work was commenced June 17, 1907, by the Chicago City Railway Company. Three types of track, differing principally as regards the foundation, have been designed and approved by the board. They are:

Type 1—Steel ties in concrete.
Type 2—Wooden ties in concrete.
Type 3—Wooden ties on a rolled stone foundation with concrete between the ties and on top of the ties to provide a foundation for paving.

The rails, tie fastenings, paving, etc., of these different types are practically the same except that screw spikes are used with wooden ties, while with steel ties a special clip is employed to fasten the rail to the tie. With both the rails can be removed and replaced without disturbing the track foundation or damaging the ties.

The tracks so far constructed are principally Types 2 or 3. The greatest mileage has been of Type 2 construction or a modification styled 2-A, which differs from Type 2 only in respect to the spacing of the ties.

The Chicago City Railway has completed to date about 84.7 miles or 90 per cent of the ordinance requirements for track reconstruction; the Chicago Railways Company about 93 miles or 68 per cent. The Calumet & South Chicago Railway Company has rebuilt to date but 2.5 miles of the 40 miles required by the ordinance, but its schedule for the year of 1909 comprises 12.5 miles of single-track rehabilitation work and about 4 miles of new extensions. The 7 miles of track rehabilitation for the Southern Street Railway Company is scheduled for this year.

SPECIAL TRACK WORK

Specifications covering the manufacture of special work have been prepared and all special work for the companies under the jurisdiction of the board of supervising engineers is manufactured under these specifications. To date

* Abstract of paper presented at joint meeting of the Electrical Section, Western Society of Engineers, and Chicago Section, American Institute of Electrical Engineers, May 28, 1909.

132 special work layouts and crossovers have been installed by the Chicago City Railway Company and the Chicago Railways Company. In a large percentage the curved frogs, crossings, switches and mates are solid manganese castings. All curves have been designed for safe operating clearances between cars of all types passing in any direction.

During the past year specifications have also been prepared covering the manufacture of open-hearth steel rails. All rails contracted for during the current year will be manufactured under this specification.

POWER DISTRIBUTION

The division of electric power distribution was organized during May and June, 1907, and has charge of the underground and overhead transmission lines, trolley wire and its connections, bonds, auxiliary cables and telephone system and includes the testing of track joints for conductivity. Plans and specifications have been prepared by this division for typical underground conduit construction of three general types as follows: Type A, square bore multiple duct; Type B, round bore single duct installed in cable slot; Type C square bore single duct.

The manholes for the most part are being constructed of brick because this type of construction is considered more flexible than concrete construction so far as working around other conduit lines, water pipes, gas pipes and other street obstructions is concerned. Most of the manholes are of the barrel shape because this form is economical and leaves a good wall face for the training of cables. In the early part of the work some multiple-duct conduit was constructed, but it was later decided to make the single-duct square-bore construction standard for all power distribution work. Specifications have been prepared for the various cables required.

In calculating the feeders for the d.c. distribution system the various lines have been divided into trolley sections and the maximum two-hour schedule of cars upon each trolley section has been taken. With this as a basis and making a liberal allowance for average current consumption at the car, based upon actual observation, the circular mils of cable for each line have been determined. The maximum drop allowed for heavy traffic sections is 50 volts, but this is increased somewhat on remote sections. In figuring the negative return system a drop of 25 volts at extreme points from the source of supply has been taken as a basis. In calculating the negative return it is assumed that all current returns to the station from which it originates.

At all special work each straight track rail is supplemented by a copper cable throughout the entire length of the special work and the ends are welded to the rails on each side of the special work.

BUILDINGS

The division of buildings and fixtures was organized in May, 1907, and took up the inspection of the construction of three new substation buildings and four new fireproof car houses of the Chicago City Railway Company. Plans for all of these buildings had previously been approved by the chief engineer of the board and they have a capacity for 1076 large double-truck cars.

In September, 1907, this division began to keep in touch with the building work of the Chicago Railways Company, and after the acceptance of its ordinance by the Chicago Railways Company Jan. 28, 1908, this division, in conjunction with the engineers of the Chicago Railways Company, prepared plans and specifications for new fireproof car houses of the double-end type and for fireproof substation buildings. Five new car houses are in course of construction by the Chicago Railways Company at this time. Together they are capable of housing 834 double-truck cars.

POWER PLANT EQUIPMENT

The initial work of this division was to inventory and value the betterments to the power plants and substations of the Chicago City Railway Company since the date of the original valuation, June 30, 1906. In July daily inspection of the work in progress at every substation was commenced and daily reports made of the labor and materials used.

At the time of the organization of the board of supervising engineers the Chicago City Railway Company had in operation three steam plants, one of which ran only during the winter months. It also obtained a large amount of electrical energy from the Commonwealth station of the Chicago Edison Company through two rotary converter substations. Since the organization of the board additional substations have been built and a contract has been entered into with the Edison Company whereby all of the current required for the operation of the railway is purchased. The five substations of the company will have a capacity of 50,400 kw, exclusive of the storage battery at Plymouth Court substation. All substation buildings of this company are designed of substantial fireproof construction with pressed-brick walls both inside and out, book-tile roofs carried on structural steel trusses, composition roof covering, concrete floors with a red tile wearing surface and are architecturally first class. The Plymouth Court substation of the Chicago City Railway is in one of the Edison Company's buildings in which the railway has been given space and contains two 1200-kw rotary converter equipments and a storage battery with a rated capacity of 2240 kw for one hour.

At the time of the organization of the board the Chicago Railways Company had two steam power plants in operation; one at Hobbie Street, on the North Side, and one at Western Avenue and Washington Street, on the West Side, both generating direct current. In addition some current was purchased from the Consolidation Traction Company and the old cable plant at Van Buren Street and Washington Street was converted into a substation. Since the organization of the board this substation has been enlarged and three new substations are in the course of construction located at Sheffield and Lill Avenues, on the North Side, Leavitt Street and Blue Island Avenue, on the Southwest Side, and at Grand and Fortieth Avenues, on the Northwest Side. Each substation has a capacity of 6000 kw. The equipment at the Van Buren outstation is being increased. The total substation capacity of the company, when the work is completed, will be 44,000 kw.

The new substations that are being constructed by the Chicago Railways Company are designed of fireproof construction, with pressed-brick walls, both inside and out, book-tile roofs, carried on structural trusses, composition roof covering and concrete floors with composition wearing surface.

CARS

The cars adopted as standard by both companies are of the pay-as-you-enter type seating 40 passengers. That of the Chicago City Railway Company is 48 ft. 3 in. in length and 9 ft. wide over all. The platforms are 7 ft. 11 in. long over all and 6 ft. 8 in. long inside. The Chicago Railways Company is building 650 pay-as-you-enter cars 49 ft. 2 in. in length and 8 ft. 9 in. wide over all with vestibules 8 ft. 4½ in. long over all. Special attention has been given to lighting and heating. The lamps for interior illumination are placed one over each seat and have frosted globes. The heaters are electric and there are special heaters on the platform for the comfort of the motorman and conductor. The cars are equipped with sliding or folding steps and both air and hand brakes. The motor equipment consists of four 40-hp motors per car. Of the 650 cars under construction by the Chicago Railways Company 600 are of wood and 50 are steel cars and are being built by the Pressed Steel Car Company. General interior arrangement and appearance are identical with the new wooden cars.

TUNNELS AND SUBWAYS

The division of tunnels and subways was organized in February, 1908, after the acceptance of its ordinance by the Chicago Railways Company. The ordinances to that company provide that it shall rebuild the tunnels under the Chicago River at La Salle Street and at Washington Street. Plans and specifications have been prepared for a double-bore reinforced concrete tunnel at La Salle Street so designed that it can be connected with and become part of any subway system that may be built in the future and that provision be made for temporary approaches from the surface so that the surface cars operating between the North and South divisions of the city can have the benefit of this tunnel to relieve the present congestion on the

bridges. It is expected that contracts will be let in the near future covering the construction of this tunnel.

Plans and specifications are also under way for the complete reconstruction of the Washington Street tunnel, which will be designed for connection to any system of subways that may be built in the future and also with temporary approaches to the surface.

Plans have been completed for a section of this tunnel on the west side of the river between Clinton and Canal Streets and a contract has been awarded for this part of the work to be carried on in conjunction with the construction of the terminal station of the Chicago & Northwestern Railroad, which crosses Washington Boulevard at that point.

DRAFTING

The drafting department was organized under a chief draftsman who has general supervision of the work performed in the department and of the various systems and records required. Reporting directly to the chief draftsman are a clerk and four squad foremen, each of whom is held directly responsible to him for the correct and proper execution of the work performed under his supervision.

All drawings are made on standard size sheets and all sizes are multiples of the regular letter size sheet, 9½ in. x 11 in. as follows: No. 1, 8½ in. x 11 in.; No. 2, 22 in. x 34 in.; No. 3, 34 in. x 44 in. Drawings that are larger than size No. 3 are called "rolls" and are designated in size as "R." drawings. For convenience each division has a classification letter which corresponds with the letter used in the classification of accounts by the American Street & Interurban Railway Accountants' Association.

Drawings are indexed to denote the size of sheet and division as follows: Track and Roadway—Division D drawings—1-D, 2-D, 3-D, R-D. Electrical Transmission—Division E drawings—1-E, 2-E, 3-E, R-E. The drawing number for each drawing follows.

The filing system consists of six groups or divisions as follows: Domestic tracings, domestic blueprints, folios, foreign prints, catalogs and miscellaneous.

ACCOUNTING

The division of accounts was organized in May, 1907, and has charge of checking all expenditures that relate to the cost of rehabilitation and of determining, with the assistance of reports from the engineering divisions, whether such expenditures are reasonable and are proper charges to capital account. The division also ascertains whether proper reserves have been created and are maintained by the companies as set forth in the ordinances and keeps account of all expenditures made by the board in the carrying out of its duties. These expenditures, in accordance with the terms of the ordinances, are to be added to capital accounts of the railway companies during the period of rehabilitation and after that period are to be charged to operating expenses.

The ordinances provide that out of the gross receipts of the company shall be paid:

First—The operating expenses, including taxes.

Second—The ordinary repairs to the physical property for which a sinking fund is provided, the minimum amount of which shall be 6 per cent of the gross receipts per annum.

Third—The renewals or depreciation of the physical property for which a sinking fund is provided, the minimum of which shall be not less than 8 per cent of the gross receipts per annum.

Fourth—Out of the gross net earnings remaining after deducting the above charges, the company may retain 5 per cent upon the capital account as approved by the board of supervising engineers.

Fifth—The remaining net earnings are divided, 55 per cent to the city and 45 per cent to the respective company.

During the rehabilitation period of three years from the date of the acceptance of this ordinance a special manner of accounting is provided covered by the following quotation from the ordinances:

"The said Board of Supervising Engineers shall have power to determine what work shall be treated as construction, reconstruction, equipment, re-equipment, extensions, new lines, underground trolleys or additions to plant or property to be paid for by the company out of the capital funds to be provided by it for that purpose and what shall be treated as maintenance, repairs and renewals, to be paid for out of the gross receipts of the company from the operation of the street railway system hereby authorized. But any such determination of said board shall be governed by the following provisions:

"During the three-year period of 'Immediate Rehabilitation' 70 per cent of the gross receipts shall be set apart and shall be used so far as required in defraying the operating expenses, including maintenance and repairs, and the residue of said 70 per cent shall be applied to the cost of renewals and no part of the cost of any renewal paid for out of such 70 per cent shall be charged to additional capital and all expenditures for renewals during said three years in excess of such residue of said 70 per cent shall be charged to capital account.

"After such three-year period of 'Immediate Rehabilitation' the cost of renewals shall be paid as provided in Section 16 hereof, but such expenditures (and only such expenditures) as are made for the purpose of extensions of or additions to property shall be thereafter considered as additions to capital, provided, however, that in the replacement of any principal part of the property, either existing or hereafter acquired, there shall be charged to capital the excess amount that the new property cost over the original cost of the property displaced, excepting that the value of property contained in the appraisal inventory of the property of the company, referred to in Paragraph 1 of Section 20 hereof, shall be used instead of first cost for all property listed in such appraisal inventory."

Each division engineer has, as a part of his organization, inspectors, who, in addition to their other duties, render to him on forms daily, semi-monthly and monthly reports of the quantities and amounts of material used and hours of labor expended on each piece of work in progress. These reports are used by the division engineers as a basis for their monthly estimates and also as a check upon the expenditures made by the railway companies and reported by them to the division of accounts. Thus counter checks from two entirely independent sources are secured—from reports of the railway companies checked and summarized by the division of accounts and from the field reports of the division engineers.

DESTRUCTION OF POLES BY INSECTS

Insects play a most important part in timber destruction. The injury done is generally underestimated as their depredations go on gradually, but forcibly, attracting little observation. When they bore into the timber they open up air chambers and channels which make it easy for rainwater to seep in and thus keep the wood in a moist condition. Fungus spores floating through the air are enabled to germinate with greater rapidity and with increased effectiveness and the decomposition of the pole consequently is materially hastened.

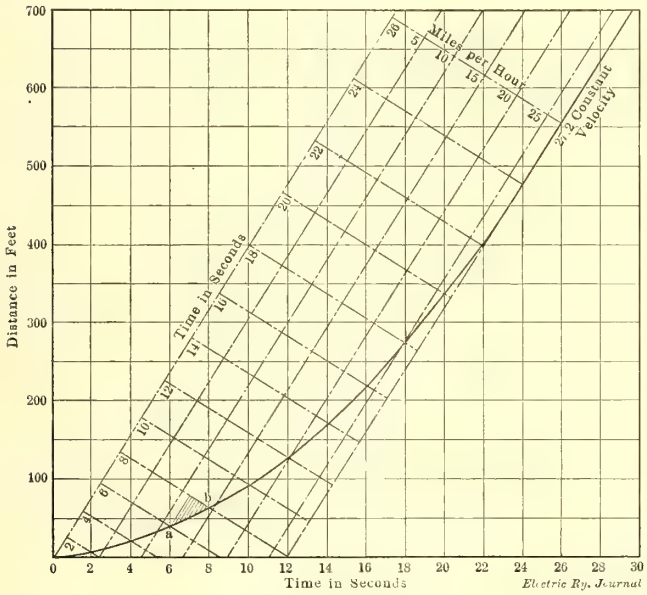
Several years ago the Forest Service co-operated with one of the large telephone companies in Georgia and Florida to experiment with various preservatives in protecting the butts of telephone poles from decay. These preservatives were simply painted upon the wood and, of course, did not sink in to any great depth. A recent examination made of this pole line showed that wherever the preservative had entered the wood no destruction due to insect attack had taken place, but where the wood was unprotected such injury was frequently quite serious. Poles in which the preservatives had seeped through a crack were often more or less fluted on the surface—that is, the oil saturating the wood in the immediate vicinity of the crack protected it from the attacks of the insects. It is essential, therefore, particularly in the warmer portions of the United States, to protect timber from the attacks of insects as well as of fungi, if the longest life is to be secured.

NEW METHOD OF PLOTTING SPEED CURVES

BY THOMAS FARMER, JR.

It is very desirable in laying out the time schedule on which the cars are to run and in ascertaining whether the proper gear ratios are being used to know the rates of acceleration of various types of cars. A very simple device can be made use of and has been employed for this purpose. It consists merely of a second clock, which records a dot on a traveling paper for every second of time elapsed, while another pencil records a dot for every revolution of the wheels. From this record the distance traversed up to any instant can be very readily read.

It has been generally the custom to plot first from the records thus obtained the distance curve, which has as co-ordinates the distance in feet and the time in seconds. This curve in form resembles somewhat a parabola. To obtain the velocity curve, this curve has to be integrated. The acceleration curve is obtained by integrating the



Distance-Time Curve, with Second Set of Co-ordinates for Reading Velocity

velocity curve. This entails considerable work and introduces an element of error on account of the two integrations, one of which depends on the other for its accuracy. The object of this article is to set forth a simple method of utilizing the distance-time curve for obtaining the velocity and acceleration readings direct.

The laws of uniform velocity are summarized in "Kent's Mechanical Engineers' Pocket-Book," page 423, in the following discussion, which has been somewhat abbreviated:

"If s = space in feet passed over in t seconds, v_1 = the velocity at the beginning of t, v_2 = the velocity at the end of the time t, and v_0 = the mean velocity, then $v_0 = \frac{v_1 + v_2}{2}$ and $s = \frac{v_1 + v_2}{2}\ t$.

"If a = the acceleration, and the acceleration is a constant quantity, then

$t = \frac{v_2 - v_1}{a}$, or if the body start from rest, $v_1 = 0$; then $t = \frac{v_2}{a}$ and $s = \frac{v_2}{a}\ t$."

It will be seen from the above that the final expression for $s = \frac{v_2}{2}\ t$ is that of a triangle. In other words, if we plot a velocity-time curve, the space or distance traversed by the car up to any point on the curve will be equal to the area under the velocity-time curve for the corresponding point.

The diagram herewith shows an actual distance-time curve of an elevated railway car, in which after a given time has elapsed—in this instance 24 seconds after the start—the curve becomes a straight line. This means that the rate of acceleration has been reduced to zero and that a uniform velocity has been reached. From the dot and dash curve which has been made by the instrument we can now determine the velocity at this point, which in this instance is 27 m.p.h. If we now draw an ordinate parallel to the straight portion of the distance-time curve, we can construct a new scale of co-ordinates, by reference to which the distance-time curve can be read as a velocity-time curve. The time scale on the new ordinates will be a variable one, and is obtained by projecting points from the distance curve, as shown in the diagram. The velocity ordinate can be scaled into equal divisions of miles per hour, starting from the point of constant velocity. We can now read velocities direct from the distance-time curve.

The tangent to the velocity curve will give the acceleration rate at any point on that curve, or, using the equation, $a = \frac{v_2 - v_1}{t}$, we can approximate the value of acceleration, as follows:

At the point b on the curve the velocity is 14 m.p.h., and at a it is 11.2 m.p.h., the difference being 2.8 m.p.h. The time elapsed during this change in velocity is two seconds; therefore, substituting these values in the above equation, we obtain $a = \frac{2.8}{2} = 1.4$ m.p.h.p.s. This value corresponds with the area of the shaded triangle at a and b.

It will thus be seen that the distance-time curve has been made to serve the purpose required of it in a very simple manner.

ELECTRIFICATION COMMITTEE OF THE NEW YORK RAILROAD CLUB

The New York Railroad Club has appointed a special committee to study the subject of steam railroad electrification, which will render a report of its work for consideration at the annual electrical meeting of the club next March. Following are the members appointed: W. J. Harahan, assistant to the president of the Erie, New York, chairman; L. F. Fritch, consulting engineer of the Illinois Central, Chicago; H. H. Vaughan, assistant to the vice-president of the Canadian Pacific, Montreal; J. H. Davis, electrical engineer, Baltimore & Ohio, Baltimore; George Wildin, mechanical superintendent of the New Haven, New Haven; Messrs. William McClellan, C. O. Mailloux and H. M. Warren, electrical engineers, New York.

The committee is to collate and tabulate such general data as may be of interest to railroad men, and make such suggestions as may appear pertinent to them with reference to the direction in which it would be desirable to have further investigation and information. The Maintenance of Way Association and the American Railway Association are considering the subject of electrification along substantially the same lines.

RECENT IMPROVEMENTS IN UNDERGROUND CONDUIT CONSTRUCTION

BY S. B. WAY

During the year 1906 the electric light and power interests of St. Louis, Mo., found it desirable to install considerable conduit incidental to an extension of the system of distributing electricity for general use and for extending high-tension feeders to reach distant street railway substations. A fairly large stock of multiple-duct tile conduit was on hand, but not in sufficient quantity for the requirements of the work contemplated. An investigation of the conduit market developed a condition not at all encouraging to those responsible for the completion of the work in hand within the required time, in that all of the conduit manufacturers were then already sold out of the kind of duct desired. This made it necessary for the engineers in charge of the work to choose between completing the work with such conduit as could be purchased and delivered within the time limit or to devise some means of building a conduit without the usual tile or other pipe. The engineers chose to make an attempt to get along without the pipe, and incidentally save money in the cost of construction. This resulted in building a conduit entirely of concrete. Upward of 170,000 duct-ft. of all-concrete or monolithic conduit has been laid in St. Louis within the last three years, fulfilling every requirement for all uses, including heavy isolated runs for high-tension cable.

It has been found that all-concrete or monolithic conduit possesses many advantages over a conduit built up of pipes

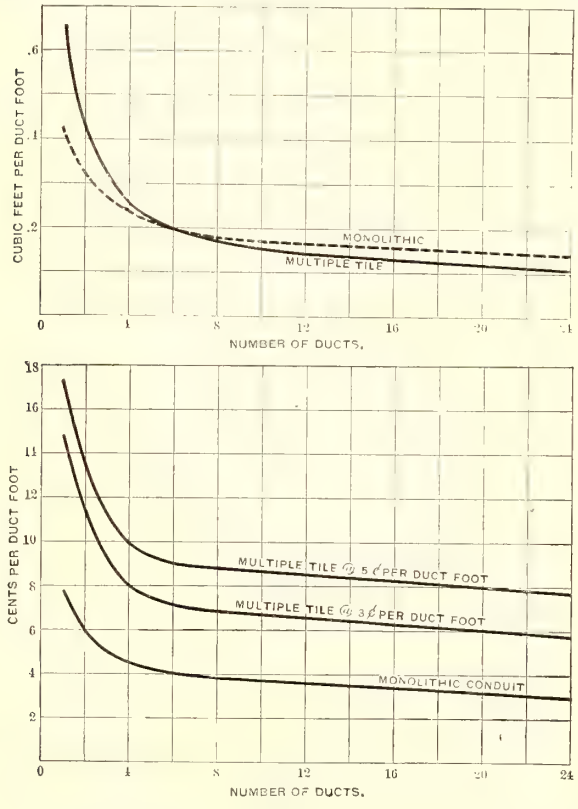


Fig. 1—Comparison of Multiple Tile and Monolithic Duct

of whatever nature, in that with such construction the structure becomes homogeneous; occupies less space for a given number of ducts of equal size; permits perfect inspection of each duct from end to end incidental to the laying of each tier; provides smooth, straight, clear, jointless and fireproof duct openings from manhole to manhole; eliminates handling, fitting, breakage and cost of pipe; requires no factory, and but few and simple special tools, and for average duct sections uses no more material (concrete) than is required for the armor or envelope of pipe construction. The amount of concrete per duct-foot required for various duct sections for multiple-duct tile and for monolithic conduit and the cost per duct-foot of completed work, exclusive of trenching, refilling and repaving, are shown by curves in Fig. 1. These curves were plotted from results obtained in actually laying a considerable quantity of each type of conduit under the same supervision and by the same men. The multiple-duct tile was laid with a 3-in. armor of concrete and with the interstices between the tiles filled with fine concrete, while the monolithic conduit was provided with 2½ in. of concrete between the ducts and the bottom and sides of the trench, with a cover or top 3 in. thick. The items of trenching, refilling and repaving are nearly constant for each type of conduit, except a small differential of about ½ cent per duct-foot in favor of monolithic conduit, due to the smaller trench and consequent reduced excavation and hauling of displaced earth required by the monolithic construction. Typical cross-sections of multiple-duct tile and monolithic conduit are shown in Fig. 2.

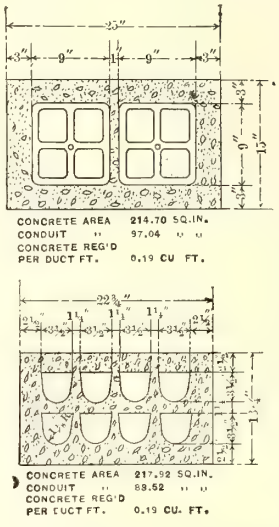


Fig. 2—Cross Sections of Multiple Tile and Monolithic Duct

The construction of monolithic conduit involves only the comparatively simple methods of good concrete work. After a trench of suitable width and depth has been excavated, duct-form supports are set to grade and perfect alignment on 16-ft. centers in the bottom of the trench. These duct-form supports serve to hold the forms or molds for producing the duct openings rigidly in place and in true alignment while the concrete is worked into place in the bottom of the trench. The duct forms or molds consist of 16-ft. sections of clear, straight-grained lumber previously dressed to the shape of a "U," and are held down in the duct-form supports against the buoyancy of the plastic concrete by suitable cast-iron, or other, weights. When the duct forms are set concrete of the proper mixture for good concrete work is dumped into the trench and suitably rammed and puddled around the forms, and finally struck off level with the tops of the molds. The concrete is then allowed to take its initial set, which in favorable weather requires about three hours, when the duct forms may be removed by simply lifting them upward and out of the concrete, leaving smooth, straight, continuous U-shaped grooves in the bed of concrete just laid, which, when covered, constitute the duct openings. Fig. 3 shows the trench with forms set ready for the concrete to be dumped in.

After the duct forms are removed from the concrete the smooth, continuous grooves molded in the concrete by the forms are open to the daylight for the full length of the construction, and every possible facility is afforded for perfect and rapid inspection. Any faults in the work may be instantly detected, and this in itself is a potent factor in securing first-class work.

The open top ducts are closed in by laying across the top of the structure thin, smooth plates, or slabs, of concrete

molded on the site of the work. These slabs or plates of concrete are made of just sufficient width to lap over each outside duct a short distance, and are laid as illustrated in Fig. 4, with a small quantity of mortar to seal the joints. The thin concrete slabs, or plates, serve the double purpose of closing in the top of the newly formed ducts and as a foundation or support for the next layer of concrete, in which an additional tier of ducts may be formed in the same manner as the preceding tier, this operation being repeated as often as necessary to produce the required number of duct openings. The top of the conduit is closed in in the same manner, with the exception that the top layer of concrete contains no duct forms and acts simply as an armor or envelope to protect the conduit construction from future excavators. Monolithic conduit has been laid under a great variety of street conditions and during all seasons of the year with perfect success and with a material saving in cost over the various forms of pipe duct.

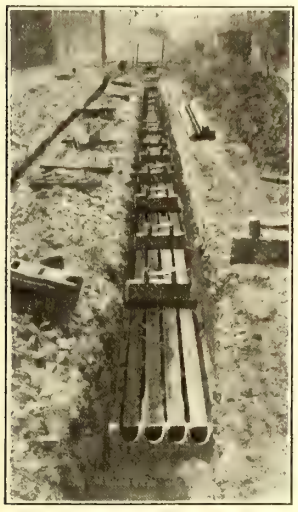


Fig. 3—Forms in Place



Fig. 4—Completed Conduit

IMPROVEMENTS AT SAPULPA, OKLA.

The Sapulpa & Interurban Railway is now operating a line 3 miles long with four cars, and work is under way toward extending this line to Kiefer and Glen Pool. It is expected that additional extensions to be completed during the present season will increase the trackage of the company to 18 miles. This road is of particular interest because it uses gas engines to generate power for operating the cars. The four cars now operated are single-truck equipments for city service, but the St. Louis Car Company is constructing for this road four 46-ft. interurban equipments, one of which will be an electric locomotive equipped with 50-hp motors. The passenger cars will be equipped with four 35-hp motors each. The electrical equipment of the cars is designed for 1200-600-volt operation, with two pairs of motors connected in series on the 1200-volt interurban section of the line and the usual series-parallel connections on the 600-volt city line.

The power plant equipment now comprises two 150-hp Bessemer gas engines, which drive both railway and lighting generators. Contracts have been made for additional gas-engine-driven units to include two 300-hp Bessemer engines driving the lighting generators and two 200-kw Bessemer gas engines belted to General Electric 600-volt railway generators. These two generators will operate in series to furnish 1200-volt current for the interurban road.

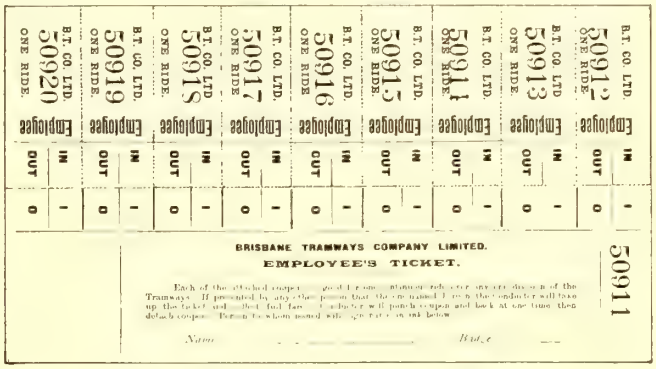
COMMUNICATIONS

STRIP TICKETS WITH COUPONS AT BRISBANE

BRISBANE TRAMWAYS,
BRISBANE, AUSTRALIA, April 15.

To the Editors:

I notice an account in your issue of Nov. 14, 1908, page 1392, of a strip ticket in which six tickets are attached to an identification strip and that "the tickets are not good for passage unless presented with the strip with which they were originally printed." A number of advantages are claimed for this ticket. The idea is not a new one, as the Brisbane Tramways Company has had a ticket of this kind in use for employees for some time. I enclose a sample ticket. As will be seen, the strip contains nine coupons, each of which is good for a ride by an employee when presented with the strip, when his name is signed to the strip and when it contains his badge number. The in-and-out feature of the ticket is a simple way of recording the direction in which the ticket is used. As will be noticed from the instructions, the conductor punches the coupon and back at one time in either the in or out space and then detaches the coupon.



Employee's Strip Ticket Used in Brisbane

J. S. BADGER, General Manager.

RETURN ON THE INVESTMENT IN PUBLIC UTILITIES

SOUTHERN WISCONSIN RAILWAY COMPANY,
MADISON, WIS., May 29, 1909.

To the Editors:

In a primary enterprise involving the construction of a street railway one-half of the actual amount of cash invested might be represented by 5 per cent first-mortgage bonds, and I think these bonds would sell at 90; the other portion, being an equity, would have to be represented by bonds or stocks yielding at least 15 per cent. The risks involved in the operation of a street or interurban railway are too numerous to warrant capitalists in assuming the junior security end of the enterprise unless they can earn fully as much or more than can be earned in trade.

We can obtain 6 per cent, 8 per cent and even 10 per cent on our capital without assuming any risk. In the West, and especially in this section of the West and beyond here, bankers and men who have money to invest find it possible to realize 8 per cent and 10 per cent without any trouble whatever. If this be true, as it undoubtedly is, why should men of means enter into an extra hazardous undertaking when the returns are likely to be no greater?

No man of means would think of investing his funds in any public service, assuming all the risks, unless he was assured of such returns as would be equal to or greater

than he can obtain in, say, a profitable manufacturing industry. The time has come when capital declines absolutely to enter into the development of public-service enterprises until it is assured that the Federal and State governments are going to deal with these matters in a liberal way. The manifest disposition of the law-making powers in many States to impose additional burdens in the way of taxes and to curtail returns by reducing rates has resulted in a positive determination to await more reasonable and equitable enactments. It is a good saying that "you can lead a horse to water, but you cannot compel him to drink." You can enact all sorts of laws regulating public-service corporations, but you cannot compel capital to invest in such enterprises.

There is much to be said upon both sides of the question, but the final outcome will be determined by the investor and not by the public.

F. W. Montgomery, President.

A HYGROSCOPIC GROUNDING DEVICE

The Lord Electric Company, New York, is meeting with considerable success in the sale of a rather unusual type of grounding device known as the "Hydro-Ground." This is made up of ovoids or egg-shaped units mounted on a central conductor rod. The units are formed of an absorbent composition which attracts and retains moisture indefinitely. Besides its hygroscopic and capillary properties, this composition is non-metallic and is unaffected by acids or alkalies. The fact that it is non-electrolytic insures a permanent earth contact and the retention of maximum capacity. The whole device is so simply constructed that it can be installed with an ordinary post-hole auger, the one matter of prime importance being to set the grounder deep enough in the soil.



Hygroscopic Ground

The manufacturer states that when placing the "Hydro-Ground" in the earth it should be accompanied by at least one pail of very strong brine. Ordinary water should be highly charged with salt and thrown in on the grounding device. Then as the earth is filled in more salt and water should be added to increase the contact and conductivity of the surrounding earth. This inexpensive practice is said to give the best results. If water is not readily obtained, salt alone can be used about the grounder and the adjacent soil. In this case, of course, the salt only improves the contact, whereas it would be detrimental to metallic contact points or plates.

The device as sent out for installation is supplied with a metal stem 12 in. long. This stem is threaded and has a coupling into which can be secured a ¾ in. galvanized iron pipe, or it can be supplied with a terminal to which a copper wire can be soldered. If copper wire is used it should be thoroughly taped and coated with insulating paint or asphaltum. If pipe is used, a piece of 1 in. cotton hose should be put around it and this hose thoroughly saturated with insulating paint or asphaltum. The insulation of such connections will overcome electrolytic actions. If a wire or pipe is employed to connect the ground point to the rail in the case of street railway line lightning arresters, all wires coming in contact with or under the earth should have some insulating covering and be thoroughly painted with insulation as previously noted. It is believed that if this practice is followed out far better results will be secured and the ground will be found to be permanent and satisfactory.

TRANSPORTATION COMMITTEE FOR DENVER CONVENTION

Considerable enthusiasm has already been shown in various sections of the country relative to the Denver convention. President Shaw is about to appoint a comprehensive transportation committee, which will have in charge the matter of the working up of special trains, special cars and parties from various points in the country. It is expected that very attractive rates, not only to Denver, but also to various Pacific Coast points, will be announced in the near future.

At a preliminary meeting to discuss various transportation matters, held at the association office in New York on June 16, the following named gentlemen were present: James F. Shaw, president, American Association; Thomas N. McCarter, president, Public Service Railway Company; J. N. Shannahan, general manager, Washington, Baltimore & Annapolis Electric Railway Company; J. H. Pardee, operating manager, J. G. White & Company; J. M. Wakeman, vice-president, McGraw Publishing Company; Chas. S. Clark, secretary, Massachusetts Street Railway Association, and B. V. Swenson, secretary, American Association.

It is expected that a party of at least 100 people will go direct from New England points to Denver, and after attending the convention will continue to various Pacific Coast points, taking advantage of the attractive Alaska-Yukon rates. Two special trains will probably start from New York City, one going up through New York State, and the other down through Pennsylvania points. Plans for a special train from Chicago are already under way, and the probability is that another special train will run from St. Louis and Kansas City. In addition, it is planned to arrange for special cars from various other points, taking care of those who go to the convention from Canada, the Southeastern States, the Southwestern States and Pacific Coast points. A further announcement in regard to these trains will be published as soon as the details are decided upon.

SUGGESTED MONORAIL LINE FOR BERLIN

August Scherl, of Berlin, Germany, has published an elaborate volume on high-speed city and trunk line traffic with special reference to the use of his monorail system. Mr. Scherl states that his monorail system will involve the use of cars which will be balanced by interior gyroscopic apparatus. He suggests the arrangement of city railway systems as combinations of ring and radial lines, and presents plans for constructing them either as elevated or surface installations. Many pages are devoted to descriptions of the proposed rolling stock, stations and line construction. The author also considers the social and economic aspects of high-speed transportation.

At the shops of the Hot Springs Street Railway Company the same lathe is used for turning iron parts and babbitted bearings. By the use of a large magnet it is found practicable to separate the babbitt from the iron turnings, and thus effect a substantial saving in the total amount of babbitt used for bearings.

News of Electric Railways

Cleveland Traction Situation

On the evening of June 11 Mayor Tom L. Johnson began his campaign in favor of the Schmidt 3-cent grant in his tent on Superior Street. He admitted that the Municipal Traction Company had not given good service, but said that the strike and bad faith on the part of others who entered into the leasing contract were responsible for this. He again said that the Payne Avenue line and its extensions would connect with the original 3-cent lines on the West Side and that transfers would be given from one to the other, although the properties formerly belonging to the Forest City Railway have been purchased by the Cleveland Railway.

At a meeting of the council committee of the whole on the evening of June 9 the Mayor explained that all 3-cent fare lines, both original and new, would be unified into one system, under the plans that have been made by the administration, if the Payne Avenue franchise is not voted down in the referendum election. In this way, he said, the stockholders of the Forest City Railway will be cared for. Herman J. Schmidt, he stated, desires the privilege of taking over the stock of the Forest City Railway, which has not been replaced by stock of the Cleveland Railway. When the Mayor secures a sufficient amount of this stock to cover a majority of the holdings his plan is to demand a restoration of the property. A nominee named by the city may make this demand, he said.

Councilman Haserodt said he thought that the way should be left open after the vote is taken on the Payne Avenue grant for a proposition from the Cleveland Railway. Admitting that there is some merit in the plan, Mayor Johnson stated, however, that he would have to oppose it. He said he is willing to consider a better proposition from the company before the vote is taken; but if the grant is sustained by the people he thought that the company should not be allowed to present another offer.

Mayor Johnson attacked the ordinance prepared by Judge Tayler and said that its terms were worse for the people than those included in the ordinance submitted some time ago by the company. Councilman Walz, who has heretofore stood with the Mayor, defended the Tayler ordinance, and said that it is what the people want, and that they do not want the Schmidt 3-cent scheme which the Mayor and the Council have recently been trying to establish. He has also defended the ordinance in newspaper interviews, and has stated that the Mayor is interpreting the ordinance to suit his own views and has not accepted the legal meaning of the various features of the ordinance because he does not want the old company to have the right to operate its property under any circumstances. Mayor Johnson signed the Schmidt ordinance immediately after its passage.

The Tayler ordinance was referred to the street railway committee without consideration or comment. Mayor Johnson said that the fatal defect in the ordinance is that it substitutes control by arbitration for control by the people. He also criticised it because Judge Tayler removed the clause referring to the Mayor's grievance against East Cleveland by putting Euclid Avenue upon the same basis as all the other streets named in the grant. The Tayler ordinance does not make it possible for the Council to force the company to redeem the promises made by the Forest City Railway and the Municipal Traction Company on guaranteed stock, and this is not to the liking of those who made the guarantees. Other obligations, however, may be met. The Tayler ordinance provides that the city shall not name another corporation to take over the property for 10 years, and this did not meet with the Mayor's approval.

The communication of the Cleveland Railway refusing to accept the ordinance tendered it says in part:

"This company has publicly agreed to accept a renewal ordinance embodying the Tayler plan, so-called, and drawn or approved by Judge Tayler. The ordinance now offered the company was not drawn, nor is it approved, by Judge Tayler, and its provisions, in many substantial respects, are radically different from the Tayler plan.

"The maximum rate of fare, as fixed in this ordinance, would make it impossible for the company to sell additional stock or bonds to raise the requisite money to provide cars and other needed improvements.

"While the property of the company was in the hands of the Municipal Traction Company that company, through a stock exchange and public advertisement, sold stock of this company upon representations that it was worth par, and upon its guarantee to make good the investment of purchasers at par and interest. The ordinance offered requires this company to make these obligations so incurred by the Municipal Traction Company a part of its capital. The board cannot believe that such obligations can legally or properly be made part of the capital of this company, upon which interest is to be earned at the expense of the patrons of the road.

"The ordinance, as to many of its provisions, is to be void if any one of them is illegal. As we are advised, at least two of these provisions are clearly illegal, viz., the provision that requires the company, under certain conditions, to become the purchaser of its own stock, and the provision that contemplates discrimination among the stockholders in the matter of the capital valuation upon which dividends are hereafter to be paid. And, as we are advised, other provisions of the ordinance are of doubtful legality. So that we are asked to accept something that is void upon its face.

"This ordinance, while purporting to grant a renewal of the company's franchises in the streets of Cleveland, omits to grant any renewal upon an important part of the system, viz., the Euclid Avenue line.

"While this ordinance provides for the arbitration with respect to many questions, by section 21, it is in effect provided that, unless the city and the company so agree, there shall not be, during the life of the ordinance, any increase or decrease in the allowances per car mile for operating expenses and depreciation, it being in this section expressly provided that no such questions shall be submitted to arbitration. The effect of this provision is to require that the property shall be maintained and operated for a fixed sum per car mile for the full period of 25 years, entirely irrespective of changing conditions—a provision which might work great injustice to the traveling public, as well as to the company.

"We beg again to assure the Council that the company is willing and anxious to co-operate with the Council in an effort to bring about a just and fair settlement of its relations with the city, in a manner approved by Judge Tayler, and to ask respectfully that it be given an opportunity to accept such a grant, and that the voters and car riders of the city be given a chance to express their views upon such an ordinance at a referendum election."

The subway grants extending over a period of 75 years were made without the least trouble and before the report of the committee of the Chamber of Commerce could be prepared. Since then the officers of the company have realized the dangers ahead and agreed to most of the provisions and limitations suggested in that report, with the exception of making two separate grants for the upper and lower level subways. W. R. Hopkins, one of the men at the head of the belt line railway, is occupying the same kind of a place with the Cleveland Underground Rapid Transit Company. No one knows whether or not there is any connection between the underground and the 3-cent grants.

George H. Earle, Jr., Elected Director of Philadelphia Rapid Transit Company

The Councils of Philadelphia have elected George H. Earle, Jr., as a representative of the city on the board of directors of the Philadelphia Rapid Transit Company, to succeed Clarence Wolf, who, as stated last week, has been elected to the board of directors as a representative of the stockholders. Mr. Earle has long been prominent in financial and business affairs in Philadelphia. Once before he has served on the board of directors of the Philadelphia Rapid Transit Company. Mr. Earle wrote to Mayor Reyburn on June 12 accepting the appointment. In his letter he said:

"I feel that I can best show my appreciation of the honor that you tender me by dealing with you and the public that you represent with perfect frankness. In accepting I wish also to tender you a resignation, to be constantly under your control, should my views of duty or policy not concur with your judgment as to what will best subserve the welfare of the city. It is my present purpose frankly to state my views. While I shall have but one vote, I think it your right to know exactly how that vote will be cast.

"In the first place, I have long believed that nothing is so absolutely essential to the welfare of this city as that the Rapid Transit Company and the city should work in complete amity. Whether he be within or without the com-

pany, he is a public enemy who unnecessarily stirs up discord between them, and should be equally despised.

"There must be harmony and good will if there is to be satisfying success. I repeat that the greatest service the management can render is to study, understand and, if possible, meet every wish of its patrons. It is imperative that the public aid, not impede, this necessity of public welfare, and to aid they must approve what is done, and to do this the people must be given full information. We must have amity. That is an absolute public necessity.

"In the second place, I may be mistaken, but I think the time has come when, with such a fine body of men as man our cars, we should be able, with their assent and approval, to fix a sliding scale of wages that would assure their participation in the enjoyment of a prosperity that their care and faithfulness can do so much to assure. I am one of those who are convinced that it would be bad for this country if any of our citizens should so lack independence as not to resent a refusal to give great bodies of men a fair and sympathetic hearing, whether their demands be possible of fulfilment or not. And that must continue to be my attitude. But beyond this, it is very injurious to a great city to have its transit facilities disturbed, and no mere question of personal pride can ever justify it.

"And now I come to the third and most difficult matter, and that is the question of strip tickets. On this subject I particularly feel that you and my fellow citizens should know just where I have stood and must always stand. It does not demonstrate that the merchants' plan is a bad thing that no one has yet seen the wisdom of giving it a fair trial. The underlying principle of that plan I advocated. I believe in, though I had nothing to do with the drafting of its details, and would make changes if I could. But I wish it again plainly understood that I believe in the principle involved, and shall work for it just as long as I serve you. If that belief incapacitates me from serving you I will withdraw with the best good will to all of you. But that is my belief.

"However others have felt, it has always been my highest desire that the company should take no important action without full consultation with your honorable bodies. May I once more trespass to explain this matter? You at least will remember how all this difficulty and agitation arose. The company, in the earnings of which the city was to have a one-half interest, was being slowly bled to death by frauds upon the transfer system, and no one can measure the harm, the ruin, the unrest, the misery and disorder that might follow to the whole city. Men would not lightly pay three fares to reach their work or return from it.

"Needing money to develop our transportation facilities more than any city in the United States, it would be an act of insanity to so treat capital already invested as to make the procurement of further necessary means an impossibility. But even facing all this, I thought that before adopting a system to check such frauds it was our duty to consult Councils. Even if under no legal obligation I felt that to be the underlying spirit of the merchants' plan, that must be abided by if it were to accomplish any high purpose. My plan and only plan, and from the beginning my sole and only ambition, was to get the city and company to work in such complete and sensible harmony as to enable them to remedy all abuses, and thus be able, in times of serious difficulty for the poor, not to increase the burdens of the honest public.

"This plan I laid before all whom I felt could advance it, and I have secured the earnest support of leading men in both parties. I am confident that I would have succeeded in it, and without trouble, had it not been for the interference of senseless agitators, or those selfishly seeking after notoriety or office at any cost. Under these circumstances the frantic appeal made to me to favor strip tickets, to be 'the people's champion,' coming largely from men whose folly defeated all my efforts to prevent any such question ever arising, would be ludicrous were it not so painful. I want to say to them that real friends of the people, real reformers, have in all ages more often appeared as martyrs than as candidates for office; for the highest sacrifice that can be made to our fellow men is to forfeit their liking rather than their interest.

"For strip tickets to continue, not transfers but fraud on transfers had to be stopped. That was, then, all that I thought necessary; but I wanted the spirit of the merchants' plan tried on the simple and business question. So finally we met a committee of Councils to devise methods. And that was the real crisis of this matter. Its majority showed every inclination to consider this a business and public question. But all its efforts were frustrated by an attitude of obstruction on the part of the minority that represented those now so loudly complaining of the results of their own folly, and that while professing to be the special friends of the people would not permit what the people's welfare so imperatively required to be done.

"Whether intended or not, I cannot say, but this gave no alternative but ruin of the company and city's interests, or the independent action that I deprecated. And counsel advised the company that such action could be legally taken. It therefore became a duty to take it. But that, of course, made confidence and co-operation impossible, made my own plan and efforts useless, and I retired from the board. Instead of sane adjustment and helpful co-operation, litigation and legal definition were forced; and when that definition did not suit, agitation and disorder followed. As a consequence the company is to-day less able to decrease its fares, and the difficulties of honest directors have been enormously increased. Until I again examine the matter, I cannot say what can be done.

"There is one other matter of which I should perhaps speak—the pay-within cars. I favored and still favor them. One reason has been all compelling, they save human life. So long as I believe that they will save one child or one woman each year from serious injury or death—and I understand they save a great many—I shall earnestly favor them.

"I have but one favor to ask, and that is, that you will be good enough to realize the enormous pressure of duties under which I struggle, and as soon as possible fill my place with some one more able to serve you."

The demand for the restoration of the strip tickets, sold by the Philadelphia Rapid Transit Company at the rate of six tickets for 25 cents, resulted in the passage by the Councils on June 9 of a resolution calling upon the city solicitor to bring legal proceedings to determine whether the company has the right to discontinue the sale of strip tickets without the consent of the Councils, this despite the fact that the Supreme Court of the State has already passed upon this point.

Fifty-Year Franchise Drafted in Kansas City

An ordinance which provides for the extension of the franchise of the Metropolitan Street Railway in Kansas City, Mo., for a period of 50 years has been drawn up and submitted to the West Traffic Way Commission of Kansas City as a basis for negotiations between the company and the city prior to its introduction into the Council. The present franchise grant of the Metropolitan Street Railway expires on June 1, 1925. The new franchise will make the date of expiration of the grant June 1, 1959. A digest of the principal provisions of the ordinance follows:

The company is to pave between its tracks and for 18 inches outside of the outside rail with the same material as the rest of the street and shall keep this in good repair and repave when the rest of the street is repaved. In the case of cable roads, paving in good repair now may remain until the line is electrified. Where extensions are built on unpaved roads, the Board of Public Works is to specify the paving to be laid by the company, but the company shall not be required to change paving if subsequently the city decides on paving for the street which is different from that laid by the company. Flagmen shall be stationed at grade crossings at the expense of both the street railways and the railroads. Cars are to stop on the near side of the street for passengers. Arc lights are to be suspended at all railroad intersections, the cost to be divided between the street railways and the railroads. Power to charge the batteries of the police and fire alarm systems is to be furnished by the street without cost to the city.

The Metropolitan Street Railway is to agree to permit interurban cars to enter the city over its tracks, but is to man the interurban cars with its own employees. Passengers on interurban cars are to have the same transfer privileges as passengers of the Metropolitan Street Railway. The Metropolitan Street Railway is to collect a fare of 5 cents from each interurban passenger within the city, of which it is to pay the interurban companies 1 cent. The Metropolitan Street Railway is to have the right to handle light express, subject to the supervision of the city. The Board of Public Works is to approve all locations for poles and all construction and repair work is to be done under the supervision of this Board. On the fifteenth of each month, this board is to report to the comptroller the amount of work done during the previous month. The company must agree to operate its cars according to regulations imposed by the City Council under the supervision of the Board of Public Works. No trail cars are to be operated. (A conditional schedule is printed in the proposed ordinance.)

The fare is to be 5 cents for all passengers more than 12 years old and 3 cents for passengers less than 12 years

old when unaccompanied. Nothing is to be charged, however, for children less than 12 years old when accompanied by their parents or a guardian. The present transfer system is to continue, subject to such minor regulations by the Council as may be deemed advisable. Policemen, firemen and employees of the company only shall be carried free. The company shall spend 12 per cent of its gross receipts yearly in maintenance or, if 12 per cent is not necessary properly to keep up the property, the balance is to be deposited and a fund created from which subsequent extraordinary expenditure may be made. The depository holding this fund shall release it only on the order of the company signed by the Board of Public Works. Four per cent per month of the gross receipts shall be set aside for depreciation and renewals, subject to conditions to be imposed by the Board of Public Works. The company shall set aside for liquidation of accident claims a sum to be decided by the Board of Public Works. This sum, however, shall merely be sufficient properly to protect the city should it exercise its right to buy the property.

The city is to have a minority representation in the board of directors and is to have the right to purchase the property any time after 1924 on 6 months' notice at a valuation which has for the present been conditionally fixed at $33,000,000, and to which the cost of extensions and improvements as made from time to time shall be added. If the city does not purchase the property by the expiration of the franchise, it is to have the right to designate a person, firm or corporation as its licensee to take over the property. The company is to make a full and complete report to the city by March 1 of each year covering its operations for the previous year and is to settle with the city on the first of March of each year on a basis of net receipts, 50 per cent of which shall go to the city. It is stipulated that an amount not less than $400,000 shall be paid to the city for the period from the present to Dec. 31, 1910. Reports of gross receipts shall be made to the city comptroller once a week. A bond of $100,000 shall be filed to insure compliance with the terms of the ordinance. After the ordinance has been passed, the company shall cause a resolution to be adopted by its directors within three days accepting the ordinance and shall file such resolution with the city clerk for record. Sixty days thereafter the ordinance shall be submitted to the people for approval.

Transit Affairs in New York

On June 8 Mayor McClellan signed the franchise giving the Hudson & Manhattan Railroad permission to extend its subway from Thirty-fourth Street and Sixth Avenue up Sixth Avenue to Forty-second Street, and thence to Fourth Avenue at the Grand Central Station. William G. McAdoo, president of the company, said that he hoped to be able to begin the construction of the extension within six months, and that unless unforeseen delays were encountered the entire system between New Jersey and Grand Central Station, New York, would be in operation by Jan. 1, 1911.

Justice Hendrick, in the Supreme Court, heard argument on June 10 in the suit instituted by the Public Service Commission against Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, for not filing an annual report with the commission on Sept. 30, 1908, as provided by law. The commission seeks to recover damages from the receivers at the rate of $100 a day. The receivers demurred to the complaint. Justice Hendrick reserved decision and gave both sides until June 21 to submit briefs.

The bondholders of the Fulton Street Railroad have applied to the Public Service Commission to submit a plan by which the operation of the road may be resumed.

Judge Lacombe of the United States Circuit Court has issued an order continuing Frederick W. Whitridge as receiver of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad during the pendency of the suit instituted by the Union Trust Company against the railroad company, the Central Trust Company and the Barber Asphalt Company.

A conflict has arisen between the Board of Estimate and the Public Service Commission over the South Shore Traction Company's franchise to operate cars across the Queensboro Bridge. The Board of Estimate granted the company a franchise recently, but the commission refused to approve the grant. The board, as a result, has passed a resolution, which concludes: "Resolved, That the Board of Estimate and Apportionment of New York, as the local authority under and pursuant to the provisions of the charter, intended to maintain all the rights and privileges conferred upon it, and to that end the Corporation Counsel is hereby directed to take all necessary steps to prevent what the board believes to be a usurpation by the Public Service Commission of the power conferred upon the board by the charter, and which in effect nullifies the action of the board in fixing terms and conditions in the granting of franchises and renders the performance of the duties imposed upon it by the provisions of the charter a mere idle ceremony, and to secure from the courts by any means open to the city a construction of the provisions of section 53 of the Public Service Commissions law which would definitely determine the powers of the said commission under such law."

By the terms of the order issued by the Public Service Commission the Staten Island Midland Railway and the Richmond Light & Railroad Company, Staten Island, are required to exchange transfers at three new points on a complaint made by Charles H. Blair, chairman of a transit committee of the Staten Island Chamber of Commerce.

Fire Destroys Indianapolis Car House.—The West Washington Street car house of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., was destroyed by fire on June 10. The blaze was discovered by a watchman at 4 a. m. and an alarm was promptly sounded. The plot on which the barn was located contains the repair and paint shops, but a fire wall prevented the flames from spreading to these buildings. An interurban limited car of the Terre Haute, Indianapolis & Eastern Traction Company, an interurban freight trailer, a large double-truck closed city car, three small single-truck closed cars and 10 single-truck open cars were destroyed.

Franchise Ordinance at Columbus Vetoed.—In the ELECTRIC RAILWAY JOURNAL of June 12, 1909, page 1095, mention was made of the passage by the City Council of Columbus, Ohio, of a 25-year franchise to the Ohio Electric Railway. The company was also granted permission to lay T-rails. Acting Mayor Rightmire has since vetoed the franchise. He says that provision should be made in the grant for the purchase of the property of the company at the expiration of the franchise and that T-rails are a menace and should not be permitted to be laid in Columbus. The ordinance was originally carried by a vote of 10 to 4, and can be passed over the veto by the same vote after 10 days.

Meeting of Central Electric Accounting Conference.—In view of the importance of the subjects to be discussed, a good attendance is expected at the meeting of the Central Electric Accounting Conference, at Columbus, Ohio, on June 19. The program in full was published in the ELECTRIC RAILWAY JOURNAL for June 5, 1909, page 1055. It includes an address by P. V. Burington, secretary and auditor, Columbus Railway & Light Company, and discussion on the subjects of the difficulties experienced with the Interstate Commerce Commission classification of operating expenses; traffic statistics; and payrolls, timekeeping and the best method of paying employees. R. N. Wallis, president of the American Street & Interurban Railway Accountants' Association, will attend the meeting.

Mayor of Bridgeport Suggests Cheaper Fare.—Mayor Lee of Bridgeport in a message to the Common Council of that city urges that a committee be appointed to take up with the Connecticut Company the question of selling six tickets for 25 cents. Mayor Lee in his message says: "I would recommend that efforts be made, by the appointment of a committee of conference, with the Connecticut Company, to obtain the consent of said company to the sale of six tickets for 25 cents, to all who desire to purchase tickets in that manner. This is done in other cities throughout the country, and I have been informed that where such a practice is in operation it has not only proved beneficial to the public, but also advantageous to the street railway companies that have authorized it. We ought at least to make an effort to bring about the operation of this system here."

Undeveloped Areas in Western Massachusetts.—L. S. Storrs, president of the New England Investment & Security Company, Boston, Mass., recently delivered a very interesting lecture before The Club of Springfield about undeveloped Western Massachusetts. Mr. Storrs said that electric railways are divided into three grand divisions, city lines, suburban lines and interurban lines, and that the interurban lines are usurping the business of the steam lines because they offer greater facilities for ready communication. Mr. Storrs also said that there are many abandoned farms in Western Massachusetts which with proper cultivation and the facilities which electric railways would afford for ready communication with places of distribution could be made to return a handsome profit on the investment and labor, and concluded "that the territory between the Berkshires and the Connecticut River, and especially that in the southern portion, should receive attention not only from those interested in transportation but from all who have the ultimate welfare of the commonwealth at heart."

Additional Report on Chicago Subways.—The final report of the subway bureau of the city of Chicago, supplementing the elaborate preliminary report abstracted in the Electric Railway Journal of March 27, 1909, page 562, has been made public. It contains four sets of plans for subways for street railways in the central downtown district of Chicago, ranging in estimated cost from $100,000,000 to $112,000,000. Each of the plans is so arranged that it may be made to include, besides the subway itself, galleries for public utilities. The plan which appears to meet with most favor provides for the construction of six through routes. Two of these will connect the north and south sides, two the north and west sides and the others the south and west sides. This plan also contemplates a so-called "depot loop"—a subway which will run around the heart of the city in close proximity to nearly all of the railroad stations. The capacities are said to provide for the growth of the population of Chicago at the present rate of increase, until the year 1932. Including standing room, the system will not reach its ultimate maximum capacity until 1950. The plans are not worked out in detail, and as it will be some time before an actual decision is reached in the matter of constructing street railway subways in Chicago, the proposals are largely tentative in form.

Outing of the New England Street Railway Club.—As mentioned on page 1094 of the Electric Railway Journal of June 12, 1909, the New England Street Railway Club will hold its annual June outing on June 22, 1909, on Narragansett Bay. The party will leave Boston from the South Station on special cars at 10:03 o'clock a. m. and is due to arrive in Providence at 11:08 o'clock a. m. At 11:25 o'clock the steamer *Warwick* of the Providence & Fall River Steamboat Company will leave Providence for Field's Point, where dinner will be served at 12 o'clock. At 1 o'clock the *Warwick* will sail down Narragansett Bay by way of the east passage to Newport, passing Newport, Fort Adams, etc., and will return to Providence by way of the west passage at 5:30 o'clock p. m. The special cars will leave for Boston at 5:58 o'clock p. m., and are due to arrive at the South Station, that city, at 7 o'clock p. m. Tickets, including transportation from Boston, dinner at Field's Point and the ride by steamer down Narragansett Bay, are $3. Tickets for members who join the party at Providence and who do not use the transportation ticket between Boston and Providence and return are $1.75. Members are requested to notify John J. Lane, 12 Pearl Street, Boston, Mass., the secretary of the club, of their intention to go on the outing.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The hearing before the joint legislative committee of the House and the Senate to consider the question of public utility legislation was continued on June 8. The session was an open one, the special subjects previously assigned having all been covered. It was intended at this session to give the members of both houses an opportunity to present any amendments, but none was offered. The principal speakers were George M. Wallace and Arthur C. Graves, New Haven. Mr. Wallace said that he represented stockholders in public service corporations who felt that the enactment of a bill creating a public service commission would work greatly to their detriment by hampering the operations of the companies in which they were interested. His opinion was that the creation of a commission would establish a precedent for bodies of that kind with sweeping powers, and might result in a demand for other governing bodies that would affect corporate interests even more directly. Mr. Wallace said that he had studied the proposed measure very carefully, and had come to the conclusion that it would simply be "a garden for the raising of plums for politicians." Mr. Graves said that he represented stockholders in public service corporations whose sentiments were similar to those of the clients of Mr. Wallace. He said that the power to regulate rates should be vested in a body with judicial functions.

Massachusetts.—Two important matters now under consideration, the railroad merger or holding bill of Gov. Draper and the new Boston city charter, make the date of adjournment uncertain. The House bill to authorize street railway companies to issue securities for supplying working capital has been passed to be engrossed by the Senate. The House has accepted the report of the committee, leave to withdraw, on the Richardson petition and bill relative to the distribution of the franchise tax on street railway companies. The committee on rules has referred to the next Legislature the petition of Frederic J. Stimson for legislation relative to judgments for damages against street railway companies, and the House has given this report a first reading.

Financial and Corporate

New York Stock and Money Market

June 15, 1909.

Although the stock market has lost none of its activity, during the past week there has been a pause in the advance movement of prices. Exceptions to the general weakness to-day were the traction stocks, which were active and higher on rumors that the reorganization plan of the Metropolitan Street Railway system would outline a scheme which would be much more advantageous to the owners than has heretofore been believed possible. Interborough-Metropolitan preferred gained 2 points to-day, while the common advanced with Metropolitan and Third Avenue securities.

The money market continues to be easy, with a very healthy demand for bonds. Quotations to-day were: Call, 1¾ to 2 per cent; 90 days, 2½ to 2¾ per cent.

Other Markets

In the Philadelphia market during the past week there has been very heavy trading in Rapid Transit stock. More than 100,000 shares have changed hands and the price has been forced down as low as 26⅞. The close to-day was 27¾. Union Traction has been weak around 52. Philadelphia Traction has been about 91.

Little was done in traction securities in the Chicago market. There has been some trading in Kansas City Railway & Light and a little business in Chicago Railways issues, especially Series 2 and 4.

In the Boston market, Massachusetts Electric preferred has been almost the only traction issue in the market. A few shares have been sold around 68. The common stock continues to sell in the neighborhood of 12½.

In Baltimore, the United Railways bonds continue to be active. Prices remain practically unchanged—4s, 87½; income 5s, 56½, and funding 5s, 80½.

Quotations of various traction securities as compared with last week follow:

	June 8.	June 15.
American Railways Company	a46	a46
Aurora, Elgin & Chicago Railroad (common)	a39¾	a41
Aurora, Elgin & Chicago Railroad (preferred)	a87	a88
Boston Elevated Railway	130¼	129
Boston & Suburban Electric Companies	*16	*16
Boston & Suburban Electric Companies (preferred)	70	*70
Boston & Worcester Electric Companies (common)	10	10
Boston & Worcester Electric Companies (preferred)	54	54
Brooklyn Rapid Transit Company	81¼	79¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	89	87½
Capital Traction Company, Washington	*136	*134
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	*4
Chicago & Oak Park Elevated Railroad (preferred)	*14	*14
Chicago Railways, ptcptg. ctf. 1	a109	a107
Chicago Railways, ptcptg. ctf. 2	a38	a37
Chicago Railways, ptcptg. ctf. 3	a26½	a26½
Chicago Railways, ptcptg. ctf. 4s	a10	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a79	a78
Consolidated Trac. Co. of N. J. 5 per cent bonds	a107	a106⅛
Detroit United Railway	59½	61⅝
General Electric Company	159½	161
Georgia Railway & Electric Company (common)	90¾	91
Georgia Railway & Electric Company (preferred)	85	*85
Interborough-Metropolitan Company (common)	16¼	17⅛
Interborough-Metropolitan Company (preferred)	45¼	48⅝
Interborough-Metropolitan Company (4½s)	78⅜	79⅞
Kansas City Railway & Light Company (common)	a50⅞	49⅝
Kansas City Railway & Light Company (preferred)	a86	a86
Manhattan Railway	a148	a148
Massachusetts Electric Companies (common)	12½	12¼
Massachusetts Electric Companies (preferred)	67	58
Metropolitan West Side, Chicago (common)	a19	a18
Metropolitan West Side, Chicago (preferred)	a55	a53
Metropolitan Street Railway	a27½	29
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	83½	85¼
Northwestern Elevated Railroad (common)	a24	a24
Northwestern Elevated Railroad (preferred)	a70	a69½
Philadelphia Company, Pittsburg (common)	a41¾	a42½
Philadelphia Company, Pittsburg (preferred)	a43½	a43¾
Philadelphia Rapid Transit Company	a30¼	a27¾
Philadelphia Traction Company	a92	a91½
Public Service Corporation, 5 per cent col. notes	*100¾	a100½
Public Service Corporation, ctfs.	a89¼	a89¼
Seattle Electric Company (common)	*108	*112½
Seattle Electric Company (preferred)	102	103
South Side Elevated Railroad, Chicago	a56½	a55
Toledo Railways & Light Company	10	a9
Third Avenue Railroad, New York	30	27½
Twin City Rapid Transit, Minneapolis (common)	*104½	105
Union Traction Company, Philadelphia	a56	a53⅞
United Railways & Electric Company, Baltimore	a12½	a12¾
United Railways Inv. Co., San Francisco (common)	38½	37½
United Railways Inv. Co., San Francisco (preferred)	56	a56
Washington Railway & Electric Company (common)	*42⅝	a43½
Washington Railway & Electric Company (preferred)	*90¼	a91
West End Street Railway, Boston (common)	a93	92
West End Street Railway, Boston (preferred)	107	*107
Westinghouse Electric & Manufacturing Company	85	85
Westinghouse Elec. & Mfg. Company (1st pref.)	a124	*124

aAsked. *Last sale.

Annual Report of the American Cities Railway & Light Company

The third annual report of the American Cities Railway & Light Company, covering the year 1908, contains a combined income statement of the subsidiary local companies. This report, which indicates that operating expenses and taxes required 60.3 per cent of gross earnings in 1908 and 62 per cent in 1907, is as follows:

COMBINED INCOME STATEMENT OF LOCAL COMPANIES.

	1908.	1907.	Increase.
Gross earnings	$5,435,494	$5,437,796	*$2,302
Operating expenses and taxes	3,280,248	3,371,703	*91,455
Net earnings	$2,155,246	$2,066,093	$89,153
Interest charges	1,228,215	1,140,662	87,553
Surplus	$927,031	$925,431	$1,600
Sinking funds	25,500	15,342	10,158
Surplus over sinking funds	$901,531	$910,089	*$8,558
Dividends declared and paid	617,176	604,676	12,500
Surplus over dividends	$284,355	$305,413	*$21,058

*Decrease.

The income account of the American Cities Railway & Light Company for the years 1907 and 1908, follow:

Income.	1908.	1907.
Dividends on stocks of local companies	$533,031	$521,965
Interest on loans to local companies	13,474	496
Interest on bank balances	1,391	4,293
Income from other sources	1	368
Total income	$547,897	$527,122
Expenses, including taxes	29,501	17,348
Net earnings	$518,396	$509,774
Dividend (6 per cent) on outstanding preferred stock	414,366	414,371
Surplus above preferred stock dividends	$104,030	$95,403
Previous surplus	200,125	104,722
Total surplus, Dec. 31,	$304,155	$200,125

The report states the following as the proportionate interest of the company in the undivided surplus earnings of the local properties and the actual cash surplus earnings of the company for the last two years:

	1908.	1907
American Cities Ry. & Light Co.'s share of surplus earnings over dividends	$259,686	$274,716
Surplus earnings collected as above	104,030	95,404
Total	$363,716	$370,120

J. K. Newman, the president, states in his report:

"Out of the undivided surplus earnings, the local companies set aside as reserve funds for renewals, betterments and contingencies, $218,875 in 1907, and $158,141 in 1908.

"The American Cities Railway & Light Company now owns in the aggregate 84.1 per cent of the preferred stock and 88.9 per cent of the common stocks of the following companies: Birmingham Railway, Light & Power Company, Memphis Street Railway, Little Rock Railway & Electric Company, Knoxville Railway & Light Company, Houston Lighting & Power Company, 1905.

"The results achieved by all the companies during the past year are remarkable, considering the extent of the industrial depression through which we have passed. The slight decrease in gross earnings was considerably more than counterbalanced by reductions in operating expenses, so that in spite of an increase in taxes, the combined net earnings of the five companies were $89,152 greater in 1908 than in the previous year.

"In the face of the material losses in earnings, both gross and net, experienced during the past year by nearly all the steam railroads, this showing cannot but be recognized as another demonstration of the fact that electric railways and lighting companies have in times of depression a distinct advantage over the steam roads, by reason of the fact that the demand for the public necessities which they supply is fairly constant and is not materially affected by business depression.

"In all the properties the tide seems now to have turned. December, 1908, showed an increase in both gross and net earnings over December of the previous year; while January and February, 1909, show further marked improvement, which will result in a very substantial increase in net earnings, as the economies in operation instituted during the last year will continue to bear fruit.

"The item which has absorbed practically the entire increase of $89,153 in net earnings is interest charges. The increase in this item is due to paying interest on nearly $1,500,000 put into new construction, which was mainly contracted for before it became apparent that the slackening of general business would postpone the time when the companies would require increased facilities to handle their business. This expenditure has been made, however, and although the additional facilities thus afforded have not been needed in 1908, they are available to take care of the increases in business which the companies are once more experiencing.

"Attention was called a year ago to the unsatisfactory power house results in Birmingham. We are pleased to be able to report that the changes made have proved entirely satisfactory and the results in the way of efficient and economical operation of the power house, are extremely gratifying.

"In Memphis, also, the power house operation has been materially improved, though it cannot be expected to be entirely satisfactory until the completion of the new power house, of which only one section is now finished and in operation."

Attention is called by Mr. Newman to a statement showing that from 1903 to 1908 the following changes took place in the five properties: Gross earnings, increase, 81.5 per cent; operating expenses and taxes, increase, 95.7 per cent; net earnings, increase, 63.6 per cent; interest, increase, 75.3 per cent; surplus, increase, 50.3 per cent; surplus after sinking funds, increase, 46.2 per cent. Mr. Newman continues:

"The temporary halt in the upward movement produced by the past year of depression promises to prove merely a breathing spell in which to get all construction matters caught up before starting upon another period of steady increases.

"The physical condition of your properties is excellent. During the past year the Birmingham company has completed the installation of automatic stokers and the most up-to-date ash-handling apparatus in its power plant. These have materially reduced the power cost.

"The capacity of the Little Rock and Houston power plants has been increased by the installation of a new 1500-kw turbine in each.

"In all the properties there have been nearly the normal amount of electric lighting extensions, while a few minor railway extensions have also been made. New cars have been added to the equipment in Birmingham and Little Rock.

"The power-plant capacity and car equipment now provided are adequate to take care of an increase of nearly 25 per cent in business if uniformly distributed. This makes it unnecessary for these companies to spend any very large amount for construction this year.

"The lessened construction requirements of the last 15 months, due to slackening of business, have given your companies an excellent opportunity to fund their previous construction indebtedness. The Birmingham company has sold $250,000 of 6 per cent refunding and extension mortgage bonds in addition to completing the delivery of the $1,000,000 sold in 1907. This leaves the company with no current indebtedness for construction except a loan of $150,000 from your own compay.

"The Little Rock Railway & Electric Company executed during the year a mortgage to secure an authorized issue of $5,000,000 refunding and extension mortgage bonds. Of these, $2,000,000 will be reserved to refund the outstanding first mortgage bonds; $500,000, bearing 6 per cent interest, are issuable at the discretion of the company, while the remaining $2,500,000, to bear such interest not exceeding 6 per cent as the directors shall determine, will be issuable from time to time for 80 per cent of the cost of additions, and subject to very carefully drawn restrictions. This is mentioned as it indicates the comprehensive plan now being generally followed for the future development of these properties. The proceeds of the $365,000 of these bonds which the company has sold are more than sufficient to pay off all of the company's current indebtedness for construction.

"The Memphis Street Railway has recently sold $300,000 consolidated mortgage 5 per cent bonds, which has permitted it to pay up its entire current construction indebtedness.

"The Knoxville Railway & Light Company during the past year sold $200,000 of its consolidated bonds, thus funding the balance of its construction indebtedness and providing for its few pressing construction requirements.

"The Houston company now has no current indebtedness for construction except $50,000 loaned by your company.

"The net result of this financing, therefore, has been to leave all the local companies entirely free from floating indebtedness (except the loans from this company) and with cash balances aggregating more than $400,000."

Union Railway, Gas & Electric Company

E. W. Clark & Company, Philadelphia, and Hodenpyl, Walbridge & Company, New York, have drafted a plan for the organization of the Union Railway, Gas & Electric Company to take over the Springfield Railway & Light Company, Springfield, Ill.; Peoria (Ill.) Light Company,

Evansville (Ind.) Light Company and the Rockford & Interurban Railway, Rockford, Ill.

The bonds, preferred stock and common stock of the Union Railway, Gas & Electric Company will be issued in exchange for the preferred and common stocks of the four companies named and for $500,000 cash, in the following proportions: For the stock of the Springfield Railway & Light Company there will be issued 100 per cent in new 5 per cent bonds of 6 per cent preferred stock (at option of holder) and 50 per cent of new common stock; for the preferred stock of the Peoria Light Company 100 per cent in new bonds or preferred stock and 20 per cent of new common stock; for the common stock of the Peoria Light Company, 70 per cent of new bonds or preferred stock and 30 per cent of new common; for the preferred stock of the Evansville Light Company, 100 per cent of new bonds or preferred stock and for the common stock of the Evansville Light Company 100 per cent of new common stock. For all common stock and redemption of the preferred stock of the Rockford & Interurban Railway and for $500,000 cash, $1,500,000 in new bonds or preferred stock and $2,050,000 of new common stock will be issued.

The present capitalization of the four companies, exclusive of underlying bonds, and the distribution of the new securities to be given in exchange follow:

	Present capitalization.		Exchange value.	
	Preferred stock.	Common stock.	New bonds or preferred stock.	New common stock.
Springfield Railway & Light Company	.....	$3,000,000	$3,000,000	$1,500,000
Peoria Light Company	$1,000,000	2,500,000	2,750,000	950,000
Evansville Light Company	1,000,000	1,500,000	1,000,000	1,500,000
Rockford & Interurban Railway	50,000	1,000,000	1,500,000	2,050,000
Total	$2,050,000	$8,000,000	$8,250,000	$6,000,000

The total underlying bonds of the various companies are as follows: Springfield Railway & Light Company, $3,500,000; Peoria Light Company, $3,500,000; Evansville Light Company, $1,250,000; Rockford & Interurban Railway, $2,714,000; total, $10,964,000. The combined earnings of the four companies for the year ended April 30, 1909, show gross receipts of $2,674,219 and net earnings of $1,314,440. Of these net earnings, $627,252 was taken up by taxes and bond interest of subsidiary companies, leaving net profits of $687,188, which would have been applicable to the securities of the proposed holding company.

Deposits of stocks of the merging companies must be made on or before June 21, 1909. Unless the plan shall have been declared operative on or before July 15, 1909, the deposited stocks will be returned.

Present Status of Chicago Elevated Railway Consolidation

The committee composed of Ira M. Cobe, E. K. Boisot and Samuel Insull which proposed a plan for leasing the Northwestern Elevated Railroad, the Chicago & Oak Park Elevated Railroad, the South Side Elevated Railroad and the Metropolitan West Side Elevated Railway through the Central Terminal Company, has announced that negotiations will be suspended for the present at least. The statement of the committee follows:

"The matter being one of public interest, the members of the committee have thought it desirable to give out a statement showing the status of the proposed leasing of the several elevated railways in Chicago. For some time past progress has been so far made with the Northwestern Elevated Railroad and the Chicago & Oak Park Elevated Railroad as to justify us in the belief that no practical difficulty would arise in concluding arrangements with these lines.

"In the negotiation with the Metropolitan West Side Elevated Railway substantial progress has been made, but not to an extent sufficient to justify us in stating whether or not an agreement would have been reached.

"The negotiation with the South Side Elevated Railroad has terminated. We have not been able to meet the requirements of the directors of that company as to the amount of rentals, and negotiations with that company have, therefore, been terminated. Inasmuch as we do not think it advisable to effect unification of the elevated lines except upon the basis of operating all of the properties, we do not think it advisable to proceed further with negotiations, at any rate for the present."

The terms proposed for leasing the companies were published on page 924 of the Electric Railway Journal of May 15, 1909, and page 1002 of the Electric Railway Journal of May 29, 1909.

Angelo Power & Traction Company, San Angelo, Tex.—The property of the Angelo Power & Traction Company has been sold at receiver's sale to Samuel Crowther, San Angelo, for $38,000.

Babylon (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized the Babylon Railroad to increase its capital stock from $25,000 to $75,000 and to issue a first mortgage for $300,000 covering all its property.

Chattanooga (Tenn.) Railways Company.—E. W. Clark & Company, Philadelphia, Graham & Company, Philadelphia, and Hodenpyl, Walbridge & Company, New York, announce that the agreement to consolidate the Chattanooga Electric Company and the Chattanooga Railways Company has been declared operative, holders of more than 90 per cent of the preferred and the common stock of the Railways Company having assented to the plan.

Columbus Railway & Light Company, Columbus, Ohio.—The Columbus Railway & Light Company has arranged to sell $490,000 of Columbus Street Railway first mortgage, 5 per cent gold bonds, due July 1, 1932. This is a portion of an authorized issue of $3,000,000 of which $2,509,000 are now outstanding. The money realized from the sale of these bonds will be used to take up first mortgage 5 per cent bonds of the Columbus Consolidated Street Railway, due July 1, 1909.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—An initial quarterly dividend of 1½ per cent on the $500,000 of 6 per cent preferred stock of the Fonda, Johnstown & Gloversville Railroad was paid on June 15 to holders of stock of the company of record on June 10.

Metropolitan Street Railway, New York, N. Y.—The Central Trust Company, New York, and William A. Read & Company, New York, have purchased $3,500,000 of Metropolitan Street Railway receivers' certificates dated June 15, 1909, to run one year at 4½ per cent, issued to retire $3,500,000 of 5 per cent certificates maturing on June 15, 1909. The certificates are offered for subscription at 100¼.

New York State Railways, Rochester, N. Y.—The New York State Railways has applied to the Public Service Commission of the Second District of New York for permission to increase its capital stock from $23,140,200 to $23,860,200, for permission to purchase the stocks of various street railways and to execute a first consolidated and refunding mortgage to secure $35,000,000 bonds, and to issue at present $6,500,000 bonds under this mortgage. The increase of stock of $720,000 is to consist of common stock. With $674,700 of its new stock it is proposed to purchase from the New York Central & Hudson River Railroad and the Central Railway Syndicate their holdings of stock of the Rochester & Suburban Railway, Rochester Electric Railway and Ontario Light & Traction Company, giving an equal amount of the new common stock at par in exchange. The company also desires to acquire, from time to time, the remaining outstanding stock of the Rochester & Suburban Railway, and the Rochester Electric Railway, amounting to $45,300. The $6,500,000 bonds to be issued are to refund the outstanding bonds of the Rochester & Eastern Rapid Railway, to acquire the bonds of the Rome City Railway, Rochester & Suburban Railway and notes of the Syracuse Rapid Transit Railway, Utica & Mohawk Valley Railway, Ontario Light & Railway Company, Oneida Railway, Rochester Railway, and Rochester & Eastern Rapid Railway. In addition, provision is made for $1,693,366 in bonds, to provide funds for the acquisition of property, construction and extension.

Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.—The suit of the Knickerbocker Trust Company, New York, against the Tarrytown, White Plains & Mamaroneck Railway to foreclose the mortgage held by the Knickerbocker Trust Company against the railway has been heard before Supreme Court Justice Keogh, at White Plains. It is expected that the final decree ordering the sale of the road will be entered this month.

Virginia Railway & Power Company, Richmond, Va.—The Virginia Railway & Power Company will be incorporated under the laws of Virginia to take over the properties of the Virginia Passenger & Power Company, the Richmond Passenger & Power Company and the Richmond Traction Company from the receivers on June 30, in accordance with the plan of the bondholders for reorganizing the companies. The capital stock of the Virginia Railway & Power Company will be $12,500,000, of which $7,500,000 will be common stock and $5,000,000 non-cumulative preferred stock, entitled to dividends of not more than 5 per cent up to Jan. 1, 1914, and not more than 6 per cent thereafter. The authorized bond issue will be $15,000,000 all 5 per cent, 25-year, first and refunding bonds, of which $9,600,000 will be issued at once or reserved under the plan of reorganization to retire outstanding issues of subsidiary companies. The amount to be used for retiring underlying bonds is $1,800,000; about $7,800,000 will be sold.

Traffic and Transportation

Arbitration of Wages at Scranton

The board of arbitration selected to consider the question of the readjustment of the wages and terms of service of the employees of the Scranton (Pa.) Railway, in accordance with the agreement between the men and the company, began the taking of testimony on June 7, and concluded the hearings on June 10.

As stated in the ELECTRIC RAILWAY JOURNAL of June 5, 1909, page 1060, the board consisted of five members, H. E. Paine and D. B. Atherton for the company, and William Corless and P. E. Kilcullen for the men, with Judge George Gray, of the United States Circuit Court of Appeals, as chairman. The men desired a flat rate of 25 cents an hour for motormen and conductors, as compared with the rate of 20, 21 and 22 cents an hour, respectively, for the first, second and third year of service now in force, and an increase of 20 per cent for men employed in various capacities in the shops and barns. The company was represented by H. B. Gill, Philadelphia, chief counsel; C. P. O'Malley, of Willard, Warren & Knapp, local counsel for the company; C. L. S. Tingley, vice-president of the American Railways Company; Frank Caum, general manager, and P. T. Reilly, superintendent.

Judge Gray suggested that the men's side be heard first. A clerk in the employ of the railroad department of the Bureau of Internal Affairs of Pennsylvania was accordingly called to testify to the reports of the company as filed with the State. Extracts from the reports of the company for 1906, 1907 and 1908 were presented in an effort to show that the earnings were sufficient to warrant the increases which have been requested. P. J. Shea, for the men, testified regarding the rates of wages paid to employees for similar service in other cities, and said that in Pittsburgh, Albany, Troy, Rochester, Wilkes-Barre, and other cities the wages were higher than in Scranton. Cross-examined by Mr. O'Malley, Mr. Shea admitted that the method of assigning runs in Scranton is more beneficial to the men than in the cities mentioned, and that perquisites such as 50 free rides a month to the families of employees are not given in the cities he mentioned. Several local merchants and real estate dealers who were called said that the cost of living in Scranton had increased materially within the last few years.

The company's side was heard on June 8. C. L. S. Tingley, vice-president of the American Railways Company, explained the acquisition of the Scranton Railway by the American Railways Company. He said that many improvements to the system are necessary, and outlined a program of reconstruction for the next three years which involves the following expenditures: New power house to cost $500,000, machinery for transforming alternating current to direct current, $20,000; Mulberry Street double tracking, $19,000; another $100,000 for track improvements; new car barn, $80,000, and $120,000 for the proposed viaduct across Carbon Street; viaduct at Old Forge, $16,000; bridge at Moosic, $1,000; 10 new double-truck cars, $60,000, and 10 single-truck cars, $40,000.

While Mr. Tingley was on the stand, reports compiled by the Department of Commerce and Labor at Washington were submitted to show the prices of commodities during the three years beginning with 1906. Mr. O'Malley for the company said he had data from local merchants, but that he was satisfied to accept the Government's figures. Judge Gray said that the reports of the local merchants were preferable as the matter under consideration concerns the workmen of the same community as the merchants. Mr. O'Malley's statements from the local merchants were not signed, and Mr. Powell for the men objected to their admission, contending that they should not be considered as evidence unless the papers showed that they contained listed prices coming direct from the merchants. Being instructed by Judge Gray to have the statements signed, Mr. O'Malley said this was impossible, as the merchants were afraid of a boycott. Judge Gray then gave vent to his feeling about the boycott. He said:

"I thought that cowardly practice had died out here long ago. It is seven years since there was any of it around here, and I don't believe there is any of it practised here now. That has been condemned by all Americans and justly so. It is cowardly and un-American and utterly indefensible, and no man dare stand up and say he could defend it. If this man is afraid to sign that report, he will say he is, and if he does we will proclaim it through the press to the country to the discredit and miserable shame of Scranton. I am very much in favor of labor unions, but nothing has acted so much to their discredit and disgrace as that miserable, un-American, cowardly system of boycotting. No man would submit to it. It was never submitted to by the American people and it never will. I would die in my tracks before I would submit to it."

Judge Gray refused to admit as evidence a statement showing the wages earned by employees previous to their entrance into the service of the railway company. During this hearing the company offered a scale of wages dividing the men into three classes, each class providing for a deduction of from 6 per cent to 10 per cent for lost time. The scale called for the following wages for all men who lost more than 10 per cent of their time during 1908, the new scale to be effective from April 1, 1909, to January 1, 1910: Grade A—18, 19 and 20 cents an hour for the first, second and third year and thereafter. Grade B—for all who lost from 6 per cent to 10 per cent of time, 19, 20 and 21 cents. Grade C—for all who lost less than 6 per cent, 20, 21 and 22 cents an hour.

The session on June 9 was given over largely to the taking of testimony of an oral and documentary character by the company to show that the employees are receiving wages proportionally as high as those paid to other labor, both skilled and unskilled. Judge Gray, late in the afternoon, asked counsel if they would sum up before adjournment and it was decided by both sides to sum up on June 10, on which date both sides reviewed the evidence and the matter went to the arbitrators.

The members of the board of arbitration announced their finding on June 13. They recommend an increase of 1 cent an hour for motormen, conductors and car-house men over the present scale, and that all men who have been employed six years or more receive 24 cents an hour. The question of a reduction for lost time on a 365 working-day basis for a year was eliminated, following the opinion expressed during the hearings by Judge George Gray that no workman should be expected to work 365 days in a year. The scale as fixed by the arbitrators follows: First year, 21 cents; second year, 22 cents; third, fourth and fifth years, 23 cents; sixth year and afterward, 24 cents.

New York Fender Hearings

The hearing on fenders and wheel-guards for Manhattan and Bronx boroughs was continued on June 9 before Commissioner Maltbie of the First District, New York. The first witness was Ralph Sanger, representing Wonham, Magor & Sanger, makers of the Hudson-Bowring wheel-guard. Mr. Sanger was permitted to take the stand to refute a statement that his company's wheel-guard had failed to save a life on the Third Avenue Railroad. The officials of the railroad company had not only advised him that this statement was untrue, but that, on the contrary, Hudson-Bowring wheel-guards had been instrumental in saving three lives since their installation. The wheel-guards had picked up the persons on the tray in every case without pushing them forward. Mr. Sanger added that some 26,000 H-B equipments are in service in about 200 cities. American cities outside of New York using this guard are Montreal and Quebec, but orders have also been received from several companies elsewhere. Snow and ice had not interfered with the operation of the guard. Its adaptability for severe grades was illustrated by a change made in the guards ordered for San Francisco, whereby a special pedal permits the motorman to avoid tripping when going up a hill.

The second witness was R. H. Nexsen, assistant electrical engineer of the Public Service Commission. Mr. Nexsen described how he had measured clearances on the plow-guards used on 58 cars of the Second Avenue line. The noses of 16.7 per cent of the plows were 1 in. and less above the slot rail; of 21.6 per cent, 1 in. to 2 in.; of 33.3 per cent, 2 in. to 3 in.; of 21.6 per cent, 3 in. to 4 in.; of 4.6 per cent, 4 in. to 5 in.; of 2.3 per cent, 5 in to 6 in. Examining the condition of the guards, he had found that 28.6 per cent had the rubber facing worn and 31 per cent had bent frames. The nose clearances in 50 per cent of the plows were greater than the clearances at the sides. The side clearance was the perpendicular distance between the lowest part of the fender and the top of the girder rail.

The last witness was G. F. Daggett, chief of the accident bureau of the commission. Mr. Daggett said that he had from five to seven inspectors who are assigned to report accidents. His files showed that from Aug. 5, 1907, to the date of the hearing there had been 64 accidents on the Second Avenue line in which wheel-guards were concerned. In 23 of these accidents the wheel-guards were involved directly. Of the 64 accidents, 25 resulted in death. Fifteen of these fatal accidents were due to the operation or lack of operation of the wheel-guard. Brainard Tolles, of counsel for the Second Avenue Railroad, objected to Mr. Daggett's production of a more detailed statement as the

evidence showed that the guards were not kept in good condition previous to the present receivership. H. H. Whitman, of counsel for the commission, asserted that the guards were now kept in no better condition than before. Mr. Daggett testified further that many of the fatal accidents were due to portions of clothing being caught under the fender or through the pushing of the bodies.

At the session on June 14, James Griffin, car house foreman of the Second Avenue Railroad, testified with regard to the attachment and care of pilot guards. He also had had charge of some automatic trip fenders on a crosstown line, and had found that they were difficult to maintain in operative condition. George W. Linch, receiver of the company, then gave some details in connection with a wheel guard accident about which Mr. Griffin had been examined. The hearing was then closed.

Car Gates in Birmingham

The Birmingham Railway, Light & Power Company has equipped all of its loop cars with gates, and began a full service with cars so equipped on June 12. In order to prepare the public for the change, the company carried a large advertisement in the daily papers illustrating cars with gates closed and open, with the following comment:

"Commencing to-day we will inaugurate a new system for the prevention of platform accidents. On all loop cars, commencing this morning, will be found wire gates which will be opened and closed by the motorman to allow passengers to get on and off the cars. There are gates on both the front and rear end of the cars, and the motorman closes the gates by a lever before he starts the car. This prevents any one from getting on the car after it has started. When the car is stopped, the motorman opens the gates with the same lever. When the gates are closed no one can get off the car.

"We have studied this system as applied elsewhere and find that it secures excellent results in preventing platform accidents. We are installing it on all our cars as fast as they can be sent to the shops. There is a double reason for trying to reduce accidents; the greatest being our desire to prevent suffering in all forms as caused by street car accidents, and in this effort the public should join us heartily, and the other reason is to reduce our annual expense caused by damage suits and claims growing out of accidents.

"Before passing judgment on the gates see how they operate, study the humanitarian question involved and bring the matter of accident home to your own family. If the use of gates prevents accidents we are mutually benefited and should be satisfied."

Bion J. Arnold on the Width of Chicago's Devil Strip

Bion J. Arnold, of the Board of Supervising Engineers, of Chicago, in a recent letter to the Council committee on local transportation said:

"Were I commissioner of public works, I would issue no further permits for track construction unless the distance between track centers was 10 ft. 2 in.

"It is practicable to secure a greater distance between track centers than 9 ft. 8½ in., the present standard, and it should be done on all future tracks. My original position in this matter was that we should increase the track centers to 10 ft. 2 in. and narrow the cars to 8 ft. 6 in., thus giving a distance of 20 in. between the cars and leaving the space between the sides of the cars and the curbstone the same as it now is. Had this position been sustained by the board, in my judgment we would have a system which would have been much safer than it is with the present clearance of 8½ in. between some of the cars.

"With a space of 20 in. no one is going deliberately to attempt to stand between the cars with the idea that he will be safe in the position, but in case a person is caught between the cars this space will give sufficient room to prevent the person being crushed, and I contend that every additional inch of room that we can get between the cars over the present space of 8½ in. should be secured.

"It is my opinion that if the local transportation committee of the City Council would take a firm stand and pass an ordinance to the effect that the distance between track centers on all tracks that are laid from this day forward in the city shall be 10 ft. 2 in., and that no cars hereafter shall be built which are more than 8 ft. 6 in. over all in width, that it would be done promptly. As time went on the present width cars could be eliminated, and ultimately we would have a reasonably safe traction system, so far as the danger of persons being crushed is concerned."

The committee has agreed to take up the subject in conference with the supervising board at a later meeting.

Advertising Campaign in Savannah.—The Savannah (Ga.) Electric Company has commenced an extended advertising campaign in the local newspapers at Savannah, with the prevention of accidents as the end in view. The illustrations are well-devised examples of "what might happen," and they appear in each paper twice a week.

Agreement Between Employees and the Michigan United Railways.—The terms of a contract between the Michigan United Railways, Jackson, Mich., and its employees to govern terms of service have been agreed upon, but the contract has not yet been formally executed. The company has agreed to recognize the men as the employees' benefit society, the men to be free to join or not to join the employees' association.

Baseball and Limited Train Schedule.—The Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, has issued a 4-page, vest-pocket baseball and limited train schedule. The Cleveland Club of the American League plays at Willoughby-beach Park, which has become popular for picnics, outings, reunions and conventions and the company has even gone so far as to arrange to sell tickets over its line from Ashtabula, Geneva, Unionville, Madison and Perry which include a 50-cent admission to the ball grounds. A complete schedule of the Cleveland Club at home and abroad is a feature of the publication.

New Flier Between Muncie and Indianapolis.—The Indiana Union Traction Company, Anderson, Ind., has issued a folder describing the new high-speed service between Muncie and Indianapolis. The train making the run is known as the "Muncie Meteor." The folder presents halftone engravings of the parlor cars used for the run and views of the Indianapolis and the Muncie terminal stations. The "Muncie Meteor" leaves Muncie at 8 o'clock each morning and returning leaves Indianapolis at 6 p. m., making the run of 57 miles in 1 hr. 45 min., stopping only at Anderson. Six other fast trains are included in the daily schedule.

Decision Regarding the Height of Steps in Toronto.—The Ontario Railway & Municipal Board has ordered that the floors of the cars operated in Toronto shall not be less than 40 in. above the rail level. In all new cars the standards for steps are to be as follows: Open double-truck cars are to have the bottom step from 14 in. to 16 in. above the ground, and the two upper steps 14 in. to 12 in. higher again. In open single-truck cars the heights are to be, for the bottom steps, 12 in. to 15 in., and for those above, 12 in. to 9 in. The first step of closed double-truck cars is to be 14 in. to 16 in. from the ground. In closed single-truck cars the height is to be 12 in. to 15 in.

"How to See Duluth and Superior."—The Duluth Street Railway, operating in Duluth and Superior, has issued a de luxe folder describing these cities and telling how the points of interest in them can be reached by the company's lines. Particularly interesting features of the publication are two panoramic views of the Duluth-Superior harbor with its heavy lighter and steamship traffic. There is also a map of the cities on which are shown the principal street railway lines and many steamship routes. This map is printed in colors and is somewhat unique in map making. The cover is in colors and has for its subject the picturesque aerial bridge spanning the ship canal. This bridge is 34 ft. wide, 393 ft. long and spans the harbor at a height of 135 ft.

Traffic Folder Issued by the East St. Louis & Suburban Railway.—The East St. Louis & Suburban Railway, East St. Louis, Ill., has issued an attractive traffic circular printed in colors descriptive of its lines. There is a complete list of places that can be reached from East St. Louis and St. Louis with the fare between points. In addition specific instructions are appended for reaching Alton, Belleville, Collinsville, Edwardsville and other places to which the company's lines extend. Alton, Edwardsville, Lebanon, Belleville and other places are described and illustrated. There is also a map of the system. The publication is concluded with a time card of the suburban lines, including the Alton division and connecting lines and the owl cars on the city lines.

Special Newspaper Advertising of the Detroit United Railway.—For several years the Detroit (Mich.) United Railway has operated a high-speed service between Port Huron and Detroit, Mich., over its Rapid Railway division in competition with the Grand Trunk Railroad at a through fare slightly lower than the regular fare of the steam road. A substantial portion of the traffic between Port Huron and Detroit originates in the section of Michigan known as "The Thumb," lying between Lake Huron and Saginaw Bay, and served by a branch of the Pere Marquette Railroad, which terminates at Port Huron. With a view to

inducing the Detroit-bound passengers from "The Thumb" to ride from Port Huron to Detroit over the electric railway, the advertising department of the Detroit United Railway is running advertisements in about 30 local newspapers located along the steam railroad in the territory north and west of Port Huron and mails folders to about 100 hotels located in "The Thumb" district, with the result that people are learning that when they change cars at Port Huron they can reach Detroit by the electric railway as quickly as by steam at a fare slightly less than charged by the steam roads.

Circular Regarding Accident Reports in Indiana.—The Railroad Commission of Indiana has mailed Circular No. 41 to the steam and electric railways in Indiana for the purpose of aiding in the organization of the service necessary in reporting, tabulating and preserving the information to be reported concerning accidents on steam and electric railways. The circular is divided into six divisions, as follows: Who Reports, Preliminary and Final Reports, What Report Shall Contain, What Not to be Reported, Forms for Reports and Mailing Reports. Subdivisions 5, 6 and 7 of Section III, entitled "What Report Shall Contain," follow: All accidents other than those occurring in shops, road houses, power houses, on boats or at wharves, are to be reported whether the persons killed or injured be employees, passengers or other persons when the accident occurred in connection with train movement at depots or depot grounds, in the yards, at terminals or anywhere along the line. If the accident was occasioned on account of defective safety appliances, such as air-brakes, automatic couplers, standard drawbars and handholds, the report must give the numbers and initial of the defective car, point of origin and destination of the freight, if loaded. Where accidents are occasioned by defective or broken rail, give weight and make of rail and date laid.

Fast Through Express Trains.—A fast freight and express train has recently been put in service between Indianapolis and Garrett, Ind., operating over the lines of the Indiana Union Traction Company, the Fort Wayne & Wabash Valley Traction Company and the Toledo & Chicago Interurban Railway. This train is primarily for the use of the United States Express Company, which loads a car at Garrett each day at the connection between the Baltimore & Ohio Railroad and the Toledo & Chicago Interurban Railway to be run through to Indianapolis as a trailer. From Fort Wayne to Indianapolis the express train comprises the trailer, loaded by the United States Express Company, and a freight motor car operated by the Fort Wayne & Wabash Valley Traction Company and the Indiana Union Traction Company. The run from Fort Wayne to Indianapolis, 124 miles, is made each way in four hours. F. D. Norviel, general passenger and freight agent of the Indiana Union Traction Company, states that, although this service has just been started, the through car for the United States Express Company carries a full load both ways each day, in addition to the regular freight and express business of the three interurban systems over which it is operated. By means of this special through service the United States Express Company is enabled to make Indianapolis a distribution point for express matter collected between Chicago and the Atlantic Coast along the line of the Baltimore & Ohio Railroad.

Uniform Wage Scale Adopted by the Public Service Railway.—The Public Service Railway, Newark, N. J., has voluntarily increased the wages of conductors and motormen on its Southern division, with headquarters at Camden. When the property at Camden was taken over by the Public Service Corporation several years ago, the men were receiving a maximum of 17 cents an hour. The company increased this to 19 cents an hour and promised two years ago to put into effect the same scale of wages which prevails on the other divisions of the company's property as soon as the earnings of the Southern division warranted it. In the judgment of the executive officers of the company that time has arrived. The announcement was made to the men during a smoker held at the Camden car barn on June 7. It came as a surprise to the men, as no demand for an increase had been made by them and they were not aware that an increase had been contemplated at this time. The company's action is really an equalization of the wages paid to its trainmen, as the scale which will go into effect July 1 on the Southern division is identical with that which has prevailed for some time on the Northern and Central divisions of the company's property. All the men will now be paid 20 cents an hour for the first year; 21 cents from the second year to the fifth year; 22 cents from the fifth year to the tenth year, and 23 cents after the tenth year. The announcement was made verbally by John Burleigh, vice-president of the company, and N. W. Bolen, superintendent of transportation.

Personal Mention

Mr. George E. Tener has been elected a director of the Philadelphia Company, Pittsburgh, Pa., to succeed Joshua Rhodes, deceased.

Mr. J. H. Reed, Jr., has been elected general controller and purchasing agent of the Philadelphia Company, Pittsburgh, Pa., to succeed Mr. Matthew Bigger.

Mr. Charles H. Hubbell and **Mr. C. F. Handshy** have been appointed joint successors to Mr. A. C. Murray, supervisor of expenditures of the Illinois Traction System, Champaign, Ill., resigned.

Mr. George H. Earle, Jr., was elected at a joint meeting of the Councils of Philadelphia on June 10 to succeed Mr. Clarence Wolf as one of the representatives of the city of Philadelphia on the board of directors of the Philadelphia Rapid Transit Company.

Mr. E. D. Grimes, a director of the City Railway, Dayton, Ohio, and secretary of that company, has been elected president of the company to succeed Mr. D. B. Corwin, whose resignation is announced elsewhere in this column. Mr. Grimes has been connected with the Tower Varnish & Drier Company, Dayton, for 20 years, and is a director of the Dayton National Bank.

Mr. Martin J. Insull, general manager of the Louisville & Northern Railway & Lighting Company, New Albany, Ind., has been appointed operating manager of the Indianapolis & Louisville Traction Company, with headquarters in New Albany. Mr. Insull succeeds Mr. W. S. Kuhn and Mr. J. S. Kuhn, Pittsburgh, who have been acting as operating managers of the Indianapolis & Louisville Railway since the resignation of Mr. A. A. Anderson, general manager of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., about a year ago. Mr. Insull will continue as general manager of the Louisville & Northern Railway & Lighting Company.

Mr. A. E. Reynolds, whose appointment as general manager of the Hudson Valley Railway, Glens Falls, N. Y., was announced in the ELECTRIC RAILWAY JOURNAL of June 5, 1909, was formerly treasurer and general manager of the Plattsburgh (N. Y.) Traction Company. Mr. Reynolds entered the employ of the Plattsburgh Light, Heat & Power Company 18 years ago, and since that time he has been prominently identified with nearly all the movements which have had for their object the betterment of Plattsburgh. He has been associated with the Plattsburgh Traction Company from its formation, becoming treasurer upon the death of D. F. Dobie. He has been general manager of the company since 1903. Mr. Reynolds has for several years been secretary of the Macdonough Club, of Plattsburgh. He was one of the organizers of the industrial branch of the club and has always taken an active part in the work assigned to that branch of the organization.

Mr. L. H. Rodenbaugh has been appointed traffic manager of the Central California Traction Company, Stockton, Cal. Mr. Rodenbaugh was born at Plymouth Meeting, Pa., April 1, 1874. He began his railroad work in 1890 with the Philadelphia & Reading Railroad, with which he served as a telegraph operator. Since then he has held positions with different steam railroads as block signal operator, telegrapher, freight cashier, agent, train dispatcher, ticket agent and traveling passenger agent, serving in these different capacities with the Pennsylvania Railroad, New York, Chicago & St. Louis Railroad, Missouri Pacific Railway, Old Colony Railroad, New York, New Haven & Hartford Railroad and the Southern Pacific Railroad. Mr. Rodenbaugh entered the employ of the Southern Pacific Railroad in April, 1903, as assistant agent. In January, 1905, he was appointed general passenger agent and held that position until quite recently when he resigned to become connected with the Central California Traction Company.

Mr. D. B. Corwin has resigned as president of the City Railway, Dayton, Ohio. Mr. Corwin has been a prominent factor in business and political life in Dayton for about 50 years. He was associated with the Republican State and County executive committees for many years and at one time was chairman of these committees. In 1873, Mr. Corwin was elected State Senator. He was elected State Solicitor in 1867 and was re-elected to that office in 1869. Up to 1880, Mr. Corwin gave his attention almost exclusively to the practice of law. In that year, however, he and Mr. A. A. Thomas organized the Fifth Street Railway, and in 1881 the line was constructed. In 1892 several of the local city lines at Dayton, including the Fifth Street Railway, were consolidated as the Dayton City Railway largely through the influence of Mr. Corwin, who was elected president of the company and has served in that

capacity since that time. Mr. Corwin will continue as a director of the City Railway.

Mr. B. R. Stephens has resigned as general traffic manager of the Illinois Traction System, Champaign, Ill., effective on July 1, to become connected with an Eastern railroad syndicate, the name of which will be announced by Mr. Stephens later. Mr. Stephens has been connected with the Illinois Traction System for eight years. For the last four years he has been general traffic manager of the company, with headquarters in Springfield, and previous to that was connected with the Indiana interests of the company for two years and served for two years at Champaign, Ill. In the capacity of general traffic manager of the Illinois Traction System Mr. Stephens has given his attention largely to freight business, and the rapid growth of this department is attributed largely to his efforts. He also succeeded in bringing about the interchange of freight business between the Illinois Traction System and intersecting railroads. Mr. Stephens has had 20 years' experience with railroads. From the position of trainman he has risen to that of traffic manager of the second largest electric railway system in the world. Mr. Stephens has at various times been connected with the Toledo, St. Louis & Western Railroad, Ohio Southern Railroad, Cleveland, Akron & Columbus Railroad, New York, Chicago & St. Louis Railroad and Chicago & Eastern Illinois Railroad. He will assume the duties of his new position on Aug. 1.

Mr. Arthur N. Dutton has resigned as superintendent of transportation of the Brooklyn (N. Y.) Rapid Transit Company to become vice-president and general manager of the Peerless Motor Car Company, New York. Mr. Dutton was born in Milwaukee in 1873, and until he became connected with the Brooklyn Rapid Transit Company in 1903, had served for many years in railroad work in the West. His business career, however, was begun with the First National Bank, Milwaukee. Mr. Dutton's father, Mr. C. F. Dutton, was general manager of the Milwaukee & Northern Railroad, and Mr. Dutton is said to have been influenced toward a railway career by the record made by his father. Mr. Dutton's first work with the Brooklyn Rapid Transit Company was on the elevated lines. Three months after entering the employ of the company he was made assistant superintendent of the elevated system, and when Mr. George R. Folds resigned as assistant general manager of the company Mr. Dutton was appointed assistant to Mr. J. F. Calderwood, vice-president and general manager, and subsequently was given the title of assistant to the general manager. Later Mr. Dutton's authority was extended and he was appointed superintendent of transportation, in which position he had supervision of the operation of the entire system. It is announced that the duties of the superintendent of transportation of the company will hereafter be cared for from the office of the vice-president, under the direct supervision of Mr. W. S. Menden, assistant general manager and chief engineer.

Mr. William L. Derr, formerly general superintendent of the New York City Railway, has been appointed inspector of the transportation division of the Public Service Commission of the Second District of New York. Mr. Derr succeeds Mr. Edmund F. Van Hoesen, resigned, who has accepted a position under the New York State Engineer. Mr. Derr was educated at the Polytechnic College of the State of Pennsylvania, Philadelphia, and entered railway service in 1876. From 1876 to 1878 he was assistant engineer of the Susquehanna Bridge, Philadelphia, Wilmington & Baltimore Railroad, and from 1878 to 1880 he was connected with the maintenance of way department of the Pittsburgh, Cincinnati & St. Louis Railway. From 1880 to 1883 Mr. Derr was assistant engineer of maintenance of way of the New York & New England Railroad in charge of the relocation of the line between Boston and Newburgh. He next became connected with the Woonsocket & Valley Falls division of the New York & New England Railroad. In 1886 he entered the employ of the New York, Lake Erie & Western Railroad as roadmaster of its Buffalo division and subsequently served as roadmaster of the Delaware division and as assistant superintendent of the Susquehanna division of the company. In 1889 he became connected with the Erie Railroad and served with that company as superintendent of the Jefferson division, superintendent of the Delaware division, superintendent of the Susquehanna division, superintendent of the New York division, and chief engineer, resigning in March, 1905, to become superintendent of the Hartford division of the New York, New Haven & Hartford Railroad. On Feb. 15, 1907, Mr. Derr was appointed superintendent of the Chicago & Alton Railroad, Bloomington, Ill., but resigned from that company on June 30, 1907, to accept the position of general superintendent of the New York City Railway.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Kansas City, Lawrence & Topeka Electric Railway, Rosedale, Kan.**—Incorporated to build an electric or steam railway between Topeka and Kansas City, 67 miles. Headquarters, 408 Gumbel Building, Kansas City Mo. Capital stock, $1,000,000. Incorporators: R. W. Hocker, F. P. Dickson, J. A. Stewart, F. B. Glover, Kansas City, Mo.; D. B. Johnson and R. O. Larson; George Holsinger, Rosedale. It is stated that this company is to take over the Kansas City-Olathe Railway, now in operation.

***Ohio Central Electric Railway, Uhrichsville, Ohio.**—Incorporated in Delaware to build electric railways in Ohio. Capital stock, $500,000. Incorporators: Harry S. Thompson, Uhrichsville; Charles C. Conkle, Pittsburgh, Pa.; Wylie Y. Taylor, Wellsville, W. Va.; Martin E. Smith, Wilmington, Del.

Finleyville Southern Street Railway, Harrisburg, Pa.—Chartered to build a 14-mile railway from Finleyville to Venetia and Bentleyville, crossing the Baltimore & Ohio Railroad by an overhead bridge. Capital stock, $84,000. Incorporators: H. B. Hayden, president; A. E. Hayden, T. M. Hayden, J. E. Hayden, S. C. Wilson, A. H. Anderson, Geo. Englert and Jos. R. Hayden. [E. R. J., April 24, '09.] '09.]

Philadelphia Suburban Traction Company, Harrisburg, Pa.—Chartered to build an electric railway from Southampton, through Davisville and Johnsville, to Hatboro, 3½ miles. Capital stock, $25,000. Incorporators: W. E. Watts, Dubois, president; John L. Grogan, H. C. Case and J. A. Bonnell, Philadelphia; W. A. Merrick, Newton. [E. R. J., April 17, '09.]

***Connell Northern Railway, Tacoma, Wash.**—Incorporated to build an electric railway from Connell to Adrian, with a branch to Ritzville and Tokio. Headquarters, Tacoma. Capital stock, $50,000. Incorporators: H. C. Nutt, F. S. Jarvis and J. L. Taggard, Tacoma.

FRANCHISES

Ensley, Ala.—J. M. Dewberry, president of the Tidewater Development Company, has applied to the City Council for an extension of its franchise to build an electric railway in Ensley.

Phoenix, Ariz.—An electric railway franchise has been granted to Dr. A. J. Chandler, president of the Consolidated Canal Company, by the City Council. [E. R. J., May 29, '09.]

Los Angeles, Cal.—Application has been made by the Pacific Electric Railway to the Board of Supervisors for a franchise to build an electric railway from the city limits of Long Beach on East Seventh Street to Redondo Avenue. The franchise was ordered advertised for sale.

Oakland, Cal.—A. W. Maltby and Joseph Napthaly, of the Oakland & Antioch Railway, have been granted a permit by the Board of Supervisors to use the tunnel, which connects Alameda County with Contra Costa County for building the proposed railway. The recent decision of the Superior Court permitted the issuance of a permit instead of a franchise. [E. R. J., April 24, '09.]

San José, Cal.—Jerry T. Burke has purchased for $11,000 a 50-year franchise for an electric railway on First Street.

Atlanta, Ga.—The City Council has granted to the Georgia Railway & Electric Company a franchise to build a street railway on West Peachtree Avenue and Ponce De Leon Avenue.

Moline, Ill.—Application has been made by the Tri-City & Northeastern Interurban Railway to the village boards of Watertown, Rapids City, Hampton, Port Bryon, Cordova and Albany for 20-year franchises. The franchises provide that the railway shall be in operation within three years after they have been granted by each individual board. The route of the electric railway will be from Watertown to Albany, Ill. [E. R. J., June 5, '09.]

Mound City, Ill.—The City Council has granted to the Cairo & St. Louis Railway a 50-year franchise to build a street railway through Mound City. This proposed electric railway will extend from Cairo to Mounds, via Mound City. [E. R. J., April 10, '09.]

Gladstone, Mich.—At a special meeting held recently in Gladstone a franchise was granted to the Escanaba Electric Street Railway for 30 years. [E. R. J., May 8, '09.]

***Ranier, Minn.**—A franchise has been granted to the American Suburbs Company, Minneapolis, to build an electric railway from Ranier to International Falls.

New York, N. Y.—The Board of Estimate and Apportionment has laid over the petition of the Tri-Borough Railroad for a franchise to operate a double-track street railway over the Manhattan Bridge and along the Flatbush Avenue extension, pending a report of the select committee to which it has been referred. [E. R. J., May 8, '09.]

New York, N. Y.—The Third Avenue Railroad has applied to the Board of Estimate and Apportionment for a franchise to construct a double-track street railway from the intersection of Third Avenue and Fifty-seventh Street, Manhattan, upon and along Fifty-seventh street to Second Avenue, to Sixtieth Street, and across the Queensboro Bridge to Jackson Avenue, Long Island City.

***Salisbury, N. C.**—A franchise has been granted to N. B. McCanless, J. K. Link, C. L. Welch and J. B. Norwood for the construction of an electric railway from Salisbury to Faith via Granite Quarry, 5 miles south of Salisbury.

***Wahpeton, N. D.**—F. L. Strum has applied to the City Council for a franchise to build a street railway in Wahpeton which is to be extended to Breckinridge. Application has also been made to the Breckinridge Council for a franchise.

***Marshfield, Ore.**—Application has been made to the City Council by J. M. Blake, who is said to represent Eastern capitalists, for an electric railway franchise.

***Scranton, Pa.**—W. S. Connell and J. J. Brown, promoters of the proposed electric railway between Scranton and Lake Ariel, have petitioned the City Council of Dunmore for a franchise to build an electric railway over certain streets of the borough so that it can be connected with the Scranton Railway.

Richmond, Va.—The City Council has granted to the Richmond & Henrico Railway an extension of one year to its franchise from June 30, 1909, to build its proposed railway and viaduct.

***Fayetteville, W. Va.**—R. H. Dickinson has applied to the City Council for a franchise to build a street railway and electric light line from Fayetteville to Stuart, connecting with the White Oak Railway.

Walla Walla, Wash.—Application has been made to the City Council, by the Oregon-Washington Traction Company, for an extension of its franchise for the construction of its proposed electric railway to January 1, 1910. [E. R. J., Sept. 26, '09.]

TRACK AND ROADWAY

Edmonton (Alta.) Radial Railway (Municipal).—This company has placed an order for 600 tons of 60-lb. rails and 200 tons of 80-lb. rails for this year's extensions, consisting of about 5½ miles. The contract for this work has been let to Lubbock & Matheson, Edmonton, and it is expected that work will be completed toward the latter part of July. Charles E. Taylor, general manager.

Glendale & Eagle Rock Railway, Glendale, Cal.—E. G. Goode, president, writes that this company has completed and placed in operation a 2½-mile narrow-gage street railway between Glendale and Eagle Rock. At the latter place connection is made with the lines of the Los Angeles Railway, running from Eagle Rock to Los Angeles. The company is negotiating with the Pacific Electric Railway for the purchase of its franchise over the distance between its Glendale line and the terminus of the new line. The company proposes to construct this connecting link within 90 days providing the franchise can be secured. The company is an independent one and at present is only operating one car. Power is rented from the Pacific Light & Power Company, Los Angeles. Capital stock, $25,000. Headquarters, 329 Cedar Street, Glendale. Officers: E. D. Goode, president and treasurer; Geoge Benson, vice-president; R. E. Goode, secretary. [E. R. J., May 1, '09.]

Pasadena Rapid Transit Company, Pasadena, Cal.—This company, which proposes to build an elevated electric railway between Los Angeles and Pasadena, will abandon the old cycleway entrance into Pasadena between Raymond and Fair Oaks Avenue, and will select another route from several which are now under consideration. [E. R. J., Jan. 16, '09.]

Denver-Greeley Electric Railway, Greeley, Col.—The City Council has accepted the $25,000 bond put up by this company which proposes to build an electric railway in Greeley. The company will commence work within a few days, starting on Seventh and Twelfth Avenues and Nineteenth Street, encircling the south part of the city. The railway will be extended to Denver.

Connecticut Company, Hartford, Conn.—It is stated that this company, which recently placed in operation a new line between Hartford and Middletown, is now planning to extend it from Middletown to Durham, a distance of about 4 miles.

Shore Line Electric Railway, New Haven, Conn.—The House has passed a resolution amending the charter of this company and providing for an important extension of its lines. The company proposes to build a connection from Guilford to meet the Connecticut company's lines at Stoney Creek and it will then run a line along the highway from Essex through the Meadows Woods Road, Deep River, Chester and through Boston Street in Guilford, through North Branford, Totoket and Foxon and into New Haven.

Baltimore & Washington Transit Company, Washington, D. C.—The District Commissioners have issued a permit to this company to construct the extension of its lines within the District. The Baltimore & Washington Transit Company has a State charter to construct a railway not only to Baltimore, but also to Gettysburg. The present construction work is with a view to obtaining a Washington terminal for the line. The contract for the extension has been awarded to Allen & Kefauver, Washington. William A. Mellen, vice-president and general manager.

City & Suburban Railway, Brunswick, Ga.—This company has awarded a contract to John F. Glenn, Atlanta, for furnishing the rails to be used in the construction of this proposed railway. This line is to extend 3 miles east and west and 3 miles north and south. Work on its construction will be undertaken at once. [E. R. J., March 20, '09.]

Vincennes, Centralia & St. Louis Transit Company, Centralia, Ill.—This company has filed for record at Lawrenceville a mortgage to the Illinois Trust Company, East St. Louis, for $2,500,000. The company proposes to build an electric railway from St. Louis, Mo., to Vincennes, Ind. Burns & Company, Isabella Building, Chicago, are said to be interested in this project. [E. R. J., June 27, '08.]

Illincis Traction System, Champaign, Ill.—It is stated that this company is preparing to begin work on its terminals in St. Louis, Mo., which it will enter by means of a new bridge that the company is erecting over the Mississippi River from Salisbury Street, in St. Louis, to Venice, Ill. It is expected to complete and put in use this structure by Jan. 1 next. The company has about 250 acres of land in St. Louis, and will build freight yards. These improvements at St. Louis are estimated to cost $5,000,000. The bridge will cost half of that, and it is designed to accommodate highway traffic and pedestrians, as well as the trains of the interurban railway. The power-house for the company will be on the Illinois shore. Steel has been received for the track in St. Louis and for the upper work of the bridge.

Charleston, Westfield, Marshall & Terre Haute Electric Railway, Charleston, Ill.—Announcement is made that this company will soon begin the construction of its proposed 12-mile electric railway. Practically all of the right-of-way between Charleston and Westfield has been donated by land owners. Three surveys leading out of Charleston have been made. It will be necessary to construct a concrete bridge. N. S. Cook, engineer. [E. R. J., Feb. 20, '09.]

Columbus, Greenburg & Richmond Traction Company, Indianapolis, Ind.—This company, which proposes the construction of an electric railway, 90 miles in length, from Columbus to Richmond, is said to be ready to discuss a contract with contractors who might be willing to accept part or all of the contract price in first mortgage bonds of the company for construction, etc. The company is also considering the advisability of installing gasoline motor cars. Officers: Aug. M. Kuhn, Indianapolis, president; R. E. Moore, 116 South Audubon Road, Indianapolis, secretary; Walter E. Moore, Richmond, treasurer. [E. R. J., March 27, '09.]

Indianapolis Union Railway, Indianapolis, Ind.—Contracts for the grading, concrete work and steel to be used in the East Washington Street track elevation have been let by the Indianapolis Union Railway Company with the approval of the city. The contracts amount to about $150,000. The contract for the steel was let to the McClintic-Marshall Company, Pittsburgh, who will also get the contract for erecting the steel. The American Construction Company, Indianapolis, received the contract for the grading and concrete work. The elevation across Washington Street will include five concrete arches with five passageways for pedestrians, vehicles and cars.

Covington & Southwestern Railway, Kingman, Ind.—This company is reported to have begun work at Kingman on its proposed electric railway which is to extend from Kingman to Crawfordsville and Covington. Coal Creek, Wallace, Alama and Yountsville will also be connected. The principal business will be the carrying of coal, but a pas-

senger service will also be maintained. Capital stock, $750,000. Officers: William C. Ruhl, president; B. E. Jones, secretary; Harmon W. Campbell, treasurer. [E. R. J., April 10, '09.]

Davenport & Manchester Interurban Railway, Davenport, Ia.—At an adjourned meeting of the board of directors of this company the following officers were elected: L. M. Matthews, president; J. A. Voorhees, Monticello, vice-president; F. W. Rank, Moline, secretary; R. F. Hilligan, Davenport, treasurer. The right of way was surveyed several months ago and the services of J. F. Cross, Chicago, Ill., were secured to head the building of the railway. [E. R. J., June 20, '08.]

***Baltimore, Md.**—Henry J. C. Hoffman and others are said to be organizing a company to build an electric railway between Brooklyn, a suburb, and Glenburnie, Md., about 5 miles. It will be called the Brooklyn, Cedar Hill & Furnace Creek Electric Railway.

Boston, Lowell & Lawrence Electric Railroad, Boston, Mass.—This company has petitioned the Railroad Commissioners for a certificate authorizing it to construct an interurban electric railroad between Lowell and Lawrence and connecting both cities with Boston. The plan is to provide an electric railroad operating over private right-of-way, with no grade crossings. If the approval of the Railroad Commissioners is obtained, the railway expects to furnish popular service with a running time of 35 minutes from Lowell to Sullivan Square, 40 minutes from Lawrence, 20 and 25 minutes between Lowell and Lawrence. Directors: Paul Butler, Spencer Borden, Jr., Butler Ames, Oakes Ames and John Burnett.

Missouri, Inland & Southern Railway, Licking, Mo.—E. C. Young writes that construction work will probably be started by Oct. 1 on this new railway which is to extend from Rolla to Lecoma, Anutt, Lenox and Licking, a distance of about 40 miles. The railway will serve directly 200,000 acres of farming land and about 100,000 acres of heavy pine timber which at present is, at least, 25 miles from a railroad. It is the intention to operate gasoline electric cars. Repair shops will be erected at Licking. Capital stock, authorized, $400,000; issued, $40,000. Officers: E. E. Young, president and general manager; A. H. Bradford, vice-president; E. C. Halbert, secretary; D. M. Meadows, treasurer. Hugh G. Palmer, Box 305, Aurora, Ill. [E. R. J., June 5, '09.]

St. Louis, Montesano & Southern Railway, St. Louis, Mo.—This company has executed a deed of trust to the St. Louis Union Trust Company, trustee for bondholders, covering all its properties for $2,500,000, for three years at 5 per cent. The document is in the nature of an amendment to the deed of trust for the same amount executed some time ago and is the first step in a plan to revive the project to construct an electric railroad from St. Louis to Flat River, a distance of 63 miles. The first deed required that the bonds of the company be sold for cash, while the new document makes them available for construction purposes, it was explained by an official of the company. At present about 8 miles of the railway extending from St. Louis as far as the company's power house is nearly completed. The plan of the company is to complete the line as far as the power house and begin the operation of cars over that distance. The balance of the line will be constructed after that is in operation.

Morris County Traction Company, Morristown, N. J.—Announcement is made that this company will place in operation on June 19 its line between Summit and Elizabeth. By an arrangement with the Public Service Railway the company's cars will be run over the Public Service line from the connecting point of the two lines in Morris Avenue, Elizabeth, to the railroad station in that city.

Champlain & Sanford Railroad, Albany, N. Y.—The Public Service Commission of the Second District has granted the application of this company for a change of motive power so that its proposed railway may be operated by electricity or by oil-burning locomotives. Under the terms of the original order the railway was to be operated by electricity. [E. R. J., Aug. 22, '08.]

South Flatbush Railroad, Brooklyn, N. Y.—This company has applied to the Public Service Commission for permission to issue $30,000 of stock and for a certificate of public convenience and necessity. The company, of which John C. Langan is president, was incorporated in January to build an electric street railroad line 3 miles long in the Flatbush section of Brooklyn. [E. R. J., April 17, '09.]

Rochester & Eastern Rapid Railway, Geneva, N. Y.—It is reported that this company will build an extension from Geneva to Penn Yan.

Metropolitan Street Railway, New York, N. Y.—The receivers of this company have placed an order with the Pennsylvania Steel Company for the following rails: 400 tons 9-in. girder rail in 59-ft. 11⅞-in. lengths; 50 tons 7-in. girder rail in 59-ft. 11⅞-in. lengths; 325 tons 7-in. girder rail in 53-ft. 11⅞-in. lengths. The receivers have also placed an order for 598 tons of channel rails for the electric conduit with the Lorain Steel Company.

Rochester Railway & Light Company, Rochester, N. Y.—Permission has been granted by the Public Service Commission of the Second District to the Rochester Railway & Light Company and the Buffalo, Lockport & Rochester Railway, to cross the Lyell Avenue grading of the New York Central & Hudson River Railroad. The Buffalo, Lockport & Rochester Railway can now run its cars into Rochester.

Rockland Railroad, Suffern, N. Y.—The Public Service Commission of the Second District has authorized the Rockland Railroad to construct and operate its line in Rockland County, and to exercise franchises in the villages of Piermont, Grand-View-on-Hudson, Nyack, South Nyack, Haverstraw, West Haverstraw, Spring Valley and Suffern, and in the towns of Clarkstown, Stony Point, Orangetown, and Ramapo. A franchise has also been received from the county Board of Supervisors. The permission given will enable the company to construct electric railway lines throughout the greater part of Rockland County.

***Salisbury, N. C.**—It is stated that N. B. McCanless, J. K. Link, C. L. Welch and J. B. Norwood, Salisbury, are interested in a plan to build an electric railway from Salisbury to Faith via Granite Quarry. The enterprise is said to be awaiting termination of negotiations with the Southern Power Company, after which active work is to begin immediately.

Shawnee Electric Railways, Shawnee, Okla.—This company advises that it will probably be ready within 60 days to take up the construction of its proposed railway which is to connect Shawnee, Dale, McLoud, Harrah, Choctaw City and Oklahoma City, a distance of 38.58 miles. Catenary construction will be installed. Twelve cars will be purchased. It is also proposed to furnish power for lighting. Officers: C. T. Edwards, president; A. Hardgrave, vice-president and general manager; R. E. Pugh, secretary and treasurer. [E. R. J., June 5, '09.]

***Baker City, Ore.**—According to press reports Anthony Mohr, who represents Portland capitalists, is making preparations to begin the surveys for the proposed electric railway in Baker City and an interurban line from Baker City to North Powder.

***Woodlawn Electric Railway, Beaver, Pa.**—This company is reported to have begun the construction of an electric railway between Woodlawn and Sheffield. Officers: J. A. Newell, Newell, W. Va., president; J. F. Reed, Beaver, secretary; M. J. Allison, Beaver, treasurer.

***Freedom, Pa.**—It is stated that Barker, Barker & Owens, civil engineers, Beaver, Pa., have completed the survey for E. B. Shilton, Freedom, and Pittsburgh capitalists, of a proposed 8-mile street railway from Freedom to Crider's Corners, at the intersection of the Pittsburgh, Harmony, Butler & New Castle Railway. A part of the right-of-way has already been secured. The new line will be equipped with electric locomotives for handling freight traffic.

Central Pennsylvania Traction Company, Harrisburg, Pa.—The shareholders of this company have authorized a bond issue of $300,000 for the purpose of building certain extensions and making other improvements. This new work will include the construction of the line from Lucknow to Dauphin, extension of the Second, Third and Fourth Street lines to Division Street, and the erection of a large addition to the car house on North Cameron Street.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—It is stated that this company has decided to build its proposed railway from Chambersburg to Red Bridge.

Waynesburg & Monogahela Electric Railway, Waynesburg, Pa.—This company has awarded to John R. Bennett. Fairmont, W. Va., the contract for grading 34 miles of roadbed from Waynesburg to Millsboro, with a branch to Carmichaels and Rice's Landing. [E. R. J., May 29, '09.]

Red Springs Street Railway, Mount Pleasant, Tex.—This street railway is now being built from Mount Pleasant to Red Springs, a distance of 1⅛ miles. About one-half of the track has already been laid and will be completed within a few days. Gasoline motor cars will be operated. Track is being laid with 35-lb. steel rails. [E. R. J., Feb. 13, '09.]

Norfolk City & Suburban Railway, Norfolk, Va.—It is stated that this company will shortly extend its railway from Oaklett to Kempsville. The line now extends from Campostella Heights to Indian River Park and connects

at Campostella with the Norfolk-Berkley division of the Norfolk & Portsmouth Traction Company.

Hinton Street Car & Transportation Company, Hinton, W. Va.—This company advises that it plans to build 3 miles of track which will be operated with Stover motor cars. In the future a change to electricity may be considered. [E. R. J., June 5, '09.]

SHOPS AND BUILDINGS

San Diego (Cal.) Electric Railway.—This company has purchased property on Fifteenth Street, from K to M, to be used as the site for its car house. The total frontage on Fifteenth Street is 600 ft., and each block extends back 200 ft. Plans are now being drawn for a building to cover almost the entire area. It will be built of brick, concrete and steel.

Washington, Alexandria & Mount Vernon Railway, Washington, D. C.—This company proposes to rebuild its passenger station at Fairfax, Va.

Illinois Traction System, Champaign, Ill.—It is announced that this company will erect in St. Louis a small passenger station at Broadway and Salisbury Street and another at Ninth Street and Branch Street, where land has been bought to straighten the line. A depot for handling merchandise freight will be constructed near the heart of town. A decision is not yet reached concerning the main passenger station, which will cost $250,000 or more. No plans will be made until a satisfactory downtown site is obtained.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The West Washington Street car house and paint shop of this company burned on June 9, entailing a loss of $50,000, fully covered by insurance. Two interurban and four city cars being repaired and repainted were destroyed. A fire wall prevented the further destruction of the shops and power house.

Vincennes Traction & Light Company, Vincennes, Ind.—This company has awarded to J. A. Keller the contract for the construction of a new car house in Vincennes. The plans, which were prepared by John W. Gaddis, call for a brick and steel structure covering the whole of the grounds where the present buildings are located on Fairground Avenue.

Wallkill Traction Company, Middletown, N. Y.—This company advises that it is at present building a new car house, which is to be over 200 ft. long.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company expects to build a concrete addition to its car house on Cameron Street on the same plan as the present structure.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—Sidney Bamberger, vice-president of this company, announces that contracts will be let during the next few months for the erection of a large car house, repair shop, etc. The company is now engaged in electrifying its railway from Salt Lake City to Ogden.

Walla Walla Valley Traction Company, Walla Walla, Wash.—It is stated that this company in connection with the Northwestern Gas & Electric Company is considering the erection of a structure at the corner of Sixth Street and Rose Street, to be used as local offices of both these companies, as well as a freight depot for the city and interurban railways.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has commenced grading work on its 30-acre tract of land, located on McKinley Boulevard, from Thirty-eighth Street to Fortieth Street, preparatory to the building of its new repair shops.

POWER HOUSES AND SUBSTATIONS

Washington, Baltimore & Annapolis Railway, Washington, D. C.—This company has engaged the Cleveland Construction Company, Cleveland, Ohio, to engineer and superintend the reconstruction of its power facilities from 6600-volt a. c. to 1200-volt d. c. The new work includes the erection of new substations and the re-equipment of the present transformer stations, also the erection of high-tension and feeder wires.

Rochester Railway & Light Company, Rochester, N. Y.—This company has closed a contract with the Rochester, Charlotte & Manitou Railway to supply it with power for the future operation of its railway. [E. R. J., June 5, '09.]

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company advises that it expects to place contracts during the next 20 weeks for the construction of a 2500-kw power station. The company also expects to purchase equipment for the same.

Manufactures & Supplies

ROLLING STOCK

Louisville (Ky.) Railway is in the market for 35 cars, it is rumored.

United Railways Company, St. Louis, Mo., it is reported, will construct one car a week in its shops.

United Railways Company, Portland, Ore., has purchased two double-truck cars from the American Car Company.

Western New York & Pennsylvania Traction Company, Olean, N. Y., has purchased two more cars from The J. G. Brill Company.

Pittsburgh (Pa.) Railways will purchase 100 city cars and 30 interurbans. No contract has been closed, as previously mentioned.

Northern Texas Traction Company, Fort Worth, Tex., will have specifications drawn soon for four interurban car bodies for service on the Fort Worth-Dallas line.

Tacoma Railway & Power Company, Tacoma, Wash., will soon buy four large combination city cars. Stone & Webster, general managers, will draw up the specifications.

South Dakota Central Railway, Sioux Falls, S. D., has had a gasoline motor car especially built for service on 67 miles of its road. The car has a 30-hp four-cylinder auto engine.

Chicago (Ill.) Railways is reported to contemplate the purchase of 300 cars. This rolling stock is in addition to the 350 pay-as-you-enter cars recently ordered from the Pullman Company.

Grand Forks (N. D.) Street Railway has purchased one 18-ft. closed motor car equipped with Brill 21-E trucks and two GE-800 motors from the Dorner Railway Equipment Company, Chicago.

Utica & Mohawk Railway, Utica, N. Y., has purchased a sprinkler car with a capacity of 3000 gal. from the American Car Sprinkler Company, Worcester, Mass. This car was recently placed in service.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., lost one large combination interurban car in a fire which destroyed the Indianapolis Traction & Terminal Company's car barns.

Nashville (Tenn.) Interurban Railway is in the market for the following second-hand material: One double-truck motor work car, one 40-ton electric locomotive, motor and trailer ballast cars, all for 500-volt d. c. operation.

San Jose & Santa Clara County Railroad Company, San Jose, Cal., has purchased five second-hand open side-seat cars from the United Railroad Company, of San Francisco. The cars seat 48, weigh 14 tons and are 40 ft. long over vestibules.

Central California Traction Company, San Francisco, Cal., is in the market for seven interurban cars. While the plans for these cars have not yet been drawn, it has been announced by the company that each car is to have a total weight of from 37 to 40 tons.

Puget Sound Electric Railway, Tacoma, Wash., as reported in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, will buy one 55-ft. motor car and one 55-ft. trailer parlor car similar to those now being operated. Stone & Webster, Boston, Mass., general managers.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., suffered a loss by fire of one interurban freight trailer, one large double-truck closed car, three single-truck closed cars and 10 single-truck open cars, when the company's West Washington car barns were destroyed by fire on June 9.

Dallas (Tex.) Consolidated Electric Street Railway has bought through Stone & Webster two cars from the Cincinnati Car Company, to be mounted on Brill 27 GE-1 trucks equipped with four GE-81 motors, K-28 J controllers and air brakes. Report of this contemplated purchase was made in the ELECTRIC RAILWAY JOURNAL of June 5, 1909.

Ohio Electric Railway, Cincinnati, Ohio, is having a number of its cars lengthened to accommodate express matter, under a new contract the company has closed with the United States Express Company. The work is being done in both the company's shops and those of the Cincinnati Car Company. The railway company is also constructing a number of new cars in its own shops.

Northern Texas Traction Company, Fort Worth, Tex., has purchased through Stone & Webster 12 28-ft. and one 21-ft. closed car bodies from the Cincinnati Car Company. The larger cars will have Standard Motor Truck Company's O-50 trucks, with four GE-81 motors, K-28 J controllers, with contactors and air brakes. Mention of the contem-

plated purchase of these cars was made in the Electric Railway Journal of May 8, 1909.

Houston (Tex.) Electric Company, mentioned in the Electric Railway Journal of May 1, 1909, as being in the market for cars, has ordered five double-end and 15 single-end cars from the Cincinnati Car Company through Stone & Webster. The double-end cars will be mounted on Standard single trucks and the single-end cars on Brill 21-E trucks. All the cars will be equipped with two GE-80 motors each and K-11 H controllers with contactors.

Helena Railway, Light & Power Company, Helena, Mont., has drawn the following specifications for the two single-truck closed cars ordered from the Cincinnati Car Company, as reported in the Electric Railway Journal of Feb. 13, 1909:

Seating capacity..32 persons	Heaters ..... Consolidated
Length of body...21 ft. 8 in.	Headlights ..... Dayton
Length over vest..31 ft. 8 in.	Journal boxes .....Peckham
Width over posts..8 ft. 3 in.	Motors 2 GE-80
Sill to roof.....8 ft. 10½ in.	Registers ..... International
H'ght rail to sills.2 ft. 4⅞ in.	Roofs ..... Monitor
Body ..... wood	Sanders .....C. C. Co.
Interior trim .....cherry	Seats .....Hale & Kilburn
Underframe ..... Composite	Seating material .....rattan
Bumpers .....steel angle	Step treads....Carborundum
Couplers.....C. Car Co. type	Trolley base.....U. S. No. 6
Curtain fix....Curtain S. Co.	Trucks ..... Peckham
Curtain material...Pantasote	Special....Wallace door fix.
Hand brakes..... Peacock	

TRADE NOTES

U. S. Wood Preserving Company, New York, N. Y., has moved its New York offices to 165 Broadway.

General Electric Company, Schenectady, N. Y., advises that its Montana office was moved to a new location in the Phoenix Building, Butte, on June 1.

E. F. Quirke, of the New York office of H. W. Johns-Manville Company, New York, N. Y., has resigned. Mr. Quirke represented this company in the South.

Standard Underground Cable Company, Pittsburgh, Pa., announces that it will remove its San Francisco office from the Shreve Building to the First National Bank Building, on June 15.

Lord Electric Company, 213 West Fortieth Street, New York, N. Y., advises that the large order recently announced is for all the electrical work and railway construction on the Manhattan Bridge from New York to Brooklyn.

Harrisburg Foundry & Machine Works, Harrisburg, Pa., announce that F. W. Jackson, for a number of years in the company's engineering and sales departments, has been appointed district manager of the Baltimore district, with headquarters at 1415 Continental Trust Building.

McKeen Motor Car Company, Omaha, Neb., announces that F. J. Jumper, formerly assistant mechanical engineer for the Union Pacific Railroad Company at Omaha, has resigned to accept the position of mechanical engineer of the McKeen Motor Car Company, at Omaha, Neb.

U. S. Metal & Manufacturing Company, New York, N. Y., announces that it has secured the services of Arthur Masters as salesman in the railroad department. Mr. Masters was formerly assistant superintendent of the Crescent Shipyard and for the past few years consulting engineer for the Panama Railroad Company and Isthmian Canal Commission. He succeeds Charles R. Day, resigned.

Barney & Smith Car Company, Dayton, Ohio, held its annual meeting on June 1. The directors were all re-elected with the exception of Col. John D. Platt, who retired in favor of his son, Frank Platt. The directors elected the following officers: A. M. Kittredge, president; H. M. Estabrook, vice-president and general manager; J. F. Kiefaber, secretary and treasurer; E. A. Oblinger, assistant secretary and treasurer.

Westinghouse Electric & Manufacturing Company, Boston, Mass., officers and employees, and officers and employees of the Westinghouse Machine Company; Westinghouse, Church, Kerr & Company; the Westinghouse Air Brake Company; the Cooper Hewitt Electric Company and the Nernst Lamp Company to the number of 65 enjoyed an outing at Salem Willows, Mass., on June 7. The party was headed by George C. Ewing, and transportation was furnished free of charge by the Boston & Northern Street Railway.

Crocker & Ketchum, Denver, Col., is the title of a new engineering firm formed by Herbert S. Crocker and Milo S. Ketchum, with offices at Suite 438, 811 Seventeenth Street, Denver, Col. The firm offers its services in connection with the following: Steel and reinforced concrete bridges; steel and reinforced concrete building construction; mill and mine buildings and structures; irrigation structures; grain elevators; bins; retaining walls; dams; foundations; examinations; valuations and reports. They are also representatives of the American Bureau of Inspection & Tests.

ADVERTISING LITERATURE

Pathé Frères, New York, N. Y., have added Sardou's famous tragedy "La Tosca" to their moving picture films.

Borne, Scrymser & Company, New York, N. Y., are mailing price lists of their "Colonial" brands of motor oil, grease and gear case compound.

H. W. Johns-Manville Company, New York, N. Y., is issuing folders on "Keystone" hair insulator for heat insulation of houses, and on "Regal" roofing.

Pettingell-Andrews Company, Boston, Mass., prints in the June number of *Juice* a number of interesting notes on "Victor" insulators, tungsten street lamp fixtures and other electrical subjects.

Dearborn Drug & Chemical Works, Chicago, Ill., has prepared a valuable booklet entitled "Lubrication versus Friction." This publication contains considerable data on the properties and testing of lubricants.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is sending out folder No. 4132, which presents brief illustrated descriptions of Westinghouse motor applications in the office, store, shop and home.

Buda Foundry & Manufacturing Company, Chicago, Ill., has published a booklet illustrating its numerous types of motor cars and velocipedes for track inspection service. This publication also describes the Buda pressed-steel wheels made from 14 in. to 24 in. diameter.

American Blower Company, Detroit, Mich., is mailing to its friends a pretty colored card showing a baby blowing out a candle, and appropriately named "A Little Blower." The other side of the card bears an invitation to visit the company's exhibit at Atlantic City, N. J., June 16 to June 23.

National Tube Company, Frick Building, Pittsburgh, Pa., has recently issued an attractive two-color folder describing the advantages of Shelby seamless steel trolley poles, especially of the Standard "A" trolley poles, and showing the results of tests to which these poles have been subjected.

National Electric Lamp Association, Cleveland, Ohio, has prepared an extensive bulletin on tungsten sign lamps with light and power cost curves, wiring, spacing, etc. It has also published a pocketbook giving important data on carbon, gem and tungsten incandescent lamps of different candle-powers and shapes.

General Electric Company, Schenectady, N. Y., announces the following bulletins: No. 4661, on aluminum lightning arresters for a.c. circuits; No. 4662, Thomson recording wattmeters for switchboard service; No. 4663, multigap lightning arresters for alternating currents; No. 4669, Curtis steam turbines for low pressure and mixed pressure.

Western Electric Company, New York, N. Y., has printed a unique booklet entitled "An International Achievement," telling how it supplied a 10,000-subscriber line switchboard to replace one destroyed by fire in Paris, France. The board was built at the Hawthorne, Ill., works, 5000 miles from Paris, and was in service on Nov. 30, 1908—less than 60 days after a definite order had been given.

Industrial Instrument Company, Foxboro, Mass., has had binders made for its 8-in. x 11-in. engineering bulletins, and will send these binders on the application of its engineering friends. The company supplies data on its instruments in the form of engineering bulletins, each being devoted to a certain line or class of meters, or to those instruments of different classes that group themselves conveniently for a certain industry. The various bulletins published by this company are 8 in. x 11 in. in size and are punched for binding together in the new covers.

Graphite Lubricating Company, Bound Brook, N. J., has issued a pamphlet which has for its subject the company's graphite bushings. The company tells about the development of these bushings and how they have met the requirements of naval constructors, steam turbine and gas engine builders and users, woodworking machinery makers and users, and how the bushings have complied with the exacting demands of railway service in trolley wheels. The company concludes the booklet with a list of users of its product which includes many of the largest railroads and manufacturers of machinery in the United States.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII. NEW YORK, SATURDAY, JUNE 26, 1909 No. 26

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.
L. E. Gould, Western Editor. Rodney Hitt, Associate Editor.
Frederic Nicholas, Associate Editor.

NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
Entered at the New York Post Office as Second Class Mail Matter.
Copyright, 1909, by the McGraw Publishing Company.

TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid..$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

CANADA: extra postage.....$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents

Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

The San Francisco Situation

The announcement that the jury in the Calhoun trial has disagreed, 10 being in favor of acquittal and only two in favor of conviction, undoubtedly marks the end of the remarkable attempt to convict the president of the United Railroads of San Francisco of bribery. We do not believe that the citizens of that city will stand for another trial. Indeed, it has been difficult for the residents of other cities to understand why the prosecution of Mr. Calhoun should have been carried so far or conducted with what has seemed to be so vindictive a spirit. Even if one believes, as evidently five-sixths of the jury did not, that the company had been mulcted by the city authorities for the privilege of rehabilitating its railway system after the fire and installing a trolley system, no other step did so much to facilitate the reconstruction of the city and bring order out of chaos. To have made an attempt to reconstruct the old cable system would have been little short of a crime, and would certainly have set back the improvement of the city for years. One fact, at least, has been demonstrated. By the attitude which Mr. Calhoun took during the subsequent long strike on his road he did more than any one else to free the city from the domination of unscrupulous labor leaders who had inflicted more damage to the city than the earthquake and fire combined.

The Master Mechanics' and Master Car Builders' Conventions

The convention of the American Railway Master Mechanics' Association, which was held last week at Atlantic City, and the convention of the Master Car Builders' Association, which followed it this week, attracted an unusually large attendance of steam railway officers. The program of the two conventions, while up to the high standard of previous years, included only a few subjects of special interest to electric railways. The most important of these was that relating to the height of the standard car-wheel flanges, a proposal which is discussed in its relation to electric railway work on the next page. So far as hotel accommodations and exhibit space were concerned, the convention was a success and confirms the deserved popularity of Atlantic City as a place for holding large gatherings of this kind. As usual, there were no afternoon sessions, a condition which contrasts strangely with that at electric railway conventions, where meetings last frequently until 5 o'clock or 6 o'clock in the afternoon, and evening sessions are not unknown. Nevertheless, the steam railroad convention schedule has its advantages, not the least of which is that it allows ample time to inspect the exhibits.

Keeping Interurban Cars Clean

Every interurban railway manager is face to face with the difficult problem of keeping his cars reasonably clean. The motto, "No dust, no dirt, no cinders," loses its value to electric roads as a promotion of traffic argument if the cars are poorly ventilated and unclean inside. A company can have its cars swept out and disinfected at terminals, and give them at regular intervals a thorough cleaning from roof to floor, but the co-operation of the traveling public is necessary to prevent them from getting objectionably dirty during the course of a single trip. Dr. Hurty,

secretary of the Indiana Health Board, at the recent conference of State and provincial boards of health, suggested that trainmen be supplied with cards or advertising leaflets appealing to the public to help keep the cars clean. This is an excellent idea which might be utilized in many ways. The Third Avenue Railroad, New York, has signs prominently displayed in all its cars reading, "Help us to keep this car clean." The backs of cash fare receipts and of transfers might also be used for making such an appeal. It is thoughtlessness, rather than malice, which prompts most passengers to throw papers, peanut shells and tobacco on the floor or to put their feet upon the seats, and a gentle reminder to passengers to avoid soiling the seats and littering the floor with refuse would undoubtedly prevent the accumulation of much of the objectionable dirt. During rainy weather rural passengers boarding the cars at crossroads carry in mud, which is soon ground into the floor and rises in a fine dust, covering the seats and woodwork. At a small expense clean gravel platforms could be built at crossroads stops, and foot scrapers could be attached to one of the retaining planks. Mired-up passengers would appreciate such conveniences and the platforms would assist in reducing boarding and alighting accidents. The practice of carrying section-men with their tools on regular passenger cars is not conducive to cleanliness, and for the comfort of other passengers ought to be regulated or prohibited.

Reduction of the Height of Car Wheel Flanges

The report of the standing committee on car wheels of the Master Car Builders' Association this year includes one recommendation which is of special interest to electric railway companies. It suggests that the height of flange of new cast-iron, steel-tired or solid steel wheels be reduced from 1⅛ in. to 1 in. by rounding off the tip of the flange on a radius of ⅝ in., beginning at the gage line ⅝ in. beyond the base line. The contour of the flange and tread inside of the gage line is not altered by the proposed change. The committee bases its recommendation principally on the possibility of obtaining a much greater mileage out of wheels with the short flange before they are condemned for worn treads under the present limit of wear allowed by the standard wheel defect gage. It will be possible to increase the allowable limit of tread wear nearly 50 per cent, and correspondingly increase the amount of flange wear, before the danger point is reached. Short flange wheels, even when considerably worn on the tread, will clear the filling blocks in frogs and built-up crossings and ride the rail head instead of the flange groove in solid manganese special work.

The proposed change is of interest to officers of electric railways for two reasons. The first is because it affords further proof of the fact that it is not absolutely necessary to have deep flanges on wheels to enable them to run safely at high speed. A second reason is that freight cars equipped with 1-in. flange wheels could be accepted from steam railways in interchange and run over shallower rails and special work in paved streets, without danger from derailment due to running on the flanges, than would otherwise be the case. The committee in its report says: "A change in the height of the flange can be made consistently when it is shown that the original angle of the flange to resist derailment is in no wise changed." Farther on it reiterates that "the change is entirely safe." We believe that it still remains to be proved that a single derailment of a car equipped with wheels having a ⅞-in. flange has been caused solely by insufficient bearing on the side of the rail. Any defect of track which will cause a wheel to climb ¾ in. or more on the rail will produce a derailment as quickly and surely with 1⅛ in. high flanges as with ⅞-in. or 1-in. flanges.

A Readjustment of Interurban Fares

A readjustment of interurban passenger fares on the system of the Indiana Union Traction Company became effective on June 10, and is renewed evidence of the widespread consideration of the question of fares which time has revealed was necessary for the electric railways in various parts of the country. A number of important changes, affecting both traffic and revenue, have been made at the same time by this company, which operates one of the most extensive systems in the important Central Electric territory. These include the abolition of the zone system of collecting fares, the abandonment of excess fares on limited cars except in a few instances, and the withdrawal of all mileage books except the 1000-mile, interchangeable Central Electric Traffic Association ticket. A monthly commutation book at a flat rate of 1¼ cents a mile will be issued.

An official statement, issued on behalf of the company by H. A. Nicholl, the general manager, says that the effect of the readjustment in interurban fares will be to increase fares in some instances, to lower in others, and to make no change in still others. Where the changes will be an increase, they "will be slight and in no case more than sufficient to place the fares on a basis now believed to be commensurate with the cost of the service." Mr. Nicholl then adds what is so well understood by managers of electric railways, but still unappreciated by the general public so far as it affects public utilities operated by corporations, that the cost of the service "has been materially increased in recent years by the increased cost of practically every element entering into electric railroad operation, combined with the necessity of extensive renewals in track, overhead and rolling stock, and of expensive betterments and improvements in roadbed, equipment and service."

That increased cost is assuredly an element with which every one must reckon is apparent to every student of the tendencies of the times affecting public service corporations. If the argument is advanced that the railways should have foreseen the necessities of the situation more accurately than has proved to be the case, the answer may be made that if the traffic and revenue possibilities of many lines had not appeared much more rosy than will be justified by the facts for a number of years, scores of communities which have been developed in every material respect by the influence of electric railways, would still be without the desired rapid transit facilities which their citizens enjoy.

One important aspect of the action of this company is suggested by its reference to the intensified effect of increased costs resulting from the decline in earnings which

started in the autumn of 1907, due to "business depression and keen competition." It was at that time that the panic which was first apparent in the security markets and financial centers began to exert its unfortunate effects throughout the rest of the country. During the interval between that time and the present some companies, notably in Massachusetts, have established, with unquestioned success, higher fares in place of rates that were admittedly inadequate. Other companies have postponed the consummation of plans for similar changes, not because they believed it would be difficult to justify advances, but for the reason that they thought a period when prices generally were advancing would be more opportune for success and appreciation of the economic necessities under which the railways were acting. Since the depression is now of the past, and the present holds assurance of continued improvement in business with renewed advances in prices, it follows that increases in fares will be worked out in various instances.

The Maintenance of Motor Field Coils

In the work of maintaining electric railway motors the commutator naturally receives the largest share of attention, and there is not infrequently a tendency to neglect the condition of other parts as long as no trouble is encountered. The field coils, for example, are generally left to shift for themselves in the absence of an active fault. There is a widespread belief that when a field coil burns out or develops a ground it can be restored by some sort of impregnation treatment and readily reinsulated for future service. This is by no means the case. In one recent instance a record was kept of the number of field coils sent to the shop for repairs in a period of four months. There were 1781 coils received in this time, and 46 per cent were so far gone that scrapping was the only alternative. On a single type of motor of recent design it was found that only 20 per cent of the coils could be saved, so severe had been the roasting in service. If these coils could have been taken out of service a little earlier they could have been impregnated in many cases and saved by reinsulation, with a resulting economy in labor and material.

It is important for the best service of armatures that weakened field coils shall not be allowed to develop through short-circuited or grounded turns. The operation of a weak field is a powerful incentive to motor flashing and to overheating of the armature coils through the suppression of the counter e.m.f. as the turns pass the weakened pole face. Often an armature which has been overheated from this cause will look all right when examined, but when the insulation is disturbed it falls to pieces and crumbles easily, showing that inordinately high temperatures have been applied. Great care on the part of car inspectors is therefore desirable in the prevention of accumulating troubles due to weakened fields. At present there are one or two electrical methods of testing the strength of motor fields, but these are scarcely delicate enough to show the conditions unless the coil is too weak to stand being impregnated for future service. The most practical method of detecting weakened fields seems to be by sounding with a tap-hammer and a practiced ear can soon tell the presence of deteriorated insulation by the dry, brittle, dead or hollow sound which the coil yields when struck. It is noteworthy that insulation will sometimes undergo considerable mechanical disintegration before the electrical breakdown comes. When a motor fails or gives evidence of field coil trouble in service, it is sometimes injured by the neglect of the motorman to cut it out on the way back to the shop. The policy of holding in the circuit-breaker in a four-motor car with one motor out of order tends to overheat and roast out the defective machine, and too much care cannot be exercised to prevent the abuse of already crippled equipment. It is possible that if motor field coils were run upon a mileage basis, with rigid shop inspection and test at the end of each period, the cost of replacing fields might be considerably decreased.

Taxation of Profits

John Stuart Mill, in discussing the subject of taxation, states that where taxes are assessed upon the profits of capital there is an inevitable tendency to shift a part of the burden of taxation upon the consumer. Capital is bound to have its legitimate profit, which is fixed by the law of supply and demand, and if a certain percentage of the profit earned in any line of business must be paid to the Government the price charged to the consumer for the manufactured article must be increased to cover, or nearly cover, the tax. Other political economists have taken a similar view, and their position is a logical one when applied to most industries. Unfortunately, the theory does not hold in city railway transportation, or, in fact, with any public utility or other corporation whose charges are fixed either by agreements or ordinances. A manufacturer of shoes or machinery can raise his prices 1 per cent or more to counterbalance a charge of, say, 2 per cent upon his profits, and if all other manufacturers of shoes or machinery have to pay a similar tax he is not much worse off than he was before. But when any such tax is laid upon a street railway company it has to be paid directly out of the meagre return to the already overburdened investor. None of it can be recouped by raising the fare. Up to this time State and municipal taxes have been the only ones which railway companies have had to consider. These taxes have grown so rapidly that in the case of the railways in New York City they have doubled within the last 10 years. If, now, a supertax of 2 per cent is laid by the National Government, as suggested last week at Washington, it will amount practically to confiscation. The claim is made that this tax is a return for the absence of individual liability of the stockholders. But articles of incorporation are not granted by the National Government, but by the States, which have power to regulate the degree of liability of the stockholder, and practically every State has already assessed its corporations for this privilege by organization fees and special taxes. We believe that the public secures at least as much benefit as stockholders from the organization of companies, because without corporations it would be impossible to carry on enterprises of any magnitude. The theory that the limited liability of the stockholder is a privilege which must be paid for several times over is merely a polite excuse. Taxes are assessed on corporations because they can be more easily reached by the assessors and tax collectors than can individuals.

BUILDING A STREET RAILWAY PARK THEATER IN EIGHT DAYS

A record-breaking performance in the construction of a theater for street railway park service was recently accomplished at Norumbega Park, Auburndale, Mass., under the direction of Matthew C. Brush, vice-president and general manager of the properties controlled by the Boston Suburban Electric Companies. At 2 o'clock a. m., Friday, June 4, the large steel, open-air theater at the park was burned to the ground, and the management faced a loss in revenue of upward of $1,000 a day for each day that performances



Friday, June 4—Ruins of Norumbega Theater

were suspended. An immediate decision was made to rebuild, and the work was done in eight days, a total seating capacity being provided for over 3000, which is 150 more than in the structure destroyed. Although the new theater is to be replaced by a structure of reinforced concrete at the close of the present season, it is practically the equal of the previous structure throughout.

The fire originated in one of the dressing rooms adjoining the stage, and was discovered by the night watchman at 1:56 a. m. The Newton Fire Department was immediately summoned by an alarm from a private box at the



Sunday, June 6—First Timber Work Under Way

entrance of the park. General Manager Brush arrived at the scene at 2:20 a. m., Assistant General Manager Sylvester reaching the spot at about the same time. It was at once seen that the theater could not be saved, and immediately steps were taken to notify the Boston newspapers, insurance adjusters, the engineer who designed the structure, structural steel men, carpenters, contractors, the architect of the theater, and every available man connected with the railway organization, by telephone. At 4 a. m. G. H. Brazier, of J. R. Worcester, Boston, consulting engineer, arrived on the scene and outlined plans for meeting the situation from the standpoint of design. Within half an hour after the fire started steps were taken to prepare for the erection of a new structure. By 4:30 a. m. 75 men were on the ground ready to clear away the debris as soon as the ruins could be sufficiently cooled. These men were called from the track, line, car house and transportation



Tuesday, June 8—Preparing the Auditorium Floor

departments from all divisions. At 5 a. m. a number of carpenters and contractors arrived to figure on the cost of the new work in a rough way, and at 6 a. m. the approval of President James L. Richards to rebuild was secured. At 7 a. m. the first of the contractors' teams arrived to remove the wreckage, which is illustrated herewith, and which included a mass of twisted steel weighing about 100 tons. During the progress of the fire men were stationed at the cages of the wild animals housed in the park zoo, with rifles loaded, ready to meet any contingency. At 8 a. m. the insurance adjuster arrived, and at 9 a. m. a force of steel erectors reached the park, and went to work



Thursday, June 10—Further Progress on Auditorium Floor

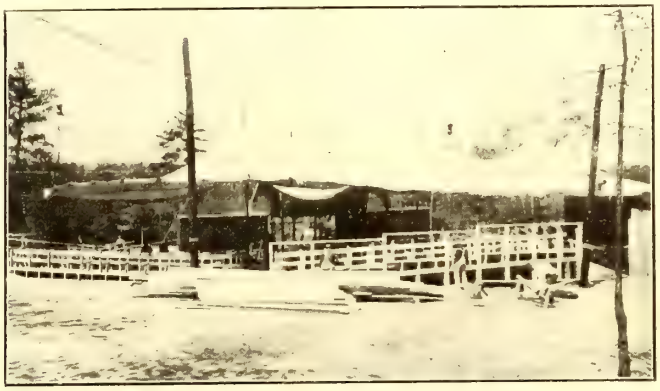
on the removal of the steel. The rivets were cut out by hand, but the steel members were removed by block and tackle connected with a donkey hoisting engine. At 10 a. m., Friday, the first load of lumber arrived at the park from the mill of the Buttrick Lumber Company, Waltham. By noon, Friday, dasher signs inviting the public to visit the ruins were placed on all cars of the Boston Elevated Railway Company and the Boston Suburban Electric Com-

panies, and a large sign was also placed on the ruined steel work, outside the park. On this day temporary electric lighting was installed to enable work to be done day and night at the site of the fire. This was handled by the line department of the railway.

Clearing of the ruins was continued on Saturday, June 5, and lines were run by the engineering force. Plans and specifications were drawn up and submitted to the contractors, and on Sunday, June 6, the contracts were awarded. Erection of the posts underneath the inclined floor of the auditorium was well under way Sunday. On Monday, June 7, regular construction under the contracts was initiated. It was decided to make the floors of the stage, property room, dressing rooms and auditorium permanent, leaving the superstructure temporary in character. In the main the plans of the previous theater were followed. This was fully described in the STREET RAILWAY JOURNAL of July 9, 1904. A photograph of the progress of the work was taken each day at 2 p. m.

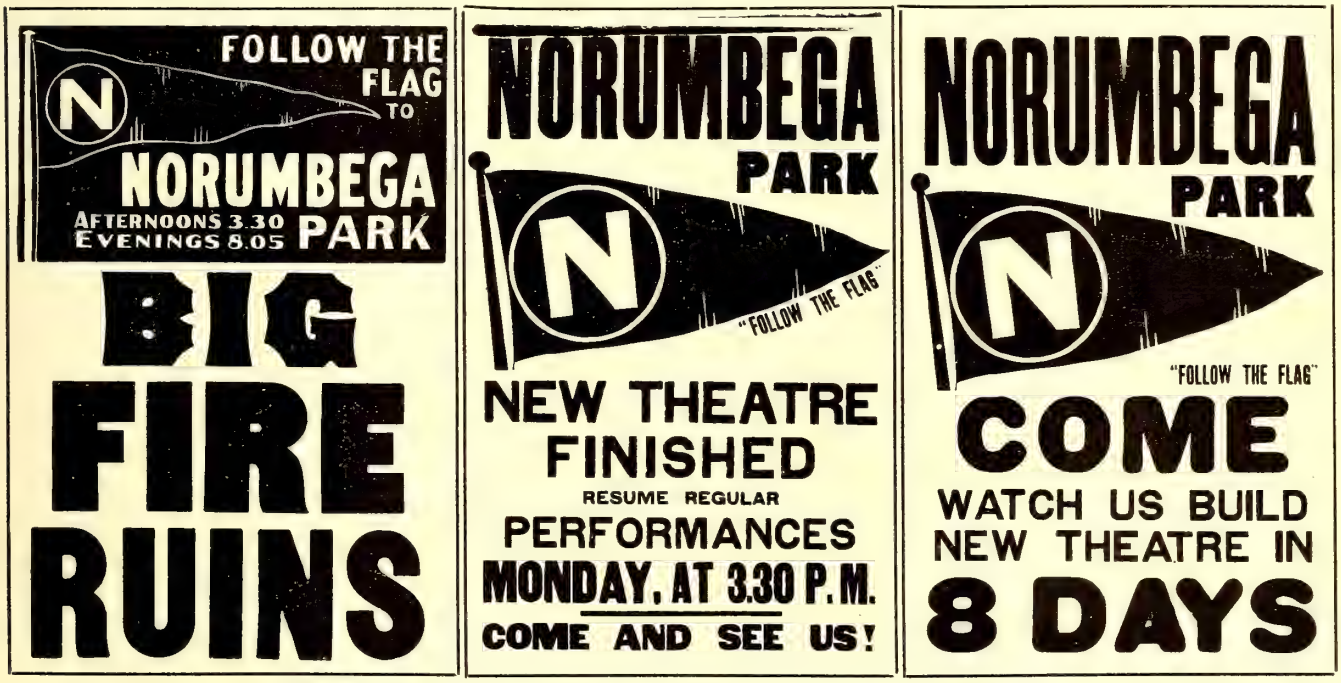


Saturday, June 12—Auditorium Nearly Completed



Monday, June 14—Ready to Amuse the Public

From Monday, June 7, to Saturday, June 12, all the cars of the Boston Elevated and Suburban systems carried posters asking the public to visit the park and see the road build a theater in eight days, and a large number of people took advantage of the opportunity. Mr. Brush promised the public that the theater would be opened for regular performances on Monday afternoon, June 14. On Monday, June 7, the foundations of the floor of the auditorium were practically completed and the floor boards laid in part. The women's rest pavilion, near the theater, had been damaged slightly by the fire, but this was nearly repaired by this date. The final running of lines for the stage was completed Monday. On Tuesday, June 8, the flooring of the auditorium was entirely covered in and the posts supporting the stage were built. On Wednesday, June 9, cross-bracing for the stage was undertaken and gin poles were erected for the placing and support of the roof covering, canvas being used for the latter. Thursday, June 10, the erection of the canvas roof was well under way, and the flooring of the stage rapidly pushed. The latter consisted of a 2-in. hardwood floor, laid on 3-in. spruce planking. The hardwood was oiled before use, as was the auditorium floor. The canvas was supported on three gin poles, 35 ft. long, of hard pine, with 10 shorter poles set at the sides for guying. The supporting of the stage required the setting of about 100 posts, while over 500 were needed for the floor timbers of the auditorium. On Friday, June 11, one week after the fire, the canvas roof was up; the seats were in place, 3000 having been brought from Somerville in a service car and trailer; the framing for the stage roof was under way, and the side and end walls of the dressing rooms were closed in. Saturday, June 12, and Sunday, June 13, the auditorium was cleaned up, and the final work done upon the stage and its surroundings. The theater was completed by Monday afternoon and ready for



Three 14-in. x 21-in. Posters Advertising the Fire as an Attraction

a performance, but the absence of an audience deferred the opening until the evening, when a large and enthusiastic attendance was present.

In the construction of the theater about 100,000 ft. of lumber were used. The heaviest timbers were the four corner posts supporting the theater stage roof, which is of wood. These were 40 ft. long and 12 in. square. The lumber was hauled to the park in automobile trucks. All sawing was done by hand on the grounds. The lighting supplies were brought from Boston, 10 miles distant, in a taxicab. The canvas was transported in a special car of the Boston Elevated Railway Company. Many of the supplies used were drawn from the storerooms of the Suburban lines. The night illumination was effected by 25 arc lamps supplied with current from the Homer Street power station. The stage is provided with lighting connections from the turbine power plant of the companies at Waltham, and is also connected with the Boston Edison service. All the wiring was inspected by the city authorities of Newton before it was used, and the plumbing was inspected practically as fast as it was completed. The day before the theater was completed, Sunday, June 13, posters were placed on the cars announcing that the work was finished, as promised. The inside of cars was also pressed into service for advertising. The work was handled by a total of 300 men, divided into two daily shifts of 18 hours each. The men were fed at the park restaurant. General Manager Brush was on the grounds and in touch with the telephone line practically every minute of the week. A special instrument was located at the site of the theater, and an operator provided to attend it. Shortly after the opening of the new theater, lantern slides showing the progress of its construction from day to day were prepared and exhibited in connection with the regular entertainment. It is the intention of the company to rebuild the superstructure in the fall, and employ reinforced concrete throughout, making the theater probably the largest and most complete fireproof open-air establishment of its kind in the world. Among the officials whose co-operation made the rapid building of the theater possible are General Manager Brush, who bore the immediate responsibility for the entire project; Assistant General Manager Sylvester; Carl Alberte, manager of Norumbega Park; George Hill, superintendent of wires; Thomas Demoy, foreman of tracks; Dan O'Connors, master painter; Samuel L. Brown, architect, Boston; G. H. Brazier, of J. R. Worcester, engineer, Boston; J. Hargedon, West Newton, contractor for staging and floor. The entire force of men worked with enthusiasm and loyalty to bring about the result attained. To date the cost of building the theater anew is about $13,000.

The Employees' Society of the Havana Electric Railway, with a membership of 919, helped its members with the following services during 1908: Cash paid to members on sick leave, $3,639; medicines, $1,766; surgical operations, $371; damages for accidents, $103; fines paid into correctional courts, $202; privileges during imprisonment, $8; funeral expenses, $48; bonds given to courts, $2,850. In addition to the foregoing, the society has taken a large number of the employees out of the hands of the usurers by loaning small sums of money to its members. These loans amounted to Feb. 1, 1909, to $7,324.85. Prior to the organization of the society, the borrowing of this amount would have cost the employees $1,464.87 a month interest, whereas at the present time the interest required by the society is $73.24 a month.

THE RECONSTRUCTION OF STREET CAR TRACKS IN CHICAGO*

BY GEORGE WESTON, MEMBER, BOARD OF SUPERVISING ENGINEERS

The principal object sought by the design of track construction adopted for the rehabilitation of the Chicago surface lines was permanency of construction with minimum maintenance, depreciation and renewal expense. Inasmuch as the rails and joints of a track are subject to direct and continuous wear and must in time be renewed, the track has been divided, possibly arbitrarily, into what we term a "superstructure" and a "substructure." That part of the track that must be renewed being styled the superstructure, consisting of rails, joints and possibly the tie fastenings; and that part of the track not subject to direct wear, or necessarily affected by the operation of renewing the superstructure, has been styled the substructure, consisting of ties, ballast, etc. Pavement is considered to be a separate item.

There has been developed and approved by the Board of Supervising Engineers three types of track, each type differing from the others in the character of the substructure and tie fastenings. These types are as follows:

Type 1 consists of a concrete foundation, with steel ties, spaced 4 ft. center to center, entirely embedded in concrete, and with a specially designed renewable clip and wedge for fastening the rail to the tie.

Type 2 consists of a concrete foundation with wood ties, spaced 4 ft. center to center, entirely embedded in concrete, and with tie plates and screw spikes for rail to tie fastening.

Type 2-A, same as Type 2, excepting that the ties are spaced 3 ft. center to center.

Type 3 consists of a rolled, broken stone foundation, with wood ties, spaced 3 ft. center to center, and with tie plates and screw spikes for rail to tie fastening.

The substructure in Type 1 track has the elements of permanent life, to wit: Steel ties embedded in Portland cement concrete. Steel embedded in concrete is protected from corrosion, and therefore permanent life can be expected from Type 1 foundation, if motion can be prevented between the tie and the concrete, which otherwise would tend to cause disintegration of the concrete and consequent failure of the foundation. While, with the use of steel ties, all members of the board were of the opinion that the resulting foundation containing the elements of permanency as regards materials, the question of rigidity of the track and the presence or absence of sufficient resilience or cushioning effect to absorb shock and vibration was discussed at length, with the final result that the use of wood ties in Type 2 or Type 2-A track meets with more favor, and today Type 2-A is practically the standard track adopted by the board.

It is only practicable to build track with a concrete foundation when conditions are such that traffic will not be put upon it for a sufficient length of time to permit the concrete to become properly set. This can be done when long stretches of track are to be built and provisions can be made for re-routing the cars, or the construction of a temporary track for their operation. Also, in the placing of special work, such as frogs and crossings, it is impracticable to attempt to use this type of foundation, and a concrete substructure should have a solid foundation of soil under it. Therefore it became necessary to design a type of track that could be used for emergency, special work, unimproved streets, etc., and Type 3 has been adopted for such uses.

The steel tie used in Type 1 track is an I-beam shape, weighing 14.5 lbs. per yard, with one wide flange and one narrow flange. The tie is inverted, with the wide flange up to receive the rail. The tie becomes a part of the permanent substructure and must be protected from wear, and must not necessarily be disturbed in the operation of renewing the rails. A tie plate and "clip" fastening were designed to accomplish this result. By the use of special fastenings, independent of the rail fastenings, the tie plate becomes a part of the tie; no movement can take place

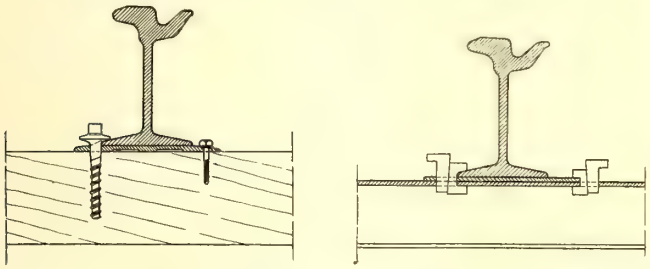
*Abstract of a paper read before the Western Society of Engineers, Chicago, June 16, 1909.

between the tie plate and the tie, thereby protecting the tie from wear. These tie plate fastenings are so designed that at the time the rail is renewed, the tie plate can also be renewed without disturbing the tie. The rail is fastened to the tie plate and tie by a clip that can be removed and replaced without disturbing the tie.

The wood tie used in Types 2, 2-A and 3 track is 6 in. x 8 in. x 7 ft. long, treated with chloride of zinc. It was believed that timber incased in concrete would be preserved against decay, and the first specification for the manufacture of ties called for untreated, 90 per cent heart, yellow pine ties. After further discussion, it was the unanimous opinion of the board that the treatment of the wood ties by a preservative would be an added insurance against their decay sufficient to warrant such additional expense that might be incurred by the use of treated ties.. For use in street railway track, where the ties are encased in concrete and protected from rains and floods, and no opportunity exists for the soluble salt to be "leached" out of the timber, chloride of zinc treatment was determined upon as sufficient to preserve the ties against decay. The specifications for treated ties include the following timbers: Long leaf yellow pine, short leaf yellow pine, loblolly pine, black gum, Norway pine, oregon fir, cypress or selected red oak.

The specifications require the treatment to be applied in retorts or cylinders properly arranged for steaming, vacuum and compression treatment. In the steaming treatment the temperature must not exceed 250 deg. Fahr., and the vacuum applied shall not be less than 26 in. of mercury, and the pressure used for impregnating the fluid shall not exceed 100 lb. per square inch. The solution must carry such percentage of chloride of zinc salt that the mean impregnation per cubic foot of timber shall be ½ lb. of pure chloride of zinc.

One of the principal causes for the failure of a concrete foundation track with wood ties has been caused by the failure to protect the tie from abrasion produced by movement of the rail. The rail having been spiked directly to the tie with ordinary hook-head spikes, the spikes pull out under traffic and permit a movement of the rail which destroys the fiber of the wood. In order to protect the tie thoroughly from the action of the rail, tie plates secured to the tie by "fetter drive" screws are being used; the plates thereby becoming a part of the tie. This tie plate can be renewed wherever the rail is renewed, without disturbing the tie if it is so desired. The rail is secured to the tie by screw spikes, which can be removed or replaced whenever it is desired to renew the rail without disturbing the tie.



Rail and Tie Plate Fastenings on Wood Tie and on Steel

To assist in holding the rails to line and gage the tie plates are provided with a shoulder and tie rods, 5/16 in. x 2 in. with 1-in. round terminals, forged from solid bars, are used, spaced every 6 ft.

The rehabilitation ordinances, under which the Board of Supervising Engineers is working, provide under the head of "Bonding" that "There shall be some form of bonding used which shall connect the ends of the rails in such manner that the conductivity of the joints shall be equal to the carrying capacity of the rail." The Board of Supervising Engineers concluded that an electrically welded joint would fulfill the ordinance requirements as to conductivity, and with proper protection against possible breakages, the joint was considered to be an advantageous one to adopt. All of the straight track that has been built to date, under the ordinances, has been electrically welded at the joints.

On "special work" a bolted joint has been used, and in order to provide for the continuity of the full conductivity of the rails through the special work a copper cable is placed through the special work for each rail, with the ends of the cable welded to the web of the straight track rail outside of the special work. The joints of this special work are bonded with a small copper bond, to take care of what might be termed the "internal conductivity" of the piece of special work.

Careful study has been given the subject of track "special" work, and the very important point of providing passing clearances for cars operating in opposite directions on curves has been accomplished. In addition to "hardened center" work, specifications also provide for solid manganese switches, mates, frogs and crossings, and a large part of the special work that has been installed under the supervision of the board, particularly on trunk line, heavy traffic streets, has been of the solid manganese type.

The specifications covering the concrete work in the substructure have been drawn very carefully, and in prosecuting the work great care has been taken to have first-class materials and thorough workmanship in mixing and placing. The specifications provide that the concrete shall consist of "Portland cement, 1 part; sand, 3 parts, and crushed stone, 6 parts;" that the Portland cement shall conform to the "Standard specifications adopted by the American Society for Testing Materials;" "the stone shall be hard, durable and free from dirt, broken and screened and what is known commercially as 1-in. stone;" "the sand used shall be sharp, clean torpedo sand, free from dust, loam and dirt." The specifications cover mixing by hand for emergency, but the mixing of the concrete for the general work is done by machine under the following specification: "The constructor may use a machine mixer at the discretion of the engineer in charge. The necessary requirements for the machine will be that the precise and regular proportioning of materials can be controlled, and the product be of the required consistency when thoroughly mixed, and that, if the machine travels on the track rails, the vibrations and the strains due to moving the mixer will not be sufficient to affect the line and grade of the track." The specifications require that the track shall stand 14 days after the concrete has been placed before cars are allowed to be operated thereon.



Rail Deflectometer in Service

Where the pavement on the outside of the track is asphalt, or of similar character, that can be swept and cleaned, the stone and sand are deposited directly upon the clean pavement, but on unpaved streets, or where the pavement is of such character that it cannot be thoroughly cleaned prior to the depositing of the concrete materials, a floor of planking is laid upon the street to receive the concrete materials.

The spaces under the heads of the rails and next to the webs are filled with a Portland cement mortar, composed of one part Portland cement and three parts torpedo sand.

In order to provide a thoroughly solid foundation, the trench prepared to receive the track, after having been excavated to the required depth, is thoroughly rolled with a heavy steam roller, and all soft places that are thereby developed are excavated and properly filled with good, clean sand or gravel, rammed, rolled or puddled, as may be directed. In the case of Type 3 track, in addition to rolling the excavation, the crushed stone is thoroughly rolled before placing the ties to receive the track rails.

In designing the foundation for Types 1 and 2 track, with the ties 4 ft. center to center, it was figured that the

principal office of the tie would be to hold the rails down and to line and gage, and that the loads of passing cars would be distributed to the soil by the concrete. During the year 1907 all wood tie, concrete foundation track constructed was of Type 2 design, with ties 4 ft. center to center. During the winter of 1908 the track built during the previous year was carefully inspected to ascertain its behavior under traffic, and it was found in places that a slight movement in the rail could be detected under the load of passing cars. The chief engineer of the work directed that an investigation be made to ascertain the cause of the movement, to what extent it affected the track construction and what the possible results might be.

In order to make this study and determine the rigidity and action of the different types of track construction under traffic, observations were taken by means of a "deflectometer," designed especially for the purpose. This apparatus was so constructed that lateral movement of the rail could be observed as well as vertical deflection, and it was also arranged so that any vertical movement of the ties in the concrete could be readily determined and measured. The principal object of the investigation was to determine if any movement occurred of sufficient magnitude to disintegrate the concrete foundations or to endanger the life of the track substructure. It will be observed by an examination of the cut on page 1155 that the "deflectometer" consists of a simple lever mounted on a suitable frame, having at its outer end a pointer which moves over a scale. This lever is proportioned for a ratio of 10 to 1—that is, the reading on the scale is 10 times the actual deflection recorded. The distance from the rail to the fulcrum is 4 in. and from the fulcrum to the scale 40 in. The frame is designed so that the joints of the supporting frame are adjustable to compensate for any inequality in the pavement, so that the apparatus can be brought to a true level when the readings are being taken.

In order to segregate the vertical movement from the horizontal movement of the rail, a small clamp was made to be attached to the outer side of the rail. This clamp is placed on the under and outer surfaces, and highly polished, so that the point of contact with the lever will move over these surfaces without friction.

To take readings for vertical deflection the instrument was set at right angles to the track and the frame adjusted to a true level, the clamp applied to the head of the rail and the short arm brought into contact with the under surface of the clamp. With the instrument in this position any vertical movement that takes place in the rail under load is transmitted to the pointer at the scale and is magnified 10 times. In this position the instrument records only vertical movement.

To measure horizontal movement of the rail, the other arm is brought into contact with the outer surface of the clamp, and in this position any horizontal movement is transmitted to the pointer on the scale in the same manner as when recording vertical movement.

To take readings for the deflection of the tie, a longer arm was attached to the apparatus, which was fastened to the tie by means of a screw eye when applied to wood ties, and when the observations were being made on steel ties the arm was hooked under the flange.

When readings were taken of the concrete substructure a small hole was drilled into the concrete and plugged with lead and a small screw eye inserted as in the case of the wood tie.

When these tests were taken it was expected that deflection amounting to as much as from ¼ in. to ½ in. would be found in some places. The results obtained were an agreeable surprise, for the maximum vertical deflection recorded was 5/64 in. In a large percentage of the track tests no vertical deflection whatever was noted. It was also shown by these tests that greater vertical deflection occurred at the rail joints, and decreased away from the rail joints, and that the average vertical deflection observed seemed to be about 1/32 in. No deflection whatever was observed in the concrete, and only in a very few cases was any deflection in the ties recorded. In these few instances the ties were excavated and it was found that the movement was due to improper tamping, leaving voids.

After numerous tests had been made it was determined that practically all movement took place between the base of the rail and the tie plate, and that in the majority of cases this movement was observed near the joint of the rails and disappeared entirely as the center of the rail was approached. This can be explained as follows: There is an opening left in the concrete to facilitate the welding of the joint, which is done after the concrete has been placed. When the weld is made the rail fastenings on the ties adjacent to the joint are loosened, and the rail apparently buckles when the weld is made, and in retightening the fastenings the rail was not forced back to its original position on the tie plates. When the loaded cars passed over the rail at these points the rail was forced down to the tie plate, and after the load was removed the rail would spring back again from the tie plate, which accounts for the vertical movement.

It should be noted that horizontal movement was recorded in practically every case of tests made, the average movement in this direction being about 1/64 in. This horizontal movement seemed to be a constant factor and varied but little. These tests proved that the naked eye greatly exaggerated the apparent movement of the track under load. It was discovered that, even to the eye of the trained observer, the rails that seemed to have a deflection of ¼ in. in reality did not move more than 1/64 in.

These tests also demonstrated that in many instances where vertical movement of the rail seemed to be observed, it was, in fact, a horizontal movement. The tests further proved that it was impossible for the observer with the naked eye to differentiate between horizontal movement and vertical movement of the rail.

These observations proved (1) that when the foundation is properly prepared, the concrete properly mixed and placed and the ties properly tamped, and the concrete given a sufficient length of time to properly set before traffic is allowed on the track, no movement occurs between the concrete and the soil or between the tie and the concrete, and that, when the fastenings are properly applied, no vertical movement will occur between the rail and the tie plate. (2) The observations proved that the types of construction that are being used in the rehabilitation of the tracks, as far as can be figured at this time, have the characteristics which promise a permanent substructure.

DISCUSSION

In the discussion H. B. Fleming, member of the Board of Supervising Engineers, representing the Chicago City Railway Company, gave some idea of the difficulties in handling traffic on a 20-second schedule in the central business district during track reconstruction. Three methods have been followed. One is to construct turnouts on a double-track route, using one track for traffic in both directions for a certain distance while the other is being rebuilt; the second is diverting cars to tracks in adjacent streets, and the third is the building of temporary tracks on the street where the work is under way.

Paul E. Green, assistant engineer of the Board of Local Improvements, criticised the paper in some respects. For one thing, he contended that electrically welded joints were not as good as cast-welded joints, owing to a greater percentage of breakages.

R. F. Kelker, assistant engineer of the Board of Supervising Engineers, explained the electric welding process, and said that the breakages of electrically welded joints are 50 per cent less than when cast welding is employed. Several others took part in the discussion. Mr. Weston said that very few of the breaks in track that have occurred have been in the joint. He also expressed as his opinion that streets having car tracks should not be paved with asphalt.

The Manhattan Bridge, spanning the East River about half-way between the Williamsburg Bridge and the Brooklyn Bridge, will be completed and open for traffic early in 1910. It will carry four subway car tracks on the lower deck and four surface car tracks on the upper deck.

ROLLING STOCK STANDARDIZATION IN BROOKLYN—CHANGES IN CAR LIGHTING AND HEATING

One of the features of the car standardization carried out by the Brooklyn Rapid Transit Company was the thorough overhauling of the lighting and heating equipments of all passenger cars on the elevated and surface divisions. The changes in lighting on the surface cars were made with the twofold purpose of reducing the fire risk and attaining more uniform illumination. For these reasons all clusters were removed and single lamps were placed in the clearstory while the circuits were placed in electrobestos conduit with ¼-in. transite backing and the lamp sockets mounted on electrobestos blocks, as illustrated in Fig. 1.

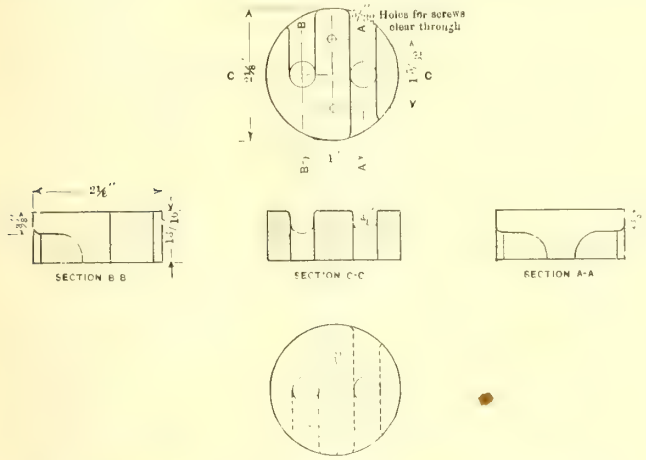


Fig. 1—Brooklyn Car Lighting—Details of Block for Lamp Socket

Fig. 2 shows the present arrangements of the lighting circuits on the principal types of surface cars. It will be noted that the lamps are connected on alternate-series circuits so that the burn-out of one lamp will not affect the adjacent lights. Originally when illuminated block destination signs were installed for the vestibules two lamps were taken from the interior of the car. It was found, however, that this change caused too great a decrease in the illumination of some parts of the car. This objection was met and the conditions considerably bettered by installing another circuit, thereby adding three 16-cp lamps for the inside lighting. The light circuits are made up of No. 14 Okonite rubber-insulated, single-braid wire.

HEADLIGHTS

At one end of the car the headlight was formerly the third lamp in the series. By making it the fifth lamp in the series, as at the other end of the car, the grounding of the headlight from water or other causes can no longer blow out the remaining lamps and fuses because the extra voltage is taken by four instead of two lamps. The two-motor surface cars are supplied with a single 16-cp incandescent headlight. The four-motor cars have headlights composed of two 24-cp incandescent lamps and an arc light for service in the open country.

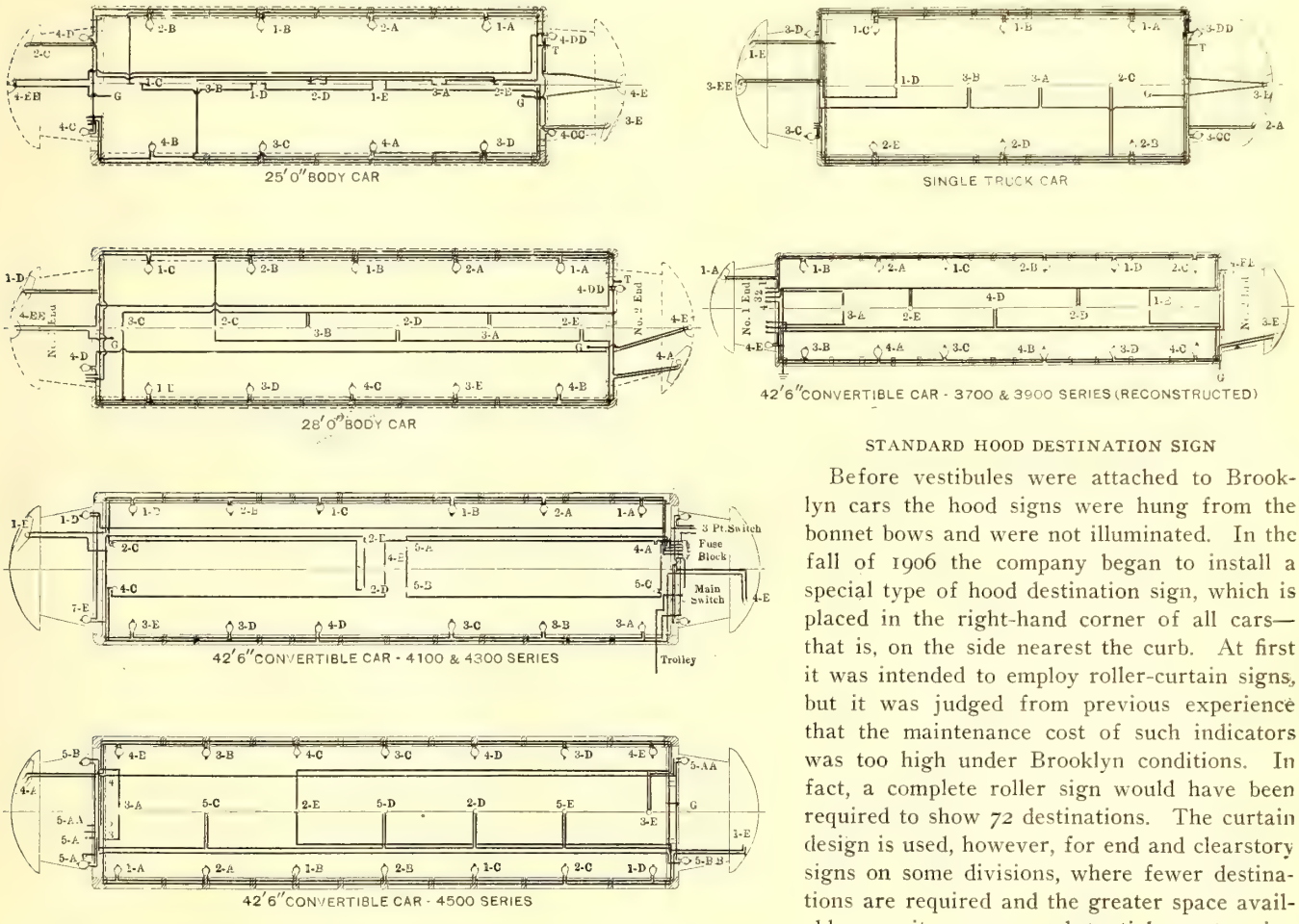


Fig. 2.—Brooklyn Car Lighting—Standard Light Wiring Diagrams of Surface Rolling Stock

STANDARD HOOD DESTINATION SIGN

Before vestibules were attached to Brooklyn cars the hood signs were hung from the bonnet bows and were not illuminated. In the fall of 1906 the company began to install a special type of hood destination sign, which is placed in the right-hand corner of all cars—that is, on the side nearest the curb. At first it was intended to employ roller-curtain signs, but it was judged from previous experience that the maintenance cost of such indicators was too high under Brooklyn conditions. In fact, a complete roller sign would have been required to show 72 destinations. The curtain design is used, however, for end and clearstory signs on some divisions, where fewer destinations are required and the greater space available permits a more substantial construction than would be possible at the hood.

The hood sign-lighting scheme finally devised permitted the use of the original four-sided block sign. The whole arrangement, which is shown in Fig. 3, has been found very effective and economical. The front of the block is illuminated by a 16-cp lamp, the end of which is at a point almost opposite the center of the sign. The top of the

hood is rounded so that no protruding shield is needed to protect the lamps. The inner upper part of the hood is lined with ¼-in. vulcabeston or transite and the sides are of sheet steel. High reflective power is obtained by coating the inside of the front and top of the hood with white enamel paint. The back of the hood is painted the standard red car color so that light will not be reflected forward

The lamp company is required to keep in reserve at the works a certain number of lamps marked for the use of the Brooklyn Rapid Transit Company. Immediately after the inspector of the railroad company has accepted lamps for shipment new packages must be reserved to make up the quota held in reserve. Lamps are tested in two ways for two distinct purposes as follows: Inspection at the lamp

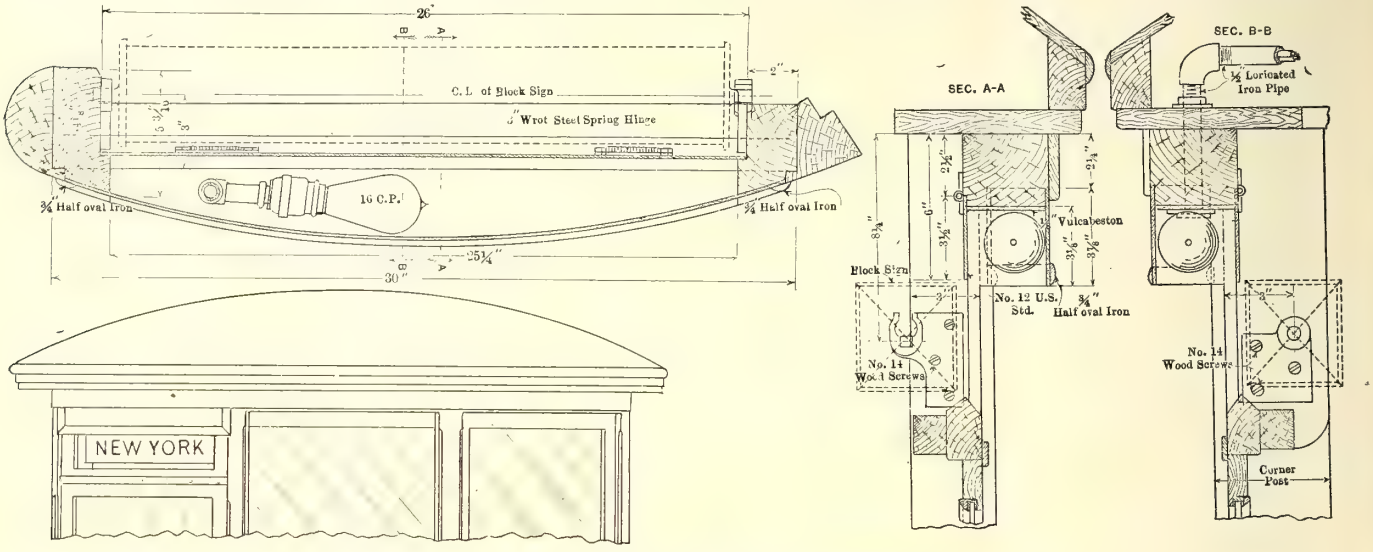


Fig. 3—Brooklyn Car Lighting—Details of Bonnet Sign

and cast a glare in the eyes of those looking at the sign from the front of the car.

Among the other construction details shown in Fig. 3 are the spring hinge attachment to permit the ready replacement of lamps and the loricated iron pipe for the lighting circuit. At present the block signs are lettered by hand, but it is planned to use an aluminum leaf transfer letter system.

LAMP SPECIFICATIONS

All incandescent lamps for rolling stock are purchased according to specifications prepared by the electrical engineer of the Brooklyn Rapid Transit Company. The lamps are of the oval anchored type and must have an illuminating intensity of 16 mean horizontal cp. They are connected across the railway circuits in groups of five in series and subjected to a potential having the normal value of 575 volts. The normal rated voltage of each lamp at normal candle-power must be 115 volts.

works by a representative of the railroad company which allows only such lamps to be shipped to the railroad as are satisfactory from the standpoint of voltage and wattage rating when the lamps are burning in a photometer at 16 cp; life and candle-power maintenance tests to satisfy the railroad that the lamps furnished are fulfilling the standard of illumination guaranteed by the lamp company.

METHODS OF TESTING INCANDESCENT LAMPS

Voltage-wattage tests are carried out in the following manner:

When the purchasing agent of the railroad has sent a formal order for the shipment of a stated number of lamps to the railroad company its inspector visits the lamp works and selects from the lot of lamps previously reserved and marked for the railroad company's use a test quantity varying from 6 per cent to 25 per cent of the total order, the test percentage decreasing with the size of the order. The percentage is also lowered if the test is made at the





Figs. 4 and 5—Brooklyn Car Lighting—Illuminated Block Sign and Illuminated Curtain Side Sign

factory. The test lamps are selected at random and measured at 16 cp in the photometer of the lamp company by its operators under the supervision of the railroad company's inspector. If 6 per cent or more of these lamps are outside of the limits of voltage, current, watts and the mechanical requirements mentioned in a later paragraph, the entire lot of lamps inspected is subject to rejection and must be replaced with acceptable lamps by the manufacturer.



Fig. 6—Brooklyn Car Lighting—Interior of Elevated Motor Car

Life and candle-power tests are made as follows:

At the completion of the work of the railroad company's inspector in accepting the quantity of lamps called for by the purchasing agent's order, he may select at random five lamps from each package of 200 and then close these packages with the seal of the railroad company. The lamps thus taken are shipped to the laboratory of the railroad company without measurements at the lamp works. Initial measurements of voltage, current and watts are made of these lamps burned at 16 cp on the railway company's photometer. Two-fifths of the lamps nearest the average of



Fig. 7—Brooklyn Car Lighting—Interior of Double-Truck Closed Car

those which came within the average limits prescribed hereafter are subjected to a life and candle-power test. These lamps are started at the voltage which would make the average lamp representing them burn at an efficiency of 3.1 watts per candle. This requisite voltage is calculated with the use of the laboratory lamp curves from photometric measurements made at 16 cp.

The life and power maintenance tests consist of 450 hours' burning at the initial voltage and exclusive of the intervals during which the lamps are removed from the lamp rack in order that photometric measurements may be made at intervals not exceeding 100 hours. The final result of the life and candle-power maintenance tests is the total cp-hours emitted in the lamp rack divided by the number of lamps with which the tests are started. The photometric measurements made on the lamps at intervals



Fig. 8—Brooklyn Car Lighting—Interior of Elevated Trail Car

not exceeding 100 hours throughout the 450 hours' tests are made at the initial voltage with which the tests are started.

MECHANICAL DETAILS OF TESTS

The lamp filaments must be symmetrically located in the bulbs and must not droop excessively when burned 450 hours on the life test without excessive vibration and in one horizontal position at a voltage corresponding to an initial specific consumption of 3.1 watts per mean horizontal cp. All filaments must be symmetrically curved



Fig. 9—Brooklyn Car Lighting—Interior of Convertible Surface Car

without kinks and free from imperfections, spots and discolorations. Leading-in wires must be fused into the glass with the joints between the copper and platinum wires well imbedded in the glass and must be straight, well separated and securely soldered to the base and cap without excess of solder. All lamps must have first-class vacuum, showing the characteristic glow of good vacuum when

tested on an induction coil giving ¼-in. to ⅜-in. spark. The lamps must have a standard Edison screw base, rendered impervious to moisture and with a short shell so that it is entirely covered when screwed firmly into the socket. In general the lamps must be uniform in shape and size, clear, free from blemishes and made to fulfil satisfactorily the exacting conditions of railway service.

CANDLE-POWER TESTS AND RANGE OF VOLTS, AMPERES AND WATTS

The candle-power tests are based on the English Parliamentary candle as interpreted by the National Bureau of Standards at Washington. Lamps are measured photometrically in a horizontal plane and are rotated in a vertical position at about 180 r.p.m. All lamps are held at 16 cp while in the photometer, the voltage and current necessary to bring them to this intensity being adjusted accordingly and measured by electrical instruments conforming with the National Bureau of Standards at Washington.

When burning at 16 cp the voltage on any lamp tested must be not less than 110.4 volts and not more than 119.6 volts. The average voltage on all lamps tested must be not less than 112.7 volts and not more than 117.3 volts. When



Fig. 10—Brooklyn Car Lighting—Center Lamps in Double-Truck Open Car

burning at 16 cp the current in any lamp tested must be not less than 0.47 amp nor more than 0.50 amp, these limits being 2 per cent below 0.48 amp and 2 per cent above 0.49 amp, the even hundredth ampere rating which is supplied in accordance with standard railway lamp practice. The average amperes of all lamps tested must not be less than 0.475 amp nor more than 0.495 amp, these limits being 1 per cent below 0.48 amp and 1 per cent above 0.49 amp.

When burning at 16 cp the watts used by any lamp tested must not be less than 52.92 watts and not more than 59.08 watts, these limits being 5.5 per cent below and 5.5 per cent above the normal power consumption of 56 watts. It is to be observed that by reason of all lamps being tested at 16 cp these limitations of power consumption are equivalent to specifications of the efficiency expressed in watts per cp, the allowable range being from 3.307 watts per cp to 3.69 watts per cp. The average power consumption of all lamps tested must not be less than 54.46 watts nor more than 57.54 watts. These limits are 2.75 per cent below and 2.75 above the normal power consumption of 56 watts and are equivalent to limitations of the efficiency between 3.404 watts per cp and 3.596 watts per cp.

LAMP GUARANTEES AND CANCELLATION

The lamp company must guarantee a standard of illumination as follows: The results of all life and candle-power maintenance tests carried out as above specified must show the average illumination emitted per lamp expressed in cp-hours to be not less than 7850. This figure is to be obtained by dividing the total integrated illumination in cp-hours emitted during a life and candle-power maintenance test by the number of lamps with which the test is started. The failure of these test lamps to conform to the foregoing standard of illumination when tested by the methods specified will cause the railroad company to reject at the next inspection all lamp packages comprising the lot from which the life test lamps were selected and may cause the cancellation at the option of the railroad company of its contract with the lamp company.

HEATING PRACTICE ON SURFACE CARS

The greater number of the surface cars are equipped with six double-coil heaters of either the Consolidated or Gold types to give 4, 8 and 12 amp. The switching equipment usually comprises two knife switches or a three-point Hart & Hegeman switch. Five-point switches with six single-coil heaters are installed only on a few closed surface cars. About 300 cars of the cross-seat type have 18-cylinder, double-coil heaters and 150 cross-seat cars have 18 single-coil heaters, but these are also arranged for the standard amperages.

HEATING PRACTICE IN ELEVATED CARS

The latest elevated cars are arranged with 18 panel and two cab heaters, all of the double-coil type, connected for three positions to give the standard elevated amperages of 6, 12 and 18. The number and style of heaters differ in the several types, but three-point switches are used throughout. Most of the other elevated cars with longitudinal seats are equipped with 12 car heaters and two cab heaters, also connected for the same amperages. The class 600 series of elevated cars are equipped with 10 three-coil heaters and two cab heaters; class 800 cars with 14 two-coil heaters and two cab heaters; the class 1000 cross-seat with 18 single-coil heaters; class 1300 cars with 24 car and two cab heaters and the trailers with 12 two-coil panel heaters. Heater circuits are carried either in electrobestos molding with transite backing or in loricated conduit which is representative of the later practice. The junction box at the end of the heater has an inner T & B bushing. The repairs of all heaters and coil replacements are made at the Fifty-second Street shops.

CONTROL OF HEATER POSITION

The heater positions are not controlled by the trainmen, but are set according to orders telephoned from the main office of the transportation department at intervals of 30 minutes if necessary to all depots and other dispatching points. These instructions simply call for "0," "1," "2" or "3," and when received the dispatcher or depotmaster hangs out the proper sign, which bears no other marks than the plain figure. These heat instruction signs are of enameled metal and are set in wooden frames supplied with a lamp and reflector for night use. When installed at junction points they are hung from the switch towers. At the car houses the signs are placed so that they can be readily observed by passing crews. Under normal conditions the switches are set as follows: First point from 40 deg. to 30 deg.; second point, 30 deg. to 20 deg.; third point, 20 deg. and below. No discretion in regulating heater positions must be exercised by anybody at the dispatching points, but the main office must be called up for revised orders in the absence of definite instructions on the temperature schedule.

MEETING OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The ninth meeting of the Central Electric Accounting Conference was held at the general offices of the Scioto Valley Traction Company, Columbus, Ohio, on June 19. The program and attendance made the meeting one of the most successful that has been held by this organization. Robert N. Wallis, president of the American Street & Interurban Railway Accountants' Association and treasurer of the Fitchburg & Leominster Street Railway, attended the meeting for the purpose of showing the interest of the national association in the work of the interurban organization. The discussion which followed the remarks made by Mr. Wallis on this subject indicated the appreciation by the speakers of the value of local organizations and emphasized the importance of co-operation by all associations of this character in movements that affect the industry as a whole.

After calling the meeting to order, the chairman, M. W. Glover, auditor, Ohio Electric Railway, made a statement concerning the affairs of the conference, in which he said:

STATEMENT OF MR. GLOVER.

On Jan. 19, 1907, a meeting of accounting officers was held in Lima, Ohio, to discuss the settlement of interline accounts between electric railway lines of Ohio and Indiana that had been interchanging both passenger and freight business for several years without any uniform method of settlement having been adopted. Nearly every line carried on its books interline accounts the details of which could not be accurately verified, caused partly by the absence of agreements covering the interchange of freight and passenger business, and partly by the lack of uniformity in such agreements as existed.

The necessity for an improvement in the situation was apparent to every one present at this meeting, and it was decided that an association of some kind should be formed to bring into closer touch the accounting officers of lines in the Central States and to formulate a uniform plan of settlement between carriers. As a result a meeting was held in Dayton, Ohio, on March 2, 1907, and at this meeting the Central Electric Accounting conference was organized, 17 members being present, representing 19 lines, all located within the States of Ohio and Indiana.

The second meeting of the conference was held at Indianapolis on June 1, 1907, 19 members being present, representing 12 lines.

The third meeting was held at West Milton, Ohio, on July 13, 1907, 20 members being present, representing 12 lines.

The fourth meeting was held at Lima, Ohio, on Feb. 11, 1908, 32 members being present, representing 19 lines.

The fifth meeting was held at Lima, Ohio, on April 23, 1908, 25 members being present, representing 23 lines.

The sixth meeting was held at Indianapolis on Oct. 3, 1908, 16 members being present, representing 14 lines.

The seventh meeting was held at Lima, Ohio, on Nov. 18, 1908, 26 members being present, representing 22 lines.

The eighth meeting was held at Lima, Ohio, on March 6, 1909, 25 members being present, representing 19 lines.

If the conference had accomplished nothing more than the settlement of the old accounts between lines, its formation would have been justified, as these accounts could never have been settled without loss to the various lines interested except through the adoption of a uniform method of handling interline business and making settlements for balances between carriers. The conference did more than this; it brought together a body of men who, although familiar with the signatures of their neighbors, had never met them personally; and every one knows the advantages, from a business standpoint, of a personal acquaintance with those with whom business is transacted daily.

Rules have been adopted by the conference for the settlement of interline accounts, which are now working in a satisfactory manner, and the rules governing the settlement of freight claims have also proved valuable.

At the fifth meeting, on April 23, 1908, Interstate Commerce Commission circular No. 20 was discussed, and a joint criticism was adopted, setting forth the views of electric railway accountants, in accordance with the request of the commission for suggestions and criticisms.

So far, the conference has been successfully carried on for over two years, and at the last meeting a constitution and by-laws were adopted, but unless the members take an active interest in its work and attend all regular meetings the influence of the conference, as stated in the constitution, will not be attained.

Another matter which should not be overlooked is the fact that the conference has been carrying out the work outlined for two years without assessing any dues or making any charge for membership. The only expense attached to the conference has been the cost of printing rules governing the settlement of claims and interline accounts, which were distributed at cost at 15 cents per copy to such members as wished them, and 90 cents to defray the cost of printing the uniform blanks adopted at the seventh meeting of the conference. I believe this is a record not equalled by any other association of the kind anywhere.

William A. Forse, Jr., treasurer, Indiana Union Traction Company, then introduced Mr. Wallis, who spoke in part as follows:

REMARKS OF MR. WALLIS

It is a pleasure for me to be present to extend assurances of the desire of the American Street & Interurban Railway Accountants' Association for a hearty co-operation with your conference, which I am authorized by action of our executive committee to do. Many of you are members of that association. I wish every one of you might be. But whether the membership of this conference is wholly or only in part enrolled also among the Accountants' Association membership, the relations between the two bodies should at all times be most cordial and intimate. We are all members of one family; our interests in a large way are identical.

It seems to me that local or sectional organizations of electric railway accountants should be encouraged for the interchange of ideas and the making of acquaintanceship. As you are aware, many national associations have such locals as part of their organization. The larger association can meet but once a year, and only in short sessions, while the members of a neighborhood association can meet frequently with great advantage and with resulting closer relationships.

One principal advantage of a sectional organization such as yours is that much educational and missionary work may be done. Discussion is much more personal and intimate and minute details can be taken up which are necessarily difficult to include in a program of a national organization. Much may be done in the way of help to the newcomer in railway accounting in order that he may avoid some of the mistakes which he would make if he were obliged to feel his way unassisted. The members who are older in the business should feel it their duty to help the recruits in the interest of a continually higher standard of accounting efficiency.

Such a sectional organization as this can do much toward setting up a high ideal of the electric railway accountant. We must continually aim to improve and advance our branch of the industry in order that we may become always more valuable to the business and the community. The intimate acquaintanceship in such a conference as this permits you to insist upon greater efficiency of method and result. It seems to me to be the duty of your organization as well of the one I represent and of each of us individually to interest the shy, modest, retiring fellow who, when drawn out, proves to be a mine of work and ideas.

Herein lies the great benefit to the national organization of close co-operation with you: That it may have the benefit of the results of the work and experience of your more frequent, more intimate conferences. Through your frequent interchange of ideas here you are better qualified to pass upon the questions which present themselves to the national organization affecting not only interurban properties or your own section, but also the whole industry and the entire country.

Your conference was formed to consider problems which arose in the development of the interurban feature of the business in which much more has been accomplished in this immediate section than in any other part of the country. With you the Accountants' Association wishes to join hands in the solution of these problems. In this work we are blazing a trail in a comparatively new branch of the industry—the accounting of through or interline business. Of necessity here more than in any other part of our accounting must there be uniformity. It is a large responsibility thrown upon us. We must go carefully, mold, change, perfect.

We have steam railroad practice to guide us in this work. It is the result of decades of experience and we would be foolish indeed if we did not avail ourselves of it. I believe you have done wisely in following this experience in your work. But we must not forget that steam railroad practice is suited for steam railroads and that the electric railway presents a different problem. We should not regard steam railroad practice as final in our work because it is traditional. We must adapt, not adopt.

The Accountants' Association's committee on interline accounts is considering these problems and through its report they will be brought up at the next convention of the association for discussion, which will be the first step toward securing uniformity of practice in this branch of accounting throughout the United States. Two of the important functions of the American Association are in securing uniformity of method and in encouraging a high standard of efficiency.

As I have previously expressed it to you, the Accountants' Association is desirous of learning from you what it can do to be of assistance to you. I am here principally to find out if I can what need of yours the association can fill. To that end I hope that suggestions will be offered through me to the Accountants' Association.

Gentlemen, I thank you for allowing me the opportunity of showing the Accountants' Association's interest in your work.

Chairman Glover stated that the conference was a small organization, holding meetings from time to time. He was satisfied that he could say for every member that it was realized that the conference represented a part of the industry, and that all wanted to work in harmony. The conference simply wanted to keep its members posted on questions of local importance.

P. V. Burington, secretary and auditor, Columbus Railway & Light Company, followed, saying in part:

ADDRESS OF MR. BURINGTON

The position each of you occupies as an accountant is threefold: First, to represent the executive management; second, to formulate and systematize executive and operating details, and, third, to make an intelligent record. To be the representative of the management means that you will be expected to know and correctly interpret the wishes of the executive management along the various lines of financial and physical operation requiring careful accounting so that it may be at all times fortified in the execution of its plans and policies. To formulate and systematize details means to be able to gather together for each branch of the business and for the business as a whole all of the essential divisions and subdivisions which will enable the management to discern at a glance what the property has done, is doing, or may do, as a going concern. To make an intelligent record means that the bookkeeper should be able so to arrange accounts on his books that there shall always be each item of classification by itself, making every entry, whether by days, weeks or months, in consecutive order, and gathering as far as possible into these periods each individual item of receipts or expenditures belonging each to its proper period, so that a direct and reasonable comparison may be made with the day, week or month preceding, or any or all of these periods with like periods of the previous year. The preparation of reports from these records for the information of the executive and operating heads becomes an easy procedure for the reason that reports must of necessity conform to the classification of accounts.

In outlining the threefold requirements of a modern electric railway accountant we are disposed to give less emphasis to the bookkeeping feature than to the others. The former is a work of routine rather than of origin. The responsibility and labor of interpreting the needs of the management is the more important feature, seconded only by the ability to master the other feature of collecting and putting into intelligent form the results of such interpretation before the matter shall go to the bookkeeper. To be sure, the efforts of the American Street & Interurban Railway Accountants' Association to furnish a complete classification have made it comparatively easy for the electric railway accountant to proceed along definite lines, as has also the Interstate Commerce Commission classification, but they do not altogether meet the requirements of each of your individual companies or solve some of the problems you are confronted with. It is to some extent for the purpose of solving these omitted or dissimilar problems that you meet together. It would indeed be a miraculous classification that could be said to cover all of the thousand and one details of your business, and to you is left the more delicate duty of harmonizing and supplementing in order that your management may be satisfied. This is not the work of the bookkeeper, but rather that of the originating accountant. It is very gratifying to modern men of accounts that the larger industries and corporations have assigned to a wider field of responsibility the men to whom they look for the logical treatment of results as an important factor of their success.

To the thorough and broad-gaged accountant this is an encouraging evolution from the routine bookkeeper of only a few years ago, principally for the reason that he is enabled to come in close touch with men of affairs and stand some reasonable chance of advancing to a place of greater moment by reason of the greater knowledge he has been permitted to absorb.

The interurban electric railways of Ohio to-day are acquisitions of which the people should be proud, forming as they do a large proportion of the interurban systems of the Middle West. The attention of the investing public was well centered on expansion when the late depression set in and new construction came to a halt. Capital is now gradually coming out from its hiding, and the prospect is brighter for the further betterment of the present systems and the formation of new lines and links to bring the people in closer touch and stimulate a more rapid commercial intercourse. By its natural position it is expected that Ohio will be foremost in the advance and nothing perhaps but the withholding of capital can hinder.

To me the outlook seems brighter by reason of a change now going on in public sentiment looking to a more careful and businesslike consideration of the rights of capital invested. It is being found that the results from attempted wholesale restriction and curtailment of public utilities by legislative and other processes are disastrous to the growth and expansion of the communities in which these utilities operate. In the drift of public opinion for the past few years no sane allowance has been made for a fair return on the actual cost of property and no leeway considered for the accumulation of a reasonable surplus to take care of times of depression or of extraordinary expenditures resulting from disaster or other causes or of depreciation of property constantly going on, the great plea being to allow only a commercial interest per cent profit on an appraised tangible value of the property as existing. With such a sentiment is it any wonder that capital has been stagnated and the tide of a growing and prosperous country turned back?

These things are of vital interest to you as accountants, knowing as you do how much they have had to do with the sought success, or unsought embarrassment, of the properties with which you are connected. We may therefore hope for something better in the near future, and as you all desire to acquire breadth of knowledge, you should be cognizant of these things and all else that is helpful to you and your superiors. It is by these mutual gatherings that we are brought to know ourselves better and to know others better.

INTERSTATE CLASSIFICATION OF OPERATING EXPENSES

Mr. Forse, who is a member of the committee on stand-

ard classification of the American Street & Interurban Railway Accountants' Association, mentioned the objections that had been made by various companies regarding the difficulty of making comparisons with results reported under the old system, but said that condition would probably be the same with any new classification. Among the other difficulties were those which had been met by companies operating different classes of utilities.

Mr. Forse also spoke of the large amount of work that had devolved upon the committee in connection with the interpretation of the accounts with the Interstate Commerce Commission representatives.

Chairman Glover spoke of the appointment at the last meeting of a committee of the conference to which it was desired that members should send their questions to be submitted in turn to the American Association committee, and urged members advise the committee of their difficulties.

Mr. Wallis said it would be an excellent plan to take up with the committee all questions about which there was any doubt. Only in this way could the committee learn the defects of the classification. This would tend to greater uniformity, for which all were striving.

Mr. Forse said that the committee passed on 58 questions at its recent meeting in Washington. The text of these questions and answers was now in the hands of the public printer and would be issued in pamphlet form by July 1, it was expected. The references would be indexed and cross-indexed thoroughly.

A question was asked regarding storeroom accounts. Mr. Glover said the subject of storeroom accounts was an important one and the executive committee had considered the advisability of considering it at this meeting, but had finally postponed it until some future date.

TRAFFIC STATISTICS

L. T. Hixson, auditor, Terre Haute, Indianapolis & Eastern Traction Company, said in discussing this subject that traffic statistics might be divided into two classes, one pertaining to revenue, the other to operation. If these statistics were to be of value for comparative purposes it would be necessary to know on what basis they were compiled. If car-mile revenue was stated it was necessary to know what revenue and what car-miles were used. The uses of statistics of this nature were left to the traffic and operating heads of departments, but the preparation was the duty of the auditor. There were difficulties in arriving at passenger traffic revenues and expenses per car-mile. Some items of expense were directly chargeable to this business, but others were indirect.

Most roads, Mr. Hixson thought, used the car-mile and the car-hour for units, but very few seemed to use the passenger-mile. He did not know whether the use of this latter unit paid for the expense of working it out. Personally he was in favor of preparing few traffic statistics and recently had been using the car-mile to the exclusion of others.

Chairman Glover said that some companies used revenue car-miles and others the entire mileage; all ought to follow a uniform method.

James S. Clark, auditor, Marion, Bluffton & Eastern Traction Company, had used traffic statistics successfully when it was desirable to make a change in schedule. These showed what trains were doing the most business. The expense was only about $3 to $4, covering the cost of envelopes for each train and one form for a record. After getting the results of one month the next month was skipped and the experience then resumed in order to develop the facts in various seasons and independent of special traffic movements.

Mr. Glover had followed the practice of reporting separate train earnings on two-thirds of the system and the operating department had found the information very valuable.

Mr. Hixson said that the experiment of having men ride on the cars to make observations concerning the individual trains did not result successfully, as the reports were likely to indicate business as good or poor according to the state of mind of the observers.

F. K. Young, auditor, Scioto Valley Traction Company, showed earnings per passenger and per freight car-mile, but expenses per car-mile only. He had always kept a record of earnings by trains. The tickets were deposited at the end of each trip and the report of the earnings for one day was out by 10 a. m. the following day. At the end of the month the information was sent to the management. While it required extra work to keep this record he thought it paid to have it in detail.

TIMEKEEPING AND PAYROLLS AND BEST METHOD OF PAYING EMPLOYEES

A paper on this subject, written by S. C. Rogers, treasurer, Mahoning & Shenango Railway & Light Company, who was unable to be present, was read in his absence by E. D. Gault, auditor of the same company. This paper is published on page 1164 of this issue.

A. F. Elkins, auditor, Columbus, Delaware & Marion Railway, said that it was necessary for him to do the work required at the least possible expense that would yield the results desired. The company never paid in cash. Except in Columbus there were no saloons in the territory through which the road operated and the proprietors of the local stores always knew the dates when the men were paid and prepared in advance to cash the checks.

Irwin Fullerton, auditor, Detroit United Railway, described the method followed by that company in paying trainmen. Currency was used. The motormen and conductors had their names printed on sheets and duplicates were secured by the use of carbon paper. The foreman of each car house indicated the time made opposite each name. When the man finished his work he signed his name to the record indicated. The time sheets were then sent to the auditor's office and abstracts made on the payrolls. The total number of hours was added and checked by the schedules. Blank receipts for pay were sent to the car-houses and each man made out his own receipt and presented it to the paymaster. If the paymaster found that the package of money bearing the name of the man agreed with the amount on the receipt he exchanged the envelope for the receipt. If he found the amount in the envelope greater than that stated in the receipt he took out the difference; if the amount was less he gave the trainman what the envelope contained, made a memorandum on the receipt concerning the discrepancy and asked the man to call at the general offices. This system had been in effect in the company for seven or eight years.

A resolution was then passed thanking Mr. Wallis for his attendance and interest in the work of the conference.

After selecting Indianapolis for the next meeting, to be held on Sept. 11, the conference adjourned.

Bucharest, the capital of Roumania, has announced a loan of $2,000,000, of which $600,000 will be used in the construction of a municipally owned tramway system.

TIME-KEEPING AND PAY ROLLS AND BEST METHOD OF PAYING EMPLOYEES*

BY S. C. ROGERS, TREASURER, MAHONING & SHENANGO RAILWAY & LIGHT COMPANY

The method of time-keeping employed by our company is, briefly, as follows:

TRANSPORTATION DEPARTMENT

Car service men turn in to the dispatchers daily an individual time slip, indicating the time on and time off and elapsed time, name, number and division. This individual time slip, if correct, is approved by the dispatcher and sent to the chief clerk of the transportation department, under whose supervision it is recorded on a separate form for each company or division, in duplicate. The heading on this form calls for the total number of hours according to the schedule on the divisions. If the total time recorded from the individual time slips exceeds the scheduled time, it must be accounted for in the column specifying extra runs, and the notation at the foot indicating the reason therefor. The original and duplicate of this form goes to the superintendent of transportation, who affixes his approval to the total time for the day thereon shown, sending the original copy with the individual time slips to the accounting department. The general time-keeping department, as part of the accounting department, compares the individual time slips with the record made by the transportation department, makes the calculations and fills in the amounts for each man in dollars and cents.

You will notice that the accounting department has by this method the personal signature of the superintendent of transportation as approval on every hour of time of the employees of his department. The transportation department also has in the duplicate copy of the record a daily record of the time of the department.

CAR BARN DEPARTMENT

A recording time clock is used in our general car barn, each employee taking out a card indicating the time of arrival, which is inserted and stamped at the time of leaving, and left with the clerk at the car barn office.

The method of recording is exactly the same as in the transportation department—that is, these individual time cards are recorded by the clerk at the car barn office, in duplicate, the original of which is signed by the mechanical engineer in charge of the car barn. The time cards accompany the original copy to the accounting department, the duplicate remaining on file in the car barn office.

POWER HOUSES

An individual time slip is prepared by each employee of this department and recorded by the clerk at the main power house, in duplicate, the same as in the case of the transportation and car barn departments.

METHOD OF PAYMENT

Payments are made on the 5th and 20th of each month, covering to the 15th and 30th or 31st of the month, as the case may be; in other words, five days elapse between the termination of the payroll and date of payment.

An order on the paymaster is prepared and signed by the timekeeper for each employee, in the form of a card, with spaces for the approval of the superintendent or foreman of the department in which the man is employed, and for the signature of the employee as a receipt. These card orders are sent to the several superintendents the day previous to the date of payment, and after approval by the superintendents, are distributed to the employees. The employee presents the pay order card to the paymaster, where prior to payment it is compared with the payroll, and if the amount agrees and the card is properly signed by the timekeeper and approved by the department superintendent and receipted by the employee, the money is paid in cash.

Our present system of payment involves the operation of the pay car over the system. We have, however, been considering the advisability of doing away with this pay car and the payment of all employees at the offices of the company, either prior to or before entering upon their duties for the day or night, as the use of the pay car requires many of our employees to leave their duties during the day to get their wages. It also causes some inconvenience to our car service men who are on night runs. The element of risk which is involved in the use of the pay car would not be nearly as large if payment were made at the offices of the company, where the money handled could be better protected.

All employees other than the general officers of the company, who are on what we call the "check roll," are paid according to the plan above mentioned.

Prior to the installation of this system many questions arose between the employees and the timekeeping office on the question of time allowed, because the large volume of time slips handled made it impossible for the superintendents personally to inspect and approve each time slip. They of necessity delegated this duty to some one else, and in many cases it was done in a perfunctory manner by a clerk who did not exercise proper care or did not understand the importance attached to his signature when affixed as approved to a time slip.

Since the installation of the present system, however, the questions regarding time allowed have been reduced to a minimum. To such an extent is this true that it is very rarely that we have any question between the timekeeping office and an employee.

One of the very great advantages of this plan is that it furnishes the operating superintendent in charge of the department with a record of the time charged to his department daily, and he is thus enabled to effect economies that under the old plan were practically impossible; and as a protection to the accounting and treasury departments in the payment of employees it gives an authorized personal approval on all time recorded and paid, and no question can arise after the pay order is presented and paid and the receipted pay card filed. The paymaster is protected in the payment of the wages, as he pays only on a properly signed, approved and receipted pay order card.

In the case of employees discharged prior to the date of payroll, the department issues an order on the timekeeper, which is taken up and pay order issued by the timekeeper on the paymaster.

It is the writer's opinion that this matter of keeping time and paying employees, owing to the large percentage of the operating and construction expenses of a railway company represented by labor and the many opportunities afforded for error, should and must be surrounded by all the protection possible, and yet a system outlined that will allow the work to be done with the least amount of inconvenience to the employees, consistent with the protection of the company's interests. I maintain the principle that the operating superintendent in charge of any particular department is the responsible head of that department, and as such should be required to affix his personal approval on the daily record of time of employees in his department. This you will notice, however, is not taken as final by the accounting department, because not only this approved daily record is turned in, but also the individual time slips forming the basis of such record, and if, upon comparison, any errors or omissions are discovered, the operating superintendent is immediately notified and corrections made with his approval; no changes are made in the time recorded to the credit of an employee without the personal approval of his operating superintendent.

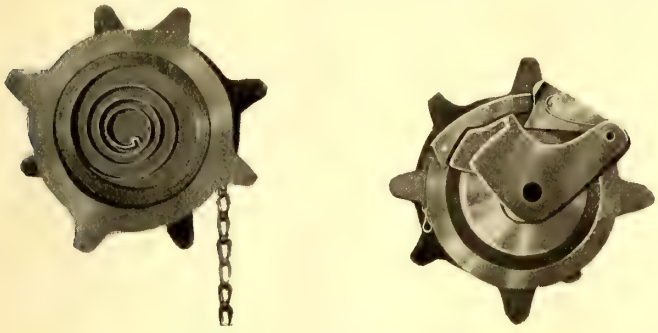
The question may arise as to the amount of time expended by the operating superintendents in recording the daily time in the manner outlined. Each department superintendent with us has a chief clerk, and the work is done in connection with other duties of the clerk, and takes but little of the clerk's time when done every day, particularly as these clerks do not make the extensions; they simply record the name, total time and account chargeable.

*Abstract of paper read before the Central Electric Accounting Conference, Columbus, O., June 19, 1909.

At the power station of the Columbus, Delaware & Marion Railway a fare register has been connected up so that it will count the number of wheelbarrow loads of coal weighed on the power house scales. The register is installed over the weighing platform and is operated by means of electrical contacts.

A SHORT-PULL TROLLEY CATCHER

The Lord Electric Company, New York, is now making a new form of the Earll trolley catcher known as the No. 9 Short Pull. This catcher is designed especially for city service and in general for use on roads where the maximum speed is no greater than 20 m.p.h. to 25 m.p.h. While constructed along the simple lines of the regular trolley catcher,



Short Pull Trolley Catcher

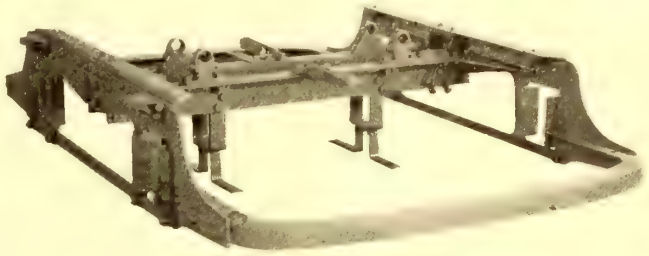
it is as effective as a trolley retriever in preventing the pole from striking the wires. Instead of retrieving and pulling down the trolley, it has the effect of relapsing the pole, causing it to take a fixed position below the point at which it left the wire. This position below the wire varies from 8 in. to 12 in., according to the height of the wire. After operation the catcher is reset simply by pulling out a foot of rope. The trolley wheel cannot be restored to the wire unless the conductor first resets the catcher as indicated. The maintenance cost of this short-pull catcher should be a small item, as the device contains only three moving pieces besides the drum. The catcher can be easily installed on or removed from the dasher to permit its ready transfer from one end of the car to the other.

PLATE FRAME MOTOR TRUCK

The American Locomotive Company has recently built a pair of electric motor trucks for the United Traction Company, Albany, N. Y., which are a new development in electric motor truck construction. In the builder's classification they are known as Type S-154, having a wheel base of 54 in. and being built to carry a load at center plate of 14,350 lb. Each truck is equipped with two General Electric Company's type 80-A motors, having a rated capacity of 40 hp each, suspended outside of the axles on a spring-supported yoke. These trucks are designed for operating at a speed of 30 m.p.h., and have been applied to one of the cars on the Albany and Troy division of the United Traction Company.

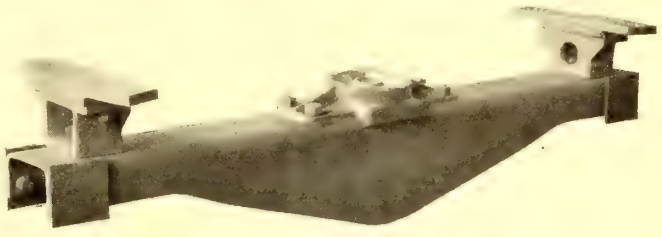
The frame construction is clearly shown in the accompanying illustrations. Each side frame is machined from a solid, high-tensile strength steel boiler plate, and the two are tied together at the ends by steel angles. Wrought-iron pedestal guides or shoes upon which the journal boxes slide are riveted to the pedestals. The transoms are of steel angles and are rigidly secured to the side frames through the medium of steel and castings to which they are bolted, and which are in turn bolted to the side frames, also by steel plate gussets. The transom end castings also serve as wearing pieces between the bolster and transoms. A special design of gusset has been employed, the gussets on both sides of the transoms being pressed from a single steel plate, which also forms an angle extending along the top of the frame on the inside for practically the entire length. This construction not only makes a very rigid connection between frames and transoms, but also serves to stiffen the frames laterally.

The swinging bolster is of strong, but light, construction. It is pressed from a steel plate and weighs about 200 lb. less than a cast-steel or built-up bolster of the same capacity. It is carried on elliptic springs, while the truck frame is supported by coil springs on the journal boxes, one on the inside and the other on the outside of the frame, the load being thus uniformly distributed on the journal.



Truck Frame

The elliptic springs supporting the bolster rest on cast-steel spring seats, riveted to the spring plank, which consists of two angles. These seats are provided with three semi-circular pockets for the swing link pin or gib, so as to permit of adjusting the angularity of the swing link, in order to increase or decrease the resistance of the bolster to swinging by changing the swing link pin from one pocket to the other. These pockets are so designed that the position of the swing link pin does not alter the height



Pressed Plate Truck Bolster

of the spring plank. This can be adjusted, if necessary to maintain the proper height of the platform or steps, by the use of a thicker or thinner swing link gib.

The service trials of this truck, which have extended over a period of about three months, have fully demonstrated the easy riding qualities afforded by the arrangement of the swing links and springs, which, it is claimed, prevents any unpleasant lateral swaying or oscillation when running at a maximum speed on a rough and uneven track.

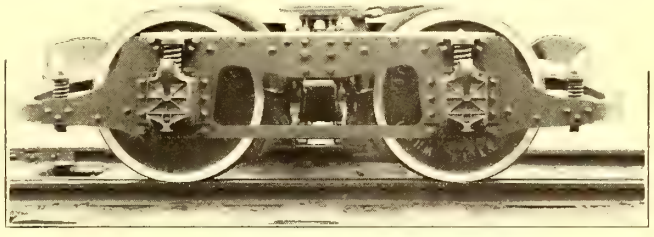


Plate Side-Frame Truck for City Service

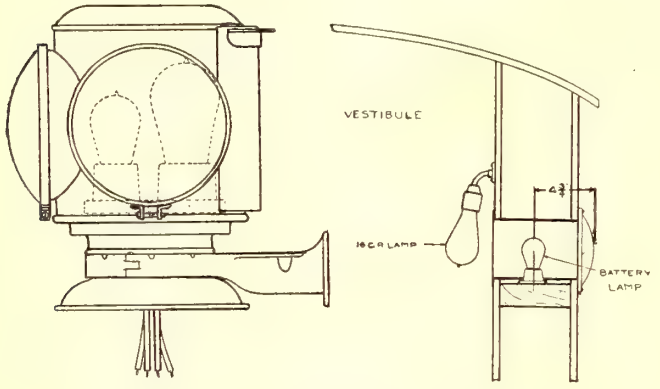
In developing this design the purpose was to obtain a truck of the specified capacity and of as light a weight as possible. Compared with a bar-frame truck of an equal capacity and the same wheel base, the truck illustrated is from 1000 lb to 1500 lb. lighter. This is a saving in weight of 2000 lb. to 3000 lb. per car. This plate frame type of construction is equally applicable to the largest trucks.

Some of the principal dimensions of the truck are given below:

Length over all	10 ft. 4 in.
Load carried at center plate	14,350 lb.
Weight without motors, wheels or axles	3346 lb.
Weight complete, without motors	5946 lb.
Number of motors on each truck	2
Weight of each motor, complete	2800 lb.
Wheels, diameter	33 in.
Axles, diameter	4½ in.
Journals, diameter and length	3¾ in. x 7 in.
Radius of shortest curve	32 ft.

ELECTRIC CAR SIGNAL SYSTEM

The Ohio Brass Company has just placed on the market a new electric car signal system to provide signals for classification and rear end markers for electric cars, to operate with or without main line current. This system is said to be easier to maintain and operate than oil lamps. Its greater cleanliness, because of the absence of smoke and oil, insures clear signals at all times. Unlike oil lamps, the signals do not jar, nor is there any fire risk. As the apparatus is permanently attached to the cars the signals cannot be forgotten, and the throwing of a switch is all that is necessary to place them in service. If desirable, some light can be provided within the car should the main trolley current fail. This auxiliary illumination also indicates to the conductor that his signals are operating.



Figs. 1 and 2—Combination Lanterns

The following figures have been prepared by the manufacturer to show that the oil lamp system really is more expensive than the electric system. It is assumed that four lanterns per car are used, this being the ordinary equipment of a double-end car displaying two tail lights at one end and two classification lights at the other. The battery depreciation is figured at a life of two years and a half. Under these conditions the total cost of operation per car with oil signals is given at $66.60, and with the electric system $20.64. In the single-end car the saving is estimated at $17.98 per car.

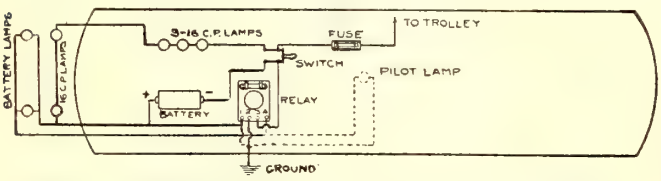


Fig. 3—Single-End Car, with Two Red Tail Lights

In the O-B system each signal lantern is normally illuminated by a 16-cp lamp connected directly to the trolley circuit. In each lantern, however, there is placed a low-voltage battery lamp, as shown in Fig. 1, which is automatically lighted by a positive operating relay connected in series with the main signal lamp, in case the latter fails to burn. This relay is also adjusted to cut out automatically when the main signal lamp burns too dimly to give a clear signal. The current for lighting the low-voltage auxiliary lamp is supplied by a storage battery, which is always kept charged by the relay. The low-voltage lamps in this system are especially designed to withstand car vibration.

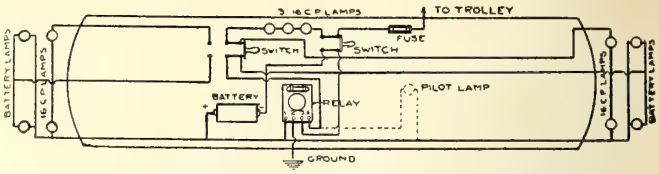


Fig. 4—Double-End Car, with Four Red Tail Lights

As the filaments are of tantalum, the current consumption for the amount of light given is very low.

As only one circuit of 16-cp lamps is used to make up the main signal circuit, it is unnecessary to disturb the regular car lights. Each signal lantern contains a 16-cp lamp, so that when fewer than five signal lamps are used there will be one or more 16-cp lamps available for car lighting.

The signal lanterns are furnished in two styles—the "Duplex" tricolor, with white, green and ruby lenses, and the "Duplex" ruby, with one lens. The tricolored lamp is adjustable for turning any of the three colors into position, and so can be used for classification or tail lights. The other lamp is a rear-end signal or tail light. In some cases the oil signal lanterns can be changed over for electric operation at slight expense. The accumulator or storage battery may be placed under a seat, as the entire case is only 14½ in. high, 8¼ in. wide and 11½ in. long. The battery jars are of heavy hard rubber, with insulating compound surrounding each jar.

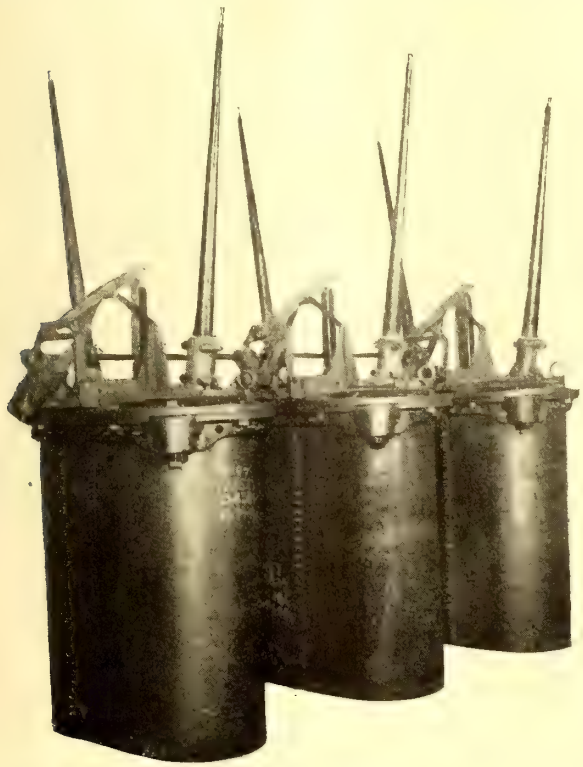
A CONDENSER-LEAD CIRCUIT BREAKER

The Westinghouse Electric & Manufacturing Company has developed a heavy capacity oil circuit-breaker known as the type GA. This breaker consists of single pole units, each enclosed in its individual boiler steel tank, with separate operating mechanism, leads, etc. All the operating parts are mounted on the cast-iron top, and are operative on the top, so that the mechanism may be lined up before it is dropped into the oil tank. As the connection between the poles is only a piece of ¾-in. gas pipe, the poles may be spaced any convenient distance apart. The pipe is used as a pull rod, being in tension only. It is impossible for the different poles to stick due to improper alignment, as they may be placed several inches out of line without making the angle of pull sufficient to jam the mechanism.

The breaker is made for four potentials—44,000, 66,000, 88,000 and 110,000 volts, hand or solenoid operated and with any number of poles. The automatic circuit-breaker is furnished either for use with series transformers or with a self-contained series trip. Time limit features may be incorporated if desired. The breaking capacity is practically unlimited, the heavy boiler steel tanks and cast-iron top giving great strength against internal pressures. The total travel of the moving contacts is large, there being two breaks in series at each pole. Each break takes place in a separate compartment, separated from the other pole by double barriers of insulating material. The break is between brass and copper, materials which have been found to give the best protection against burning. Each moving

contact piece has its own heavy steel spring to take up any wear due to arcing, and slides across the stationary piece with a rubbing motion, keeping the contact bright. In this form of circuit-breaker there are only three insulation points, namely, the two leads and the wooden rod. The rod, being of moderate cross-section, can be easily and thoroughly dried and impregnated, and is well immersed in oil at all times, so that its factor of safety is large.

The maker believes that the condenser type of lead used in this breaker marks a great advance in high-tension work. The problem of carrying a high-tension conductor through a grounded surface has been one of the limiting factors in developing higher voltages. Due to the fact that it was impossible to maintain the same stresses in all layers of insulating material, on account of the unequal distribution of potential in them, excessive amounts of insulation were required to secure safety. It was even found necessary to remove all grounded material from the neighborhood of



Type GA, Three-Pole Oil Circuit-Breaker for 60,000 Volts

the conductor, and various further methods have been used, such as oil-filled terminals, double or triple porcelains and excessive amounts of varnished cloth or paper. In the Westinghouse type G breaker, which is regarded as the standard for 66,000-volt transmissions, providing the protection for both the Niagara and Southern Power Company lines, heavy soapstone tops, varnished cambric leads and expensive and cumbersome porcelains were required. The contrast in the type GA breaker is surprising. A moderate-sized lead made up of alternate layers of tinfoil and insulation is fastened solidly into cast-iron flanges, and at voltages far in excess of that required to break down former constructions these leads show no static discharge or other evidences of strain.

All the cars of the Liverpool Corporation Tramways are to be fitted with an automatic bell or light signal device which will indicate to the motorman when a passenger attempts to board or alight. The device is the invention of C. W. Mallins, general manager of the tramway system.

MEETING OF THE COMMITTEE ON STANDARDS

The committee on standards of the American Street & Interurban Railway Engineering Association held a meeting in Atlantic City on June 21 and 22, to consider some of the subjects assigned to it by the executive committee of the association. The members of the committee present were W. H. Evans, chairman; H. H. Adams, Metropolitan Street Railway, New York; James Heywood, Philadelphia Rapid Transit Company, and B. Penoyer, Schenectady Railway Company. Paul Winsor, president of the Engineering Association, was also present, as were N. W. Storer, Westinghouse Electric & Manufacturing Company, and G. L. Schermerhorn, General Electric Company.

At the meeting of the committee on Monday a number of communications suggesting possible modifications of the existing standards were informally discussed. L. L. Smith, master mechanic of the Chicago & Milwaukee Electric Railroad Company and a member of the committee on standards, sent a letter calling attention to the need of larger axles for heavy, high-speed interurban cars than any of the present standard axles. No action was taken on this recommendation, which was referred to the committee on equipment.

The extent to which the existing standards have been adopted by member companies during the last two years was brought up for discussion by Mr. Evans, and suggestions were asked from members of the committee as to the best means of calling the attention of member companies to the standards so far adopted and the advantages to be derived from their use on all new equipment. At the suggestion of Mr. Winsor it was decided to prepare a pamphlet containing all of the standards so far adopted by the association and send one of these pamphlets to each active member. To aid the committee in its work, it was also decided to send out, with these pamphlets, data sheets to be filled out and returned to the committee, showing the extent to which the association standards have been adopted, the advantages derived from their adoption or the objections to their use. The data sheet will also request information about local company standards which may be in use, and is to be accompanied by a letter signed by the president of the Engineering Association and the president of the American Association, calling attention to the value of standardization work.

The method of adopting standards by vote of members of the association was discussed at some length. A resolution was passed requesting the executive committee of the association to frame amendments to the by-laws providing for the adoption of standards by letter ballot only, the votes to be cast by properly accredited engineering officers of the member companies and approved by an executive officer of each company, the basis of representation to be one vote for each 1,000,000 car-miles or fraction thereof made by the member companies' cars during the last fiscal year preceding the casting of the vote.

The possibility of adopting further standards in the construction of gears and pinions was taken up with the representatives of the two manufacturing companies present. The standard distance between the center of the axle and the center of the armature shaft for motors of the same horse-power capacity was one point on which the members of the committee thought it might be possible to reach an agreement. Standard taper of armature pinions and standard locking devices for pinions were also referred to the manufacturers' representatives. Mr. Storer and Mr. Schermerhorn agreed on behalf of the companies which

they represented to investigate this point carefully, and advise the chairman of the committee at a later date whether it would be practicable to agree on standard dimensions.

At the meeting of the executive committee of the Engineering Association held last winter in New York the committee on standards was instructed to present to the convention this year specifications for wrought iron for brake rigging, specifications for axles and specifications for rubber-covered wire. The committee on standards decided to present to the committee next fall such data as could be obtained on existing specifications for wrought iron without recommendations for their adoption as standard. The subject of specifications for rubber-covered wire is to be included in the report of the committee on power transmission.

FREIGHT LOCOMOTIVES FOR THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD

The New York, New Haven & Hartford Railroad has placed an order with the Westinghouse Electric & Manufacturing Company for two freight locomotives to be employed on its main line. One of these locomotives is to be equipped with side rods and the other is to be of the geared type. It is understood that tests will be made with these locomotives to determine (1) the relative performance of electric and steam locomotives for freight service and (2) the relative advantages of the two types of locomotives which are to be employed.

So many conflicting reports have appeared in the technical and public press in regard to the proposed extension of the New Haven electrification that it may be well to give the facts. The performance of the present electrical system is very satisfactory, and the number of engine-miles per failure is far larger than with steam operation. During the month of May it amounted to 7345. The engineers of the company have made a very careful investigation as to the cost of electrifying the company's six-track Harlem River branch and the four tracks of the main line from Stamford to New Haven, inclusive of the necessary power houses, looking to the handling of passenger and freight trains. The investigation also covers the trackage incident to the electrification of freight and passenger yards. These estimates have been filed with the directors of the company, but no definite action has been taken by them looking to immediate extension of the system.

It is proposed, however, during the next few months to extend the present electrification from Stamford for the distance of one mile for experimental purposes. The overhead construction will differ somewhat in regard to the form of steel bents and arrangement of overhead wires from those previously used, but these changes are incident only to the improvements in forms of construction and reductions in cost. The main features of the present form of construction, including a steel contact wire suspended every 10 ft. by clips of the present design from an overhead copper conductor, will be retained.

EXHIBITS AT THE ATLANTIC CITY CONVENTION

The exhibition of railway appliances and machinery at the Atlantic City convention of the Master Car Builders' and Master Mechanics' Associations this week and last was held on Young's Million Dollar Pier. In point of size the exhibits exceeded all previous records; they covered 65,476 sq. ft. of floor space on the pier, and in addition a number of cars and locomotives were shown on the side tracks of the Philadelphia & Reading Railway. As in other years, the booths and decorations were of uniform design and effect. An especially large display of machine tools was made in Machinery Hall, on the south side of the pier. Among the exhibitors who furnish apparatus to electric railway companies were the following:

Adams & Westlake Company, Chicago, Ill., showed continuous basket racks with detachable bottoms; car trimmings; signal lamps and lanterns.

American Blower Company, Detroit, Mich., presented blowers for forges and furnaces; heating and ventilating apparatus for stations and shops; vertical enclosed self-oiling steam engines for electric lighting and pumping; Sirocco portable electric ventilating fans.

American Brake Shoe & Foundry Company, Mahwah, N. J., exhibited electric and steam steel-back brake shoes and reinforced extra durable high-friction brake shoes for all kinds of railway equipment; malleable-iron brake heads.

American Car & Foundry Company, New York, St. Louis and Chicago, had a reception booth only.

American Joxyl Company, New York, N. Y., showed car ceiling and panel decorations in wood.

American Mason Safety Tread Company, Boston, Mass., presented Mason safety treads; Empire treads; Karbolith composition floors for coaches and buildings.

American Steel Foundries, Chicago, Ill., exhibited a large number of bolsters, truck parts, roller bearings, Davis cast-steel wheels, etc.

American Tool Works Company, Cincinnati, Ohio, offered several of its machine tools, such as planers, lathes, drills and shapers, in connection with electric drive.

American Vanadium Company, Pittsburg, Pa., exhibited vanadium ores, alloys and steels; vanadium cast iron; vanadium brasses, bronzes and copper; also vanadium aluminum and other products.

Asbestos Protected Metal Company, Canton, Mass., showed headlinings and sheathing for steam and electric cars; controller box lining and general insulation; roofing and siding for railway structures.

Atha Steel Casting Company, Newark, N. J., exhibited Atha cast-steel body and truck bolsters and manganese steel railway motor gears and pinions.

Boker & Company, Herrmann, New York, N. Y., showed their Novo high-speed steel, various high-speed tools, etc.

Booth Company, L. M., New York, N. Y., operated a Booth water softener of 2500 gal. per hour purifying capacity.

Bowser & Company, Inc., S. F., Fort Wayne, Ind., exhibited oil storage systems complete; long distance self-measuring pumps; power pumps; automatic registering oil meters; oil storage tanks of all sizes and shapes, with pumps for handling and measuring all kinds of lubricating, paint and other oils, including gasolene, etc.

Brighton Brass & Bronze Company, Pittsburgh, Pa., presented journal bearings made of various mixtures and "Brighton" bearings.

Buffalo Brake-Beam Company, New York, N. Y., showed truss I-beams and special section brake-beams for all classes of equipment; also forged heads, fulcrums, chain clips and wheel guards.

Carnegie Steel Company, Pittsburg, Pa., showed Schoen steel wheels for steam and electric service. It also displayed Carnegie steel cross ties, fittings and new type rail sections; Duquesne rail joints; slack barrel kegs for spikes; track bolts, etc.

Chicago Car Heating Company, Chicago, Ill., presented vapor system of car heating with multiple regulation of heat; steam hose coupler, train-pipe valves, car heater specialties and Baker heater specialties.

Chicago Railway Equipment Company, Chicago, Ill., offered brake-beams of the Creco, Diamond, National Hollow, Kewanee, Reliance, Sterlingworth, Ninety-six and Monarch types; Monitor bolsters; Creco roller side bearings; Creco slack adjuster; Creco journal box and lid; Creco brake jaw; automatically adjustable brake heads.

Chicago Varnish Company, Chicago, Ill., displayed car sides with "Ce-Ve Process" of six-day painting on them.

Chisholm & Moore Manufacturing Company, Cleveland,

Ohio, had on hand one 30-ton chain hoist and trolley hoists of various sizes.

Chrome Steel Works, Chrome, N. J., showed steel car wheels with cast steel centers and forged tires, tires interlocking and keyed to center.

Cincinnati Bickford Tool Company, Cincinnati, Ohio, displayed several drills.

Cincinnati Planer Company, Cincinnati, Ohio, showed one 37 in. x 37 in. x 8-ft. forge planer with four heads and variable speed motor drive.

Clow & Sons, James B., Chicago, Ill., exhibited plumbing fixtures; steam, gas and water heating apparatus for railway buildings and cars; Eddy valves, hydrants; Jefferson unions and flanges; fountain brushes.

Coe Manufacturing Company, W. H., Providence, R. I., offered Coe's ribbon gold leaf and Coe's gilding wheels.

Commonwealth Steel Company, St. Louis, Mo., had aluminum models of car and locomotive underframes and bolsters.

Consolidated Car Heating Company, Albany, N. Y., exhibited quick-opening end valves, vapor and pressure steam heating systems, improved types of steam couplers and signaling system.

Consolidated Railway Electric Lighting & Equipment Company, New York, N. Y., showed its standard type "D" equipment of 4 kw capacity and its standard type "F" equipment of 2 kw capacity; also the Kennedy regulator.

Crane Company, Chicago, Ill., exhibited valves for superheated steam, steel valves and fittings for superheated steam, ferrosteel valves and fittings, pipe bends, steam separators, and also showed tilt steam traps in operation.

Curtain Supply Company, Chicago, Ill., displayed ring fixtures, Forsyth roller tip fixture, vestibule curtain handle and curtain materials of all kinds.

Damascus Brake Beam Company, Cleveland, Ohio, showed adjustable brake heads and forged steel fulcrums.

Davis-Bournonville Company, New York, N. Y., presented the Davis-Bournonville oxy-acetylene welding and cutting system and an oxygen generator and compressor.

Davis Solid Truss Brake Beam Company, Wilmington, Del., offered solid truss brake beams and solid steel back brake shoe.

Dearborn Drug & Chemical Works, Chicago, Ill., demonstrated their method of scientific treatment of boiler feed water.

Dixon Crucible Company, Joseph, Jersey City, N. J., showed silica-graphite paint for steel cars, lubricants and other graphite products.

Dressel Railway Lamp Works, New York, N. Y., made an extensive exhibit of car, track and station lamps.

Dudgeon, Richard, New York, N. Y., offered Universal jacks and test pumps in many forms, including car inspector's, railway, plain, base, claw, independent claw, horizontal and traversing jacks; electric power pump, and several types of hand-operated pressure pumps.

Duff Manufacturing Company, Pittsburgh, Pa., exhibited Barrett track and car jacks, "Duff-Bethlehem" forged steel hydraulic jacks, Duff ball-bearing screw jacks, journal jacks, geared ratchet jacks and wrecking jacks.

Duntley Manufacturing Company, Chicago, Ill., showed Duntley vacuum cleaners for passenger coaches and smaller vacuum cleaners for household purposes.

Edwards Company, O. M., Syracuse, N. Y., had an automatic steel trap-door for coach platforms, metal sash, car window fixtures, sash balances.

ELECTRIC RAILWAY JOURNAL, New York, N. Y., distributed copies of the ELECTRIC RAILWAY JOURNAL and engineering books.

Electric Storage Battery Company, Philadelphia, Pa., exhibited a complete line of storage batteries for car lighting, signals, etc.

Fairbanks, Morse & Company, Chicago, Ill., had two gasoline hand cars, one in the exhibit booth and one on the P. & R. tracks; Sheffield telescopic water column; Duff hydraulic jack of a new style; F. M. & Company tool grinder.

Flannery Bolt Company, Pittsburgh, Pa., exhibited Tate flexible staybolts and installation tools for applying same; "F. B. C." arch bar and continuous nut locks.

Forsyth Brothers Company, Chicago, Ill., displayed the Forsyth high capacity buffing device for passenger cars; radial draw-bar centering device; metallic window sash and safety deck sash rachets.

France Packing Company, Philadelphia, Pa., showed metallic and fibrous packings.

Franklin Manufacturing Company, Franklin, Pa., offered reinforced corrugated asbestos roofing or siding, asbestos century shingles, asbestos building lumber; Franklin rubber roofing; asbestos pipe coverings; papers, boards, packings and other asbestos railway supplies; wool and cotton waste.

Galena-Signal Oil Company, Franklin, Pa., entertained in its reception booth.

General Compressed Air & Vacuum Machinery Company, St. Louis, Mo., showed the Thurman portable electric vacuum cleaner.

General Electric Company, Schenectady, N. Y., exhibited one gasoline-electric car and maintained a reception booth.

General Railway Supply Company, Chicago, Ill., showed metallic (steel) sheathing; National steel trap-doors and lifting device; Schroyer friction curtain rollers and fixtures; Garland ventilators; the end of a vestibuled passenger coach equipped to show the application of Flexolith composition flooring; National vestibule curtain catches; National standard roofing; Imperial car window screens; Perfection sash balance and roller deck sash ratchet.

Gold Car Heating & Lighting Company, New York, N. Y., offered car heating and car lighting apparatus.

Goldschmidt Thermit Company, New York, N. Y., explained thermit methods for welding locomotive frames, driving wheel spokes, connecting rods and mud rings. It also showed metals manufactured by the aluminothermic process; samples of welds on pipes and wrought-iron and steel sections; thermit in cans for reviving dull iron in the ladle; Titanium thermit in cans for purifying iron and steel; welded rail joints and compromise joints.

Gould Coupler Company, New York, N. Y., displayed M. C. B. couplers; Gould malleable-iron journal boxes; Gould side-unlock coupler; Moritz M. C. B. coupler; Gould friction draft gears; Gould cast steel side frame; Gould cast-steel journal box; Gould special electric locomotive coupler; Hartman ball-bearing center plates and side bearings; special malleable-iron draft rigging and striking plates; frame with Gould body bolster, freight coupler, friction draft gear and steel draft frames; Gould draft gear, new passenger coupler, righting device and Gould vestibule.

Gray & Sons, Inc., Peter E., Cambridge, Mass., displayed lamps, lanterns and sheet metal specialties for every department of railway service.

Greene, Tweed & Company, New York, N. Y., offered Palmetto braided and twist packing; Palmetto air pump packing; Palmetto throttle valve packing; Manhattan packing; Favorite reversible ratchet wrench.

Grip Nut Company, Chicago, Ill., presented Grip nuts; Universal window fixtures; steel sash; Universal deck sash ratchets and car trimmings.

Hale & Kilburn Manufacturing Company, Philadelphia, Pa., exhibited car seats and seating of all kinds for standard railway cars; steel seats; steel interior finish, bulkheads and trim for all-steel cars; steel window sash and steel doors for all-steel cars.

Heywood Brothers & Wakefield Company, Wakefield, Mass., had car seats of various types.

Harrington, Edwin, Son & Company, Inc., Philadelphia, Pa., demonstrated the principles of geared and plain four-wheeled travelers, lower flange of I-beam; spur-geared hoist; improved screw hoist and differential hoist.

Home Rubber Company, Trenton, N. J., displayed black sheet packing; high and low-pressure diagonal rod packing; hydraulic packing; flax packing; gum core packing; ring and combination packings.

Illinois Malleable Iron Company, Chicago, Ill., offered brake shoes and unions.

Johns-Manville Company, H. W., New York, N. Y., exhibited asbestos packing, roofing, pipe covering, wick and rope packing, asbestos cement, hair felt; vulcabeston gaskets; joint washers and pump valves; magnesia covering.

Joliet Railway Supply Company, Joliet, Ill., showed 12 tested Huntoon brake beams; 24 new and old service tested Perry side bearings; one electric vacuum cleaner.

Joyce, Cridland Company, Dayton, Ohio, presented railway jacks.

Keller Manufacturing Company, Philadelphia, Pa., displayed vacuum cleaners.

Kerite Insulated Wire & Cable Company, New York, N.

Y., showed a section of Colon-Panama submarine cable, samples of aerial, underground and submarine cables, railway signal wire, sections of cables which have been in service from 30 to 40 years; Kerite tape.

Keystone Lantern Company, Philadelphia, Pa., exhibited the Casey standard railway hand-lantern.

Lackawanna Steel Company, New York, N. Y., made a display of rails, rail joints, tie plates, beams, channels, angles, steel plate, steel forging, corrugated and deformed bars, twisted squares, the Abbot base plate, sheet piling.

Linde Air Product Company, Buffalo, N. Y., offered its oxy-acetylene welding and oxy-coal gas cutting apparatus.

Link-Belt Company, Philadelphia, Pa., exhibited drive chains.

Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, presented one 24 in. x 12 ft. patent head motor-driven lathe, and one 18-in. x 8 ft. patent head motor-driven lathe.

Love Brake Shoe Company, Chicago, Ill., showed steel connector electric railway brake shoes and steel connector motor and coach shoes for elevated railway service.

Lupton's Sons Company, David, Philadelphia, Pa., displayed rolled steel skylight, rolled steel windows, hollow metal fire door and Pond operating device for pivoted sash.

Modoc Soap Company, Philadelphia, Pa., exhibited car cleaning soaps and similar material.

McConway & Torley Company, Pittsburgh, Pa., offered a wide variety of Pitt, Janney, Kelso and Buhoup couplers and the McConway steel-tired wheel.

MacLeod & Company, Walter, Cincinnati, Ohio, operated a model of a water softener and purifier. They also showed oil rivet forges, Buckeye heaters for repairing steel cars, the Buckeye light, and a new type of sand-blast machine.

McCord & Company, Chicago, Ill., exhibited freight and passenger journal boxes, draft gear and gaskets.

National Lock Washer Company, Newark, N. J., had car curtains, curtain fixtures, sash locks, sash balances, window fixtures, lock washers and nut locks.

National Malleable Casting Company, Cleveland, Ohio, displayed Tower, Climax and Sharon couplers.

National Railway Devices Company, Chicago, Ill., presented Schroyer uncoupling apparatus, Dohlin automatic car door fastener, Nichols car door fastener, Schoemaker firebox door operator, Turnbull driving-wheel flange lubricator and Rubbertex roofing.

National Tube Company, Pittsburgh, Pa., presented seamless tubes for mechanical purposes, Kewanee unions, valves and air pump unions.

New York Air Brake Company, New York, N. Y., had an exhibition rack, showing operation of latest improved brake equipment for locomotive, tender and passenger train of eight cars; also air signal equipment and the Forsythe automatic coupler.

Niles-Bement-Pond Company, New York, co-operated with the Pratt & Whitney Company in a display of the Pond rigid turret lathe, single screw tool clamp for Pond car wheel lathe, P. & W. 16-in. precision lathe for tool-room use, P. & W. high-speed twisted drills.

Norton Company, Worcester, Mass., had a large wall-case of Norton grinding wheels made of alundum and a case of India oil stones.

Norton Grinding Company, Worcester, Mass., showed a pair of car wheels illustrating a flat wheel and a wheel ground on a Norton car wheel grinder.

Pantasote Company, New York, N. Y., displayed Pantasote car curtains and upholstery materials, Agosote head linings, panels, partition, etc.

Pittsburgh Equipment Company, Pittsburgh, Pa., exhibited side frame, journal boxes, draft casting, body bolster and structural truck bolster.

Pressed Steel Car Company, Pittsburgh, Pa., confined itself to photographic reproductions of its products.

Railway Materials Company, Chicago, Ill., presented steel back brake shoes for car and electric service, Ferguson oil furnaces, Rymco journal boxes.

Ritter Folding Door Company, Cincinnati, Ohio, offered a model Ritter folding door, constructed of wood and glass, as used in machine shops.

Rubberset Brush Company, Newark, N. J., showed paint brushes set in rubber, adapted for railway use.

Russell, Burdsall & Ward Bolt & Nut Company, Port Chester, N. Y., exhibited finished and semi-finished castellated nuts, semi-finished hexagon nuts, finished case-hardened nuts, cold punched, chamfered and trimmed nuts, metal bolts and nuts.

Ryerson & Son, Joseph T., Chicago, Ill., displayed the Lennox rotary bevel shear, high-speed friction saw, boring bar, improved riveter, high-speed chain hoist and trolleys, valve seat facing machine, glyco-lined M. C. B. standard car journal bearings.

Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., presented open-hearth steel castings, consisting of body and truck bolsters, side truck frames, Excel couplers, engine frames, car and tender underframes, driving wheel centers and miscellaneous car and locomotive castings.

Scully Steel & Iron Company, Chicago, Ill., showed Everlasting blow-off valves, Simplex car and track jacks, homolaminated staybolts, journal jacks, wrought-steel floor plate, hose couplings.

Spencer Turbine Cleaner Company, Hartford, Conn., showed suction machinery for cleaning carpets, car floors, etc.

Standard Steel Car Company, New York, N. Y., exhibited forged steel wheels.

Standard Steel Works Company, Philadelphia, Pa., had a reception booth only.

Sterling Steel Foundry Company, Pittsburgh, Pa., showed the Sterling automatic car coupler.

Strong, Carlisle & Hammond Company, Cleveland, showed samples of Randall's graphite sheet lubricator for railway motor and journal bearings.

Symington Company, T. H., Baltimore, Md., offered journal boxes, flexible dust guards and miscellaneous malleable iron castings.

Taylor Company, W. P., Buffalo, N. Y., showed the Taylor improved dust-proof self-locking journal boxes for freight and passenger service.

Topping Brothers, New York, N. Y., displayed the Burrows ball-bearing jacks and cone-bearing jacks.

Underwood & Company, H. B., Philadelphia, Pa., presented a portable cylinder boring bar, portable crank-pin returning machine, portable crank-pin rivet head facer, new vertical machine for boring small cylinders, such as air brakes, etc.

Union Fibre Company, Winona, Minn., displayed car lining, special fire and waterproof lining material for steel cars.

Union Spring & Manufacturing Company, Pittsburg, Pa., exhibited coil and elliptic springs, pressed steel journal box lids and spring plates, Kensington all-steel journal box.

U. S. Metal & Manufacturing Company, New York, N. Y., presented the Ideal automatic car coupler, Columbia lock nuts, Hutchins car roof, Detroit car door, Howard wrought-iron brake jaw, Western malleable-iron brake jaw, Hillman locked clevis and turnbuckle, Diamond tapered steel pole, St. Louis Surfacer & Paint Company's panels, an exhibition car equipped with Dunham hopper door device.

Watson-Stillman Company, New York, N. Y., showed hydraulic car wheel and crank-pin presses, hydraulic rail benders and jacks, turbine pumps.

West Disinfecting Company, Inc., New York, N. Y., displayed soap dispensers, disinfectants, disinfecting appliances for toilets and fumigating apparatus.

Westinghouse Automatic Air & Steam Coupler Company, St. Louis, Mo., showed a sample of its automatic air and steam coupler.

Westinghouse Air-Brake Company, Pittsburg, Pa., had a triple valve operative test rack, motor-driven air compressors, "hose protecting" couplings, annealed steel hose clamps, and made a demonstration of force required to separate hose couplings between cars as compared with standard hose couplings.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., showed various types of metallic filament and carbon lamps for car service.

Wheel Truing Brake-Shoe Company, Detroit, Mich., showed abrasive brake-shoes for truing up flat wheels, dressing down tread-worn tires and long flanges.

Wickes Boiler Company, Saginaw, Mich., presented the Wickes vertical water-tube safety steam boiler.

Yale & Towne Manufacturing Company, New York, N. Y., offered electric hoists, Triplex chain blocks, I-beam trolleys, electric triplex hoists, padlocks, door checks, night latches and builders' hardware.

News of Electric Railways

Program of A. S. & I. R. Claim Agents' Association

The executive committee of the American Street & Interurban Railway Claim Agents' Association has determined to eliminate the reading of set papers and the Question Box at the convention this year. Conforming to this decision, a program, as outlined below, has been prepared, and it is hoped and believed that the subjects selected will arouse a keen interest among members and provoke discussions that will be profitable to all. From two to four members have been requested to prepare written discussions of the various questions, and such discussions will be printed in advance and will be distributed to all the members immediately before the subjects are brought up. It is thought that in this way members will be better able to follow the discussion of the question in hand and that the arrangement will lead to a freer exchange of ideas than if the remarks were read from manuscript only.

PROGRAM.

1. What is the best means of preventing collision of cars and of cars with vehicles and pedestrians?
2. How can boarding and alighting accidents be diminished or prevented?
3. What is the best plan of having trainmen procure and report an increased number of witnesses to accidents?
4. Is it good practice, when statement of injured party is obtained of accident, to furnish him with copy of his statement? Would the effect be to lessen the tendency of plaintiff to deny his statement when testifying under oath? Is it good practice to furnish witnesses copies of statements at the time same are taken? What will be the results?
5. Is a school of instruction for trainmen essential? If so, in what departments should the instruction be given, and by whom?
   (*a*) As relating to new employees.
   (*b*) As relating to old employees.
6. Should information be furnished newspapers regarding the work of the claim department? If so,
   (*a*) By whom?
   (*b*) What subjects can be treated advantageously, beginning with the time of the occurrence of an accident; methods of handling; settlement; result of court trials; fraudulent claims?
7. What should be the relationship of the medical and claim departments? How can the medical best serve the claim department in the handling of accidents?
8. The claim department and its relation to the operating department:
   REASONS WHY IT SHOULD BE CLOSE:
   (*a*) The importance of all accidents being reported promptly to the claim department.
   (*b*) The importance of co-operation between the operating and the claim departments in all matters relating to accidents.
   (*c*) The opportunities afforded the claim department by learning the causes of many accidents and suggesting a remedy to the operating department for its consideration.
9. The unreported accident, its evil and remedy:
   CONDUCTORS FAIL TO REPORT ACCIDENTS BECAUSE:
   (*a*) They do not think it is necessary.
   (*b*) They do not want to take the time to make out the report.
   (*c*) Because the people say to the conductors they are not injured and the first heard from them is through an attorney or suit.
   THE EVIL:
   (*a*) The claim department is in the dark as to whether the claim is based upon a real accident or fake.
   (*b*) The difficulty of making proper investigation.
   (*c*) Lack of defence which enables the plaintiff to recover a verdict in cases which, if properly defended, might result in a verdict for the defendant.
   THE REMEDY:
   How to eliminate this character of accidents is a matter on which it is felt every claim department will be glad to hear a free and full discussion.

Data Sheets of A. S. & I. R. Engineering Association

The committee on way matters of the American Street & Interurban Railway Engineering Association has prepared data sheets Nos. 11a, 11b, 11c, covering the use of T-rail in paved streets, the use of open hearth steel for rails, the use of manganese steel for rails, the influence of increased width of gage on curves, the use of rail joints and economical maintenance and has sent them to member companies and associate members with the request that the questions be answered as fully as possible and the circulars returned to E. O. Ackerman, chairman of the committee on way matters of the association, in care of the Columbus Railway & Light Company, Columbus, Ohio. The questions on the data sheets follow:

RAIL FOR TRACK IN PAVED STREETS.

Data Sheet No. 11a.

1. Miles of track (on single-track basis).
2. Miles of track in city streets, paved.
3. Miles of track in city streets, unpaved.
4. Miles of T-rail track of modern construction in paved streets.
5. Miles of groove and half-groove rail track of modern construction in paved streets.
6. Give dimensions of wheel tread and flange used on cars operated on your tracks.
7. Rail section now being used for construction in paved city streets, giving length of time it has been used by your company with the reasons for its adoption and results obtained.

(*a*) Have vehicles been damaged in crossing or turning out from rails you have just described? (*b*) Is the rail described by your city engineer or highway officials as satisfactory for wagon traffic as any rail in use on your road? (*c*) Do heavily loaded wagons turn out from the flange-way along the rail now favored by you as easily or better than from rails formerly used?

8. (*a*) Give width of street pavement with single track. (*b*) Give width of street pavement with double track. (*c*) Give distance between inner gages of double track. (*d*) Give gage of track.
9. Give the extent of vehicular traffic, viz., estimated number per day of each of the following classes:
   (*a*) Automobiles and vehicles weighing one ton or under. (*b*) Wagons from one to three tons. (*c*) Wagons and trucks from three to five tons. (*d*) Wagons and trucks over five tons.
10. Kinds of paving and foundation (give approximate percentage of each kind and describe how it is installed with the rail).
11. Are you required to use the same kind of paving in the tracks as is used on the balance of the street?
12. (*a*) Is the T-rail track and paving satisfactory to your company? If not, why not? (*b*) Is the groove rail track and paving satisfactory to your company? If not, why not?
13. (*a*) Is the T-rail track and paving satisfactory to the authorities? If not, why not? (*b*) Is the groove rail track and paving satisfactory to the authorities? If not, why not?
14. Give the cost for maintenance of tracks:
   (*a*) Of your T-rail tracks. (*b*) Of trilby or girder rail tracks under similar conditions.
15. What portion of the paving are you required to maintain?
16. What is relative cost of maintenance of pavement on your approved T-rail track compared with:
   (*a*) Trilby or grooved girder rail? (*b*) Tram head girder rail?
17. What rail section do you recommend for use in paved streets under heavy vehicular traffic? Why?
18. What rail section do you recommend for use in paved streets in outlying residence districts where vehicular traffic is light? Why?
19. As to T-rail and groove rail, what argument have you against one and in favor of the other?
20. What type of paving do you consider best practice:
   (*a*) With T-rail track where vehicular traffic is heavy? (*b*) With T-rail track where vehicular traffic is light? (*c*) With groove rail where vehicular traffic is heavy? (*d*) With groove rail where vehicular traffic is light?
21. What height of rail do you consider best practice? Why?
22. Give details as far as convenient (with drawings if possible) of your modern track and roadway construction, including foundation and paving, and state what led to their adoption.

NOTE.—In addition to having questions 17 to 22 inclusive answered by your engineer or track superintendent, ask your city engineer to answer them and forward his answers to the chairman.

STEEL FOR RAILS.

OPEN-HEARTH RAIL.

Data Sheet No. 11b.

1. (*a*) Miles of open-hearth rail. (*b*) Rail section and when installed.
2. How does it wear in comparison with the Bessemer section?
3. Under what specifications was the rail obtained?
4. Have you a standard specification for open-hearth rail? If so, please forward it; if not, any suggestions on standard specifications for open-hearth rail will be pertinent.
5. Remarks.

MANGANESE RAIL.

1. Are you using any manganese rail outside of specials?
2. (*a*) What is the section? (*b*) Is it rolled manganese or cast manganese?
3. How long in use?
4. How does the life of the cast manganese compare with that of Bessemer or open hearth? (Give curve construction where rolled rail is used.)
5. Have you any suggestions to offer on standard specifications of manganese steel rails?
6. In what manner do you apply rail bonds to manganese steel rails?
7. Remarks.

GAGE OF CURVES.

Data Sheet No. 11c.

1. What is your practice as to the gage of curves of different radii?
2. Have you any figures or data on the effect on rolling equipment of the increasing of gage of tracks at curves?
3. What type of curve construction do you use and recommend in T-rail track?
4. What do you recommend as shortest radius for curves?
5. Give dimensions of wheel tread and flange used on cars operated around your curves.
6. Remarks.

RAIL JOINTS.

1. Give various types of joints you have in service and state the results obtained.
2. Give various types you have installed with your recent construction, with reason for adopting same.
3. What types do you recommend as best practice?
4. Remarks.

The committee on power generation of the association has prepared data sheet No. 12, on fuel gas analyzers, which it has addressed to members of the association with the request that the questions be answered and the circular returned to G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind., as soon as possible. The questions on the data sheet follow:

FLUE GAS ANALYZERS.

1. Have you a CO_2 recorder or flue gas analyzer?
2. What type of CO_2 recorder of flue gas analyzer?
3. How long have you been making flue gas analysis?
4. Do you employ hand firing?
5. What type of hand-fire grates do you use?
6. Do you use mechanical stokers?
7. What type of mechanical stokers do you use?
8. Do you find that there is any particular type of hand-fired grate or stoker with which it is easier to obtain a high percentage of CO_2 in the flue gases?
9. If you have obtained any increase in efficiency by the use of the CO_2 recorder, please state what per cent increase in efficiency you have obtained.
10. What kind of coal do you burn?

11. From what mines do you obtain your coal?
12. Do you make coal analysis? If so, what is the analysis (moisture, volatile, combustible, fixed carbon, ash) of the coal used?
13. What average per cent CO_2 do you usually obtain under the guidance of the CO_2 recorder?
14. What average per cent CO_2 did you find you obtained in your flue gases previous to being guided by the use of the recorder?
15. What maximum percentage of CO_2 should you obtain from the type of grate you use and the kind of coal you burn for the best economy?
16. Do you not think that the proper percentage of CO_2 to indicate best efficiency varies with different fuels?
17. Does the per cent of CO_2 vary with the rate at which you are working your furnaces? If so, please indicate through what ranges it varies and corresponding ranges of capacity of furnace.
18. Do you find your loss to be due to insufficient air, excess air, or lack of proper diffusion of air?
19. What changes in furnace construction, grate construction, arrangement of arches or baffling have you made to increase furnace or boiler efficiency?
20. Have you found that infiltration of air through the ordinary red brick boiler setting has been a material factor in the reduction of per cent of CO_2 obtained? If so, what steps have you taken to make your boiler walls impervious to air infiltration?
21. Have you made evaporation tests, checking evaporation and per cent of CO_2 and other gases? If so, please give us data showing results.
22. Where several furnaces discharge their gases into one stack, is it necessary to have a continuous record of the conditions of each furnace, or will not a record of the stack gases give all the information that is usually required?
23. Do you regard a draft gage an essential instrument in guiding one in obtaining best results in connection with the CO_2 recorder? If so, is it essential to have a recording gage?
24. Have you found that a decreased or increased draft has been required in your case to obtain higher furnace efficiency as indicated by the CO_2 recorder?
25. Have you found that automatic damper control produces more efficient results than hand damper control?
26. Have you found pyrometers or thermometers for taking flue gas temperatures essential auxiliaries in connection with flue gas analysis?
27. What relation have you found to exist between flue gas temperature and per cent of CO_2 in flue gases?
28. What is the form and location of gas collector in the flue which has been found the most satisfactory?
29. Do you analyze your flue gases for other gases than CO_2? If so, in what way has the additional information been of practical value?
30. How often do you find it necessary to check your recorder in order to make sure that it is accurate?
31. Has the maintenance and attention required to keep the CO_2 recorder in service and operating accurately been a material factor, and if so, what expense?
32. Do you find that such instruments as are now on the market have so far passed the stage of development as to be sufficiently reliable and accurate for all practical purposes?
33. Do you encourage attention on the part of boiler-room attendants by paying a bonus for good records made by the CO_2 recorder? If so, what is your schedule of rates?
Remarks.

Transit Affairs in New York

Arthur J. Baldwin, of counsel for the Bradley-Gaffney-Steers Company, addressed a letter to the Public Service Commission on June 18, giving in detail the proposition for the construction of a tri-borough subway route in place of the original proposal submitted by the company on March 18, 1909. The new proposition includes the building and operation of subways estimated to cost about $109,000,000. The various sections are given as follows:

Sec. 1. A route from the Battery through Church and Vesey Streets to Broadway, thence to Tenth Street and through private property to Irving Place, northward along Lexington Avenue and under the Harlem River to Mott Avenue and 149th Street; following substantially the lines of the Broadway-Lexington Avenue subway as planned by the commission.

Sec. 2. A route for two tracks in the so-called Brooklyn loop subway, now nearing completion, and also to and across the Manhattan and Williamsburg bridges.

Sec. 3. A two-track subway connecting the first two sections through Canal Street.

Sec. 4. Two tracks in a subway from the eastern terminal of the Manhattan Bridge along the Flatbush Avenue extension and Fulton Street to Ashland Place, being a portion of the Fourth Avenue subway laid out by the commission.

Sec. 5. A two-track subway along Fulton Street from Ashland Place to Lafayette Avenue, thence easterly along Lafayette Avenue to Reid Avenue and northerly to Broadway, Williamsburg, and westerly along Broadway to the Williamsburg Bridge.

Sec. 6. A two-track subway or elevated railroad northerly along Jerome Avenue in the Bronx, substantially as planned by the commission as a part of the Broadway-Lexington Avenue route.

Sec. 7. A two-track subway or elevated road easterly from Mott Avenue along 138th Street, as laid down by the commission.

Sec. 8. The Fourth Avenue subway, Brooklyn, from Ashland Place southerly, for which contracts have been awarded by the commission, but which have not been acted upon by the Board of Estimate.

The company proposes to build all of these lines without cost to the city, with the exception of the Brooklyn Loop Line Subway, now nearly completed, which has cost nearly $10,000,000, and the Fourth Avenue subway, the first six sections of which are to cost about $16,000,000.

Mr. Baldwin says: "The proceeds derived from the operation of such railroads, after deducting operating expenses, including maintenance of plant and equipment, payments to reserve and amortization funds, as provided in the grant, and equitable charge for the use of the Brooklyn Loop Line Subway and the Flatbush Avenue extension, and after payment of interest at the rate of 5 per cent upon the actual cost of construction of the other sections and of the equipment of said road, shall be divided, share and share alike between the company or its successors and the city, the company's rights in and to the railroad, unless sooner taken by the city, to cease at the end of the amortization period without compensation."

Cleveland Traction Situation

Since the holding of public meetings in furtherance of traction affairs in Cleveland has stopped matters have taken a political turn. Mayor Johnson made several addresses in his tent early last week, but later went East on an errand said to be connected with the work of financing the Schmidt franchises. Both Mayor Johnson and his associates, in these tent addresses, have taken for granted that they will be able to wrest the 3-cent lines from the Cleveland Railway by revoking the grants made to the Forest City Railway, the Low Fare Railway and the Neutral Street Railway. They have even stated that the Schmidt interests will control 80 per cent of the street railway lines after the expiration of the old franchises early next year.

On the evening of June 12 the City Council adopted resolutions giving notice that the franchises granted on 11 of the 3-cent routes will be revoked at the end of six months, under conditions in the ordinances, and further moves indicate that Mayor Johnson and his friends believe that a company will be organized to take over these lines and combine them with the new grants to Herman J. Schmidt. Should this program work out as arranged, the old company will still have a number of the most important lines and connecting roads in the city, to which transfers cannot be given. A long legal contest will, doubtless, result if the administration seeks to find a cause for revoking any of the franchises of the companies whose properties have been purchased. The statement by the Mayor that the company has not lived up to the gentlemen's agreement entered into between him and F. H. Goff does not carry much weight since Mr. Goff has stated publicly that he considered that the company carried out its part of the agreement in full.

Attorneys for Mr. Schmidt have been at work for several days preparing an ordinance granting Mr. Schmidt an extension of rights to all the streets on which the Cleveland Electric Railway's grants expire early next year. It seems to be the intention to have the Council pass this grant and to make all the other grants extensions.

About 45,000 people have signed the petitions for a referendum vote on the Schmidt franchise. The Chamber of Commerce will take part in the campaign. Robert E. McKisson, candidate for Mayor on the Republican ticket, will speak against the ordinances, but will urge a plan which he recommended when he was Mayor some years ago. He asserts that he will have a committee of 1000 men to work with him.

Herman J. Schmidt states that the projectors of the 3-cent fare lines will be financed in Cleveland, if possible, as it is the desire of all that they be owned by home people. He has also spoken about plans for taking over the stock of the Forest City Railway by exchanging stock of that company for stock of a new company.

Nothing new has developed relative to the subway franchise. The projectors of this plan have agreed to most of the changes desired by the Chamber of Commerce, with the exception of dividing it into two grants, one for the upper and the other for the lower level. Some of the business men of the city feel that the grant for the upper level will not be taken advantage of for building lines, but that it will be held to prevent other companies from doing so. This level would accommodate street cars only, while the low level may be used for an entrance for interurban cars and for steam roads as well.

Hearing on Boston, Lowell & Lawrence Electric Railroad

The Massachusetts Railroad Commission gave a hearing on June 14 upon the petition of the Boston, Lowell & Lawrence Electric Railroad for a certificate of public convenience and necessity granting the right to build a high-speed double-track electric interurban road equipped with the third rail between Boston, Lowell and Lawrence. The directors of the company are Paul Butler and Congressman Butler Ames, Lowell, Mass.; Spencer Borden, Jr., Fall River, Mass.; Oakes Ames, North Easton, Mass., and John T. Bur-

nett, Southboro, Mass. J. W. Farley, Boston, conducted the case for the petitioners. The Boston & Northern Street Railway was represented by Bentley W. Warren, counsel, and the Boston & Maine Railroad by William H. Coolidge.

Mr. Farley said that the object of the Boston, Lowell & Lawrence Electric Railroad is to provide fast service and short headway connections between Boston and the other terminal cities; the municipalities of Tewksbury, Wilmington, Woburn, Winchester and Arlington would receive improved service through its construction. The consulting engineers for the proposed line are Westinghouse, Church, Kerr & Company, New York.

W. Tucker, of Westinghouse, Church, Kerr & Company, said that the road will be built entirely upon its own right of way, with no grade crossings. Alternate routes have been selected, one running from Sullivan Square, Charlestown, by way of Arlington Centre, Winchester and Woburn, a distance of 24.3 miles, to Lowell, and 9.2 miles from Tewksbury Junction to Lawrence; and the other by way of Arlington Heights and Burlington to the same terminal points, a total distance of more than 30 miles. The first route has been selected as the more desirable. The estimated cost of construction by the first route is $7,065,700, as compared with $6,445,600 for the Arlington Heights and Burlington line.

The Boston terminal is to be located at the west of the present terminal station of the Boston Elevated Railway, with which direct connection is to be made by platforms and stairways. The terminal is to be built inside of and above the level of the present loop of the Boston Elevated Railway, with four stub tracks and the necessary platforms, waiting rooms, and ticket offices. Stairways will also connect with the street level. At Lowell the terminal will be located in the business district at the intersection of Central Street and Church Street. At Lawrence the terminal location is on South Broadway, near the business centre.

Mr. Tucker stated that the maximum grade is to be 2 per cent. The permanent roadway will be 28 ft. wide on embankments and 32 ft. wide in excavations, with subgrade 2 ft. below the top of the rail and gravel ballast. The ties will be 6 in. x 8 in. x 8 ft. long, with 85-lb. rails, 24-in. angle bar joints, 4 bolts per joint, with tie plates on all curves and bridge floors. The line will be equipped with automatic block signals of the home and distant type, with average block lengths of about 1 mile. All terminals, junctions and yards are to be equipped with interlocking towers. Power will be supplied from a plant located near the Shawsheen River and five substations. A fireproof car house and repair shop will be located near the power plant. A telephone line will be provided for the entire system. The third rail will of 100-lb. sections, and the track rail bonding will consist of two No. 4-0 bonds per joint. There will be 38 steel body passenger cars equipped with two 200-hp motors each, with forced motor ventilation, automatic air brakes and multiple unit control, two snow plows, one work car, six flat cars and six gondola cars for coal service. The estimated cost of the line follows:

ESTIMATED COST.

Cleaning and Grubbing	$ 17,400	
Grading	1,035,900	
Masonry	847,900	
Culverts	33,300	
Bridges and Trestles	595,600	
Track	643,600	
Fencing	81,700	
Block Signals	67,000	
Relocating Streets, Roads, Electric Line, etc.	25,700	
Supporting B. & M. Tracks	11,700	
Raising B. & M. Trestle, etc., Lowell	8,900	
Raising Lawrence Street, Lowell	52,500	
Boston Terminal	25,000	
Lowell Terminal	12,000	
Lawrence Terminal	8,000	
Stations (14)	10,000	
Power House	450,000	
Substations	190,500	
Transmission Lines	76,800	
Track Bonding	48,100	
Third Rail	377,600	
Car House and Shops	59,500	
Rolling Stock	564,600	
		$5,243,300
Construction Contingencies 5%	$ 262,200	262,200
		$5,505,500
Franchise, Legal Expenses, Engineering, Administration and Interest	605,600	605,600
		$6,111,100
Real Estate	954,600	954,600
Total	$7,065,700	$7,065,700

The company plans to make an express running time of 35 minutes, with one stop between Lowell and Sullivan Square, the express time to Lawrence from Sullivan Square being 40 minutes. Local trains will make a schedule speed of about 33 m.p.h. compared with 43 m.p.h. for the express runs. The single fare from Lowell to Sullivan Square will be 35 cents, 10-ride tickets being sold for $3 and 50-ride books for $12.50. From Lawrence to Sullivan Square these rates will be 40 cents, $3.50, and $15, and between Lowell and Lawrence, 30 cents, $1.80 and $7.50. The local fares are fixed on the mileage, based on the through rate units.

Philadelphia Rapid Transit Company Plans Improvements

The board of directors of the Philadelphia (Pa.) Rapid Transit Company met on June 21. Geo. H. Earle, Jr., reentered the directorate of the company as a representative of the city. Mayor Reyburn, of Philadelphia, was the only city director not in attendance. He is on his vacation.

The questions of extensions and improvements were considered, and improvements to the power station of the company at Thirty-third Street and Market Street were decided upon which will involve an outlay of $225,000. Among other things, the purchase of a 6000-kw Westinghouse exhaust steam turbine for this station was authorized, and $100,000 was appropriated for the foundation for an extension of the power house on North Delaware Avenue. It was reported at the meeting that track improvements completed since Jan. 1, 1909, had cost $875,000, much of which was spent for rebuilding and for special work at curves and crossings.

George H. Earle, Jr., Clarence Wolf, Jeremiah J. Sullivan, with John B. Parsons, president of the company, as a member ex officio, were appointed a committee to consider plans for publishing bulletins in the newspapers outlining the conduct and policy of the company. Mr. Earle was made chairman of this committee. The following resolutions were also adopted:

"Resolved, That in deference to the suggestion of City Councils the proper officers be, and are hereby, requested forthwith thoroughly to investigate and report to this board whether the company can properly perform all its obligations and duties to every one and at the same time accede to the request of Councils. And be it further

"Resolved, That said officers be requested to make such report as clear and succinct as is consistent with giving all the reasons and data necessary to justify and understand such conclusions as may be submitted to this board."

"Resolved, That the officers be requested to consider and report upon the practicability of arranging that the employees of the company shall be given participation in its net earnings, in order that, if possible, the adjustment of wages may be made automatic and not a possible subject of contention, and so that each employee may hereafter have as direct an interest in the company's well-being as any owner of its securities."

On June 22 the Supreme Court dismissed the suit instituted by the committee of fifteen to enjoin the company from refusing to sell six tickets for 25 cents and denied City Solicitor Gendel the privilege of filing a petition which was intended to make the municipality a party to the proceedings. Chief Justice Mitchell said that the usual practice is for such matters to be taken to the Court of Common Pleas and then, if necessary, through that channel to the Supreme Court. Mr. Gendell immediately filed the same bill in equity in the Court of Common Pleas, No. 2, which he had prepared for the Supreme Court.

Appraisals of Franchises to be Discussed at Lake George

E. S. Fassett, president of the Street Railway Association of the State of New York, has announced that one of the features of the meeting of the association at Lake George on June 29 will be an address by Ralph R. Rumery, expert appraiser of the State Board of Tax Commissioners. Mr. Rumery has had charge of the appraisals of many of the public utility corporations in the State for several years, and in his address will describe the methods used by the board in these appraisals. His presence at and participation in the meeting indicate a desire on the part of the tax commission that the companies shall be conversant with its policy of franchise appraisals. The address will form part of the proceedings of Tuesday afternoon, June 29. The invitation extended by Mr. Fassett to Mr. Rumery to present this address was not accepted in time to permit an announcement of the fact on the printed program which was published on page 1094 of the ELECTRIC RAILWAY JOURNAL of June 12, 1909.

Electric Railway Opened at Manhattan, Kan.—The Manhattan City & Interurban Railway has opened its line in Manhattan.

Extraordinary Session of Supreme Court to Consider Franchise Taxes.—Under authority of a law enacted by the last Legislature designed to bring to early trial actions pending for the review of unpaid special franchise taxes, involving about $41,000,000 in New York State, Attorney-General O'Malley has announced that upon his application the Governor has appointed an extraordinary term of the

Supreme Court to convene in Erie County July 12 for the purpose of hearing special franchise matters in the Eighth Judicial District. The new law provides for the trial of these actions before extraordinary terms of the Supreme Court instead of before referees.

Consideration of Creation of Public Service Commission in Maryland Postponed.—The cabinet of Governor Crother of Maryland was to have met in Baltimore on June 17 to consider the question of creating a public service commission. S. Davies Warfield, chairman of the executive committee of the Consolidated Gas, Electric Light & Power Company, Baltimore, desires to explain to the cabinet a proposition to bring natural gas into Baltimore from West Virginia, and the meeting has been postponed until June 28, when it is expected that Mr. Warfield will set forth this plan in detail. Mr. Warfield, it is said, desires to enter into an agreement with the City of Baltimore direct, proposing that the city be adequately represented on the board of directors of the company, in which event he is said to feel that the company should not be subject to a State governing body. The Governor is reported to have said that he thinks it would be advisable to consult with the representatives of public service corporations, draft a law such as the company desires and then submit it to the cabinet for consideration.

Circular on Exhibit at Denver.—John A. Beeler, vice-president and general manager of the Denver (Col.) City Tramway, has issued a cordial invitation to manufacturers of electric railway apparatus to exhibit at the Denver convention next October. Mr. Beeler's letter, which has been sent to a number of supply houses, follows: "The annual convention of the American Street & Interurban Railway Association will be held in Denver, and I am the committeeman for this district upon whom rests a part of the responsibility of making it a success. As this is the first time that the association has met so far west, all Western men, and I especially, are deeply interested in proving that no mistake has been made in choosing Denver for the meeting. There surely will be a new field opened by this convention that is worthy of attention of the American Street Railway Manufacturers' Association and of all material men, and my object in writing you is to call this fact to your attention and also to express my personal wish that you send not only an exhibit, but such representatives as the importance of your line requires. To secure space address K. D. Hequembourg, vice-president American Street Railway Manufacturers' Association, in charge of exhibits, Dunkirk, N. Y."

San Francisco Jury Disagrees.—The case of Patrick Calhoun, president of the United Railroads of San Francisco, accused of bribery in connection with the granting of franchises to his company by the City Council, was submitted to the jury shortly before noon on June 19, and at noon on June 20 the order for dismissal of the jury was made by Judge Lawlor with the consent of the prosecution and the defense, each juror having pronounced the prospect of a verdict as hopeless. The jury stood 10 for acquittal and two for conviction. The trial was begun in February, and was marked by a sensational rifling of the offices of the company on March 26 and 27 by the police on a search warrant. Further raids of this kind, however, were stopped by an injunction obtained by the company to protect its property. The typewritten record of the case amounted to 2,500,000 words when the jury was completed. Judge, attorneys and witnesses have added another 1,750,000 words to the bulky transcript since that time, making a total of 4,250,000 words.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—It is more than likely that the Legislature will adjourn on July 15. A resolution to this effect was introduced in the House on June 16, and was passed and ordered to be transmitted to the Senate. Later a motion was made to reconsider the matter as it was feared by some members that the work of the Senate might be hampered under the circumstances, but this motion was lost as was also a motion to reconsider transmitting the resolution of the adjournment to the Senate. By some the hope is expressed that the public utilities matter may be still further delayed so that action on it will be impossible before adjournment. On the other hand, there are interests that feel that the matter had better be settled now, as it is likely to come up again next year with another period of attending uncertainty. One thing is certain, nothing has been stated by any of the members of the committee that would indicate the disposition to be made of the matter. The legislative committee of the State Business Men's Association recently sent a letter to the newspapers of the State in which many questions were propounded that have caused considerable editorial comment. The hearings on the measure were concluded on June 15, but the testimony did not add materially to the volume of information before the committee.

Financial and Corporate

New York Stock and Money Market

June 22, 1909.

After a week of liquidation and price reaction, the New York stock market to-day showed some symptoms of recovery. Trading was only moderately heavy, but all of the more active issues recorded fractional gains. While there has been no distinctive bear campaign, during the past week there has been more or less of selling pressure mostly from those who accumulated shares at lower levels and were seeking profits. The failure of the plan to list Steel common in Paris and the exaggerated reports of Mr. Harriman's illness were both depressing influences. Traction stocks were less active than earlier in the month, but price changes were insignificant.

The demand for bonds is a trifle less insistent but is still very good. Money continues to be easy at cheap rates. Quotations to-day were: Call, 1½ to 2 per cent; 90 days, 2¼ to 2¾ per cent.

Other Markets

Philadelphia Rapid Transit recorded a small advance. Union Traction, also, on more moderate sales, has slightly improved in price.

In Boston, a few lots of Elevated have been sold and some blocks of both issues of Massachusetts Electric, but changes in prices have been insignificant, although the general tendency has been upward.

No interest has been shown in the Chicago market in tractions. Chicago Railways has been practically out of the trading. Kansas City Railway & Light has been occasionally offered for sale, the price ranging from 49 to 50.

In the Baltimore market, United Railway bonds, the only traction security that has been of interest for many months, have been less active. Quotations are practically unchanged.

At the auction of securities in New York last week the following tractions were sold: $300 Jackson (Mich.) Consolidated Traction Company 5 per cent gold bonds, $100 each, at 90; $5,000 Albany & Hudson Railroad Company 5 per cent bonds, at 38.

Quotations of various traction securities as compared with last week follow:

	June 15.	June 22.
American Railways Company	a46	a45¾
Aurora, Elgin & Chicago Railroad (common)	a41	a43
Aurora, Elgin & Chicago Railroad (preferred)	a88	a88
Boston Elevated Railway	129	128
Boston & Suburban Electric Companies	*16	*16
Boston & Suburban Electric Companies (preferred)	*70	*71
Bos ton & Worcester Electric Companies (common)	10	10
Boston & Worcester Electric Companies (preferred)	54	a56
Brooklyn Rapid Transit Company	79¼	77⅞
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	87½	86¾
Capital Traction Company, Washington	*134	a134½
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*4	*4
Chicago & Oak Park Elevated Railroad (preferred)	*14	*14
Chicago Railways, ptcptg, ctf. 1	a107	a109
Chicago Railways, ptcptg. ctf. 2	a37	a36¾
Chicago Railways, ptcptg. ctf. 3	a26½	a28
Chicago Railways, ptcptg. ctf. 4s	a10	a10
Cleveland Electric Railway	*78	*78
Consolidated Traction Company of New Jersey	a78	a78½
Consolidated Trac. Co. of N. J. 5 per cent bonds	a106⅛	106¼
Detroit United Railway	61⅝	a62⅜
General Electric Company	161	160
Georgia Railway & Electric Company (common)	91	a93
Georgia Railway & Electric Company (preferred)	*85	88
Interborough-Metropolitan Company (common)	17⅛	16⅞
Interborough-Metropolitan Company (preferred)	48⅝	45⅜
Interborough-Metropolitan Company (4½s)	79⅛	78¼
Kansas City Railway & Light Company (common)	49⅝	a49
Kansas City Railway & Light Company (preferred)	a86	a84¾
Manhattan Railway	a148	143⅞
Massachusetts Electric Companies (common)	12¼	a12½
Massachusetts Electric Companies (preferred)	68	a68
Metropolitan West Side, Chicago (common)	a18	a17
Metropolitan West Side, Chicago (preferred)	a53	a52
Metropolitan Street Railway	29	a27
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	85¼	83¼
Northwestern Elevated Railroad (common)	a24	a23
Northwestern Elevated Railroad (preferred)	a69½	a69½
Philadelphia Company, Pittsburg (common)	a42½	42½
Philadelphia Company, Pittsburg (preferred)	a43¾	a44
Philadelphia Rapid Transit Company	a27¾	29¼
Philadelphia Traction Company	a91½	91
Public Service Corporation, 5 per cent col. notes	a100½	a100½
Public Service Corporation, ctfs.	a89¼	a89
Seattle Electric Company (common)	*112½	*109
Seattle Electric Company (preferred)	103	102
South Side Elevated Railroad, Chicago	a55	a55½
Toledo Railways & Light Company	29	29
Third Avenue Railroad, New York	27½	26¼
Twin City Rapid Transit, Minneapolis (common)	105	104¼
Union Traction Company, Philadelphia	a53⅛	53⅜
United Railways & Electric Company, Baltimore	a12½	a11¾
United Railways Inv. Co., San Francisco (common)	37½	38¾
United Railways Inv. Co., San Francisco (preferred)	a56	a62
Washington Railway & Electric Company (common)	a43½	a43
Washington Railway & Electric Company (preferred)	a91	a90⅝
West End Street Railway, Boston (common)	92	92
West End Street Railway, Boston (preferred)	*107	105¼
Westinghouse Electric & Manufacturing Company	85	83¼
Westinghouse Elec. & Mfg. Company, (1st pref.)	*124	a124

aAsked. *Last sale.

Causes Ascribed for Failure of Metropolitan Street Railway to Meet Obligations

Edwin S. Marston, Edwin M. Bulkley, John W. Castles, Dumont Clarke, R. Y. Hebden and Otto H. Kohn, comprising the committee representing the $16,604,000 of 4 per cent bonds of the Metropolitan Street Railway, New York, have issued a circular to the holders of these securities in which the statement is made that under existing conditions the earning power of the properties, as ascertained by a careful and exhaustive analysis, is not sufficient to pay any fixed return on either the $12,500,000 of 5 per cent bonds or the $16,604,000 of 4 per cent bonds of the company. The causes which they ascribe to this failure follow:

THE TRANSFER SYSTEM

"The theory upon which the surface railway companies accepted the transfer system imposed by the Legislature as a condition to the making of certain mergers and leases has proved to be a fallacy and a mistake of judgment. A fixed fare of 5 cents will compensate for carrying a passenger for a certain distance, precisely as any given sum will compensate a certain amount of labor or purchase a certain amount of merchandise. When the laborer or merchant is compelled to furnish labor or merchandise at less than the value or cost thereof, starvation or bankruptcy is inevitable. The purchasing power, i. e., the actual value, of 5 cents to-day is admittedly considerably less than it was 10 years ago, while the cost of all the items which enter into the service rendered for 5 cents by the street railways has largely increased. The great amounts necessary to construct the property, the constantly increasing cost of the items entering into the charges for its operation and maintenance, and the burdens imposed by the public authorities, have combined to demonstrate that the carrying of passengers not only for an unlimited distance on a continuous line, but also with the privilege of obtaining transfers from one line to another (in some instances to a practically indefinite extent), is impossible to be continued without a great and constantly growing loss. The practical reduction of the fare to about 3 cents per passenger has been imposed by the transfer system, in the face of the fact that the cost of the construction of street surface electric lines in the Borough of Manhattan (where the use of the underground electric system is required) is several times greater per mile than in any other city or in the other boroughs in New York, to say nothing of the enormous increase in the cost of operation and maintenance due to the annually increasing congestion of vehicular traffic in the principal thoroughfares.

"The reasons why such a result cannot be fairly insisted on by the public have never been more clearly presented than in the memorable message of Governor Hughes accompanying his veto of the bill which fixed a rate of 2 cents per mile for the transportation of passengers by steam railroad companies.

"In the present instance, the resulting disaster is emphasized by the gross abuses which have grown up in the practical workings of the transfer system and the consequent additional loss.

"The solution of the problem and the remedy for the wrong rest with the public authorities.

EXCESSIVE TAXATION

"Under laws passed upon the theory that this property produced large profits in addition to a fair return on the actual investment, and therefore merely from the company's utilization of franchise rights (an impression, the existence of which, it must be said, is chargeable in part at least to those formerly in control of the company), it is now claimed by the taxing officers that more than 35 per cent, and probably more than 40 per cent, of its net earnings (before paying any interest or other return on the cash actually expended in constructing and equipping the property), must be paid, annually, by way of special franchise taxes and other public charges. That this is confiscation, pure and simple, is self-evident. That no business can carry such a burden is clear. Here, too, a readjustment at the hands of the public authorities is imperatively necessary.

"The net result of the matters mentioned in the above paragraphs may justly be thus summarized:

"During the last 15 years, the fare per passenger carried has been reduced from 5 cents to an average of practically 3 cents, namely, nearly 40 per cent, while in less than 10 years the burden of taxation has been increased fully 100 per cent.

LEASED LINES

"In creating and enlarging the Metropolitan system, the policy was adopted of taking over certain lines on long-time leases under which the company undertook to pay certain rentals or guaranteed dividends (in many instances at an exceedingly large rate) to the lessors or to their stockholders. Careful and laborious examination, practical tests, tabulations and study, have resulted in demonstrating, conclusively, that, separately operated under existing conditions, not one of the leased lines produces an income sufficient to pay its operating expenses and taxes, and yield a return equal to the amounts specified in the lease thereof. The catastrophe which has overtaken the Metropolitan system is a general one. It affects as well its leased lines and the holders of the securities representing their properties; in some cases, the effect on the leased lines involved is even more disastrous. In most instances, the contribution of a leased line to the combined gross earnings of the system as a whole is greatly less than the cost of operating and maintaining its properties. A readjustment of relations with the leased lines, or with such of them as it may be deemed wise to continue to keep in the system, is therefore essential to a proper and stable solution of the problem.

MISCELLANEOUS CONSIDERATIONS

"The most important of these is the necessity for the raising of a large sum of new money for the general rehabilitation of the system and the acquisition of new cars, and of adopting the conservative policy of applying large portions of current earnings to defraying the necessary maintenance and depreciation charges. The present demands for these purposes may, in a large measure, be justly ascribed to the failure of the New York City Railway to make adequate expenditures and reserves in respect of such matters.

"A proper reorganization must not only be based on sound principles of a financial and administrative character, but must also develop a management which will conform thereto, and particularly one which will apply and enforce these principles in the operation and conservation of the property, thereby remedying the faults of the past and giving assurance against their recurrence.

"As it will be perceived, the situation is far from satisfactory. The committee believes that it is due to the bondholders whom they represent that the facts should be plainly stated and generally understood. They concern not only the security-holders but the general public as well. A readjustment of relations is essential in the interest of all. Street car transportation is a public necessity. The extent and character of the service rendered are necessarily limited by the ability and means of the company to provide the same.

"The committee is prepared to support any proposition which will promptly accomplish normal and just relations between all concerned in the welfare and proper operation of the lines which it may be determined to include in the reorganized system. Such relations must necessarily be worked out by means of a readjustment based on changed conditions, and in the light of the lessons taught by past fallacies and erroneous policies, and grounded upon propositions which are inherently and practically just and equitable, to the public, the city, and the company alike.

"While the considerations above stated are of more or less general application, they are of graver and more pronounced importance in the case of the Metropolitan system than in the case of any other lines in Greater New York, for the following reasons:

"(a) The traffic in the streets occupied by the principal Metropolitan lines is more congested than in any other part of the city, thereby resulting in burdens not shared by lines operated in less congested streets;

"(b) The Metropolitan system is built up more than any other system in Greater New York upon leases and mergers, by reason of which the law imposes the transfer obligation—the Third Avenue system, for instance, has no leases, and, so far as the Borough of Manhattan is concerned, is practically free from compulsory transfers; and

"(c) The existence of the leases above referred to very materially increases the taxes and losses of the system.

"After most careful study and thought the conviction is forced upon your committee that a reorganization which shall be more than a mere temporary makeshift leading before long to a renewed collapse, but which shall provide a sufficient amount of new capital, be fair and reasonable to the community at large and the legitimate claims of security-holders, and safeguard with a reasonable degree of assurance against disaster in the future, cannot be effected unless and until a change shall have been brought about in the fundamental points which we have enumerated, and at least two of which depend for their correction upon appropriate action by the public authorities. If such action is not had, your committee may be called upon to face and to present to you the question whether under such circumstances, it will not be the wisest course and one which in the end will involve a minimum of financial sacrifice on your part, to take title to and possession of those properties (real estate and others) especially pledged

as security for your bonds, and to convert the same into cash for your benefit—a course of action which with due consideration for your interests and even more for those of the public, should be resorted to only as a last resource, inasmuch as it would mean a total disorganization, if not actual disruption, of the street railway system and service in much the greater part of New York City."

Annual Report of the South Side Elevated Railroad

Gross earnings of the South Side Elevated Railroad of Chicago in the year 1908 were $2,241,690, as compared with $2,105,193 in the preceding year, or an increase of 6.48 per cent. Operating expenses, including loop rental and taxes, were equal to 70.1 per cent of gross earnings, as compared with 69.3 per cent in 1907. The following table shows the earnings for three years:

	1908	1907	1906
Gross Earnings	$2,241,690	$2,105,193	$1,788,975
Operating Expenses and Taxes	1,571,066	1,459,746	1,207,269
Net Earnings	$ 670,624	$ 645,447	$ 581,706
Interest and Rentals	436,620	205,939	33,750
Net Divisible Income	$ 234,004	$ 439,508	$ 547,956
Dividends	76,723	409,187	409,177
Surplus	$ 157,281	$ 30,321	$ 138,779

Of the total of $1,571,066 shown as operating expenses, $758,106, or 33.8 per cent of gross earnings, was required for conducting transportation. This compares with a corresponding expenditure equal to 32.2 per cent in the previous year. There was expended on maintenance of way and structure in 1908 a total of $128,588, or 5.7 per cent of gross earnings. On maintenance of equipment there was expended $178,605, or 7.9 per cent. This indicates a total expenditure on maintenance of 13.6 per cent of the gross earnings.

Charles V. Weston, the president, in the address presented to stockholders at the time of the annual meeting, said in part:

"During the months of August, September, October and November, 1908, the volume of traffic was less than for the corresponding months of the year 1907. The other eight months of the last year showed increases in traffic over corresponding months of the previous year, ranging from 21.96 per cent to 2.17 per cent, the net increase for the year over the total number of paying passengers carried in 1907 being 6.32 per cent.

"The low point in the traffic for 1908 was reached in February, when the daily average number of passengers transported was 111,927. The highest number of passengers carried for one month during last year came in June, when the daily average was 125,876 passengers, or 749 passengers less per day than were carried during the month of October, 1907, when the average per day reached 126,670 passengers, the highest daily average in any month of that year.

"The lower rate of increase in net earnings, compared with the increase in gross earnings, is due to the fact that the unavoidable increase in the operating expenses, on account of operating additional lines, was proportionately greater than the increase in revenue, for the following reasons: The general business recession, and more vigorous competition from parallel lines of transportation. To meet the competitive service installed by other companies in the territory tributary to your road, it was necessary last year to operate car mileage greater in proportion to the traffic received than has been heretofore necessary.

"There were increased expenses coming from other sources than conducting transportation on additional road.

"The stock yards branch of your railroad was opened to traffic on April 8, 1908. The business developed on that line during the first nine months of operation indicates that the time is not far away when it will become a profitable piece of railroad. The operation of the extensions to your railroad, considered as a whole, verifies the wisdom of your directors in undertaking the projection of these branch lines into territory which had been sufficiently developed to insure—from the beginning—some surplus earnings over operating expenses, maintenance costs and fixed charges.

"The physical property of your company has been maintained in the very best condition of repair and efficiency. A larger amount of renewals of track timbers has been made during the last fiscal year than was done during any previous year.

"Your rolling stock is in first-class condition. The electrical equipment on the cars, as a whole, is in better condition than it has been for several years, for the reason that many of the original motors, which had been in service for nine years, were showing signs of failure, and on a large proportion of the equipment, the commutators, armatures and fields have been renewed, in such manner that the machines are in equally good or better condition for service than when they were first installed. All the cost of renewing these equipments has been charged into operating expenses. The work of renewing the equipments which are showing signs of failure will be continued this year until all have been made good.

"During the last year some progress has been made in respect to the lengthening of platforms at loop stations. Civic associations investigated the question of loop platform extensions, with a view to arriving at an impartial judgment of the matter. Discussion of the question of platform extensions involved the question of increasing the length of haul on the elevated railroads, for the same rate of fare now charged. Your directors and your president recognized that any increase in the average distance of haul per passenger carried over that which is being done now on the elevated lines, for a flat rate of five cents, would result in serious loss to the companies, and representations bringing out that fact were made to the local transportation committee by your president.

"The average haul distance on the South Side Elevated Railroad to-day, including one-half the circuit of the loop, is 6.6 miles. The average cost of hauling a passenger is 3½ cents, leaving 1½ cents per passenger to pay fixed charges, depreciation, renewals and fair return on the actual investment in the property. These figures, in respect to the cost of the service and net revenue per passenger carried, apply to all the elevated railroads in this city.

"All new construction of the third track and branch lines authorized has been completed, and these are now in full operation. The cost of the new construction has been just within the amount realized from the sale of the bonds issued for that purpose.

"It is the opinion of your present directors that the physical property, in its present condition, could not be replaced for the amount of the stock and bond issue. Your company has no floating debt, or other indebtedness, except current expenses. It is discounting its bills, and had $343,109 cash on hand on Dec. 31, 1908.

"As I see it, the crisis in the affairs of your company has been passed, and although we may not reasonably hope for any sudden or extraordinary expansion of traffic, it is entirely consistent to predict a steady and continuous growth of business which will ultimately place the property on a good paying basis, provided that entanglements which will put additional burdens upon it without adequate compensation are avoided."

The published statement contains the following:

"Between 1908 and Dec. 31, 1907, $420,541 was eliminated from the cost of property; in January, 1908, $50,000 additional was eliminated, making a total amount of $470,541 taken away from the cost of property, on account of depreciation, to and including January, 1908. This amount is now charged to cost of property and credited to a depreciation reserve, less $279,859, being the amount of property replaced or disappeared, leaving a balance in depreciation reserve of $190,682, to which has been added $50,000, set aside for depreciation and deducted from reserve account in 1908, making a total depreciation reserve of $240,682."

Report of Chicago Railways Company for April and Three Months

The Chicago (Ill.) Railways Company reports earnings as follows for April, 1909, and the three months ended April 30, 1909:

April:	1909.	1908.
Gross receipts	$997,348	$865,435
Expenses and taxes	665,258	626,333
Balance (actual)	$332,090	$239,102
Balance (30 per cent of gross)	299,204	259,630
Interest (5 per cent on value of property)	171,522	136,492
Net income	$127,682	$123,138
Division:		
City's, 55 per cent	$70,225	$67,726
Chicago Railways', 45 per cent	57,457	55,412
Three months:		
Gross receipts	$2,853,956	$2,481,993
Expenses and taxes	1,980,416	1,799,478
Balance (actual)	$873,580	$682,525
Thirty per cent balance	856,199	744,633
Five per cent interest return	500,363	408,345
Net income	$355,836	$336,288
City, 55 per cent	195,710	184,958
Company, 45 per cent	160,126	151,330

American Cities Railway & Light Company, New York, N. Y.—At a meeting of the board of directors of the American Cities Railway & Light Company, held on June 17, the regular quarterly dividend of 1½ per cent was declared on the preferred stock and a dividend of 1 per cent was declared on the common stock, both payable on July 1, 1909,

to stockholders of record on June 21, 1909. The dividend on the common stock is the initial dividend. It is understood that the earnings of the properties controlled by the company are showing a very satisfactory increase over last year.

Boston & Northern Street Railway, Boston, Mass.—The Railroad Commission has granted the Boston & Northern Street Railway permission to issue coupon or registered bonds at par value not to exceed $536,000, payable 50 years from date and bearing interest at the rate of 4 per cent, as necessary for meeting the cost of additions and improvements.

Central Pennsylvania Traction Company, Harrisburg, Pa.—At a meeting of the stockholders of the Central Pennsylvania Traction Company recently, it was voted to issue $300,000 in bonds for the purpose of securing funds to carry out a number of improvements to the property which have been under consideration for some time.

Chicago (Ill.) Railways Company.—N. W. Harris & Company, New York, and the National City Bank, New York, have purchased $5,000,000 of first mortgage 5 per cent rehabilitation bonds of the Chicago Railways Company and are offering the same for public subscription. The new issue increases the total issue of bonds to $19,000,000. The advertisement offering the bonds for subscription contains the report of the company for the year ended Jan. 31, 1909, and a statement giving the financial liabilities of the company. A feature of the advertisement is the statement that the bonds are in the nature of a quasi-municipal security.

Connecticut Valley Street Railway, Greenfield, Mass.—The Connecticut Valley Street Railway has petitioned the Railroad Commission for authority to issue stock to the amount of $750,000 for refunding its funded debt and meeting other obligations in connection with the purchase of physical plant and franchises.

Dayton & Xenia Traction Company, Dayton, Ohio.—T. A. Ferneding, Edward Canby and John Vogeler, as a committee of reorganization, purchased the property of the Dayton & Xenia Traction Company recently at special master's sale for $580,000.

Denton Interurban Railway & Power Company, Denton, Tex.—The property of the Denton Interurban Railway & Power Company will be sold under foreclosure at Denton on July 6, 1909. The property was inventoried in court at $51,652, and the vendor's lien notes were listed at $50,822. Those who desire to bid should address E. F. Bates, Denton, the receiver of the company.

Gainesville Railway & Power Company, Gainesville, Ga.—The Gainesville Railway & Power Company has been organized to succeed the Gainesville Electric Railway, the property of which was sold recently under foreclosure. The new company will have an authorized capital stock of $150,000 and will authorize $150,000 bonds, and will issue $125,000 of each, reserving the remainder for future requirements. A. G. Sharp, Atlanta, will be elected president of the company, and W. H. Slack will be secretary and treasurer.

Havana (Cuba) Electric Railway.—The directors of the Havana Electric Railway Company have under consideration a plan to retire the $5,000,000 of 6 per cent preferred stock of the company and replace it with an issue of bonds. In addition to the preferred stock there is $7,500,000 of common stock outstanding.

Interborough Rapid Transit Company, New York, N. Y.—Application was made to the Public Service Commission of the First District of New York on June 17 by the Interborough Rapid Transit Company for authority to issue $10,000,000 bonds under the $55,000,000 mortgage of 1908 in order to retire the $10,000,000 of three-year 5 per cent gold notes of 1907 due on March 1, 1910. Of the $55,000,000 issue of bonds, $30,000,000 were deposited to secure $25,000,000 of three-year 6 per cent notes of 1908, due on May 1, 1911, of which $23,424,000 was outstanding.

Louisville & Eastern Railroad, Louisville, Ky.—The receiver of the Louisville & Eastern Railroad has been authorized by Judge Evans of the Federal Court at Louisville to issue $337,624 of receiver's certificates to complete the road to Shelbyville, a distance of 24 miles, on which about $400,000 has been expended.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—The Meadville & Conneaut Lake Traction Company has lately elected new officers as follows: L. A. Frazier, president; Dr. J. A. McCready, first vice-president; C. Hallen, secretary; W. H. Sief, treasurer; A. L. Newhand, auditor; F. R. Shyrock, general manager and park manager; E. O. Shyrock, superintendent; F. R. Shyrock, purchasing agent; George D. Schreber, engineer of power station; William Watson, master mechanic.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has arranged to retire $500,000 first mortgage 5 per cent bonds issued by the West Side Railroad, which mature on July 1, 1909, and to pay the accompanying coupons due July 1, 1909, on and after that date on presentation at the Trust Company of America.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—The notes of the Citizens' Railway, Light & Power Company and the Danville Railway & Electric Company, aggregating $220,000, which were secured by the deposit of stock of the Newport News Company, have been cancelled as requested by the Maryland Trust Company, Baltimore, trustee of the general mortgage, and Alexander Brown & Sons, Baltimore, and the suit filed with the United States Circuit Court at Norfolk in February, 1909, asking for the appointment of a receiver, has been withdrawn.

Old Colony Street Railway, Boston, Mass.—The Railroad Commission has granted the Old Colony Street Railway permission to issue coupon or registered bonds at par value not to exceed $275,000, payable 50 years from date and bearing interest at the rate of 4 per cent, as necessary for meeting the cost of additions and improvements.

Richmond Railway & Power Company, Richmond, Va.—On page 1140 of the issue of the ELECTRIC RAILWAY JOURNAL for June 19, 1909, mention was made of a plan to organize the Virginia Railway & Power Company under the laws of Virginia to take over the property of the Virginia Passenger & Power Company, the Richmond Passenger & Power Company and the Richmond Traction Company from the receivers on June 30, in accordance with the plan of the bondholders. It has since been decided that the name of the new company shall be the Richmond Railway & Power Company, and this company will organize as follows: Frank Jay Gould, New York City, chairman of board of directors; Wm. Northrop, Richmond, president; Fritz Sitterding, Richmond, vice-president; Henry W. Anderson, Richmond, vice-president and general counsel; Guy Phillips, New York, secretary and treasurer; Geo. B. Williams, Richmond, assistant secretary and assistant treasurer; R. H. Keim, Richmond, general auditor; A. B. Guigon, Richmond, assistant counsel; G. H. Whitfield, Richmond, general superintendent of light and power department; C. B. Buchanan, Richmond, general superintendent of railways. William Northrup, one of the receivers, informs the ELECTRIC RAILWAY JOURNAL that the plans for the development of the system have not yet been decided upon.

Roanoke Railway & Electric Company, Roanoke, Va.—The stockholders of the Roanoke Railway & Electric Company held their annual meeting at Roanoke recently. R. D. Apperson, president of the company, submitted his report, which showed that the company made very satisfactory progress during the year. Since the last report it has obtained control of the Roanoke Water Power Company and has built a three-story office building. The directors and officers were all re-elected.

Rockland, South Thomaston & Owl's Head Railway, Rockland, Maine.—The Rockland, South Thomaston & Owl's Head Railway, which was in the hands of receivers, has been succeeded by the Rockland, South Thomaston & St. George Railway, which has organized as follows: John L. Donahue, president; M. A. Johnson, vice-president; Henry M. Wise, secretary and treasurer; John T. Berry, superintendent and master mechanic.

Shelburne Falls & Colrain Street Railway, Shelburne Falls, Mass.—The Shelburne Falls & Colrain Street Railway has petitioned the Massachusetts Railroad Commission for the authority to issue $25,000 in stock to extend its line across the Deerfield River at Shelburne Falls.

Uvalde (Tex.) Street Railway.—The Uvalde Street Railway has been leased for one year to Peterson & Avant, San Antonio, Tex., and M. M. McFarland, Uvalde, Tex.

Wheeling (W. Va.) Traction Company.—A dividend of 1 per cent has been declared on the $2,000,000 stock of the Wheeling Traction Company, payable on July 15, 1909. This is the first distribution on this stock since July 1, 1903, when 1 per cent was declared. The first dividend of 1 per cent was disbursed on this stock on Jan. 10, 1903.

In answer to the petition of residents of Rockville, Lucknow and Feldheim for a reduction of fare on the Fort Hunter line of the Central Pennsylvania Traction Company, Harrisburg, from 10 cents to 5 cents, the officials of the company state that the line has never been self-sustaining; that the company has not paid its stockholders dividends for years, and point to the returns annually made to the city by the company on the basis of 3 per cent of the gross receipts, which showed a decrease from $17,568.15 in 1907 to $17,307.59 in 1908.

Traffic and Transportation

Arbitration of Wages at Scranton.

The full text of the Board of Arbitration in the question of the readjustment of the wages and terms of service of the employees of the Scranton (Pa.) Railway is now available. As stated in the issue of June 19, the board consisted of five members, H. E. Paine and D. B. Atherton for the company, and William Corless and P. E. Kilcullen for the men, with Judge George Gray, of the United States Circuit Court of Appeals, as chairman. The men desired a flat rate of 25 cents an hour for motormen and conductors, as compared with the rate of 20, 21 and 22 cents an hour, respectively, for the first, second and third year of service now in force, and an increase of 20 per cent for men employed in various capacities in the shops and barns. The company was represented by H. B. Gill, Philadelphia, chief counsel; C. P. O'Malley, of Willard, Warren & Knapp, local counsel for the company; C. L. S. Tingley, vice-president of the American Railways Company; Frank Caum, general manager, and P. T. Reilly, superintendent.

The first reports of the decision of the board were erroneous in a few particulars. The decision in regard to the motormen and conductors was that they shall receive 20 cents an hour during the first year of their employment, 22 cents an hour during the second year of their employment, 23 cents an hour during the third, fourth and fifth years of their employment, and 24 cents an hour during and after the sixth year of their employment. The wages of the other employees of the company are increased 1 cent an hour.

The arbitrators in their decision paid a great deal of attention to the claim of the employees that a flat rate be paid to all motormen and conductors of 25 cents an hour. They found that, while this rate was paid in some cities, it should not be considered as furnishing a standard for Scranton any more than a case in which a lower rate of compensation was paid. On the other hand, the social and physical conditions of Scranton and suburbs render this district an attractive place for residence.

The board expressed its opinion strongly against any flat rate of compensation, because it would ignore entirely the benefits derived from experience. On this point the report says:

"It must, of course, be admitted that the occupation of either a motorman or conductor is one involving a high degree of responsibility and of a fair degree of skill. It requires measurable time and experience for the motorman to acquire that co-ordination of nerve power and quick mental perception to enable him to carry his car safely through crowded thoroughfares or to meet the emergencies that must occasionally arise in the conduct of his business. The conductor, too, has much to learn by experience in the handling of large crowds, and in the collection of fares. In safeguarding the passengers under his charge his duties require a cultivated courtesy, restraint of temper, and quick intelligence. The testimony shows very clearly to the undersigned that these qualities are developed by experience, and that men become more valuable as their service lengthens. Again, it is in the natural order of human experience, that young men in any employment, while recognizing the necessity of a novitiate, should be entitled to look forward to something in the way of increased compensation by reason of lengthened service and increasing maturity of their physical and intellectual powers. The fidelity to the service in which one is engaged as evidenced by lengthened employment is valuable to the employer, and is properly recognized by an increase in compensation. All these considerations are ignored in the demand for a flat rate of payment."

The demand that promotion and day work be given to men according to length of service was disallowed as being undue and unwise interference with the discretion of the management of the company. This claim was made for the power-station employees as well as for car crews.

An interesting feature of the hearing was the deliverance by Judge Gray made in reply to the argument by the counsel for the men that the latter were entitled to an increase in wages because of the prosperity of the Scranton Railway. Judge Gray said that the two questions had no relation to each other. Continuing, he said:

"Wages are not rated, however much you may think of the ability of the man to pay them, upon the mere income; that is, this is not a profit-sharing institution and you do not make any claim to that. You put it in to show that they have the ability to pay fair wages and that they can not come in here in *forma pauperis* and try to reduce wages because they are not able to pay them. That would be absurd, for we do not fix wages, you know, on what may be the profits of a concern, otherwise it would be a profit-sharing and a partnership instead of an ordinary employment."

Injunction Against Boycott at Evansville Made Permanent

The temporary injunction secured by the Evansville & Southern Indiana Traction Company, Evansville, Ind., on June 7, 1909, from C. A. DeBruler, judge of the Vanderburgh Circuit Court, against former employees of the company and others, restraining them from interfering with the company's business by intimidating persons anxious to avail themselves of the facilities of the company has been sustained by the court in a vigorous opinion which prohibits the boycott, holding it to be a conspiracy.

The demands of the employees of the Evansville & Southern Indiana Traction Company for a readjustment of the terms of service with the company and the attitude of the company were referred to in the issues of the Electric Railway Journal of May 29, 1909, and June 5, 1909, and in the issue of June 12, 1909, the failure of the strike of the men was noted. In fact, within three days after the men went on strike cars were operated again on schedule. Realizing that they had lost, the men declared a boycott against the company, and the company, in order to mimimize the effect of the boycott and to protect its new employees, secured the injunction which has just been sustained.

At the hearing before Judge DeBruler affidavits were presented from H. W. Marshall, president of the company, and F. M. Durbin, general manager, showing that the company is operating with a permanent set of men, but that if the injunction were disallowed some of these men might leave the company through fear. The boast of one of the advisers of the strikers, made before the Consolidated Business Association, about the probable cost of the strike to the company was also cited. It was also shown that one of the advisers of the strikers had made an incendiary speech at a strike in another city which had caused a riot.

The temporary injunction secured by the company says in part:

"The plaintiff, having filed its verified complaint herein, praying for a temporary restraining order, and plaintiff having filed its undertaking to the approval of the judge of this court, it is ordered that the defendants * * * and all other persons, and all other persons co-operating with said defendants and each of them be and they hereby are restrained from in any manner interfering with, hindering or obstructing or stopping the business of this plaintiff or its employees in the operation of the cars of this plaintiff; from picketing or maintaining at or near the car houses, shops, power houses, or along the tracks of this plaintiff any picket or pickets; from assaulting or intimidating, by threats or otherwise, the employees of this plaintiff or any persons who may become or seek to become employees of said plaintiff; from congregating about or near the car houses, shops, power houses, or along or near the tracks of plaintiff or in any other place for the purpose of compelling, inducing or soliciting the employees of this plaintiff to leave its service or of preventing or attempting to prevent any person from freely entering into the service of this plaintiff; from interfering with or attempting to interfere with, by force, threats or intimidation, the employees of this plaintiff in the operation of plaintiff's cars and railway system in the usual and ordinary way; from following the employees of this plaintiff to their homes or other places for the purpose of inducing them by threats or intimidation or otherwise to leave the employ of this plaintiff; from attempting by bribery, payment or promise of money or other rewards to induce the employees of plaintiff to leave the service of this plaintiff; from attempting to induce persons from abstaining from patronizing this plaintiff's street cars; from congregating about or near the places of business of this plaintiff or about or near any place where their employees are lodged or boarded, for the purpose of compelling, soliciting or inducing the employees of the plaintiff to leave the service of the plaintiff or to refuse to work for the plaintiff or for the purpose of preventing or attempting to prevent any person from freely entering the service of the plaintiff, from organizing or maintaining any boycott against the plaintiff, from sending any circulars or other communications to patrons of the plaintiff's road for the purpose of dissuading them from patronizing or riding upon the cars of the plaintiff; from assembling at and picketing the different railroad stations and all other places in Evansville for the purpose of preventing persons and the public from entering and riding upon the ears of this plaintiff; until notice and the further order of this court."

Notice of Change of Fare by Indiana Company

The Indiana Union Traction Company, Anderson, Ind., recently addressed this notice of a change in rates on its lines to its patrons: "The interurban passenger fares of this company have been readjusted and equalized, being placed on a uniform rate basis over the entire system, effective June 10, 1909. All tickets will be good on either limited or local trains (with a few exceptions) without excess fare. The Central Electric Traffic Association 1000-mile book, good over the principal interurban lines of Indiana and Ohio, price, $17.50, will be the only mileage book sold on and after June 10, 1909. All other mileage books will be withdrawn from sale, but outstanding books will be honored within their time limits. In place of the mileage books withdrawn, a 54-ride commuter's book, good between all stations during the month of issue, will be sold at 1¼ cents per mile. Round-trip tickets will be sold at reduced rates, good only in the direction in which they read. For further information please apply to the ticket agent."

Under date of June 1, 1909, H. A. Nicholl, general manager, addressed the following communication to officials, agents and employees of the traffic and transportation departments of the company:

"On June 10, 1909, a readjustment of the interurban passenger fares of the company will become effective. In order that you may be correctly informed concerning this readjustment, the following statement is made:

"In the growth of the interurban system of the Indiana Union Traction Company, extending over a period of about 15 years, and involving the present operation as a unit of what were formerly a number of independent lines, inequalities have arisen in the rates of fare upon the different lines of the company. This arises from the fact that the rates of fare originally established on the various lines, which were constructed or acquired at different times, by different companies and under varying conditions, have been maintained as the lines have been from time to time merged into larger systems. By the readjustment referred to, all fares over all lines of the company have been equalized and placed on a uniform rate basis, so far as possible.

"Also, the company has been led to believe that the system of charging excess fare on limited cars was objectionable to a considerable part of the traveling public. It has therefore undertaken the experiment of abolishing these excess fares, except in a few instances where the forced inadequacy of the local fares or the necessity of preventing the crowding of limited cars compels the company to continue the charge. This important change, which it is believed the public will appreciate, means that the same tickets and the same rates of cash fares will apply to all cars, whether limited or local, including the Marion Flyer, the Muncie Meteor and the special Kokomo Limited.

"The readjustment also involves another radical change in the abolishment of the 'zone system' of establishing fares, which system has been used by this company, as well as by practically all other interurban companies, in making up its fare charges. Under this system, inherited from city street railroad practice, the interurban lines of the company have been divided into 'fare zones,' within each of which a 5-cent fare has been charged, so that a passenger riding through any portion of two fare zones, no matter how short the distance, would be required to pay a fare of 10 cents. The readjustment does away with this system and charges according to the actual distance traveled, and obviates criticism based on the ground that such fares violate the 2-cent fare law.

"All mileage books will be withdrawn except the 1000-mile interchangeable Central Electric Traffic Association ticket good over the principal interurban lines of Indiana and Ohio. To meet the case of the daily rider whose home and place of business are at different places, a system of commuter books good for 54 rides in the month in which issued between the points specified, at a rate of 1¼ cents per mile each way, will be placed on sale.

"The readjustment will in some instances increase, in others lower, and in others make no change in the present rates of fare. In those cases where the effect will be to increase fares, the changes will be slight, and in no case more than sufficient to place the fares on a basis now believed to be commensurate with the cost of the service. This cost, it should be noted, has been materially increased in recent years by the increased cost of practically every element entering into electric railroad operation, combined with the necessity of extensive renewals in track, overhead and rolling stock, and of expensive betterments and improvements in roadbed, equipment and service. The effect of this increased cost has been intensified by the falling off in earnings which began in the fall of 1907, due to business depression and keen competition.

"You will observe in this connection that the rates of fare heretofore in effect on several of the more important lines of this company have been, and under the readjustment will continue to be, lower than those of many of the other interurban lines of Indiana and Ohio and other States. In spite of this fact, the company will endeavor to give the highest grade of interurban railroad service and in so doing it asks the aid and co-operation of all to whom this communication is addressed."

Methuen Fares to be Considered.—The Selectmen of Methuen, Mass., have petitioned the Railroad Commission for an extension of the fare limit on the Boston & Northern Street Railway so that patrons of the Lowell line may be transported from the Lawrence transfer station to the Methuen and Dracut town line for 5 cents. A hearing will be given by the commission.

Accident on Chicago, Lake Shore & South Bend Railway.—In a head-on collision between two cars of the Chicago, Lake Shore & South Bend Railway, South Bend, Ind., near Dune Park, Porter County, Ind., on June 19, 10 persons are reported to have been killed and 40 injured. The wreck is said to have been due to the failure of the motorman of the eastbound car to observe an order to wait at Wilson for the westbound car to pass.

Fare Order Issued by Ontario Board.—The Ontario Railway & Municipal Board has instructed the International Traction Company, Buffalo, N. Y., to accept a 5-cent cash fare for any distance not exceeding 3 miles on its line between Queenstown and Chippewa, Ont. Children under 10 years of age must be carried 3 miles for 3 cents, and any additional distance 1 cent per mile. School pupils are to have the privilege of purchasing eight tickets for 25 cents for 5 miles and under during school hours.

Turnstiles on Brooklyn Bridge.—The Brooklyn Rapid Transit Company has installed turnstiles at the terminal of its elevated lines at the Manhattan end of the Brooklyn Bridge, but is using those at the entrance to the Fifth Avenue group of lines only during the rush hours. The company says that turnstiles afford a better check on the number of tickets sold and tend to regulate traffic by forcing it into channels. The turnstiles will be made permanent if they prove successful under the strain of actual service.

Chicago's Devil Strip.—The agitation for a wider devil strip between the reconstructed tracks of the Chicago surface railways continues, several people having recently been killed by being caught between cars moving in opposite directions. A letter on this subject by Bion J. Arnold was printed on page 1142 of the ELECTRIC RAILWAY JOURNAL of June 19, 1909. Mr. Arnold recommends that the distance between track centers be increased from 9 ft. 8½ in. to 10 ft. 2 in. This would make the space between cars 20 in.

Folder of the New Jersey & Hudson River Railway & Ferry Company.—The New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J., has published a new folder and time-table of its lines in northern New Jersey, which contains an excellent map of the road and its connections, printed in four colors. Owing to the increase of traffic, the company's ferry between Edgewater and 130th Street, New York, is operating on a 20-minute schedule between 1.40 p. m. and 8.20 p. m., and on a half-hour schedule for almost all of the rest of the day. The ferry connects with through cars running to four or five different points in Northern New Jersey. A number of the trips are being made with double-headers and through service to Newark has been inaugurated.

Trolley Circular of Central New York.—The New York State Railways, Rochester, N. Y., has issued a folder describing the eastern group of lines which it controls, embracing the Syracuse Rapid Transit Railway, the Oneida Railway and the Utica & Mohawk Valley Railway, all in the historic Mohawk Valley in Central New York. There is an excellent double-page map of the territory between Albany and Syracuse, on which the lines of the New York State Railways, independent connecting electric railways, connecting steam railroads, railroads that do not connect with the New York State Railways, the new barge canal and the Erie Canal are shown. At the bottom of this map there are small maps of Syracuse, Oneida, Rome, Utica and Little Falls, showing the lines in these cities. The text is illustrated with many excellect half-tone engravings of points of interest in the principal cities in which the company operates and of scenes along the interurban lines. General information about the rate of fare, redemption of tickets, baggage regulations, children, through tickets and special service are given on the last page, together with a list of the cities and towns reached, their population, on

which line they are located, and the distance from both Utica and Syracuse.

Steam Railroads Must Interchange Passenger Traffic with Electric Railways.—According to a ruling and order made by the Indiana Railroad Commission, steam railroads must stop their passenger trains at points where their lines intersect with interurban electric railways for the purpose of permitting the interchange of passenger traffic when such service is petitioned for and traffic justifies the expense. This ruling and order are the result of a hearing before the Railroad Commission of Indiana on the petition of the citizens of Garrett, Ind., against the Vandalia Railroad and the Toledo & Chicago Interurban Railway, seeking an interchange of passenger traffic between the steam railroads and the interurban railways at their intersection south of Garrett. The case was heard by the commission on June 14, and the commission found that it would be practicable for the Vandalia Railroad to stop all of its passenger trains and its freight trains carrying passengers, at or near the crossing of the Toledo & Chicago Interurban Railway, south of Garrett for the purpose of permitting passengers to change from one line to the other. An order has therefore been issued by the commission that beginning July 1, 1909, the Vandalia Railroad shall stop all of its passenger trains at the junction mentioned for 60 days. If at the end of the 60 days, the Vandalia Railroad can prove that the passenger returns do not justify it in stopping its trains, the order will be annulled, otherwise, it will be continued until July 1, 1911.

Suggestion for Indicating Excess Fare in Indiana.—The Railroad Commission of Indiana has addressed a passenger tariff circular to all steam railroads and electric railways in the State, requesting them to adopt, as far as practicable, a uniform system of indicating upon passenger tariffs the charge of 10 cents additional fare authorized by the Legislature and the statutory requirements that passengers shall be given the opportunity to secure tickets at the ticket office for 30 minutes continuously before the departure of any train. A form of notice to be used is suggested as follows: "(a) When any passenger is given an opportunity for thirty (30) minutes continuously before the departure of any train to secure a ticket entitling said person to carriage and fails to do so, ten (10) cents in addition to the regular ticket fare will be collected from such person, for which a receipt shall be given by the conductor, which receipt shall not be redeemable by the railroad company. (b) When passengers board trains at a station at which no agency is maintained, or where for any reason ticket office is not open, the regular ticket fare only will be collected. (c) Ticket offices where trains are scheduled to stop must be open at least thirty (30) minutes continuously before the departure of such trains and agents will furnish passengers every reasonable facility for the purchase of tickets. You will therefore see that these suggestions are substantially followed, either by filing supplement to existing tariffs or by filing new tariffs with the commission."

Prizes Offered for Suggestions for Preventing Accidents in Philadelphia.—One hundred dollars in prizes is offered to the motormen and conductors of the Philadelphia (Pa.) Rapid Transit Company for suggestions as to means of preventing accidents. In a bulletin issued by the company's bureau for the prevention of accidents the following announcement is made: "Several times each week certain of our conductors and motormen advance suggestions of one character or another in connection with our accident work. Many of these suggestions have in the past proved of the greatest assistance to us. With a view to stimulating interest in this direction, we shall offer 10 cash prizes of $10 each for the 10 best suggestions of this character which may be submitted between now and July 1. Competition will be open to all men of the surface divisions and the Market Street Elevated. No restrictions will be placed upon the character of suggestions which may be offered, other than that they shall relate either to the work of handling accidents, or to the problem of preventing the occurrence of accidents. If you chance to have any original ideas along this line, do not hold them back because of any fancied deficiency in penmanship, spelling, punctuation, grammar or composition. We will take care of that for you with pleasure. What we are after is the thought, or the suggestion, or the idea, which you may have in mind. The manner or form in which it may be expressed by you will be purely of secondary consideration. Should several suggestions occur to you, let us have all of them, for no limit will be placed upon the number which may be submitted by any one man. If one suggestion does not prove successful, another may." This prize offer should meet with a hearty response from the platform men as they have had the accident question explained to them from many standpoints by the claim and transportation departments.

Personal Mention

Mr. C. C. Watkins has been elected treasurer of the Owensboro (Ky.) City Railroad to succeed Mr. J. H. Parrish.

Mr. Martin Marcussen has been appointed claim agent of the Tri-City Railway, Davenport, Ia., to succeed Mr. R. W. Holland.

Mr. H. D. Swain has been elected secretary and treasurer of the Putnam & Westchester Traction Company, Ossining, N. Y.

Mr. Stephen Stone has been elected vice-president of the Westmoreland County Railway, Pittsburgh, Pa., to succeed Mr. P. Ridge.

Mr. J. H. Davis has been appointed electrical engineer of the Baltimore & Ohio Railroad in Baltimore to succeed Mr. L. T. Gibbs, deceased.

Mr. J. H. Bradt has been elected vice-president of the Twin City & Lake Superior Railway, Minneapolis, Minn., to succeed Mr. W. H. Crossland.

Mr. A. E. Locke, Boston, Mass., has been elected president of the Norwich & Westerly Railway, Poquetanuck, Conn., to succeed Mr. H. H. Gallup.

Mr. W. P. Stottlemyer has been elected treasurer of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., to succeed Mr. D. M. Wentz.

Mr. George T. Schofield, Cleveland, Ohio, has been elected treasurer of the New York & North Shore Traction Company, Roslyn, N. Y., to succeed Mr. James R. Nutt, Cleveland.

Mr. John Harrington, assistant superintendent of Division 7 of the Boston (Mass.) Elevated Railway, has been appointed superintendent of that division to succeed John J. Horgan, deceased.

Mr. John H. Derby, who recently resigned as fire protection engineer of the Metropolitan Street Railway, New York, N. Y., was tendered a farewell dinner at the Park Avenue Hotel, New York, on June 17, by about 20 of the officers of the company.

Mr. W. A. Shay has been appointed inspector of the San Bernardino Valley Traction Company, San Bernardino, Cal., to succeed Mr. Louis Hatch, resigned. Mr. Shay entered the employ of the company as a conductor, but for some time has been chief dispatcher of the company.

Mr. John W. Paine, for several years assistant treasurer of the Houghton County Traction Company and the Houghton County Electric Light Company, Houghton, Mich., has been appointed treasurer of the companies to succeed Mr. J. Harry Dufresne, who has recently been appointed assistant treasurer of the Northern Texas Traction Company, Fort Worth, Tex.

Mr. William H. Swain, who has been superintendent of the Summit, Millburn & Springfield division of the Morris County Traction Company, Morristown, N. J., has been appointed to a similar position on the Dover division, and Mr. Wilmer F. Sickley has been appointed to succeed Mr. Swain as superintendent of the Summit, Millburn & Springfield division of the company.

Mr. M. Curry Turpin has become connected with the Public Service Commission of the First District of New York as an electrical engineer, and is at present engaged on the appraisal of the property of the Brooklyn Rapid Transit Company which is being made by the Public Service Commission. Mr. Turpin was formerly superintendent of the Auburn Light, Heat & Power Company, Auburn, N. Y.

Mr. P. H. Palmer has been appointed to the recently created position of assistant to the general manager of the Kokomo, Marion & Western Traction Company, Kokomo, Ind. Mr. Palmer has been associated with the Kokomo, Marion & Western Traction Company for the last five years as electrical engineer for the railway department and as superintendent of the light department, which positions he still retains.

Mr. Matthew Bigger has resigned as purchasing agent of the Philadelphia Company, Pittsburgh, Pa. Mr. Bigger became connected with the company in February, 1886, two years after its organization. In 1890, he was given the additional duties of general contracting agent, but in May, 1908, the office was divided, Mr. Bigger remaining general purchasing agent and Mr. Samuel B. Stewart becoming general contracting agent. Mr. Bigger enlisted as a private in Company F, Thirty-fourth Ohio Volunteers, immediately after President Lincoln's call for volunteers in 1861, and was mustered out at the end of the war as a second lieutenant.

Mr. Edmund S. Davis, principal assistant to Howard A. Carson, chief engineer of the Boston Transit Commission since the beginning of the subway and tunnel work in Boston, has been appointed acting chief engineer of the commission, the appointment to take effect July 1. Mr. Davis, who is about 60 years old, was born in Northfield, Vt., but has lived in Massachusetts many years. From 1875 to 1879 he was employed on the Boston Water Works. In 1880 he went to Leadville, Col., and was employed in the United States Surveyor-General's office. The following year he went to Denver, Col., and in 1887 he received the appointment of chief of the mineral division of the United States Surveyor-General's office at Denver, and retained the position until 1890, when he resigned and came to Boston to reside. He became associated with Mr. Carson when the latter was appointed chief engineer of the Boston Transit Commission in 1894, and has served with Mr. Carson since that time.

Mr. Howard Adams Carson has resigned as chief engineer of the Boston Transit Commission. Mr. Carson was born in Westfield, Mass., on Nov. 28, 1842, and was graduated from Massachusetts Institute of Technology in 1869 with the degree of B.S. He was assistant engineer of the Providence water works in 1871 and in 1873 was in charge of that city's sewer construction. He was principal superintendent of the construction of the main drainage system of Boston in 1878. Later he designed and was chief engineer of the North Metropolitan and Charles River Valley sewerage systems, which combined service for about 20 cities and towns, with numerous siphons under tidal estuaries and an outlet, 1800 ft., into the sea from Deer Island. He was named chief engineer of the Boston Transit Commission Aug. 30, 1894. Mr. Carson is a trustee of the Massachusetts Institute of Technology, a member of the Institution of Civil Engineers in London, the American Society of Civil Engineers, Boston Society of Civil Engineers, of which he is a former president, and the Alumni Association of the Massachusetts Institute of Technology.

Mr. Hugh M. Wilson, formerly proprietor of the *Electric Railway Review* and also of *The Railway Age,* has just returned to this country from a trip abroad of about eight months. On the evening of June 19 Mr. Wilson was tendered a banquet by a number of his friends and former associates in the steam and electric railway industries, at the Chelsea Hotel, in Atlantic City. About 200 persons were present. Among those who replied to the toasts were Mr. W. H. Boardman, of the *Railway Age-Gazette;* Mr. H. W. Frost, who was associated with Mr. Wilson on *The Railway Age* for a number of years, and Col. George A. Post. In replying to these speeches, Mr. Wilson expressed appreciation of the compliments which had been extended to him, and then referred to some of the ideals in technical journalism which he had endeavored to follow in his newspaper work. He dwelt strongly upon the importance of appealing to the human interest of the reader, as well as to the scientific and technical aspects of the industry represented by the paper. He said he did not consider that engineering and business problems in their final analysis related to mechanics and mathematics merely, but were problems whose solution involved the welfare of the human race. According to him, the interworking of political, economic and business forces was never so pronounced in any nation as it is with us to-day. During the dinner Mr. Wilson was presented an engrossed and illuminated parchment which referred to his 18 years' presidency and editorship of *The Railway Age,* to his services to the railroad industry through the publication of that paper and its daily edition, and to other ways in which he had gained the gratitude and esteem of operating railroad officials and supply men throughout the country.

OBITUARY

Julius R. Jacobson, superintendent of the Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, and special representative in Brazil of the General Electric Company, was drowned in a motor boat accident in Brazil recently. Mr. Jacobson was one of the party of fifteen persons, six members of which lost their lives.

James A. Richmond, formerly president of the Broadway Surface Railroad, New York, and long prominent in street railway affairs in New York, died in Paris recently. Mr. Richmond was born in Little Falls, N. Y., in 1830, and after having been in business in New York for several years he bought an interest in the stage line which was operated on Broadway. He was one of the organizers of the Broadway Surface Railroad, which succeeded the Broadway stage line, and was president of the company for some time. He retired from business late in the 80's.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Vincennes Western Electric Railroad, Vincennes, Ind.**—Incorporated to build an electric railway 14 miles in length to connect Vincennes and Bridgeport, Ill. It is reported that a contract has been let to Wm. L. Sontag, Evansville, for financing and constructing the proposed railway which includes a bridge across the Wabash River. The company also proposes to furnish power for lighting. Robert V. Stinson, Vincennes, president; J. D. Lacroix, Vincennes, secretary.

***Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.**—Incorporated to build an electric railway from Nelsonville to Athens with branches to Chauncey and from Sugar Creek to the Sugar Creek coal mines. Headquarters, Nelsonville. Capital stock, $300,000. Incorporators: E. B. Young, J. Gaston Coe, M. A. King, Chas. A. Vorhes, Warren N. Badger, H. H. Isler and Chas. E. Poston.

***Oakland & Tidewater Railway, Portland, Ore.**—Incorporated to build an electric railway from Oakland to Empire. Capital stock, $1,000,000. Headquarters, Portland. Incorporators: C. A. Pengra, H. D. May and W. W. Purdy, Portland.

FRANCHISES

Bessemer, Ala.—The City Council has granted to the Birmingham & Gulf Railway & Navigation Company, Birmingham, an extension of its franchise of 14 months to build its proposed railway in Bessemer. This company has been granted extensions of its franchises in the towns of East Lake, Graymont and Pratt City.

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has applied to the City Council for a franchise to build a number of new lines over certain streets in Birmingham. A. H. Ford, president and general manager.

Sacramento, Cal.—A. L. Shinn, representing the Central California Traction Company, has applied for a franchise to build a street railway on Thirty-first Street, from X to Y Streets, to connect the X Street railway with the railway through Oak Park, for which the supervisors recently granted the franchise. [E. R. J., June 12, '09.]

***Pensacola, Fla.**—C. E. Dobson, C. C. Goodman and R. O. Hoffman have applied to the City Council for a franchise to build a street railway on certain streets of Pensacola.

Moscow, Idaho.—A franchise has been granted to the Spokane & Inland Empire Railroad, Spokane, to build and operate an electric railway in Moscow.

New York, N. Y.—The Public Service Commission of the First District has approved the franchise granted by the Board of Estimate and Apportionment to the New York & North Shore Traction Company for an extension of its surface line from the city line at Little Neck into Flushing, and from Chestnut Street, Flushing, to Whitestone.

Tulsa, Okla.—The City Commissioners have granted to the Oklahoma Union Traction Company a 25-year franchise. The franchise provides that the company must commence grading within 40 days and the railway completed within a year after the franchise has been granted. The proposed railway will connect Tulsa with Sapulpa and Broken Arrow. [E. R. J., May 22, '09.]

***Aberdeen, S. D.**—Application has been made to the City Council by A. L. Ward for a franchise to build a street railway in Aberdeen.

El Paso, Texas.—The El Paso & Fort Hancock Electric Railway has petitioned the City Council asking to be granted, without an election, a franchise to build an electric railway through certain streets of El Paso. [E. R. J., April 17, '09.]

Edgwood, W. Va.—The Rapid Transit Railway, Wheeling, has applied to the Town Council for a franchise to build an electric railway through Edgwood. This company proposes to build an electric railway connecting Pittsburgh and Wheeling. A. M. Shenk, Wheeling, president. [E. R. J., May 29, '09.]

Ellensburg, Wash.—Application has been made by A. S. Randall, representative of F. S. Farquhar, of the Cle Elum-Roslyn Railway & Power Company, Roslyn, to the City Council for a 50-year franchise to build an electric railway on certain streets of Ellensburg. [E. R. J., May 22, '09.]

Walla Walla, Wash.—A franchise has been granted to the Walla Walla Valley Traction Company, by the County Commissioners, to build an electric railway on Yellow Hawk Avenue to Prospect Heights. [E. R. J., Feb. 20, '09.]

Ashland, Wis.—The Ashland Light, Power & Street Railway Company has been granted a franchise to build a 3-mile extension in Ashland.

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has let the contract for building the proposed electric railway from Fresno to Hanford to the Franklin Construction Company. Grading will be started on or before July 15, 1909. The track will be standard gage and will be laid with 75-lb. rails. F. S. Granger, Fresno, vice-president and general manager. [E. R. J., June 5, '09.]

Meriden, Middletown & Guilford Railway, Hartford, Conn.—The Legislature has extended the charter of this company to July 1, 1911.

Litchfield & Torrington Tramway, Southington, Conn.—The Legislature has extended the charter of this company until July 1, 1911, in which to begin the construction of its proposed electric railway between Torrington, Litchfield and Lake Bantam, 6 miles. T. H. McKenzie, Southington, secretary and treasurer, advises that it is the intention to build the proposed line during the summer. [E. R. J., Sept. 9, '08.]

Pensacola Electric Company, Pensacola, Fla.—This company announces that it expects to rebuild 4 miles of city track.

City & Suburban Railway, Brunswick, Ga.—This company has awarded the contract for building its electric railway in Brunswick to the Chatham Construction Company, Brunswick. F. D. Strachan, Brunswick, president. [E. R. J., June 19, '09.]

***Boise, Idaho.**—W. C. Dickey and several other capitalists are said to be interested in a proposition to build an electric railway from Burley to Albion.

Boise Valley Railway, Boise, Idaho.—It is stated that the stockholders of this company have subscribed funds to the amount of $73,000 to complete the construction of its railway into Nampa. About 5 miles of track are yet required to complete the entire system. Work will be started at once.

Springfield, Beardstown & Quincy Railway, Springfield, Ill.—W. J. Gates, vice-president, writes that this company is about ready to award the contract for the building of its proposed railway from Springfield to Quincy. [E. R. J., Feb. 13, '09.]

Fort Wayne & Springfield Railway, Decatur, Ind.—This company has completed a 12-mile extension to its railway to the southern end of Decatur, and will at once proceed to complete the line to Monroe, a distance of 7 miles.

Central Kentucky Traction Company, Frankfort, Ky.—Smethurst & Allen, Philadelphia, who have the contract to build the electric railway from Lexington to Nicholasville, of this company, have completed the preliminary arrangements for beginning work. Track will be laid with 80-lb. rails. It is the intention to have the extension in operation by Jan. 1, 1910. [E. R. J., June 5, '09.]

Boston & Northern Street Railway, Boston, Mass.—This company having received an approval of its plans for a street railway from Stoneham Square through the Middlesex Fells to Spot Pond, has awarded its main contract. The work will begin shortly and will be completed in the fall. The contract for sub-grading calls for completion on or before Sept. 15.

Delta Electric Light, Power & Manufacturing Company, Greenville, Miss.—This company, which operates the local street railway, is at present completing a 1½-mile extension to the new city park. Orders have been placed for all track material.

Kansas City, Ozarks & Southern Railway, Mansfield, Mo.—This company announces that it expects to place contracts during the next four weeks for 1000 tons of 56-lb. relaying rails. The company is building a 14-mile electric railway from Mansfield to Ava. G. W. Wilhelm, Mansfield, secretary.

Chautauqua Traction Company, Jamestown, N. Y.—It is announced that this company will resume the construction of its proposed extension from Westfield to Barcelona Harbor. A contract has been entered into by this company and the Lake Shore Railroad which permits the Chautauqua Traction Company to cross the Lake Shore Railroad at North Portage Street under certain conditions.

Oneida (N. Y.) Railway.—The Public Service Commission of the Second District has granted to this company a certificate of necessity for the construction of its proposed extension from Sherill to Kenwood, 1½ miles. The company expects to expend the sum of $68,000 for this improvement.

Peekskill Lighting & Railroad Company, Peekskill, N. Y.—This company advises that the Putnam & Westchester Traction Company, which it operates, has started to construct 1300 ft. of track through private right-of-way, and when this work is completed, approximately 1½ miles of new track will be put in operation.

Utica Southern Railroad, Utica, N. Y.—This company has filed an amended certificate with the Secretary of State at Albany as to the location of its railway. It is proposed to build it from Clinton to Hamilton with the Deansboro-Waterville branch and thence from Hamilton to Norwich. This will add 27 miles to the original length of the railway. Application will be made to the Public Service Commission of the Second District to build the extension.

Elmira, Corning & Waverly Railroad, Waverly, N. Y.—The State Highway Commission has granted the request of this company to build its electric railway on the State Highway between Elmira and Wellsburg. Work will be started on this railway within a week.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—The directors of this company have authorized an issue of $6,000,000 in bonds, the proceeds to be used in building an electric railway from Cleveland to Zanesville, via Elyria, Barberton, Orrville, Millersburg and Coshocton. J. J. Breitinger, president. [E. R. J., June 5, '09.]

Dayton & Troy Electric Railway, Dayton, Ohio.—It is announced that this company will build an extension in the southern part of Piqua. The new line will cost about $25,000. C. M. Paxton, general manager.

Pittsburgh & East Liverpool Electric Railway, East Liverpool, Ohio.—This company has completed the surveys, and, for the most part, the right-of-way from Pittsburgh to East Liverpool of its proposed railway. The building of this railway is now being considered by eastern capitalists, who, it is said, will finance it. J. M. Reed, Pittsburgh, Pa., president. [E. R. J., Dec. 5, '08.]

Ardmore, Okla.—Oscar Ayres, Ardmore, writes that a company has not yet been organized to build the proposed standard-gage railway which is to extend from Ardmore to Chickasha, Duncan and Fort Sill, 170 miles. Arrangements have been completed for nearly all of the right-of-way and other preliminary work. Electricity will be used for hauling passengers and light freight, and steam will be used for heavy freight service. It is proposed to build a water-power plant on the Washota River. M. T. Forsythe, West Chester, Pa., engineer. [E. R. J., June 12, '09.]

Berlin & Waterloo Street Railway, Berlin, Ont.—This company expects to place contracts during the next four weeks for the construction of about 1 mile of double track through Berlin. V. S. McIntyre, Berlin, secretary.

Scranton & Lake Ariel Railway, Scranton, Pa.—This company has practically secured all the right-of-way for its proposed electric railway between Scranton and Lake Ariel, 20 miles. It is the intention to start work during the coming season. John J. Brown, president. [E. R. J., June 19, '09.]

Clemson College, S. C.—W. M. Riggs, of the faculty of Clemson Agricultural College, writes as follows: "Our trustees some time ago considered the advisability of putting in an electric railway between the College and the railway station of Calhoun on the Southern Railway, but no decision was reached, and in my judgment, they will not build a railway, as it is not practicable from a commercial standpoint." [E. R. J., June 12, '09.]

Sioux Falls (S. D.) Traction System.—F. M. Mills, president, advises that construction work is under way on a 2-mile extension of this company's line across the river to East Sioux Falls. During the last few months the company improved its system by building 3 miles of new track, a new car house, having a capacity for 8 cars, and containing an office and waiting room.

San Antonio (Tex.) Traction Company.—J. J. King, general superintendent, writes that this company will build a 3-mile extension to Lakeview. Work will be started Sept. 1. Rails and ties have been ordered.

Spokane & Inland Empire Railroad, Spokane, Wash.—Work has been started by this company grading the line from Spokane to Greenacres by way of Opportunity. This will be a part of the general plan to double track the Cœur d'Alene division of the electric system. The connection with Greenacres will virtually give the company double-

track facilities as far as Spokane bridge. It is expected that work will be started this fall on the double tracking of the remainder of the line from Spokane bridge to Cœur d'Alene city. The construction of the new line from Spokane to Greenacres is being done under the supervision of Alex M. Lupfer, chief engineer.

SHOPS AND BUILDINGS

Connecticut Company, Hartford, Conn.—Plans have been approved for a new car house to be built by this company for its Willimantic and South Coventry line. It is the intention to start construction at once.

Tampa-Sulphur Springs Traction Company, Tampa, Fla.—This company advises that it is considering the purchase of a car-wheel borer and facing machine. L. Brill, Tampa, manager.

Norfolk & Bristol Street Railway, Foxboro, Mass.—F. M. Perry, superintendent, writes that this company, in the near future, expects to install a sprinkler system in its car house.

Ohio Electric Railway, Cincinnati, Ohio.—It is reported that this company has secured an option on the Beaver Building, Dayton, which it proposes to convert into a freight depot for the use of several electric railways entering Dayton. This company has also asked for the privilege of relaying its tracks on Main Street in Dayton.

Bluestone Traction Company, Graham, Va.—This company advises that contracts will be placed during the next few weeks for the erection of a new car house. P. M. Walizer, manager.

Washington Water Power Company, Spokane, Wash.—This company has purchased in Spokane a site 256 ft. x 305 ft. for its proposed car house. It is stated that the company expects ultimately to provide room for about 125 cars. Work will begin this summer on a portion of the building. The plans for the building are now in the hands of the architects.

POWER HOUSES AND SUBSTATIONS

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—This company has recently contracted with the General Electric Company, Schenectady, N. Y., for the purchase of 1 500-kw, 25-cycle, 600-volt rotary converter, 3 air blast 13,200-volt to 430-volt, 185-kw transformers, together with the necessary reactive coils, oil switches and switchboard panels.

Stark Electric Railroad, Alliance, Ohio.—This company will increase the capacity of its present power station, having purchased one 1000-kw Westinghouse turbine with condenser and other accessories. Knox Engineering Company, Fisher Building, Chicago, engineers.

Portland Railway, Light & Power Company, Portland, Ore.—Fire at the substation of this company on Seventh Street, Portland, on June 14, caused a loss to machinery estimated at about $100,000. Two of the six transformers were ruined by water and two of the rotary converters were damaged from same cause. The entire West Side service was tied up for two hours.

Columbia Power, Light & Railways Company, Bloomsburg, Pa.—The contract for the furnishing of power to this company by the Harwood Electric Company has been signed and work will be started at once on the construction of a 16-mile high-tension line from the Harwood plant to Berwick, where it will connect with the railway company's lines.

Roanoke Railway & Electric Company, Roanoke, Va.—This company has about completed the repairs to the raceway of its power dam and power is now being used from the plant. A concrete wall, 120 ft. x 20½ ft. x 5 ft. was built at this point.

Washington Water Power Company, Spokane, Wash.—Work is under way on the substation of this company on Post Street on the south bank of the river. Two stories of the walls have been built. The structure will be four stories high and will be 208 ft. x 108 ft. in size. It will be 85 ft. high from the foundation. On each corner of the building will be large towers 24 ft. square, surmounted by a sphere. The construction material will be brick and concrete and the building will be fireproof. There will be but one room on each floor. The steel girders supporting the roof will rest on concrete piers. The building will cost about $100,000.

Ashland Light, Power & Street Railway Company, Ashland, Wis.—This company has purchased the plant and buildings of the White River Power Company, including dam and power station, having a capacity of 1000 kw, at White River, transmission lines, substation at Ashland, etc. The consideration is said to have been $150,000.

Manufactures & Supplies

ROLLING STOCK

North Alabama Traction Company, New Decatur, Ala., will buy a set of double trucks.

Hornellsville & Canisteo Railway, Hornell, N. Y., expects to purchase two 10-bench open cars.

Springfield (Ill.) Consolidated Railway has ordered five 22-ft. closed cars from the American Car Company. Mention of the contemplated purchase of these cars was made in the ELECTRIC RAILWAY JOURNAL of March 20, 1909.

Portsmouth (N. H.) Electric Railway has ordered 20 registers from the Sterling-Meaker Company, Newark, N. J.

Wilmington, New Castle & Southern Railway, New Castle, Del., is in the market for one or two new freight cars.

Covington & Oxford Street Railway, Covington, Ga., desires to purchase two light 18-ft. second-hand cars suitable to be operated by horses.

Utica & Mohawk Railway, Utica, N. Y., did not purchase a sprinkler car as reported in the ELECTRIC RAILWAY JOURNAL of June 19, 1909, but simply tried out a car of that type.

Ohio Electric Railway, Cincinnati, Ohio, has ordered eight 40-ft. freight trailers, six 50-ft. express and six 61-ft. 6-in. interurban cars from the Cincinnati Car Company, Cincinnati.

Tri-City Railway, Davenport, Ia., has ordered Peckham trucks to be used on the 10 cars ordered from the Cincinnati Car Company which were mentioned in the ELECTRIC RAILWAY JOURNAL of June 5, 1909.

Mount Pleasant & Red Spring Railway, Mount Pleasant, Tex., has purchased two 15½-ft. gasoline motor cars, each with a seating capacity of about 16, from Fairbanks, Morse & Company, Chicago.

Keokuk Electric Railway & Power Company, Keokuk, Ia., will not purchase the three second-hand cars contemplated, as reported in the ELECTRIC RAILWAY JOURNAL of April 24, 1909, until August or September.

Albia (Ia.) Interurban Railway, mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 19, 1908, as being in the market for one coal car, has had a special car built by the McGuire-Cummings Manufacturing Company, Chicago.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., is said to have placed an order for cars with the Cincinnati Car Company. It was reported in the ELECTRIC RAILWAY JOURNAL of May 8, 1909, that this company would purchase 10 city cars.

Boston & Northern Street Railway and Old Colony Street Railway, Boston, Mass., mentioned in the ELECTRIC RAILWAY JOURNAL of May 1, 1909, as having drawn specifications for 40 cars, has ordered 42 cars from the Laconia Car Company, Boston, Mass. The trucks have not been purchased as yet.

Louisville (Ky) Railway is sending out inquiries for 33 city cars. The car bodies are to be 31 ft. in length and are to be provided with eight cross seats on one side and seven cross seats on the other side. That this company was contemplating the purchase of new cars was mentioned in the ELECTRIC RAILWAY JOURNAL of June 19, 1909.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., which has placed an order for five single-truck cars with the McGuire-Cummings Manufacturing Company, Chicago, as reported in the ELECTRIC RAILWAY JOURNAL of June 12, 1909, has specified that these cars have an over-all length of 28 ft. 11 in., a seating capacity of 24 persons and a total weight of 10,370 lb. The cars are to be equipped with McGuire-Cummings hand ratchet brakes.

United Railways, Portland, Ore., has drawn the following specifications for the two vestibuled cars, reported in the ELECTRIC RAILWAY JOURNAL of June 19, 1909, as being ordered from the American Car Company: Seating capacity, 52; length of body, 51 ft. 6½ in.; length over bumpers, 57 ft. 3 in.; width over sills, 8 ft. 8 in.; width over posts at belt, 8 ft. 8 in.; curtain fixtures, Curtain Supply Company; curtain material, Pantasote; heating system, Consolidated; motors, Westinghouse 112; sanders, Nichols-Lintern; trolley retrievers, Knutson; trucks, Baldwin.

Interborough Rapid Transit Company, New York, N. Y., has ordered 170 trailer trucks from the American Locomotive Company, New York; 40 trailer trucks from the Standard Motor Truck Company, Pittsburgh, and 90 motor trucks from the St. Louis Car Company, all for subway service on the new cars recently ordered. In addition, orders were

placed with the Wason Manufacturing Company for 100 trailer trucks and the Standard Motor Truck Company for 60 motor trucks to be used on the new cars ordered for the Manhattan elevated division. There still remains an order for 40 trailer trucks to be placed for cars to be used on this division.

Western New York & Pennsylvania Traction Company, Olean, N. Y., mentioned in the Electric Railway Journal of June 19, 1909, as having purchased two cars from the J. G. Brill Company, has ordered them to be of the semi-convertible vestibule type, and has drawn up the following specifications:

Seating capacity.....32	Destination signs....Hunter
Length of body..20 ft. 8 in.	Gongs .....Dedenda
Length over vestibule .....30 ft. 1 in.	Heaters .....Consolidated
	Headlights ....Crouse-Hinds
Width over sills... 7 ft. 9½ in.	Motors.....Two GE-54
Width over posts at belt..... 8 ft.	Registers .....International
	Sanders .....Dumpit
Interior...Cherry, mahogany finish	Seats .....Winner
	Trucks.....Brill No. 21-E
Bumpers...Brill Angle-Iron	Wheels.....Schoen 34-in.
Control system.....K-12	Track scrapers.....Brill
Curtain fix....Curtain S. Co.	Brill automatic doors

TRADE NOTES

Q M S Co. is the corporate name under which the Quincy, Manchester, Sargent Company, Plainfield, N. J., will do business hereafter.

Indiana Engineering Company, Indianapolis, Ind., a company that proposes to build electric railways, has recently been incorporated with a capital stock of $30,000. The incorporators are Henry T. Wilkerson, Albert K. Roweswell and Gilbert Helm.

Okonite Company, 253 Broadway, New York, N. Y., one of the largest manufacturers of high-grade insulated wire in this country, has recently changed from an English to a United States corporation, and has been organized under the laws of New Jersey. The following are the officers of the company: Willard L. Candee, president; H. Durant Cheever, treasurer; George T. Manson, general superintendent; William H. Hodgins, secretary. The company's factories are at Passaic, N. J.

The Buffalo Brake Beam Company of New York, Buffalo and St. Louis, has recently completed and now occupies its new factory located in Buffalo, N. Y., designed and built to meet its future requirements. The factory is equipped throughout with the latest design of individual motor driven machinery for manufacturing I-beam, special section and truss brake beams for interurban, passenger, freight and tender equipment. The company also manufactures a line of forgings consisting of brake heads, fulcrums, safety chain clips, wheel guards, hangers and steel backs for brake shoes.

Wolfe Brush Company, Pittsburgh, Pa., announces that I. R. L. Wiles has resigned as supply agent of the Missouri Pacific System, with headquarters in St. Louis, to accept the second vice-presidency of this company, in charge of railroad sales. Mr. Wiles started his railroad career in 1897 with the Chicago, Burlington & Quincy Railroad, at Plattsmouth, Neb., when he was 20 years of age. Leaving that company in 1903, he became connected with the Wabash Railroad at St. Louis, Mo. In 1906 he entered the employ of the Missouri Pacific System. The Wolfe Brush Company has been making brushes for railroads since 1851, so that Mr. Wiles' future field of operation will be practically the same as the past.

Electric Railway Improvement Company, Cleveland, Ohio, has engaged Mark Stanton as engineer and expert. Mr. Stanton was for a number of years connected with the Cleveland Electric Railway as engineer in charge of the return circuits, and for the last year has filled the same position with the Rochester (N. Y.) Railway. Mr. Stanton's services and expert advice will be at the disposal of customers and prospective customers. The company also reports that it has leased bonding cars for installing its well-known electric weld bonds to the Third Avenue Railroad, New York, the Syracuse (N. Y.) Rapid Transit Company and the Winnipeg (Man.) Electric Railway. That weld bonds are giving satisfaction in every case and are rapidly growing in popularity is proved by the numerous large orders for bonds which this company is receiving from roads which have leased cars.

Wonham, Magor & Sanger, 30 Church Street, New York, N. Y., report the receipt of an order for the H-B life guards to equip the cars of the following companies on Staten Island, N. Y.; Richmond Light & Railroad Company, the Southfield Beach Railroad and the Staten Island Midland Railroad. Wonham, Magor & Sanger are also equipping the new convertible cars of the Tarrytown, White Plains & Mamaroneck Railway, White Plains, N. Y.; have received orders from the Boston Elevated Railway for 32 equipments; from the Metropolitan Street Railway, New York, for 150 equipments; from the Westchester Electric Railroad, Mt. Vernon, N. Y., for 50 equipments, and are furnishing equipments to the Atlantic City & Shore Railroad, Atlantic City, N. J., and the Long Island Railroad, Long Island City, N. Y. Substantially 2000 sets of equipments have been contracted for in the United States within the last few months.

United States Light & Heating Company, which was incorporated in January under the laws of Maine for the purpose of taking over several electric car-lighting properties, has completed its organization. The authorized capital of the new company is $17,500,000, consisting of $2,500,000 7 per cent cumulative preferred and $15,000,000 common. No bonds are authorized. The company has taken over the Bliss Electric Car Lighting Company, of Milwaukee; the National Battery Company, of Buffalo, and the United States Lighting and Heating Company, of New Jersey, which has a plant at 22 Thames Street, New York City.

ADVERTISING LITERATURE

Hall Signal Company, New York, has published with detail illustrations an extended description of its Style "H" top post electric semaphore signal.

Maryland Steel Company, Sparrow's Point, Md., has printed a booklet describing the qualities of its Cunningham coal tar preservative paint. This publication also contains a number of micro-photograph illustrations.

Barber Car Company, York, Pa., has made up a telling publication describing the several merits of the Barber single truck. The illustrations are numerous and show the principles of construction most effectively.

Drummond's Detective' Agency, New York, is sending out a circular letter referring to its 21 years of experience in handling detective work. This agency confines itself only to strictly legitimate business, handling no divorce cases.

Keystone Steel Company, Warren, Pa., has issued a folder giving tables of sizes and weights of its several types of "Kesco" wrought-steel floor plates. These plates are suitable for floors, stairways, power houses, bridges and other places.

Ohio Brass Company, Mansfield, Ohio, presents in its June Bulletin descriptions of the Chicago Lake Shore & South Bend Railway, of the Tomlinson coupler, of Mansfield's first electric railway and of the growth of the company's manufacturing facilities.

Power Specialty Company, New York, has just issued an elaborate detail catalog on the Foster superheater and on the Willits valve, Harter flexible joint and other steam specialties. Other publications printed by the company relate to high duty hydraulic rams for water supply and to Duval metallic packing.

Standard Steel Works, Philadelphia, Pa., has gotten out a new pamphlet on its rolled steel wheels for different kinds of steam and electric service. The pamphlet is accompanied by detailed drawings of the standard tender, car and motor axles adopted by the various railroad associations and by a facsimile of a dimension blank for forged and rolled steel wheels. The company will be pleased to send copies of this catalogue on request.

Goldschmidt Thermit Company, New York, in the second quarterly issue of Reactions describes a number of interesting applications of thermit-welding to electric railway work. The first article describes the method used in welding third-rail conductors on the Metropolitan Railway of Paris, which is now operating about 42 miles of double track. Another article describes the applications of thermit-welding in Los Angeles, Cal., and the third describes a successful weld of a commutator ring on a large generator in San Francisco.

General Fireproofing Company, Youngstown, Ohio, announces that it is now offering for sale its Diamond Mesh Expanded Metal manufactured by an improved process. The superiority of this product consists in the following points: The metal is not stretched, strained nor weakened; there is no danger of crystalization; the full strength of the steel is preserved; the original thickness and sectional area of the metal are not diminished; the process of manufacture induces no initial stresses in the steel; it requires no annealing; it is never brittle. The company says this process does not in any way infringe the rights of its associated competitors, so that its customers are afforded complete protection in the use of its expanded metal.

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